Wellness Program

CORPORATE TRAINERS' MANUAL

2016

SHAKTANAND

Shaktanand's

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2016

Assistance: Indebted to all the dear friends who helped in inputs / suggestions of their specialized fields on below. Without them it would have been very difficult to finish the project.

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Corporate Wellness

From the Author's Pen……..

It has been decades that one is passionately involved in the field of health. People of our generation, used to do more physical work, be it household or agricultural, be it going from house to work on foot or by bicycle, playing different games in the local parks together, participating in various physical exercises in the open, be it weight training or martial arts. Everything was done in the lap of nature, thus one got more connected to it. One fondly remembers a pious soul in the form of a Sikh gentleman, who fought in World War II in Germany. On coming back to India, he brought along designs of all the equipment the German army used to exercise its troops. On his own, with his money, he built those structures and installed them in a park near one's locality during the early 70's, when one was only 10-11 years old. His place was shifted at least three times from one sector to another, to a ground, then to a school and then again into a small ground. In early mornings around 5 am and in evening around 5pm, people would flock there; take his empty sacks to be used as mats and perform yoga asans while on the other side young people would be doing weight training, rope climbing, swinging on Roman rings, stretching on parallel bars and other equipment. All the weight - lifting equipment there was also bought by him. It was a total selfless service to which the government paid no heed. Thus one grew with exercise and sports from childhood itself. Parks use to be full of people doing exercises or playing different games, unlike the laptop and cell phone addicted population of today. People had less but still they were joy full.

Everybody called the Sikh gentleman 'Babaji' and touched his feet. Children use to fear him also. Whenever he would come towards their side, some would run away. This was because, once he laid his hands on you at an exercise station, he would see to it that you completed that exercise. It was immaterial to him whether you we are shouting or crying or imploring him to let go, whatever! Although he was a hard task master, he was a great soul at heart. One remembers an evening in the late 80's when one went there to just see the place and found the old Babaji walking alone with thick specks there in the park with slight unsure steps maybe because of the old age. One touched his feet and inquired about his well-being. When one asked if any help is needed to make new things or repair old ones, a reply came, "O beta, you tell me what more you want here I will get it made as enough money is lying with me." Such was the spirit! And after a couple of years one went again to check if he was still there but alas he was no more.

Just about that time things started hanging, people started earning more & more and losing health faster and faster. Money became the enter point of life and everything was sacrificed in that fire. The 90's saw a faster changing pattern in the society. People had less and less time for each other and even for themselves. Materialistic ambitions, big vehicles, big houses, big bank accounts but, small hearts. Computers and cell phones did the rest. People

became prisoners of their own lifestyles. They caught diseases. Whatever they earned in their prime, they pent later on for their medication. Somewhere in between these twenty years the balance was lost. Faced with diseases, a new gym culture became popular. People started undertaking aerobics, dance classes, so called cross-fits and so many different kinds of patented yogic systems. Despite all these things, society has not benefited. Why is this so? Nobody seems to have any answers to the things happening in our society because all are busy looking outside, but not inside. One performed asans but real Yoga disappeared, which was totally internal.

Our culture is still intact, after centuries of subjugation by foreigners only due to the strength of the inner self, and not of outside material possessions, as is advocated by our ancient Rishis. People forgot their message and started aping the West and as a result we also have this present state of affairs. One strongly believes that to offset all this one has to return to one's roots, the quicker the better. It is in this background that the present system was thought of and designed, with a view to help more and more people. Keeping the interest and attitude of them modern people in mind, a comprehensive approach has been devised. Nobody has time, for that matter, companies would like to utilize each and every second of their employees' time for their own purposes. In the corporate culture an individual is not an entity but is reduced to just a number. If one can provide a solution, which will look after the physical, psychological and spiritual growth of its employees, it will be a great social service. The whole idea, being to make strong human resources, which will generate stronger corporates ensuring greater strength to our country, Mother India.

Since the field of knowledge is so diverse in this programme, one has to seek the help of similarly driven souls. One is indebted to all these friends who provided their expertise in writing or editing the script from time to time. So many thanks to Dr. Ekta for her help in the Pathological part, to Dr. Sohan Chandel with the Psychological part, to Chandni Maurya for her help in the Food & Nutrition part and to Radheshwari for her help in editing of the text. Without their help, one could not have completed the text in such a short time span. Now at least one document in this direction has been generated which will be improved upon from time to time by oneself or some qualified motivated souls. This self may come and go, but the show must go on until all start enjoying true Wellness.

Though one sat to write something else but as the heading suggests, whatever flowed from the heart through the pen is being written here.

Sarve Bhawantu Sukhinaha, arve Santu Niram ayah, Sarve Bhadrani Pashyantu, Ma Kashchid Dukh Bhag Bhawait . Om!

Dated: 11.05 pm, May 5th, 2016. Shaktanand.

Corporate Wellness Program

Introduction:

Life is continuously evolving. What is its purpose? The highest goal as per our scriptures and ancient seers is to realize one's own true nature or to become one with atma. A great number of commentaries have been written on the subject. Different paths have been described to attain the same goal. Many dharmas like Sanatandharma, Budhdharma, Jain dharm etc. all talk about final emancipation. Actually Dharma is only one, i.e. to know one's own true nature also called Swadhrma. But if we descend to a little lower from these lofty ideals, to the life we are leading, then the most apt description of it is given by yogis of ancient times. It has been described in monosyllables like Equanimity, Attunement or Sambhav.

Everybody in the world desires peace, happiness and love. The ways and means to arrive at it may be different for different religions or cultures. According to Indian sage Patanjali, founder of Ashtnagyog or Raj yog, the first sutra mentioned in his scripture is 'Yogasch Chit Vritti Nirodha'. It means if we are able to control our desires, we will achieve yog. We will be at perfect peace and enjoy eternal happiness.

Slowly-slowly, the above values eroded in modern times, people started equating health with fitness, a state free of diseases etc. Everybody started frequenting various gyms, pumping iron, building muscles at the cost of their overall health, which they did not realize. Questions is, 'Is only a muscular body, a symbol of good health', or 'Is only a disease free body healthy'. In our opinion, the answer is big 'NO'. Hence, we should not be talking of FITNESS alone but rather WELLNESS.

In the present manual, we plan to introduce the readers to this concept of wellness. In our thinking wellness is a combination of physical fitness and sound mental health. By physical fitness we mean a body which is free of diseases, is well built to undertake all kinds of challenges which are posed to it during our life and carries strong genes in to our off springs. Mental fitness can be defined as a state where our mind is totally at peace with our surroundings, we pray and work

for the well being of each and every living being by practicing non-violence. The non-violence can also be described three fold, namely, Mansa, Vachsa and Karmanai.e through mind, speech and our actions. One who attains this, three fold non-violence, nothing wrong can be performed by him/her. In a way, we can say that we work for the realization of Vasudev Kutumbkam, the whole world is one family. A true moral evolution is an essential part of a real civilization. Thus our concept combines both the attributes to arrive at overall wellness of an individual. We must teach our youth all these values, so that they inculcate it in each & every pore of their skin, in each nook and corner of their body and in each and every breath, so that they all become great human beings.

According to Ayuveda, when Charak wanted to check as to who understood the real concept of health explained by him in his scripture, he accosted various Vaidya who practiced according to his scriptures. But all failed except, Vaidya Raghav, who when posed with a question 'Koruk Koruk?' or 'who is healthy?' gave a concise and apt reply 'Hit Mit Rit Bhuk' (हित मत ऋत भुक्). Thus according to Charak, writer of Ayurveda, one who eats what is beneficial, eats less than his hunger, eats from his judiciously earned income only, is really healthy. His definition of health is true for all the times to come.

Present work has been divided into seven chapters. The **first chapter** covers the physiological part of our body. As we are using this body while travelling through this realm of life, we must know it well its ways to function and give symptoms of unease. The **second chapter** describes various diseases, which we develop due to lack of our above knowledge and despite symptoms shown by our body. Here, we have tried to categorize various ailments, which have more chances of occurring profession specific. The **third chapter** carries various modules of physical exercises which when performed on regular basis will take care of indigestion, wrong postures, healthy breathing habits, strengthening of mind to overcome bad habits, development of positive energy. These modules have been designed in such a way that they can be performed at one's work station only, hence there is no need for a person to go away from his seat and waste time in changeover. The **fourth chapter** carries details of diet and nutrition, which is an essential part for

any enthusiast to know and practice towards good health. One has tried to add enough information on the subject for any trainer to deal with his clients day to day requirements.

The **fifth chapter** deals with the self-defense aspect, which is being especially developed for working women. It gives them a good idea of the various martial arts, their roots, differences, simple techniques and some pointers on psychological understanding of the opponent, which will come in handy in actual situations. Whole of the course is designed in a manner so that it is interesting as well as educational and immensely beneficial to the practitioner.

The **sixth chapter** is on psychological training to help the employees to understand stress and know methods to remove it, build team building, motivation & leadership qualities and thus become an asset to their organization.

In the **seventh chapter**, one has tried to deal with subject of yoga. Though the subject is too vast to cover in the limited space of present work, but still one has tried to touch and share most of the aspects of Hatha and Ashtang yoga to one's own limited knowledge and understanding. One is sure all will benefit from it.

1st April, 2016, Chandigarh. **Shaktanand.**

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Chapter I : Physiology

Understanding the basics of human physiology is a must for any serious enthusiast of sports and fitness. This doesn't mean that we have to be doctors to do that. Any fitness personnel should know the basic structure of the human body, its important organs, and their respective functions. One should have an overall view of the digestive system, respiratory system, excretory system, skeletal system, muscular system and nervous system. One should also have understanding of various symptoms indicated by our body in its gait, in its general appearance, in specific functioning etc. Apart from this, one should also be able to develop client specific programs in terms of muscle mass development, fat reduction or alleviating specific conditions. Depending upon these inputs, one should be able to guide the client rightly by developing proper exercise patterns and nutritional inputs. Here, we will directly concentrate on the subject at hand.

Our body is a complex of many systems as written above. It grows from a newborn baby to a toddler, who in turn grows in to a child, entering teens, then one becomes an adult. During this journey from baby to youth, many physical and psychological changes take place in us. Thus right from birth our body needs energy to keep its internal systems working, to develop our bodies and for doing any kind of physical work. The energy needed to keep our basic internal systems working, when we are at total rest position is called *basic metabolism rate*. Understanding of it for analyzing the needs of a physique is important for any trainer.

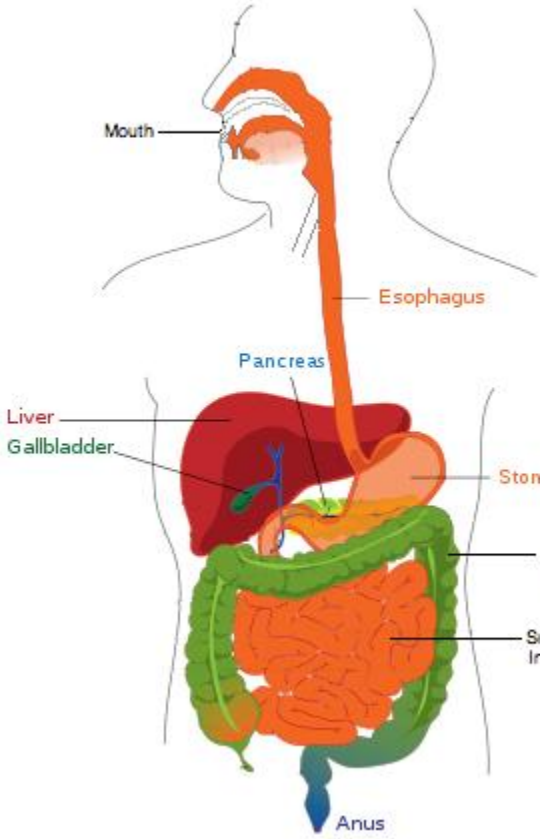
As discussed above, body continuously needs energy. One important way this is generated from the food we eat. The scientific study of the food and its utilization in our body is the main aspect of nutrition, which will be discussed in details in the specific forthcoming chapter. Anything, which nourishes our body is called food, which has two parts, nutrients and non-nutrients. The nutrients are essentially 40 in number and broadly classified under Proteins, Carbohydrates, Fats, Vitamins, Minerals and water, while non-nutrient aspects of food are its colour, taste and flavor. Thus, food we eat serves four physiological functions; ***Energy givin****g- provided by carbohydrates and fats,* ***Body building*** *– provided by proteins,* ***growth and repair of body cell****s - Protection from infections and subsequent recovery,* ***Regulatory*** *- pulse, temperature, muscle contractions etc*.

Digestive system:

Since our body cannot handle food as it is, hence it has to be broken down into smaller utilizable form through a process called Digestion. First part of digestion starts in our MOUTH itself. It breaks the large pieces of food, which cannot easily combine with water, into small water-soluble pieces with the help of teeth, so that it can be absorbed by our blood plasma. Thus two processes take place here simultaneously, physical break down by mastication

(chewing) and chemical break down with the help of enzymes. As we put food in our mouth or rather in anticipation of receiving food, our salivary glands located in mouth excrete Saliva,

Digestive System

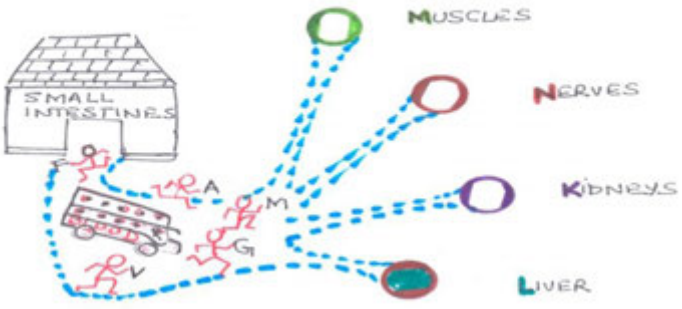


,which contains an enzyme called Amylase. Saliva also contains mucus and thus lubricates the food and adjusts its Ph value so that amylase can act properly on it. Food is best when its Ph value varies between 4-9. It acts on cooked carbohydrates and breaks them into smaller parts to ease their digestion. Since this part of the digestion is very important, our scriptures always stressed on the principle of chewing food 32 times before allowing it to enter the Esophagus, our food pipe. The better the food is meshed up in our mouth, the easier it will be for the body to digest it. Our food pipe expands and contracts, a process called peristalsis in medical terminology and thus makes the food move further down towards the STOMACH. Yogis clean their esophagus regularly by usage of Dhauti, which is explained in details ahead in the yogic section I. As food enters the stomach, gastric juices act on it. These juices contain hydrochloric

acid, enzyme pepsin and water, which makes food soup-like and easier to handle and digest. The enzyme breaks proteins for partial digestion. As both hydrochloric acid and enzymes may damage the inner lining of stomach, so saliva is generated here to provide an inner coating to the stomach. Waves of movements of muscles in the stomach wall, mix the food properly.

After about 1-2 hours of action in stomach, thick soupy food is passed on to duodenum, where after mixing with secretions of liver and pancreas, it is passed on to the small intestines. On right side of the stomach is located our LIVER, while on the left posterior side of stomach is located PANCREAS. Both the Liver and Pancreas are very important organs as they generate important juices known as Bile and Pancreatic juice.

Below the Liver is the DUDENUM, a tube-like structure, which is considered first part of small intestines and carries bile to it. Between meals, liver secreted bile is stored in GALL BLADDER, where 80 – 90 % of water and electrolytes are absorbed leaving aside bile acid and cholesterol. The food, after getting processed through stomach, moves to the SMALL INTESTINES, whose average length is 6.9 meters in adult males and 7.1 meters in adult females with a diameter of 2.5-3 cm. Here all the important juices collect to perform the complete digestion. Bile from the Liver digests and absorbs fats. Pancreatic juice from pancreas breaks down fats, proteins and carbohydrates into simpler substances, starches are broken into glucose and proteins into its amino acids. It is lined with epithelial tissues and is a fold like structure. Whole of the small intestinal length is lined inside by a thin lining called VILLI.



Each villi has a network of capillary tubes close to it. The epithelial cells of villi transport nutrients from intestines to these capillary tubes. It helps in absorption of various nutrients from the food here. In case this lining gets damaged, it hampers the process of digestion. Almost 95% of the nutrient absorption is completed in the small intestines.

After complete digestion of nutrients, whatever undigested food, mainly cellulose, which is left behind along with excess of water is brought to the LARGE INTESTINES. It is about 1.5 meter in length with inner diameter varying from 5.3 cm to 8.3 cm at different places of ascent, descent

and near therectum. The large intestine is also known as colon. In men it is about 10 cm longer than in adult women. About 1.5 liter of water arrives in our colon each day. Excess water and minerals are reabsorbed by the large intestines and the solid waste is excreted from our body through anus. Here Ph value of food mixture is slightly acidic in nature, ranging from 5.6 – 6.9. A little below the junction of large and small intestine is located a thin extruded tube-like structure called 'Appendix', which is 9 cm in length though it can vary from 2 to 20cm and has a diameter of 5-8 mm. It acts as a safe house for symbiotic gut microbes, preserving the flora during times of gastrointestinal infections without medicine.

Respiratory System:

Its control through the nervous system occurs through *medulla oblongata and pons* in the upper part of spinal column below our brain. The respiratory system in our human bodies starts with nose, which has two nostrils. The nostrils are lined with olfactory cells for smelling, mucus to moisten the air entering them and hairs to filter air going inside it. It is made up of bones and cartilage. As per yogic scriptures Krikal, an up-pranicvayu is responsible for sneezing. As per Swarodaya scripture, depending upon the way our breath is flowing in the nasal passage at any given time, one can know the predominant element in ones body at that particular moment. Further, it is said that normally one breathes from a distance of 12 fingers from the nasal tip. As we reduce this distance, finger by finger, one attains many subtle powers. As the temperature of a car engine is controlled by a thermostat (inside radiator), in the same way temperature of our body is controlled by both the nasal passages. The right nasal passage heats the body while the left nasal passage cools it. The nose warms the inhaled air, moistens it and filters it. Thus, the left nasal passage represents the Moon, while right nasal passage represents the Sun or we can say that the right represents Siva and the left represents Parvati or the right represents Purusha and the left represents Prakriti.

From the nasal cavity, air travels through the Pharynx and Larynx into the trachea, which then divides into two, one goes to the left lung and the other goes to the right lung. It is 4-6 inches in length and about 1 inch in diameter. There are 15-20 tracheal rings in the front and the sides of the tube to maintain the air path. The Esophagus lies behind it and that is why its rings are not complete. The Epiglottis closes the opening to the larynx during swallowing to prevent any food particles entry into it.

On the ends of the tracheal branches are connected our lungs. The right lung is of course bigger than the left lung as on the left side, some space is taken up by the heart. The lungs weight is about 1.9 kgs and they have a total area varying from 50-70 square meters. They exchange oxygen with deoxygenated blood sent by the heart into them. The lungs have millions of air sacs, known as Alveoli (grape like in shape), which fill with fresh air breathed in through the

nose. On the other side of them are small capillary tubes carrying deoxygenated blood from the heart. Many Alveoli join together to form a bunch. The lungs have two wall linings. The outer one lines the inside of the ribcage while the other lines the inner side of the lungs. Oxygen diffuses through the walls of Alveoli into the surrounding blood vessels and goes back to the heart for pumping into the whole body. The blood volume of lungs is about 9 % of the total circulatory system. The whole lung tract is lined with hair-like projections called *Cillia* that beat in rhythm and carry mucous which is essential for arresting foreign dust particles and infection germs.

Generally, it is seen that all of us are shallow breathers. The greater the amount of oxygen in the blood, the better will be its quality, the more improved will be the endurance of the body and more pranic energy will be at hand. Special pranayama practices are undertaken to learn how to breath deeper. Even flaring of the nostrils increases it by 10 percent. One should breath in such a way that one feels the lowest part of the lungs too.

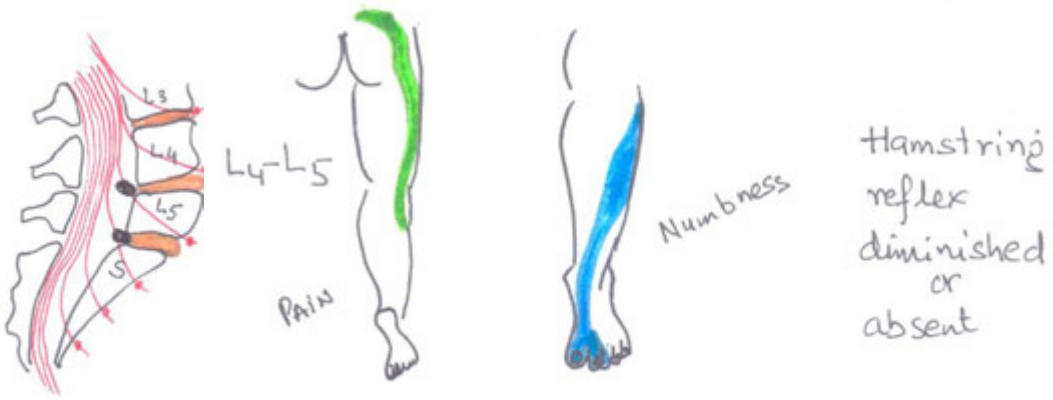
SKELETAL SYSTEM

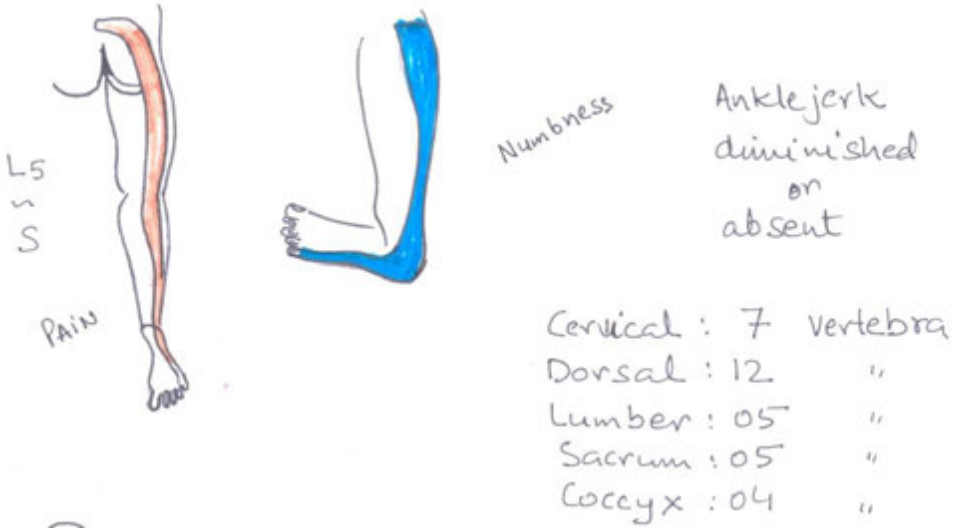
Our whole body is able to stand up because of the skeletal system. With joints at various places, it helps us to bend in different directions and perform many intricate movements. We have around 270 bones in our body at birth, out of which many fuse together, resulting in about 206 by adulthood. There are 33 vertebras in vertebral column, 12 ribs, 22 bones in skull and 7 associated ones, Humerus, Ulna, Radius in arms and Femur, Patella, Tibia, Fibula in legs. Apart from this, shoulder blades, clavicles etc. in the upper part of our back and chest are there. There are in total 27 bones in the human hand and 26 bones in the human foot. It has been mentioned in yogic scripture if one continues to do yog for three generations then the children born will have a greater number of bones and be stronger.

Apart from making us stand, our skeletal system has many other functions too, like protection of inner organs. The skull protects the brain; the ribcage and sternum protects our blood vessels, lungs and heart and the vertebral column protects our spine. It helps in production of blood cells (in the bone marrow), storage of certain ions (calcium, which is used in calcium metabolism and Iron which is used in Iron metabolism) and endocrine regulation function (bone cells release a hormone which helps in regulating blood sugar and fat deposition). The female skeletal system is little less robust as compared to the male skeletal system but pelvic in women is more pronounced then in men.

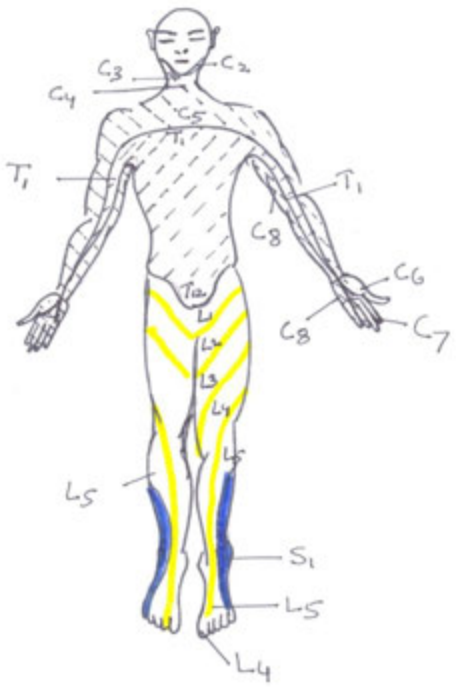
In our bones, arthritis is the problem of joints, while osteoporosis is the problem of decrease in bone density. Healthy diet, regular exercise, life style changes and supplements of calcium and vitamin D are also suggested to alleviate such problems.

Various parts of the body connected to different nerves coming out of various vertebras is being depicted through the diagrams below.

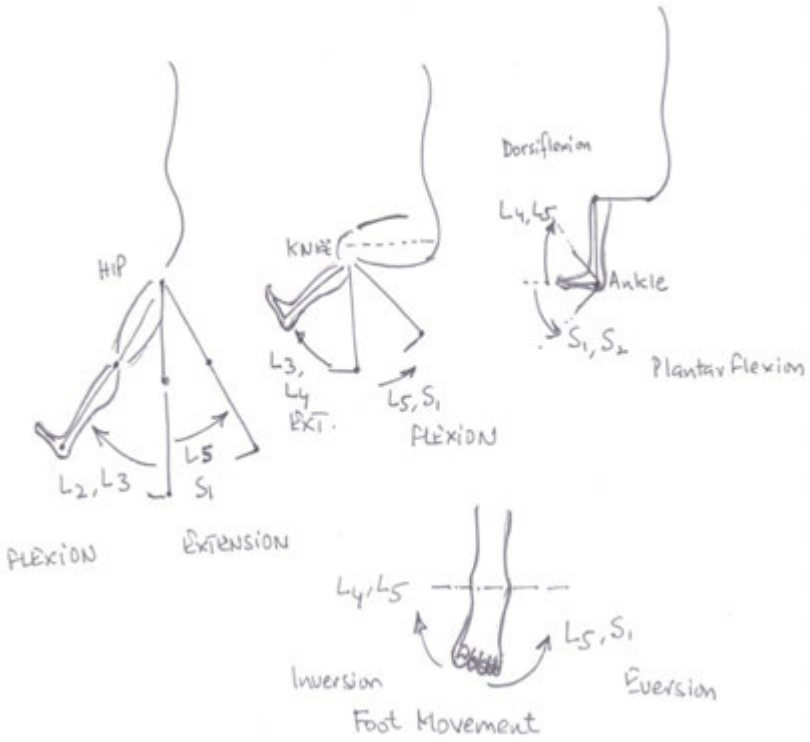




Cervical : 7 Vertebra
Dorsal : 12 "
Lumber : 05 "
Sacrum : 05 "
Coccyx : 04 "

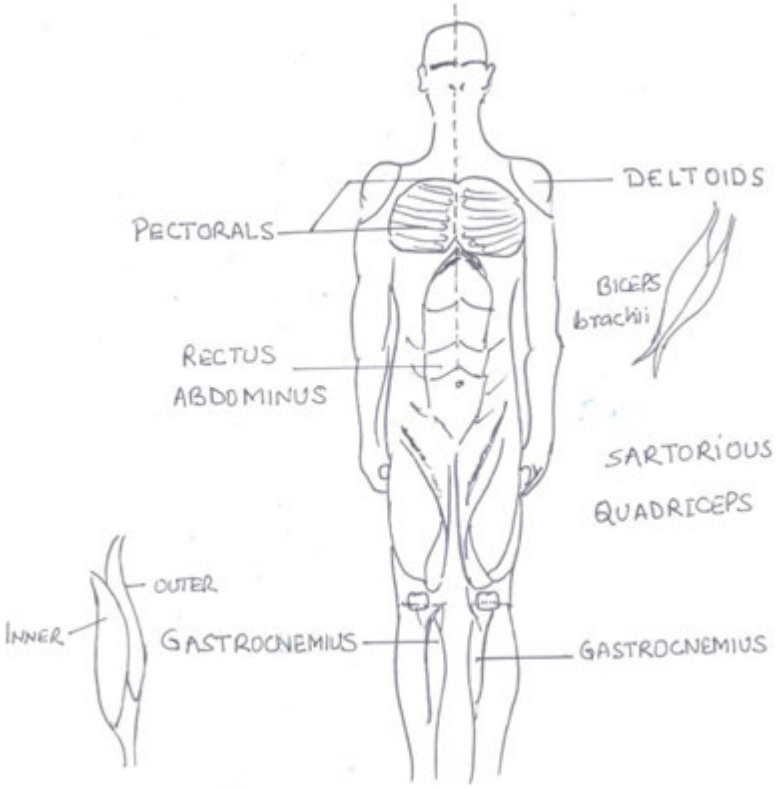


Lower Limb movement: Vertebras responsible for lower limb movement is detailed below.

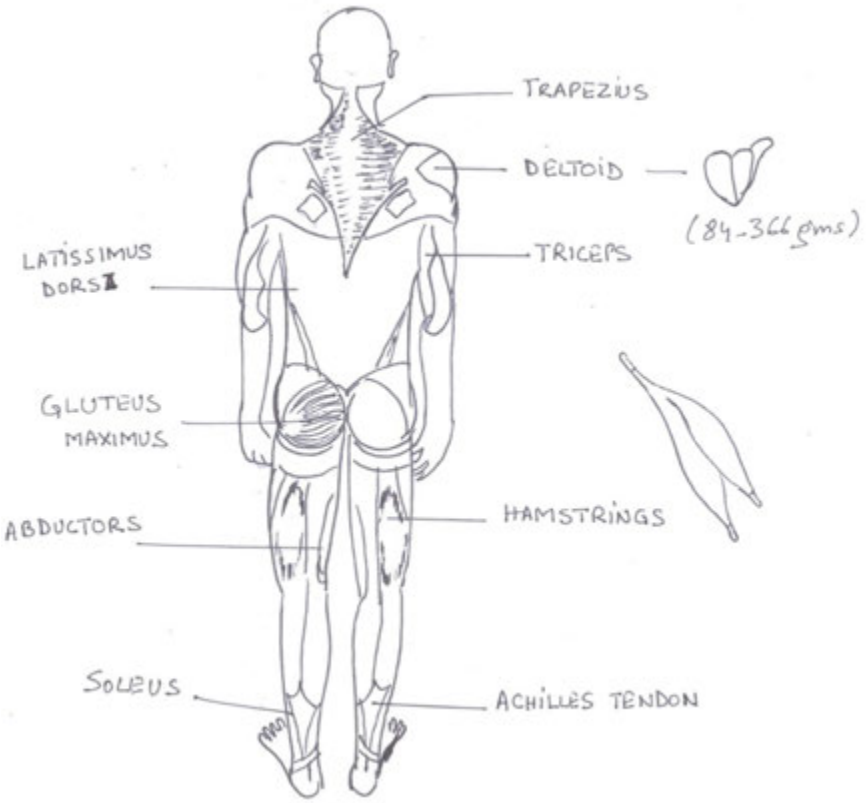


MUSCULAR SYSTEM

As we have seen in the skeletal system, various bones are joined with each other through a number of joints. It is because of the joints, we are able to bend our legs, arms, spine and move our neck, move our toes and fingers etc. The joints cannot move independently, on their own. They need some outside control over them, which is provided by our muscles. Muscles provide strength, power, control, balance, movement, posture and also generate heat to keep our body warm. Muscles are generally categorized as *cardiac or heart muscles, skeletal muscles and non-strained muscles*. Their overall movement is controlled through our brain. On action potential the skeletal muscles contract. This movement requires energy, which is provided by *Adenosine Tri-Phosphate* (ATP). Generally, when muscles are worked, lactic acid (and other fatiguing products) is produced at the site but when at rest ATP is produced *aerobically*(using oxygen) inside the mitochondria, which has been described as the power sources for the cell. They provide chemical energy.



FRONT SIDE



REAR SIDE

When exercising for a long duration on lower intensity, oxygen is combined with fats and carbohydrates. But when we indulge in high intensity exercise training (HIET), which is of less duration but higher intensity, the ATP production is through the *anaerobic path*(the process in which biological fuels are utilized in the presence of oxygen to generate large amounts of energy). Aerobic metabolism is 15 times more efficient than the anaerobic method. The*Aerobic condition in humans produce pyruvate, while anaerobic conditions produce lactate.*The Aerobic process converts one molecule of glucose into two molecules of pyruvic acid. Four molecules of ATP are produced but only two are available for usage.

The heart muscles are different from skeletal muscles and are controlled by the autonomic nervous system. Muscles which are moved by the autonomic system alone and cannot be moved by our conscious effort, are called smooth muscles. Cardiac muscles can be controlled by a thought, to how so ever small extent, hence are called involuntary muscles.

Aerobic ATP production is slow and requires a long duration with a low intensity exercise regimen. It produces no fatiguing waste products, which cannot be removed by our body. It requires an efficient oxygen delivering system in our body. While in case of *anaerobic system*,

the energy is produced much faster during HIET but produces an appreciable amount of lactic acid, which gives a fiery feeling at the particular muscle location.

ISOMETRICS are also used for exercising our muscles. Generally in this method of exercise, joints and muscles act against an immovable object and their lengths are kept static during exercise. This can also be applied in two ways, in the first method, we can just maintain the applied power to balance outer resistance experienced. An example of it can be of holding or lifting a weight without raising or lowering it. Second method can be to apply maximum force on the immovable object. During this method BP rises, so people with hypertension etc should consult their physician before performing them. One should continue deep breathing throughout to make more oxygen available to the body. During such exercises keep one's abdomen a little tight so as not to spoil the normal posture. It is recommended that 3-4 sessions a week, with 20-30 movements with holding time of 5-7 seconds is good enough to generate results in about fifteen days time. If isometrics are used for strength training than one should hold positions with 15-20 degree increments and may move from 10 to 80 degrees in complete movement. Another exercise method for muscles can be Isokinetic. In this method movement is also provided along with pressure. For example if we press both our palms together, it is an isometric but if we simultaneously extend our arms forwards slowly it becomes Isokinetic.

NERVOUS SYSTEM

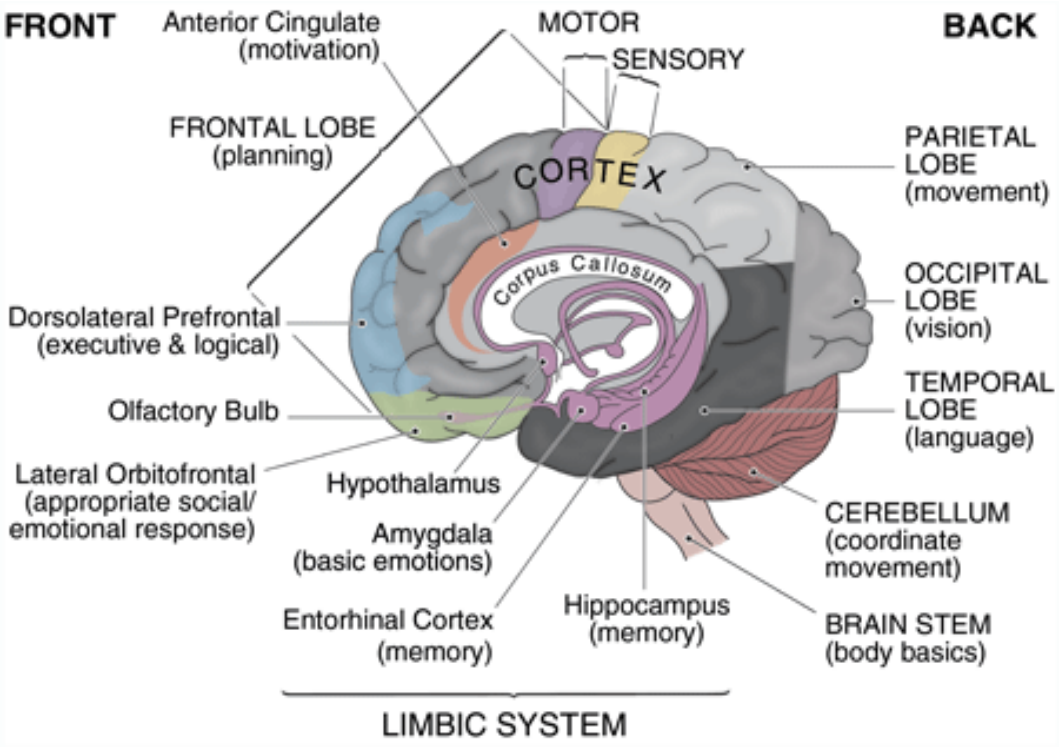
The nervous system in humans is of two kinds, one is *Central nervous system*, which contains our brain and spinal cord, and the other one is called *Peripheral nervous system*, which includes all the nerves. Nerve cells(neurons) and Glial cells are the most important part of the nervous system. The Glial cells provide support and nutrition. The nervous system helps to send signals from one cell to the other cell and from one part of the body to another part.

The fore brain

The mid brain

The hind brain

www.brainwave.com



Peripheral system:

Thalamus, Hypothalamus, Pineal and Pituitary, all the four important glands comprise our mid brain.

1. Somatic: Control voluntary movement

2. Autonomic: It is also of two kinds, Sympathetic and Parasympathetic.

    a. Sympathetic: Activated in case of emergencies to generate energy.

    b. Parasympathetic: Activated in relaxed states

System	Structure	Function
1. **Central Nervous system**	Brain, spine	Integrates and controls centers
2. **Peripheral Nervous system**	Spinal, Cranial nerves	communication path between CNS And rest of the body.

a.		
Sensory Division (GyanIndriya)	Somatic and visceral Sensory nerve fibres.	conduction of impulses from receptors to CNS.
b.		
Motor Division (KarmIndriya)	Motor nerve fibres.	Impulses from CNS to muscles and glands.

Motor Division

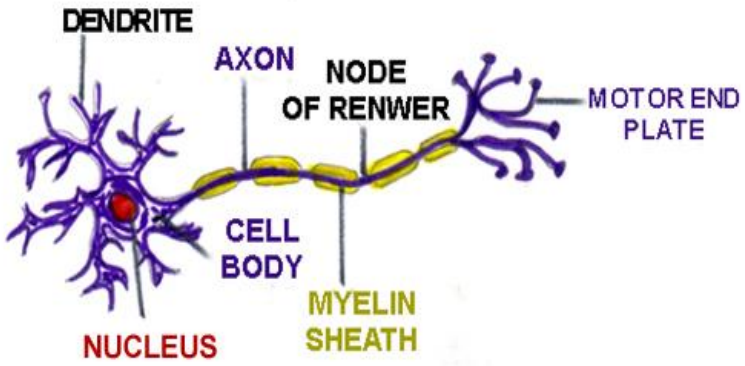
Autonomous Nerves system		*Somatic Nervous System*	
Structure	Function	Structure	Function
Visceral Motor	Conducts impulse from CNS	Somatic motor	CNS to skeletal
Cardiac & smooth muscles, glands.		Muscles	

Sympathetic	Parasympathetic
Active during	Conserves energy,
Fight and flight	promotes fns during rest.

An adult human brain weight is about 1.3 – 1.4 kgs. Out of this around 80% (1.12 kgs) is grey matter, about 10% (0.14 kgs) is blood and rest 10% (0.14 kgs) is CSF (cerebrospinal fluid). Anatomically, our brain alone is made up of almost 100 bn nerve cells, called *neurons*. The name was invented by a German, Heinrich Wilhelm, in 1891. Each neuron has an amazing ability to gather and transmit information through a series of electrochemical signals, which can travel up from a distance of a few feet to a few meters. A *neuron* is basically a cell body with ***a nucleus having DNA, endoplasmic reticulum, ribosomes (for building proteins), mitochondria (for making energy) inside it***, connected with cord like structure called *Axon* with *Synapses* at its end. Axon is covered like an electric cable with a Myelin sheath made up of fats and proteins which is yellowish in colour. It carries electrochemical impulses and help in speeding up transmission. The cell body has dendrites on its surface with the help of which it connects with the axons to share information as well as know about its environment. If a cell dies, the neuron also dies. *As per our elders, one should drink cow's milk as it makes our brain sharper.*

Interesting to note that colour of the cow's milk is also yellow like the colour of Myelin. A neuron diameter is 4-100microns and length varies from fraction of an inch to a few feet. Neuron may be connected to 1000 to 10,000 neurons and may have same number of Synapses. *It can transmit signals at 200 mph. Weight of a large neuron may be* 10^{-6}*gms*.

A sketch of motor neuron ,is shown below:



Neuron Body

All mental activity involves electrostatic or electro-magnetic information exchange. Various machines like, ECG, EEG, MRI, functional MRI and CT scanners have been made to measure critical body attributes. EEG, electric encephalograph, is one in which mental energy is analyzed and monitored through EM principles.

'Our *parasympathetic nervous system* mainly functions during rest by slowing the heart rate, lowering our blood pressure and increasing digestion while the *sympathetic nervous system* is responsible for mounting responses to physical and mental stimuli. The sympathetic nervous system boosts heart rate, blood pressure and directs blood flow away from digestion to maintain glucose in the blood stream so that it can be used for immediate energy for the well-known "fight or flight" response'.

The autonomic function is most often estimated by measuring heart rate variability and the heart rate response to challenging situations. It can be determined using the heart rate recovery (HRR) from a graded exercise treadmill test. HRR is the difference between maximum heart rate and heart rate 1 or 2 minutes after cessation of the treadmill test. The principle determinant of HRR is thought to be parasympathetic reactivation. Smaller (slower) values of HRR indicate a smaller parasympathetic response.

Parasympathetic and sympathetic nerve fibers are present in each of the major organs and body systems that control metabolism. Glucose and insulin are regulated by a feedback cycle that is controlled, in part, by autonomic inputs. As plasma, glucose concentrations rise with feeding, a healthy autonomic response is characterized by parasympathetic neurons stimulating the pancreas to produce insulin. The liver simultaneously increases insulin sensitivity and shuts down glucose production in favor of glucose uptake. Conversely, sympathetic activation blunts the pancreatic secretion of insulin. Hepatic glucogenesis is stimulated, and glucose uptake slows down.

These opposite actions of the two provide a fine degree of control over energy regulation, making more energy available during times of high physical or psychological demands (sympathetic activation) and storing energy when needs are low (parasympathetic activation). 'If these systems do not work appropriately, glucose homeostasis can be disrupted and weight gain can be stimulated'. (Autonomic Regulation of the Association between exercise and diabtese, Mercedes R Carnethon, Lynette L.Craft)

Thus we see that as we face any stress situation, sympathetic nervous system is triggered. In our modern lives, we face stress filled situations all day long. It means our sympathetic system is triggered again and again. This results in higher BP, higher pulse rate and less energy for digestion. Thus as we keep an exercising life style, our sympathetic nervous system is not unnecessarily activated in general day to day stress situation and thus help us to maintain better cardiac health. Thus regular exercise and meditation are essential for a peaceful state of body and mind.

Note: The adult hearing range is 20-20,000 hz; Old age hearing range is 5-8,000 hz. The amount of light needed to excite a Rod is 1 photon, while amount of light needed to excite a Cone is 100 photons.

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Chapter II : Disease and Cures

In today's environment, professional requirements, product and strategies of other competitors, pressures, hectic work schedules, all are taking their toll on everyone. Thus as compared to the work environment of a decade or so back when the whole approach was less demanding, professionals of today are becoming more and more prone to various physical ailments and mental stresses. Since, these pressures and stresses are going to be a part of our lives for the times to come, we have to devise ways and means to tackle them, lest they become a hazard for us. This would entail many life style changes.

It's not an easy task to pin point anybody's disease but here we are trying to generalize them with respect to professions. Thus we can have an idea, as to what kind of physical or mental stresses may occur in a particular environment setting. Hereunder, we have listed some of them explaining their general causes and procedures to alleviate them. We are not suggesting any kind of medicinal approach here, as that is a field of specialized, qualified doctors but we are only suggesting certain non-medicinal life style adjustments. These may involve physical isometric-cardio exercises routines, yogic asana &pranayam, meditation techniques and psychological techniques administered through a team of qualified, experienced trainers. Thus instead of pursuing a symptomatic approach, we will try to deal with the basic cause of it. A table to the effect is shown below.

General Profession-wise Disease Table

1	IT industry	1.Vitamin D
		2.Spondylitis
		3.Back ache
		4.Wrist and finger Arthritis
		5.Obesity
		6.Indigestion
		7.Insomnia
		8.Migraine
		9.Diabetes
2	Marketing	1.Back problems
		2.Stress and anger management

		3.Digestive disorders
		4.Respiratory problems
		5.Cardio-Vascular disorders
		6.Migraine
3	Manufacturing	1.Back and Neck aches
		2.Respiratory diseases
		3.Boredom and monotony
		4.Damped Communication Skills
4	Banking	1.IT industry problems as explained above.
5	Pharmaceutical	1.Module 1 and 2
6	Govt.	1.Core values, Neck & Back problems.
7	BPO	1.As per IT industry problems as explained above.
8	Schools	1.Specific modules for stress and core values.
9	Malls	1.Lower back, neck, muscle fatigue etc.

Schools& Educational Institutions:

1st to 8th class : Need to engage in at least one game, focusing of the mind and body, diet and nutrition understanding for growing body and i*nculcating moral values*.

9th-to-11th class: Focus, Stress relief, nutrition, teenage issues, counseling, if needed. Also generalize modules for specific professional diseases as enumerated above.

Higher Institutions:

Colleges and Universities students must be positively engaged to focus their energies on self and social improvement pursuits apart from their professional studies.

General Disease list:

1. Vitamin D – Deficiency
2. Prostate Enlargement
3. Carpel tunnel Syndrome

4. Thyroid
5. Migraine
6. Spondylitis
7. Slip Disk
8. Stones
9. Diabetes (Sugar)
10. Back ach
11. Acidity
12. Asthma
13. Blood Pressure
14. Uric Acid
15. Obesity

For every disease, we can follow a particular approach (where ever possible) as per the module plan shown below.

General Module Plan:-

1. Causes
2. Symptoms
3. Tests
4. Treatment
    a. Asan
    b. SukshamVyayam
    c. Pranyam
    d. Bandh
    e. Shatkarm
    f. Mudra
5. Diet:
    a. Avoid
    b. Consume
6. What not to do.

Vitamin D deficiency

Vitamin D belongs to a group of fat-soluble seco-steroids, which are responsible for absorption of calcium, phosphate, iron, magnesium and zinc in our intestines.

Symptoms/ Effects:

1. Vitamin–D is required to balance sugar levels in blood by regulating secretions of Insulin. Thus its lower level increases the risk of Type–II diabetes later in life. Some studies also suggest risk of Type –I.

2. Lower level of 25 Hydroxy Vitamin–D is significantly associated with increased risk of fatal cardiovascular events. It's deficiency increases the risk of cardiovascular diseases by 62%.

3. This vitamin deficiency causes recurrent infections and predisposes adults and children to respiratory infections.

4. When red blood cells are less anemia occurs. Vitamin–D is said to be some way linked with it too.

5. Low level of vitamin–D can absorb only 10-15% calcium intake, which is needed for strong bones, hence Vitamin –D deficiency results in weak soft achy bones. Lack of calcium deposition is due to deficiency of Vitamin-D and causes Rickets in children and Osteomalecia in adults. It affects the bone density in adults, and hence increases the risk of osteoporosis/fractures. Vitamin-D helps reduces chronic pain in people with fibromyalgia.

6.Dark Skin: The darker the shade of skin lesser will be the vitamin D absorption in our body.

7.Feel "Blue":The absence of sun light causes people to become depressed. (Serotonin rises with exposure to sun light)

8.Age ≥ 50 years: The kidneys become less efficient in converting Vitamin-D to a form, which can be used by our body, thus less Vitamin D generated.

9.Overweight (obese): Vitamin–D is a fat-soluble hormone like any Vitamin. So body fat acts as a sink for collecting it. Thus a fat person needs more Vitamins–D than someone thin. The same holds true for people with higher body weight due to muscle mass.

10.Aches and pains in combination with fatigue, throbbing, aching bone pains.

11.Head Sweating

12.Gut Trouble:- Gastrointestinal condition affect sour ability to absorb fat, it may result in lower absorption of fat soluble vitamins like Vitamin–D, Crohn's disorder*, Celiac and non-celiac gluten sensitivity, IBD.

*Cohn's Diseases: IBD (Inflaming bowel Diseases) affects intestine. Vitamin – D deficiency makes symptoms, worse.

13.Brain damage:- It can affect the oxidative state of the brain, cognitive performance and memory power.

14.Infertility:-Daily morning walk in sun boosts our reproductive growth by stimulating testosterone and progesterone.

15.Aging:- Bone mass decreases, prevalence of ageing.

Abundant Vitamin–D level reduces the risk of colon, breast and prostate cancer.

It also reduces rate of colorectal cancer, prostate cancer, by 30 -50%, if Vitamin–D is proper.

1. 50-70 mg/ml – optimal
2. < 50 mg/ml - lower level
3. 70-100 mg/ml – threat of heart diseases.
4. >100 Excess

Causes:

Environmental: If one is living in such a place where the exposure to the sun is less, then this deficiency can occur. If we are all the time sitting inside an air-conditioned environment, then exposure to the sun is negligible. This is the case for most of the IT professionals who have to work long hours on computer terminals.

Skin Colour: As melanin in our skin rises, the colour of it becomes darker. Melanin reduces our skins ability to make Vitamin–D in sunlight.

Testing Method:

Treatment: Have minimum of 15-30 minutes exposure to sunlight. Morning walk is the best option. Perform with ramping of breath, gradually moving from 4 steps to maximum of 16 steps. Once a fortnight or so have oil massage, lie in the sun, absorb the suns rays and then have a bath.

Perform:
Pranayam etc.: Kapalbhati(300-500 times), Agnisar kriya-1 (10 times/day), Agnisar kriya-2 (10 times/day), Agnisar kriya-3 (80 times/day).

Perform Shankhprakshalan, once in 3 months.

Ardhmatsyendraasan

Udrakarshanasan

Asan: Suryanamaskar(max 12 cycles), Udrakarshan(hold45 seconds each side), Ardhmatsyendra(hold 45 seconds each side), Poornmatsyendra*(hold 30 seconds each side). * for Poorn matsyendrasan one leg is folded below while the other is folded in half lotus position above it.
Bandh: Udiyanbandh, 3-5 times every day.

SukshamVyayam:-Stand with feet together and arms by the sides and hands open. Inhale air and fill the cheeks with it. Lower the chin into hollow of the throat, holding breath. Now vigorously move shoulders up and down at a quick pace without using elbows etc. Move the whole arm up and down as one unit. Do it 50-70 times.

Diet: Non alcoholic, non fatty, less spices etc. should be taken. Avoid preserved juices, soft drinks and junk food.

Not to do: People who have very light skin which experiences burning in the sun should not over expose themselves. Researches have indicated that red headed people should not be exposed to the sun and people who have too many moles on their skin should also refrain from long exposure to direct sunlight.

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Prostrate Enlargement

It is called *madana-granthi*. It becomes active with the sex impulse and begins to give secretions to lubricate urethra and flow down spermatozoa through it. Also checks the flow of urine during that process. When enlarged, exerts pressure on the neck of the bladder, hence interfere in voiding of urine. If held for longer duration, decomposition of urine takes place in bladder to sicken this gland. Prolonged retention of it produces local or even general edema or toxaema.

Cause:

1. Over activity or under activity, causing weakness in the long run.
2. Accumulated poison in the system

Life Style Causes

1. Sedentary habits
2. Over indulgence in eating and drinking etc.

Treatment

Mayurasan

Shalabhasan

1. Drink a lemon and salt water mix and performthe following asans.
    a. Bhujangasan
    b. Mayurasan
    c. Ardhchakra-asan: Lie down on floor with face up. Bend knees keeping both feet on the ground. Bring hands behind head. Tuck in chin towards the chest. Raise the back to bring chest close to the thighs. Hold comfortably as long as possible. Repeat 7-10 times.
    d. Padhast–asan: Stand straight with heels close together and toes apart at almost 90 degrees to each other. Inhaling through nose, raise both arms up and bending forward, bring the left hand down to hold the left ankle, keeping the right arm extending upwards. Do as long as comfortable and return back to standing position. Repeat the same on the right side.

       Again inhaling, raise both arms up and bed backwards from the waist, trying to make arms parallel to ground. Hold as long as possible. Return to starting position. Now again inhaling bend front from the waist and try to bring both hands down to touch the feet. Thus bending in all the four direction is performed here. It helps to maintain flexibility of the spine. It adds new blood to the system and hence helpful for aneamic people. It cures

constipation, Indigestion, Sciatica, flatulence around waist and defects of the kidneys. People with conditions of heart and blood pressure should not do it.

e. Shalbh-asan
f. Kati chakraAsan
   (standing)
   If above asans cannot be performed, keep repeating Katichakrasan in standing pose alone. However if others are also done then the effect is better.

2. Take a tub bath and practice Nauli(2-3 minutes)
3. Agnisar kriya: a.Agnisar-1; b.Agnisar-2; c.Aagnisar-3
   a. Inhale breath, antrik kumbhak, suck in navel and hold as long comfortable.
   b. Exhale, bahiya kumbhak, suck in navel and hold as long as comfortable.
   c. Exhale fully and move naval in and out. 100 times maximum in a single set or complete in as many sets as comfortable.
4. SahjPranayam
   a. Move the chin up, inhaling and down with exhaling breath. (2-3Minutes)
   b. Anulom –VilomPranayam:- Exhale first from the nasal passage and then start inhaling from it.Do 9 – 11 times.
5. Vaman and Vastra Dhoti:- Twice a Week.

Evenings

1. VeeprieetakariniMudra :- 2 min
2. JanuShirshAsan :- 3 times
6. Sahj Agni Sar: SahajAgnisarkriya - a.Sahajagnisar 1(5 times); b.Sahajagnisar 2 (5 times); c.Sahajagnisar 3 (5 times)
   a. Inhale breath, antrikkumbhak, suck in navel and hold as long as comfortable.
   b. Exhale, bahiyakumbhak, suck in navel and hold as long comfortable.
   c. Exhale fully and move naval in and out. 100 times maximum in single set or many sets as comfortable.

Pranayama

a. Lie down on your back – perform 11 times.
   i. Arm raising with inhale.
   ii. Arm lowering with exhale.
b. Sit, slowly and gently inhale deep through the nose and exhale through mouth (2-3 minutes).

   c. Chin raising (inhale) and Lowering (exhale)- While Sitting Comfortably – 21 times.
   d. Anulom – Vilom:- 11times
   e. Before staring it, exhale through particular nasal first then through the one from which one is going to inhale.
   f. Generally, to heat the body, one should start from right nasal passage.
   g. To cool down the body one should start from the left nasal passage.
3. ShashankAsan:-25-30 seconds, 3 times.
4. Suksham-Vyayam:
   a. Stand straight with feet one shoulder width apart. Keep the back straight and hands by the sides on thighs. In this position with force, squeeze the perineal floor so that both anus and urinary organ are lifted up. Do it 50-60 times at any time. It cures diabetes, piles and cures ailments associated with semen and it's beneficial for both men and women.
   b. Stand with a distance of around one foot between the two feet. Keeping back straight and relaxed, hands by sides, squeeze the anal muscles and pull the apan vayu towards the navel to meet the pran vayu there. Do it 15-20 times in one go. It reduces the production of excretions from the body. Even old people become young with its practice.
5. Notes;-
   a. Use of medicine to shrink the gland in primary stages is generally done, but it does not take care of the cause.
   b. Leave all concentrated fluids, flesh food and fast food for at least a day in a week, until cured. Though it is better, if one can refrain from their usage altogether.

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Thyroid

Thyroid is the largest endocrine gland in our body and is located below the Adam's apple and consists of two lobes connected together. It controls the rate of consumption of energy in our body, protein synthesis and body's sensitivity to other hormones. It is a 5 cm long, 3 cm wide and 2 cm thick, lying against and around larynx and trachea. It's health is tested through T3, Tri-ido-threonine and T 4, Thyroxin, tetra-ido-thyronine testing method. Under secretion of thyroid gland is called Hypothyroidism, while over secretion is called Hyperthyroidism.

Thyroid Functions:

a. It affects the metabolism, controls body temperature, heart rate and production of proteins in our body.

General Treatment:

Setubadhasan

Ustrasan

1. Jallandhar Bandh : Sit in any dhyanasan comfortably and take deep inhalation.
    a. Exhale
    b. Bend your neck forward
    c. Rest chin in the hollow of the neck (below the Adam Apple) and stay as long as you can holding bahiya kumbhaki.e in exhaled breath position.
    d. Inhale through nose smoothly without jerk and come up slowly. Perform 3-5 times.
    e. Chant 'Ham' through the throat, rotating in clockwise direction, 11 times.
    f. Tighten and loosen the thyroid /neck, 9-11 times.
    g. Setubadhasan (1 minute), Ushtrasan (25 seconds x 3 times), Lizard pose (1 minute), Matsyasan (1 minute) and in all, breath in and out through the nose.
    h. Vajrasan: Perform after eating food and sit for 5-10 minutes.
    i. Lotus pose, Simhasan (1 minute), Vipritakarani mudra (3 – 5 minutes), Kanthsanchalan, Ushtrasan (25 seconds 3 times).

Pranayam: Do Ujjai breathing (11 times), Nadishodhan (7 – 11 times).

Dhyan: Dhyan of Vishudhi chakra, chanting 'Ham' beej in such a way that the vibrations are experienced in the neck region. Once this is achieved, rotate the energy of mantra in a clock-wise direction in the chakra petals. One can also perform chanting of the chakra petal beej mantras individually feeling their vibrations.

Hyperthyroidism symptoms: (overactive thyroid)

1.Excess energy generated inside or body.

2. As a result heart beat increases.

3. Blood pressure increases.

4.Excessive motions occur.

5. Weakness is felt especially in legs, unsure footsteps.

6.Anxiety, less sleep, weight decreases. Experiences more perspiration.

7. It increases metabolism, so one should try to reduce it through exercises.

In case of hypothyroidism, to increase metabolism start Bhastrika(21 times on empty stomach morning and evening), Agnisar(maximum 100 times in a day on empty stomach), Nauli(do 7 cycles of three and a half rotations of Vaam and dakshinnauli), Udiyanbandh(05 times daily in the morning on empty stomach), perform Mayurasan(hold as long as comfortable because it requires sense of balance, strength of wrists, core muscles etc). One may also do Suryabhedi pranayam 11-21 times. Do full Shankhprakshalan, once in three months.*(Its complete method isgiven at the end of the yoga section.*)

Diet: Use fibrous diet. Check for a few weeks as it may affect the medication absorption in the body. Goitrogen rich diet may help slow down its functioning, like broccoli, cabbage cauliflower, peaches, millet, spinach, redishes, peanuts, bamboo shoots, sweet poatoes etc. Goitrogens are substances (whether in drugs, chemicals, or foods) that stops the production of thyroid hormones by interfering with iodine uptake in the thyroid gland. This triggers the pituitary to release TSH, which then promotes the growth of thyroid tissue, eventually leading to goiter. Thus it can change a hyperthyroidism state into hypothyroidism state.

Thus they inhibit the body's capacity to generate thyroid hormone, it restricts body's capacity to convert iodine into T3 and T4 hormones. But if you are suffering from Hypothyroidism, then one may not need to avoid these foods completely but take them in moderation.

Perform Chandrabhedi pranayama 11-21 times, Sheetali or Sheetkari 11 times, neck rotation 1-2-3, 10 times each. SukshamVyayam of shoulders 20 times x 3 sets, Ardhmatsyendrasan on both sides holding

30-40 seconds, Parshavudrakarshan on either side holding 40-50 seconds, Yoga nidra initially as per instructor.

Hypothyroidism Symptoms: (underactive thyroid)

a. Sometime Pituitary disorder also effects TSH production and effects thyroid function or Iodine deficiency.
b. fatigue,
c. increased sensitivity to cold,
d. Constipation.
e. Dry skin,
f. May result into unexpected weight gain,
g. Puffy face,
h. Generates tenderness –stiffness –aches in muscles, swollen joints.
i. It can cause depression.
j. May also impair memory.
k. Lowers metabolism, so should include exercises to increase it.

Perform Suryabhedi pranayama 11-21 times; Shoulder-Suksham vyayam 20 times x 3 sets; Ardhmatsyendra 30-40 seconds on both sides; *Agnisar 1*-10 times, *Agnisar 2* – 10 times, *Agnisar 3* – 80 times maximum in 24 hours; Shankhprakshalan – once in 3 months; Mayurasan 30 – 40 seconds x 3 times; Parshavudrakarshan both sides holding 30-40 seconds.

Common for both Hypo and Hyper:

Drink enough water as it will help in digestion, get rid of water retention and bloating, reduce appetite, improve digestion and elimination and remove constipation. It is said that one should take about an ounce of water for every kilogram weight of one's body. Generally, it is said that 2000-2500 ml daily intake of fluids is essential.

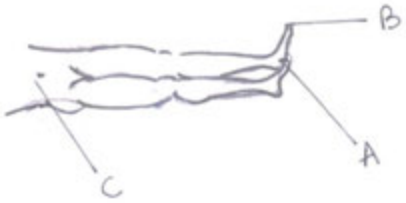
Do Chandrbhedi, Sheetali or Sheetkari pranayama.

Alternate method: Another procedure can be added here, for correcting the nabhi/navel. It is seen that if the stomach is generally upset in a patient, whether by constipation or diarrhea, the navel is generally dislocated. This can be diagnosed and corrected by a yogic method as follows:

The navel is an important part in our body. If dislodged from it's correct position, many problems arise which a doctor may not be able to check. Hence proper diagnose, cause and correction must be known to relieve pain and inconvenience to a patient. It has been seen that patients keep on taking medicines for years without realizing the cause. For a trained person, it's only a few minutes job. But if unchecked for years, the navel gets set in the wrong place, hence it becomes very difficult to bring it to right position and make it stay there. It is seen that in men it generally shifts towards LEFT while in women it mostly shifts towards RIGHT.

Examination:

Make the patient lie on the floor with face up. Rest hips on the floor. Raise head and feet about 12 inches above the ground as per Utanapadasan, shown in the sketches below. Slowly lower the body into Shavasan with head, feet and heels on the floor. Keep heels together and toes rolled outward.



Men Women

1.

For men, measure the distance between the navel (C) from both nipples A and B. If AC = BC, navel setting is correct. If AC not equal to BC, then navel setting is displaced.

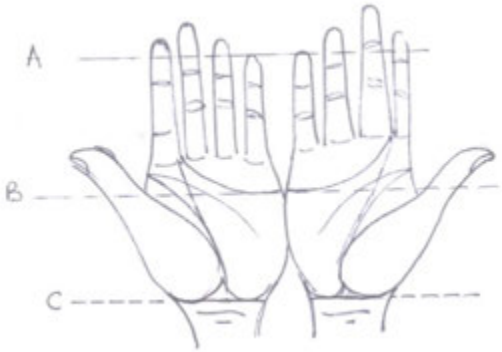
In case of women, measure distance between the navel and the big toes. IF AC = BC, navel is correctly placed. If AC not equal to BC, then navel is displaced.

2.

Join all the fingers tips and thumb of one hand and press them into the navel of the patient lying down. If pulsating, it is ok. Else feel the exact location of pulsation around the navel, as to which side it has shifted. It means it is displaced.

3.

Join both hands at C, then bring B lines closer together and check height of both little fingers at A. If all the three matching, navel is correctly placed. If it is displaced then A and B will not match or little fingers will also not match in height with each other.



Remedial measures:

1.

If the navel is up towards the left side, Pull the LEFT foot or Push RIGHT foot, three times with a jerk.

If navel is up towards the right side, Pull the RIGHT foot or Push LEFT foot, three times with a jerk.

If the navel has not moved then perform remedial measure 2.

2

Make the patient lie on the floor with face down. Put one foot on the lower back, hold left hand and right ankle and pull them up together, pushing the back little downwards. Repeat this on the other hand, holding right hand and left ankle pull them up pressing the sacrum region of back downwards. Check the navel, if it is still not corrected move to next remedial measure.

3.

Let the patient do Ustrasan and lift him up holding from the upper arms, as per fig 1. The patient should not release his hold on the ankles.

4.

General asans which are good for keeping the navel in the centre are, Ustrasan(fig 1), Utanpadasan(fig 2), Dhanurasan(fig 3) , Chakrasan(fig 4) and Matsyasan(fig 5) as shown in the sketches below.

fig 1

Lifting in Ustrasan

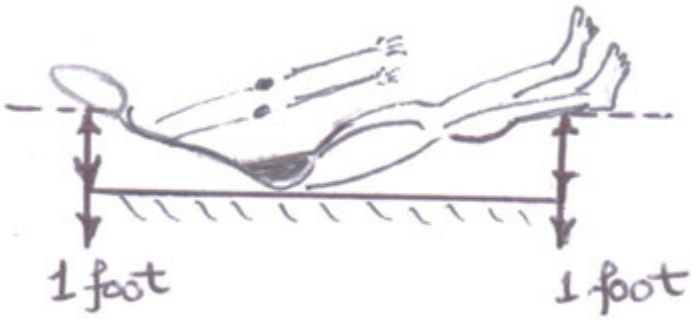


fig 2

Utanpaadasan

fig 3 Dhanurasan

fig 4 Chakrasan

Fig 5 Matsyasan

After correction of the navel, let the person lie down, hold his hands without moving his feet position, pull him up into position 2. Then pull him up into position 3, so that patient sits on his feet. Give him 1-2 biscuits to eat in the sitting position. Then pull him up to position 4. The feet location is not changed at all throughout the 1-4 positions.

If the navel travels upwards, then stools will be hardened. Even artificial laxatives will become in-effective. If it has travelled down, loose motions, dyspepsia, Colic pain and bad dreams may occur.

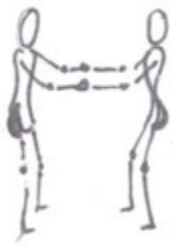
If it goes to the sides, then acute pain in the stomach area will occur.

In females it causes leucorrhoea, irregular menstrual cycles, unhealthy colored discharge. Babies born to such mothers will become weak.

1

2

3



4

Hence one should ensure one's navel is always centered.

Migraine

Migraine gives periodic headaches, usually unilateral, associated with visual disturbances and vomiting. It starts generally after puberty and continues till late middle age. The attack intervals vary from a few days to several months.

Symptoms

Due to vasospasm – (spasm of any vessels, especially blood vessels)

Seeing of white colored light spots, wavy lines, defect in visual field, weakness in one half of the body, may cause numbness of the both hand and region around the mouth.

Symptoms may last up to half an hour and follow with headache, which starts from one point and spreads to whole of one side of the head. This may be same or opposite side of visual condition happening. The throbbing pain, vomiting, severe loss of muscles tone leaves one weak and exhausted.

Western View:

As per the western view it is caused due to a disturbance in the carotid or vertebra basilar tree.

The initial phase of *vaso-constriction* causes symptom of *local cortical or brain* and *brain stem ischemia*, followed by *vasodilation*.

It affect both intra/extra cranial arteries, dilation of extra cranial vessels, causes pain by stretching nerve ending of arterial wall.

Ayurveda

These brain nerves are affected by vitiated bile. The coolness of night and darkness of room ameliorates the condition since the bile is soothed by cold.

Normally due to:

1. Vitiated bile
2. Less blood supply to brain
3. Mucus at the root of the nose

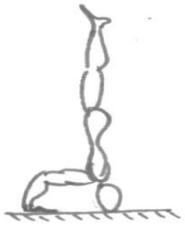
All these symptoms indicate Pitraj, Kafaj and Raktaj- Shirorog.

Treatment

1. Pranayama
    a. Sahaj Pranyam with individual leg raises – 11 times each side.
    b. Sit, inhale through nose exhale through mouth with chin up and down, 11 times.
    c. Anulom Vilom – 9 – 11 times
    d. Bhastrika 21 times.
    e. Bharmari Pranayam – 2 times daily.
    f. Jalneti with normal saline water if hi BP, else with warm saline water. May use Sendha salt, if not possible then may utilize normal iodized version only. Do daily in the morning. After it drink 25-30 ml milk through nose.
    g. Nadi Shodhan : Perform 10-15 minutes.
    h. Sheetli Pranayam: 9 – 11 times.
    i. Breath through ajna chakra 02 to 05 minutes.
2. Mudras
    a. Shanmukhi Mudra: Can be performed twice a day, morning and evening on light stomach.

    b. Hast-mudra: Press 3rd and 4th finger with thumb. Can be performed on either on one hand or on both, can be performed any time of the day in any position. Care should be taken not to overdo it. One should do 15-40 minutes in a day.

3. Asans
    a. Salamb Shirsh Asan: On empty stomach, 2-5 minutes, morning and evening.
    b. Sarvang Asan : 2-3 minutes, twice a day, morning and evening.
    c. Paschimotan Asan : 40-50 seconds on either legs and both legs. 03 times.


Shirshasan


Pashchimotanasan


Sarvangasan

4. Others:
    a. After evacuation take half tub bath
    b. Vaman Dhauti or Varisaar, twice a week. Vamandhouti is done by drinking salty water and vomiting it out. While in varisaar dhouti a rubber tube is used, which 3-4 feet in length and ¾ inches in diameter. After drinking tepid water, put the tube in the mouth and devour it inch by inch till it reaches the stomach. Bending forward water will start coming out slowly-slowly in a number of times. It will wash out all the undigested food, rotten mucus, decomposed bile. After water has been ejected, keep pressing the stomach, forcing the vitiated wind out of the system. It will remove bacteria and impurities from Surya-granthi i.e Pancreas in the lower abdomen. It is good for acidity, indigestion, constipation, TB. Do not eat anything for at least half an hour after it. After Vaman, one graduated to Varisaar and after that one goes on to perform Vastra Dhauti.
    c. Water Cleansing laghu shankhprakshalan – twice a week.
    d. Shankh Prakshlan(explained at the end of yoga section) once in three month
    e. In acute cases, close opposite nostril for 5 – 6 hours daily for 5-7 days, till relief is felt.
    f. Yog Nidra: half an hour to one and half hour session.
    g. Sandalwood paste application on forehead, center of palm, center of soles of feet and heart.
    h. Meditation in Veerasan or Siddhasan.
5. Diet:
    a. Do Eat: Soups, Vegetables, fruits, Honey, pulses and milk.
    b. Don'ts : Abstain from Non veg food.

****

Spondylitis

It is an inflammation of the vertebra. It may involve one or more of vertebral joints.

Types

1. **Pot's Diseases**
    a. Stiffness, pain on rotation, tenderness on pressure, prominence of certain vertebral spines, occasional abdominal pain, Abscess formation, paralysis.
2. **Ankylosing Spondylitis**
    a. Inflammation involving spine Sacroiliac joints
    b. Causes stiffness in neck, jaw, shoulder, hip joint and knees.
    c. Sacroiliac joint (where pelvic and spine meet)
    d. It may be due to the excessive or extremely less movement of the joints cause inflammation, pain while standing from sitting position, lifting of knee towards chest, pain down the buttock and back of the thigh, increase with prolonged sitting.

    It may cause pain:

    e. While sitting and standing
    f. Lifting knee chest ward
    g. Down the buttock
    h. Back of thigh
    i. Increases with prolonged sitting
3. **Intervertebral disk space inflammation**

4. **Lumbar Spondylitis**

Pain in lower back and lumber region, hence also called back ache.

Treatment: For cervical strengthening, do the following,

1. Hand - Head Press
    a. Put your right palm on the temple
    b. Push inward by palm and outward by head – create opposite force.
    c. Repeat with left palm and left temple
    d. Palm and Forehead – Opposite force
    e. Palm and back of the head

2. Neck Traction
    a. Lie down on (Table/ Bed) where your shoulders rest at the edge of bed and while neck is hanging downward. Do as long as comfortable.
3. Shoulder rotation
    a. Raise your arms side wise up-to the shoulder height
    b. Now rotate your shoulder in both directions 5-5 times, 3 sets.
4. Waist Twisting
    a. Twist your waist left side exhaling and hold for 10-15 seconds
    b. Twist your waist right side exhaling and hold for 10-15 seconds.
    c. No jerks, perform 03 sets.

Bhujangasan

5. BhujangAsan
    a. Lie on down on your stomach
    b. Join your feet
    c. Bend your arm and put your hands besides your shoulder
    d. Now inhale and slowly raise your upper body up to the navel with the support of your hands for 25-30 seconds.
    e. Stretch your back and neck maximum backward. Look over your shoulder at opposite side heel. Exhale while turning neck and inhale while returning to front faced position. Exhale again when turning in opposite direction. Repeat 7-9 times.
    f. Exhale and come down (can repeat 3 times)

Uttith Prishth Asan

6. Uttith Pristh Asan (lizard Pose)
    a. Sit on your knees and heal as in Vajra – Asan
    b. Put your hands on ground in front of you lifting the torso up and slowly stretch your arms forward to maximum distance. Keep sliding body front till chin and

chest are touching ground and torso is held up as much as possible. Hold for 30 seconds to 1 minute as comfortable.

7. Ushtra- Asan (Camel Pose)
    a. Stand on your knees,

Ushtrasan.

    b. Weight further supported by ball of the foot,
    c. Raise your both arms above the head,
    d. Rotating in a circle move your left arm backward and downward to touch the heel of left foot at the back,
    e. Similarly rotating in a circle right arm backward and downward and touch the heel of right foot,
    f. Thrust pelvic in forward direction and head in backward direction. Also stretch tongue upwards so as to touch soft pallet. Hold for 30-40 seconds and repeat it 03 times.

ParshavUdrakarshan Asan

Chakrasan

Dhanurasan

8. Parshav –UdarakarshanAsan
    a. Lie on your back
    b. Spread your arms up to shoulder
    c. Now bend your left knee
    d. Now exhaling twist your waist toward right and touch left knee to ground. Stretch right arm at 90 degrees to body palm downwards onto the floor and take left arm all the over to the other side so that both the arms are in a straight line. Right palm is also touching ground. Hold position for 30-40 seconds.
    e. Repeat the same with right leg. Do 03 sets.
9. Later Stages
    a. Dhanur-asan: 25-30 seconds, 03 times.
    b. Chakra-asan : 25-30 seconds, 03 times.

Cervical Spondylitis

1. Pain spreads in back of neck
2. Bone spurs
3. Dehydrated spinal disk
4. Cracked disk allows leakage of cushioning material
5. Arm numbness
6. Pain like sciatica, arm numbness and ligament stiffness, genetic factors excess weight
7. Pain around shoulder which might increase when
   A. Standup
   B. Sitting
   C. Sneezing
   D. Coughing
   E. Tilting your neck backward
   F. Muscles weakens and hard to lift arm or grasp objects firmly
   G. Loss of balance, bladder and bowel control

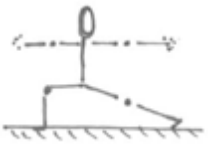
Diagnose

1. X-ray for bone spurs
2. CT –scan for image of neck
3. MRI- locate pinched nerves
4. Myelogram: Details images of area
5. Electro Myo Gram (EMG): is used to check electrical activity of the nerves

Treatment:

Bhujangasan

Katichakrasan



Veerasan


Ardhchakrasan 1 Ardhchakrasan 2

1. Parshv Kona asan: 20-25 seconds on both sides 2-3 times.
2. TiryakBhujangasan: 11 times with breathing.
3. Kati-chakrasan: hold 20-25 seconds on either side, 3 times.
4. Ardh-chakrasan: Standing backward bending, hold 25-30 seconds, 3 times.
5. Veer- Asan: 40 – 50 seconds on both legs, 3 sets.
6. Neck traction: Lie down face upwards on the bed in such a way that the shoulder line is at the edge of the bed. Now let the neck hang downwards providing natural traction to it. Maintain it as long as comfortable. It provides great relief.

Slip- Disk

This condition occurs when outer ring of the disc gets ruptured and inner soft portion protrudes through it. Medically, it is also known as spinal disc hernia. Though the condition is called slip disc but actually disc in not slipped.

Treatment:



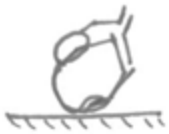
Makarasan Jyatekaravasan Bhujangasan

1. Stage 1:
    a. Makarasan: 25-30 seconds, 3 times
    b. Reversed corpse pose
    c. Shav-asan: As per the instructions
    d. Jyatekaravasan: 25-30 seconds on either side, perform 03 sets.

Marjari Asan

2. Stage 2
    a. Bhujang Asan: Curl neck first of all while going up and uncurl it last of all while coming down. Inhale while going up, exhale while coming down slowly. In top position hold for 25-30 second trying to look as far backwards as possible on the ceiling. Inhale exhale through nose 7-9 times while up. Perform it three times.
    b. Ardhshalbhasan: 25-30 seconds, perform 03 times.
    c. Ardhchakrasan: Standing bend backwards, 25 – 30 seconds, perform 03 times.
    Stand with feet shoulder width apart, inhale and raise arms over head, exhaling bend backwards, hold position.
    Alternately, one can lie down on the floor. Bend knees with feet on the floor. Hands behind head, chin tucked in, bring chest towards thighs. Hold and then go back. Repeat 5-10 times. People with high BP, pregnancy, ulcers in stomach should not do it.
    d. Marjari Asan: Inhale while arching back and exhale while humping it up. Do 7-10 times.
3. Stage 3:

Shalabhasan



Dhanurasan

Ustrasan

    a. Shalabh-asan: 25 - 30 seconds, 03 times.
    b. Dhanurasan: 25 – 30 seconds, 03 times.
    c. Ushtra- asan: 25 – 30 seconds, 03 times.

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Stones

GALL STONES

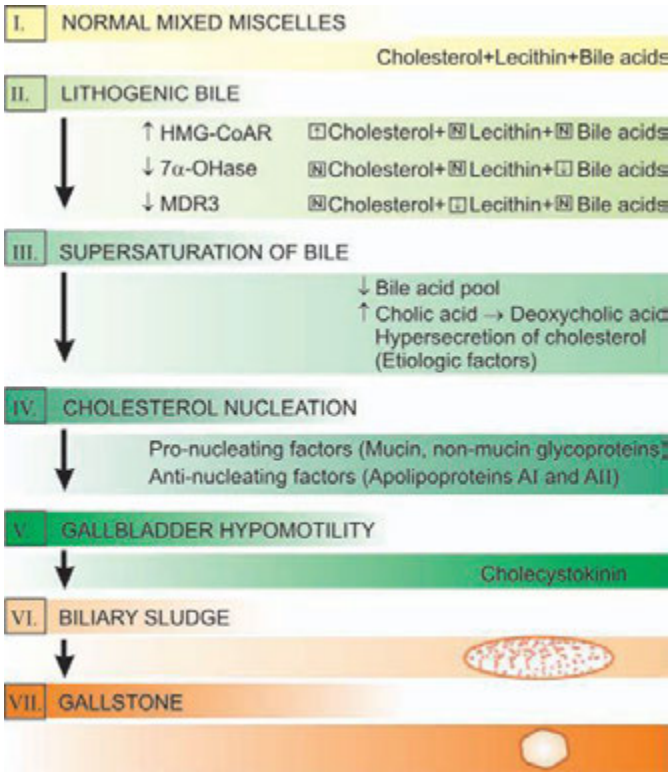
Gallstones are formed from constituents of the bile (viz. cholesterol, bile pigments and calcium salts) along with other organic components. Accordingly, the gallstones commonly contain cholesterol, bile pigment and calcium salts in varying proportions.

Risk factors: 4F's acronym for—*fat, female, fertile (*multipara) and forty.*
*(*multipara is a woman who has more than 2-3 pregnancies.)*

Pathophysiology: Cholesterol remains dissolved in bile with help of bile salts (salts of cholic and chenodeoxycholic acid conjugated with glycine and taurine) because these are highly amphiphilic.

A high cholesterol to bile salt ratio favours crystallization of cholesterol in bile.

These crystals act as nidus(nest, cluster, nucleus or point of origin) for the stone formation.



URINARY STONES: Nephrolithiasis or urolithiasis is formation of urinary calculi at any level of the urinary tract. Renal calculi are characterised clinically by colicky pain *(renal colic)* as they

pass down along the ureter and manifest by haematuria. 4 types of urinary calculi known:

	Type	Incidence	Etiology	Pathogenesis
1.	*Calcium stones*	75%	Hypercalciuria with or without hypercalcaemia; idiopathic	Supersaturation of ions in urine, alkaline pH of urine; low urinary volume, oxaluria and hyperuricosuria
2.	*Mixed (struvite) stones*	15%	Urinary infection with urea-splitting organisms like *Proteus*	Alkaline urinary pH produced by ammonia from splitting of urea by bacterially produced urease
3.	*Uric acid stones*	6%	Hyperuricosuria with or without hyperuricaemia (e.g. in primary and secondary gout)	Acidic urine (pH below 6) decreases the solubility of uric acid in urine and favours its precipitation
4.	*Cystine stones*	2%	Genetically-determined defect in cystine transport	Cystinuria containing least soluble cystine precipitates as cystine crystals
5.	*Other types*	< 2%	Inherited abnormalities of amino acid metabolism	Xanthinuria

The mechanism of calcium stone formation is explained on the basis of imbalance between the degree of super-saturation of the ions forming the stone and the concentration of inhibitors in the urine. The site where the crystals of calcium oxalate and/or calcium phosphate are precipitated is the tubular lining or around some fragment of debris in the tubule acting as nidus of the stone. The stone grows, as more and more crystals are deposited around the nidus.

Symptoms

1. Uneasiness after meals, slight pain in stomach, vomiting gives relief
2. As it progresses absence of desire for food
3. As pain intensifies fever rises, vertigo and vomiting occurs
4. Pain occurs first at the right epigastric region, where bile-sac is located.

When it gets chronic, stones grows longer, pain radiates over whole body, even shoots up to right shoulder. Isolated gravels (larger number) are passed from bile sac to the intestine, to be excreted in to stool.

When system is vitiated, attack intensifies, resulting in over activity and consequent depression of the local nerves and glands. Body fails to purge the contents of the bile sac, various other morbid products add to it; size becomes more and becomes impassable through the duct.

Kidney: - Its function is to collect waste material from the blood, spare water from the tissues. They are excreted in the form of urine.

Biliary colic

Pain of Gall stone:-*mostly on the right side of the stomach to back.* Sometimes it goes up to the right shoulder.

Renal colic

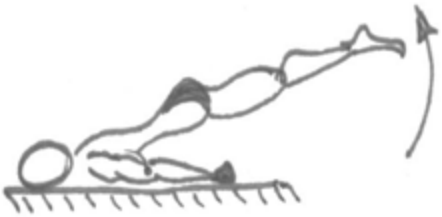
Pain of kidney stone: *Pain in loins, shooting down to thighs.* Desire to urinate but painful, Urine may be dark and bloody.

Causes:

1. Liver Produces bile and purifies blood.
2. Sends impurities of blood to bile sac for excreting through intestines.
3. If blood is vitiated, diseases germs grow in it and gradually form these impure matters into gravel, which join and turn into stone.
4. May be due to constipation, indigestion, acidity, imbalanced diet, too much taking of meat and concentrated foods.

Treatment

Ardhmatsyendrasan



Shalabhasan

Pashchimotanasan

Bhujangasan

1. Morning:
    a. Sahaj Bastikriya: 2-3 times a week at start. Mix water, lemon juice and salt together. Drink it 2-3 glasses and lie down flat on the ground facing up. Perform Vipritakarani mudra for 3-4 minutes, Mayurasan, Shalabhasan, Bhujangasan, Ardhmatsyendr asan, Chakrasan and Pashchimotanasan 2-3 times holding for 25-30 seconds. A strong motion will entail. It's a very good method of curing constipation.
    b. Vaman Dhouti – 2-3 times a week

2. Sahaj Pranayam
    a. Inhale – exhale with arm and leg raises – 11 times each
    b. Anulom- vilom: 9 – 11 times. To heat body it is started from right side and to cool body it is to be started with left side. Whichever side we are to start with, first exhale from that side first.
    c. Elbow breathing. 7 – 11 times. Had on shoulders, inhale while raising the elbow in a backward arch and exhaling while bringing them back to starting position.
    d. Uddiyaan Bandh: Hold as long as comfortable. 3-5 times on empty stomach.
    e. Two bath 5 min, in afternoon in hot season only
3. Evening

Halasan

Ustrasan

Pashchimotaanasan

    a. NadishodhanPranayam: 7 – 11 times.
    b. SahajAgnisar
        i. Sahajagnisar 1: Inhaled position, suck navel to spine, hold as long as comfortable, then exhale slowly. Do 03 times. It increases appetite and cures diarrhea and dysentery.
    c. Hal- asan: Hold asan for 40 – 60 seconds, walk feet both sides 03 times.
    d. Ustra –asan: 25 – 30 seconds, 03 times.
    e. Ardh-matesendrasan: perform both sides, holding 40-50 seconds.
    f. Pashchimotan – Asan: hold for 40 – 50 seconds, bending from waist and not back.
4. Diet:
    a. On diagnosis, give up breakfast and all kinds of flesh food / eggs etc. and concentrated foods. Fasting with profuse quanity of lemon juice be observed.
    b. Skimmed milk, butter mill vegetable soup, Bael (aeglefolia) fruit juice less of cooked material taken.
    c. Green coconut water.
    d. Eat less than your hunger, chew food 32 times.
    e. Cooking should be not rich in ghee/spices.
    f. Fasting with abundant lemon juice be practiced.
    g. Half fasting after pain subsides.
    h. Take 20 ml of raw olive oil orally daily. It reduces cholesterol.

****

Diabetes (Sugar)

DIABETES MELLITUS

Small Description: Weak liver cannot store up glycogen and weak pancreas cannot generate Dextrose. The sugar therefore gets returned to the blood stream, overloads and destroys its alkalinity. This puts excessive pressure on kidney to filter the extra sugar from blood. Hence Liver, pancreas and kidneys malfunction occurs in this disease at start.

Symptom

Increased thirst, frequent urge to urinate, profuse urine, sweetish taste in tongue.

Simple boil/ cut turns into a malignant gangrene

Skin is dry, teeth look morbidly pale and dirty

Occasionally, intolerable itching all over body.

Cause

1. Debilitated blood as caused by excessive intercourse
2. Excessive carbohydrate intake
3. Excessive flesh food and sweets
4. Effects of strong drugs like chloroform strychnine.
5. Intensive thoughts and worries.

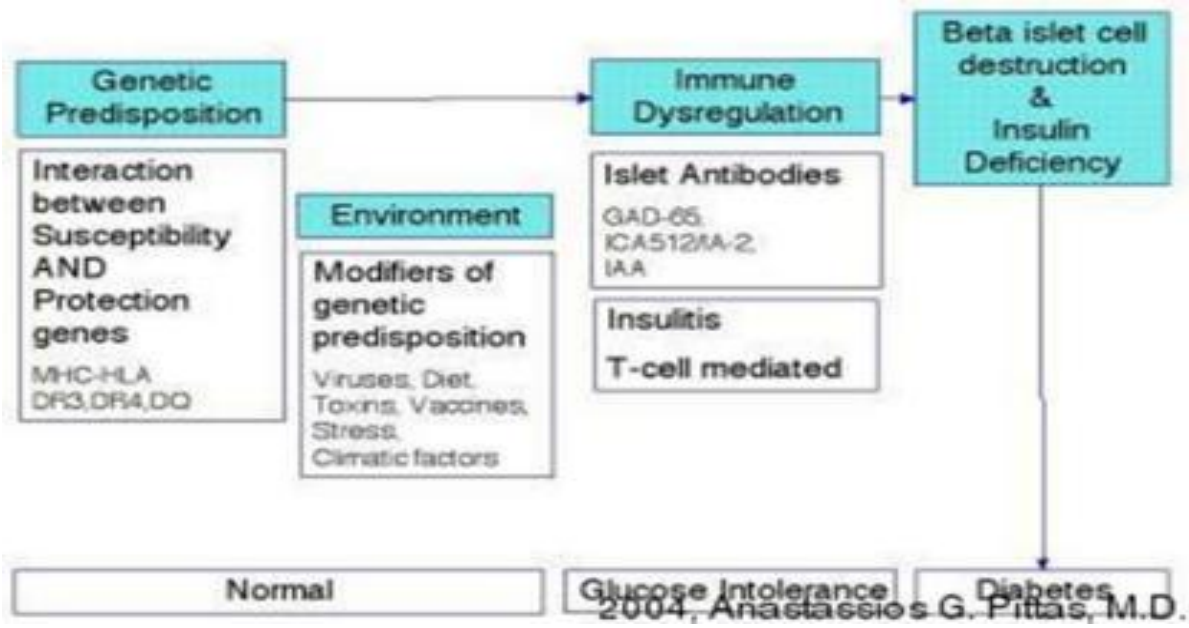
Tests

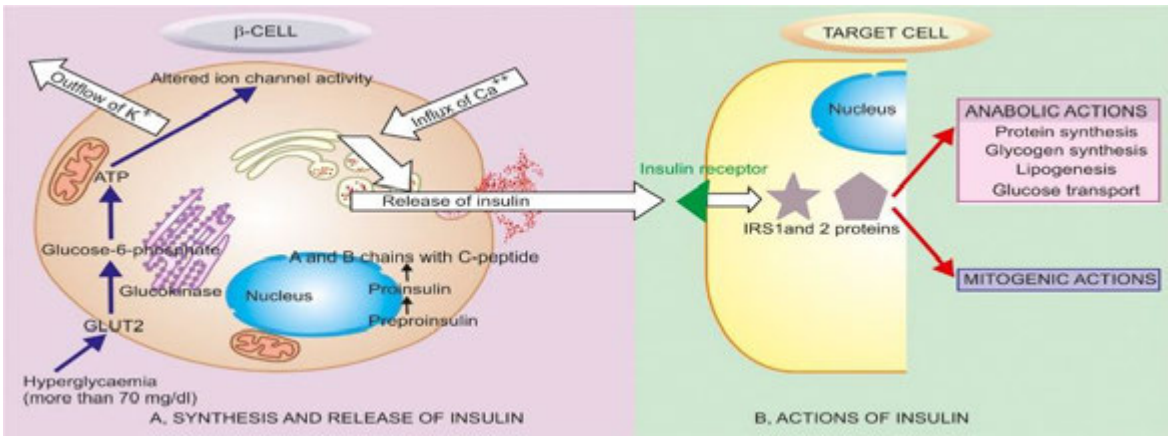
Blood sugar test - Fasting and non-fasting

Definition: It is a heterogeneous metabolic disorder characterized by common feature of chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism.

Insulin plays a vital role in maintaining glucose homeostasis in our body.

Type	Normal glucose tolerance	Prediabetes IFG/IGT	Diabetes mellitus
Fasting plasma glucose	<5.6 mmol/l (100 mg/dl)	5.6-6.9 mmol/l (100-125 mg/dl)	>7.0 mmol/l (126 mg/dl)
2-h plasma glucose	<7.8 mmol/l (140 mg/dl)	7.8-11.1 mmol/l (140-199 mg/dl)	>11.1 mmol/l (>200 mg/dl)





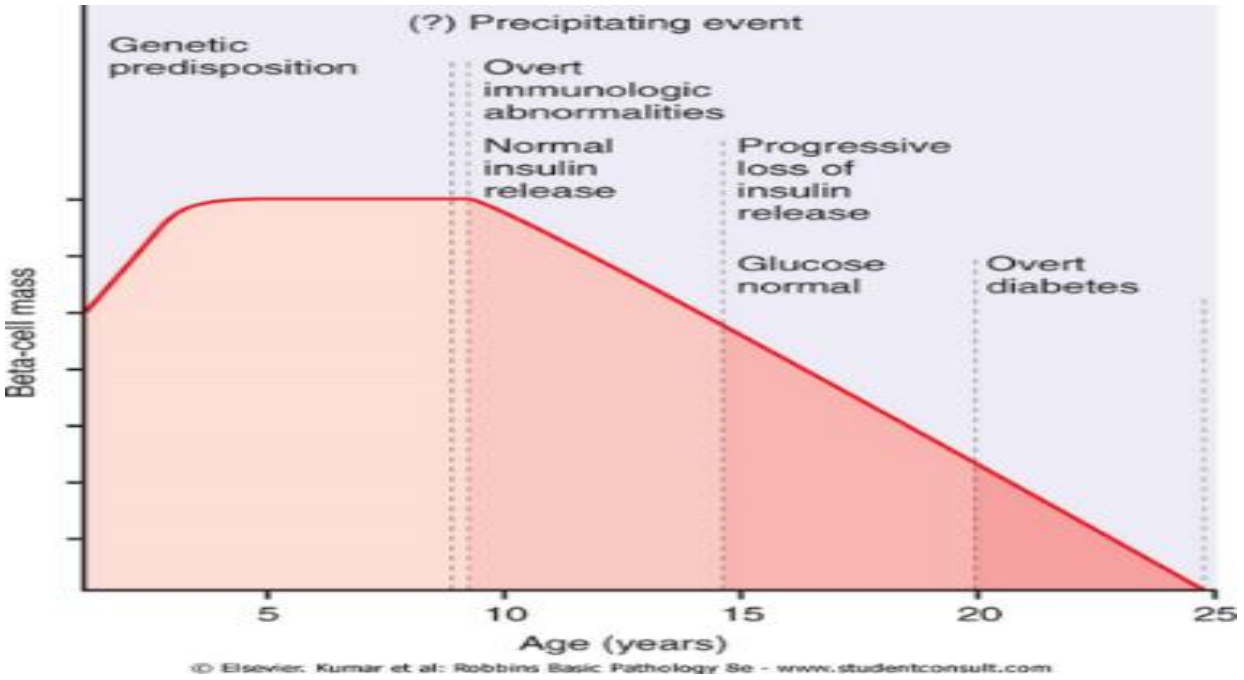
Pathophysiology:

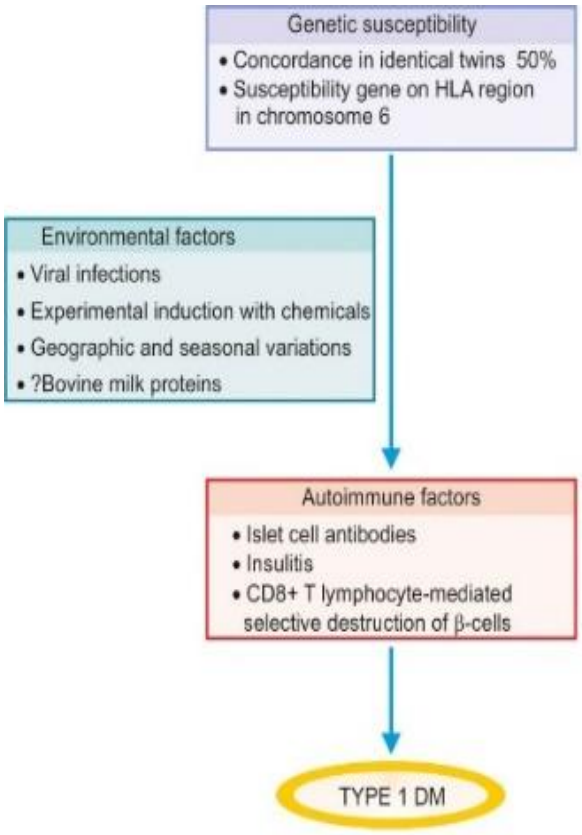
Hyperglycemia may result from-

1) Reduced insulin secretion
2) Decreased glucose use by the body
3) Increase glucose production

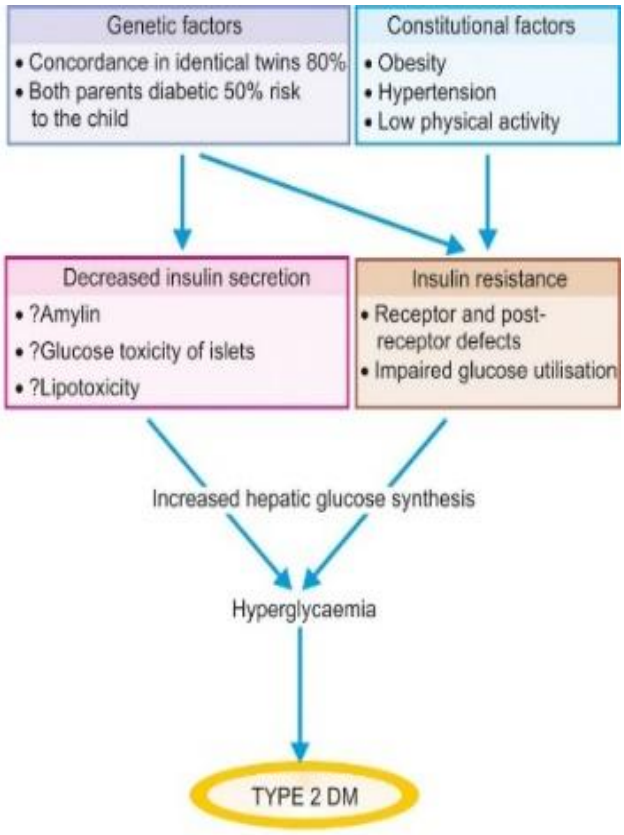
Type I DM: destruction of ß-cells leading to *absolute deficiency of insulin*.

Type II DM: there is *impaired insulin secretion or insulin resistance; thus inspite of being present, body doesn't respond to insulin.* It is generally said that type II can be cured with life style changes, though HATHA yoga procedures claim to remove it completely.





A, PATHOGENESIS OF TYPE 1 DIABETES MELLITUS



B, PATHOGENESIS OF TYPE 2 DIABETES MELLITUS

Symptoms:

1. Urine of such patents attracts flies and ants.
2. Increased thirst, frequent urge to urinate, profuse urine, sweetish taste in tongue.
3. Occasionally, intolerable itching all over body.
4. Simple boil/ cut turns into a malignant gangrene
5. Wt. loss alarming
6. Cataract patients are found to be diabetic to some extent
7. Even suffers from constipation and diarrhea
8. Skin is dry, teeth look morbidly pale and dirty

Cause

Ashaktt Agni Granthi: Liver, spleen, pancreas.

Internal secretion of Pancreas, insulin, prepares Dextrose from Glycogen, which is manufactured by liver from starch, fat carbohydrates and albumen. This sugar is stored in pancreatic cells, burnt according to needs of our body, which maintains body temperature and keeps the nerves and tissues active. *Thus a weak liver cannot store up glycogen; a weak pancreas cannot generate Dextrose.* The sugar therefore is returned to the blood stream, overloads and destroys it alkalinity.

So *poor body resistance, over work for kidneys to filter their extra sugar demands for excessive water for dissolution arises, thus it results in profuse thirst* and frequent urination. Due to overwork, kidney gets damaged, Excessive sugars, starches and fats taken, makes sugar flows in urine. To check it, insulin is injected. Excessive insulin generates cold perspiration, fluttering of heart. If immediate sugar is not given, may result in a stroke, which becomes fatal.

Thus Diabetes may develop from

1. Debilitated blood as caused by excessive intercourse.
2. Excessive carbohydrate intake.(check diet)
3. Excessive flesh food and sweets.(check diet)
4. Effects of strong drugs like chloroform strychnine.(check medication being taken)
5. Intensive thoughts and worries.(meditate to remove stress)

Treatment:-

Morning

a. SahajAgnisaar – 40
b. Agnisardhauti – 1 =10 times
    i. lemon + salt + 1 liter tepid water
    ii. Drink and perform following asans

Mayur Asan

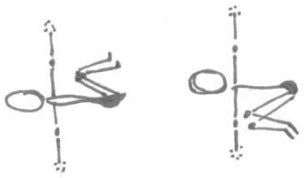
Vipritakarini Mudra

Shalabh Asan

Katichakrasan

1. Vipritakarni mudra 2-5 minutes
2. Mayur Asan: 30-40 seconds, 03 times.
3. Shalbha Asan: 25-30secods, 03 times.
4. Kati chakra Asan: 15-20 times
5. It cures constipation. Those who are not habitually constipated may use only water, not salt /lemon.

2. Sahaj Pranayama.
    a. Arms and legs -2 mints
    b. Inhale through nose –exhale through mouth – 2 mints.
    c. Chin up / down- 2 min
    d. Sheetli – 2 mint
3. Nadishodhan:
4. Bharamari Pranayaam: 9-11 times.
5. Vaman / barisaar dhouti: twice a week.
6. Uddyaaan bandh: 3-5 times daily o empty stomach.
7. Nauli: 3.5 times either side, 7-11 sets.
8. Mahamudra: 3-5 times empty stomach.
9. Sheetli – 2 min
10. Asan
    a. Dhanur- asan: 25-30 seconds, three times.
    b. Shalbh- asan: 25 – 30 seconds, three times.
    c. Jathar Parivartanaasan: All three routine.



Jathar parivartanasan variation 1

Jathar parivartanasan variation 2

Dhanurasan

Shalabhasan

Repeat it on both sides.

d. Mayur- asan: 25-30 seconds, three times.
e. Matasyander – asan: 25 -30 seconds both sides.
f. Janushirshasan : 25-30 seconds, three times.

MayurAsan

Janushirshasan

Evening

Janushirshasan

Sarvangasan

Ushtrasan

1. Asan
    a. Janushirshasan: As above
    b. Pachimotanasan: 25-30 seconds, three times.
    c. Sarvangasan: 2-3 minutes in one go or in 2-3 times.

d. Matasyaasan: 1 minute.
e. Ushtra-asan -3 times
f. ShashankAsan- 2 mints

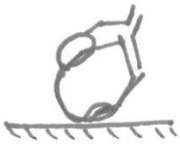
Shashankasan

2. Sahaj Agnisar -40 times
    a. Arms and legs -2 mints
    b. Inhale through nose–exhale through mouth – 2 mints.
    c. Chin up / down- 2 min
    d. Sheetli – 2 mint
3. Agnisar dhauti: 10 Times
4. Morning and evening, breath through ajna chakra 21 times. Meditate regularly.

Diet: Fasting for consecutive 2-3 days will reduce it in blood, eliminate in urine. Fast for nights, full moon and new moon. Complete fast on ekadashi. It is good for all above 40 years of age.

Rice/ Wheat flour substituted for green plantain, arum roots, starches, carrots, fats minimized well boiled daal, partially sour taste fruits taken ,black beans, coconut mango, curd , butter milk, ground-nut.

Treatment



Dhanurasan

Shalabhasan

Janushirshasan

Mayurasan

Paschimotanasan

Ustrasan

Shashankasan

Jatharparivrattasan

Asan	**Name**	Duration	Set
	Dhanur	30 – 40 seconds	03
	Shalabh	30 seconds	03
	Janu- shirsh	01 minute	01
	Mayur	01 minute	01
	Pashchimotan	30 – 40 seconds	03
	Matsya	01 minute	03
	Ushtrasan	25 – 30 seconds	03
	Shashank	25 seconds	03
	Jathar–parivartan	30 – 40 seconds	03 (palms on the floor)
Pranayam	NadiShodhan	9 – 11 times	
	Bharaman	15 minutes	02 times daily
	Sheetli	11 – 21 times	
Shat- karm	Nauli	3.5 circles clock wise and anti clock wise.	11 to 21 times
	VamanDhauti	Weekly	
	Agni Sar- Dhauti	Do 1,2 & 3	Max 100 times in 24 hrs/

	SahajAgnisar	If upper one can not be done.	Press with fingers 100 times
Bandh	Uddyan	3-5 times on empty stomach	Daily

Suksham Vyayam: Stand with both feet one foot apart. Back is straight and relaxed, arms by the sides along the thighs. Inhale and squeeze the anal muscles and urinary tract upwards. Hold it tightly as long as comfortable and then relax. Keep repeating it 7-11 times. Make sure the squeeze is done with full force. Though it seems easy but is not so easy to perform. One's whole area around anus etc becomes tired easily. Apart from diabetes it cures many other diseases like piles and problems concerned with semen.

Hatha Yoga Shankhprakshalan kriya:

This is a long schedule, which is to be followed as per the following instruction table. IF in between one is not able to follow it, then one has to start from first step again. Hence all efforts should be to follow it truly.

Month	No of times, Shankhprakshalan to be performed
1st to 3rd	6 times (once every 15 days)
4th to 6th	3 times (once every month)
7th to 12th	3 times (once every two months)
Total :	12 times in one year.

Procedure:

Decide a day when you have complete holiday and will remain at home full day. On previous day, take lunch, say at 2pm. After this no solid food is to be taken. Dinner must be skipped also. It is better if complete fasting should be observed, but if not possible one may take light beverages. Try not to take milk tea or heavy juices. One should not stop medicine and whatever is advised by physician should be followed.

Observe fasting for 18 hours, which means till 8 am next morning no solid food should be taken at all. At 8 am, boil about 1.5 lit of water and take another 1.5 liter normal water in an another pan. Take another empty jug. Mix both hot boiled water and normal water in the jug so as to make it drinkable. Put salt in it, preferably Sendha (Iodised, if other not available), in the ratio of

1.5 table spoons for every liter of water. Thumb rule is that when we drink salt should not be very less and not excessive that it makes one vomit.

Now be ready to start the procedure and make sure toilet is nearby. Drink 3-4 glasses of this warm salted water and do katichakrasan (standing with feet one shoulder width apart, swing arms side to side, twisting at waist), tiryakbhujangasan, kaagasan and mayurasan. If one cannot do all asans, just do katichakrasan. Keep drinking and keep doing the twisting movement, till one feels the urge to urinate or relieve oneself. Go to the toilet, sit on the seat, do whatever is natural and do not exert. Return to drinking again and twisting, till need to relieve. Slowly water will start clearing our intestines and bladder. Keep drinking and keep moving to the toilet till water coming out of the body is as clear as the one we are drinking. When that happens, stop drinking.

Lie down face up on a bed and do not take side i.e turn right or left, for one hour. After that one can eat Khichri made out of rice and moong daal with salt. One can mix cow's desi ghee(clarified butter) in it as per desire. Do not use anything else to eat for the day except ghee and khichri. As for khichri, one may eat as much as one desires.

Try to rest completely on the day. Do not exert physically, do not climb stairs. From next day, one is free to eat normal diet, work as per normal routine. This completes one cycle of shankhprakshalan. Such cycle is to be followed 12 times in one year as per the details given in the chart at start. Do not use hard drinks etc. By the year end, one's body organs would have regained their strength to handle sugar by generating required secretions.

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Backache

As the name suggests, this pain occurs in our back. Now back can be divided into four different areas. First area is cervical where neck pain occurs, second is thoracic region of middle back, then third is lower back lumber region and while the fourth is in sacral coccygeal region. But it has been noted that almost 95% of the pains are in the lower back i.e lumber region and that also L3-L4-L5 region.

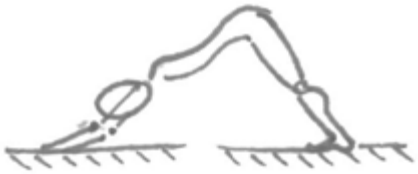
First we have to diagnose the reason of it. Back pain can come with different symptoms like loss of sleep, stomach upset, and weakness in legs. Some time patient experiences fever and weight loss also. Pain following accident etc or due to osteoporosis should be immediately checked. The back pain can be due to disc herniation or degenerative disc disease. Thus we can say that there are a number of reasons for this state.

Posture of the patient should be checked with plumb line test also to know the exact areas of problem if it is due to muscles spasm, disc herniation etc. One can have a still better idea if one knows the professional or routine movements of the person.

If it lasts for more than three months it effects physically as well as psychologically. Thus one must pay immediate attention to this kind of problem and not let it linger on and become chronic. If we can check it at start, one can easily cure it.

Treatment

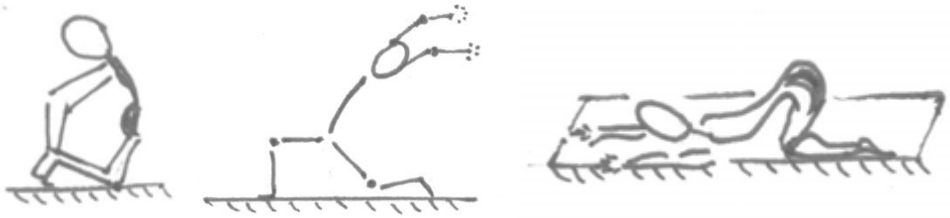
1. *Asan*



Adhomukhsvan Asan (heels should be on the ground)

   a. *Sheersh Asan: Salamb or by a wall, 2-5 minutes as comfortable. Take care not to jerk while going up and coming down.*
   b. *Sarvangasan: Salamb or by wall, 1-3 minutes as comfortable.*
   c. *Chakra – asan: 20-30 seconds, three times.*
   d. *Dhanur-asan: 20-30 seconds, 03 times.*
   e. *Shalbhasan: 20-25 seconds, 3 times.*
   f. *Adomukhswanasan: Bend from waist and not back, hold position for 40-50 seconds. While bending, bend from waist and not from back. Keep heels planted on the ground.*

g. *Marjariasan: Inhale while arching back and raising chin upwards, hold position for 15-20 seconds.*
h. *Matasyaasan: hold feet, inhale and pull so that back arches well, hold for 30-40 seconds. While maintaining position breath in and out through nose forcefully. This will clear all the mucus from nose and cough problem of the throat. Perform three times.*



Ushtrasan *Ardhachandrasan* *Utthita Prishthasan*
(Rear leg knee on the ground)

i. *Ushtra–asan: Perform thrusting the pelvic front and throwing the head back. Inhale exhale forcefully through nose. Hold position 30-40 seconds and may repeat up to three times.*
j. *Ardhchandrasan: From veerasan, put the read knee on the ground and arching back, raise both arms above head and backwards, raise chin maximum to see as far back as possible. Holding this position, take slow and deep breaths through nose to experience the bottom most part of lungs. Hold 20-30 seconds and repeat on both sides i.e alternating keeping different legs front and back.*
   One can also stand in Veerasan with hands on the wall, elbows little bent. Arch back, and straighten arms to push the upper body all the back and hold position for 30-40 seconds. Repeat by changing the position of legs. May do 03 times on each leg.
k. *Uthaanpratishthasan: Lizard pose. Hold for 30-40 seconds with chest and chin touching ground with pelvic as high as possible.*
l. *Kandharasan: Face up, shoulders on ground, raise pelvis, hold ankles.*
m. *Triyak Bhujangasan: Do 11 times with breath, looking at the opposite heel over the shoulder.*
n. *Twist from waist, while standing with feet parallel and 1-2 shoulder width distance apart. Spread arms sidewise to make them parallel to ground. Starting with inhaled position exhale while twisting and inhale while coming back to starting position. Then repeat same on twisting to opposite side. Hold twisted position on both sides for 20-25 seconds. Do this 03 times on both sides.*

2. *One can just hang down from a parallel bar or roman rings, and experience the stretch of waist.*

3. *Upside down hanging is also very relieving for back. This can also be done on parallel bar as well as roman rings both. Do as long as comfortable.*
4. *Stretching back to back with other help*
    a. *Stand back to back*
    b. *Raise your arm and joint them above your head*
    c. *Lean one by one, tilt other person on your back*
5. *One can lie down on a bed. Slowly slide legs and torso beyond the edge of the bed. Put both feet on the floor and let torso hang down from the edge with chest on the bed surface. Wait for a few minutes to experience the relaxation in lower back. From this position, do not go up back again, but continue sliding front to come into sitting position on the floor. From here, rise up, keeping the back straight. It has been found a very good exercise for people with lower back problem.*
6. *One can also practice yog-nidra for relaxation and pran-vidya in energizing the painful area. Though it is not an easy process for a beginner but it can be done with help from a trained guide.*

Mudra	*Maha Mudra*	*3 times*	*Morn/Even*
Dhyan		*½ to 1.5 hrs*	*Daily*

SukshamVyayam: Stand straight with feet about shoulder width apart. Put both hands at lower back. Inhale through nose and backwards as much as possible. Hold the position comfortably and then return back to the normal straight standing stance. Slowly exhale through nose. Repeat it 5-7 times.

Diet	*Avoid*	*Rice/ Wheat flour substituted*
	Take	*Green plantain, arum roots, starches, carrots, fats minimized well boiled daal, partially sour taste fruits taken like black beans, coconut, mango, curd , butter milk, ground- nut.*

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Acidity (Amal)

It's a state of indigestion, when acids are formed more and try to rush up through the esophagus generating burning sensation through the chest.

Symptoms:

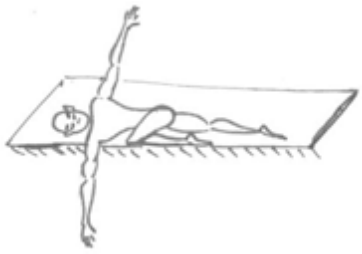
Indigestion, want of energy, burning chest and throat sensation, insipid tongue.

Cause: Oxygen converts into Carbonic acid gas and glands are motivated to secrete profusely throughout the alimentary canal, when food comes in. The secreted juices are acidic in nature. The glands overwork, the undigested food moves to duodenum and small intestine where enhanced digestion through pancreatic juice takes place. Bile also tries to help in completing digestion process. If still something is undigested matter decomposes to mix with wasted bile (Ptomania) inside the intestines and turns into virulent acidic poison. When it moves up, it gives the earlier mentioned symptoms and causes acidity. It neutralizes the acidic character of our body.

This acidity in the maturing process brings about gastralgia, duodenities, duodenal ulcers, biliary colic etc.

Treatment

1. Basti and complimentary asans like tiryak bhujangasan, waist twisting while standing.
2. After evacuation, vamandhauti.
3. Sahaj Agni sar- 50 times
4. Agnisardhouti: Morning and evening on empty stomach.
    a. Inhale + navel to spine: 10 times
    b. Exhale + navel to spine: 4 times
5. Uddyanbandh: 03-05 times daily in the morning on empty stomach.
6. Ardh Matsyender: hold for 25-30 second both sides, morning and evening.
7. Badh Padmasan: If possible, else do yoga mudra 5-11 times in padmasan, if not possible then in sukhasan.



ParshavUdrakarshan

8. Parshav Udrakarshan: On empty stomach, hold 25-30 seconds, on both sides, do 3 times or may hold 1 minute on both sides and perform just once.

Mayur Asan

9. Perform Mayurasan for 20-25 seconds on empty stomach for 3 times. Observing from back side, stomach should be seen, then the asan is in correct form. Same can also be done with padmasan.
10. Perform Nauli rotation i.e Vaam and Dakshin nauli. Make 3.5 circles clock wise and 3.5 circles anticlockwise. May perform 7-11 such sets. Or one can do from 5 -45 minutes for best results and many subtle benefits of Kundlini jagran. People with heart conditions, high Blood pressure, stomach ulcers, Dudenal ulcers should refrain from such practice.

SukshamVyayam: Stand straight with feet one shoulder width apart. Raise arms in front so that they are parallel to the ground. Inhale fully through nose. Twisting from waist without moving feet, turn your arms backwards, exhaling. After untwisting the waist, come to the standing position again as we started. Inhale fully and exhaling twist to the other side. Repeat on both side 7-11 times. Try to co-ordinate both movement along with breath. Keep lower abdomen a little sucked in to maintain correct posture.

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Asthma

Symptom:

Wind joins with mucus, exerts pressure and gives rise to dyspnea or breathing problem.

Air flows from trachea to narrow bronchi and then to the lung cells.

If narrow bronchi are attacked by mucus, spasm of chest may occur, though not fatal but very troublesome. Inset in later part of nigh, intensifies on the patient wake up.

Cause:

Weak lung nerves, narrow bronchi cannot expand

Neurons weakness also responsible

Generally caused by weakness of glands of vayu like lungs, tonsils, thyroid/ parathyroid; Agni glands like spleen, liver, pancreas, adrenal etc.

Weakness causes constipation/ indigestion/ toxins accumulation and even blood gets poisoned.

Treatment: Morning

1. Sahaj basti Kriya
2. Sahaj pranayama:
   Sit in a comfortable pose. Inhale through nose taking the chin upwards till head is tilted maximum back. Then exhaling, bring it to front again. Repeat it 15-20 times.

   Lie down on the floor with face up, arms straight by the sides of thighs. Inhale lifting left leg through 90 degrees and exhale, bringing it down again. Do on alternate legs. Repeat 11 times.

   Now instead of legs, lift left arm all the way over the head lying down till the arm touches the floor, thus moving through 180 degrees. Make sure that breath and 180 degree movement of the arm is coordinated i.e. when movement finishes, inhalation should also complete. Then move it back again through 180 degree to starting position exhaling. Exhalation should finish, when the hand touches the floor after travelling 180 degrees. Repeat on other arm too. Perform 7-11 sets.

Put hands on the waist while sitting. Inhale through nose, fill the lungs maximum, hold comfortable and then exhale. Perform 7-11 times.

While sitting, put hands on respective shoulders. Inhale, lifting the elbows backwards and exhale while bringing them to starting position. Repeat 7-11 times.

Put hands over the hand with interlocked fingers and inhale through nose, hold as long as comfortable and then exhale again slowly through nose. Repeat 7-11 times.

Raise both arms up in air, bring chin also upwards, tilting the head back. Looking up towards the sky, inhale through nose to feel the bottom most part of the lung. Hold as long as comfortable and then slowly exhale. Repeat it 7-11 times.
Note: It is felt that one should control one's breath in a way that no jerk is felt while starting exhaling from completely inhaled position and starting inhaling from completely exhaled position.

3. Agnisardhouti: 1,2,& 3. Perform 20,20 and 60 times respectively in a day.
4. Vaman; 2 times /week
5. Bharaman pranayama: 15 minutes to 30 minutes. Progress from 4 steps to 16 steps gradually.

Evening: After Bhraman pranayama, perform

Vipreetakarani

Ushtrasan

Shashank Asan

6. Veeepreetkarni Mudra: 2-5 minutes.
7. Ushtraasan: 20-25 seconds 03 times.
8. Shashankasan: 20-25 seconds, 03 times.
9. Yog mudra, 3-5 times on empty stomach.
10. Gaumukhasan. Repeat it on both sides. As we do on one side, other side lung (the arm which is raised up) is activated and breathes in more air than normal. Hence it cleanses the lungs and increases the blood flow in it. It pumps I much more oxygen into the system than the normal breathing. Take 10 deep breathings on each side.

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Blood Pressure

Pressure exerted by circulatory blood on walls of the blood vessels. It is generally measured in millimeter. Usually expressed in terms of Systolic (max), Diastolic (min) expressed in mm-hg. Normal resting blood pressure is 120/ 80 mm hg.

Hypo tensions: caused by Low blood pressure.

Hyper tension: caused by high blood pressure.

Long term hypertension is more risky and cause many diseases like kidney failure/ heart attack/ strokes.

Category	Systolic (mmHg)	Diastolic (mmHg)
Pre-hypertension	120-139	80-89

Range of Blood Pressure variations can be systematically depicted as below:

Hypotension		Systolic	Diastolic
		<90	<60
Healthy		90-119	69-79
Disease	Stage 1	140 -159	90-99
Progression in Hypertension	Stage 2	160-179	100-109
	Stage 3	≥180	≥ 110

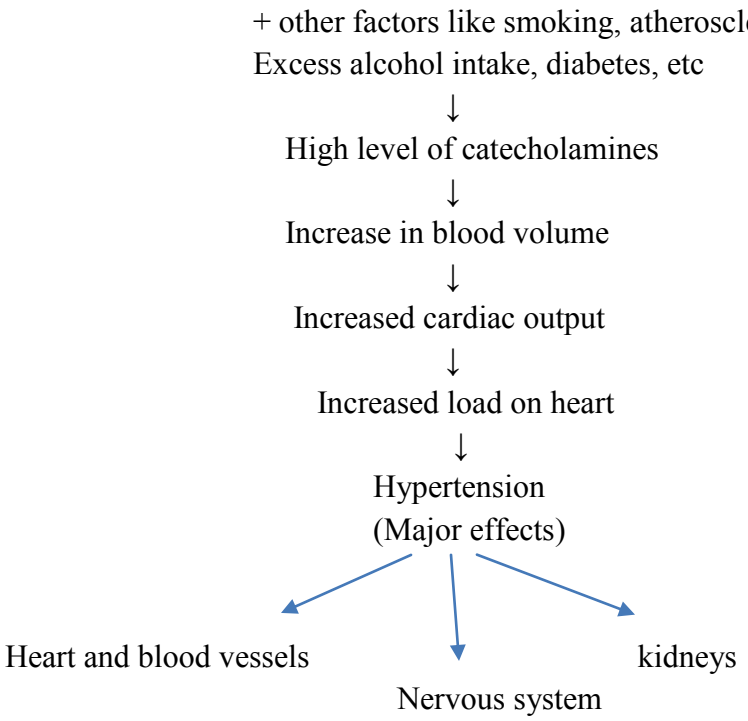
Primary (Essential) hypertension: cause of high BP unknown

Secondary hypertension: high BP caused by diseases of kidney, endocrines etc.

Pathophysiology: BP regulated by 2 hemodynamic forces: Cardiac output & total peripheral vascular resistance

Factors affecting these lead to hypertension

Genetic factors + racial & environmental factors



Symptoms: Vital signs are:

1. Respiratory rate
2. Heart rate
3. Oxygen saturation
4. Body temperature

Risk of cardiovascular diseases increases when BP range exceeds 115/75 mm/hg.

Stage	Age	Systolic	Diastolic
Infants	1-12 Months	75 -100	50-70
Pre School	1-5 yr.	80-110	50-80
School age	6-12 yr.	85-120	50-80
Adolescents	13-18 yr.	95-140	60-90

Earlier attention was paid to mostly diastolic, but these days systolic and pulse pressure (difference between two is also considered important).

Symptoms:

If blood pressure is low then following symptoms may occur.

Light headedness, Dizziness, weakness, fainting. Its cause may also be: blood loss, toxins, and sepsis Addison's diseases hormonal abnormalities eating disorder

If blood pressure is high,

1. Risk factor are
    a. Age >65
    b. Being overweight -- loose weight
    c. Eat too much salt -- Eat less salt.
    d. Do not enough exercise – exercise regularly, minimum two and a half hour workout every week, may add aerobic workouts for increasing intensity.
    e. Drink too much coffee – cut down on caffeine intake.
    f. Smoke -- Quit smoking and enjoy healthy eating habits. An easy method to calculate Blood Pressure of say a 60 yr. old person = 120 + 60/5 = 132 mm of hg. Another method for this calculation is = 100 + 60/2 =130 mm hg. Though a little variation of 2 mm is shown here in both methods.

Causes:

Protein replenishes deficiencies in the body. It is not much required by those above 40 years age, especially those who do not undergo physical activity. Extra protein taken in daily diets is useless for anybody as there is no system to store up protein in our body. *Liver and digestive glands have to drain it out of body*. If it is not drained, it rots in body vitiates the blood causes gastric troubles, kidneys, lungs and other blood pumping organs overwork and become weakened. Due to these poisons, arteries lose their elasticity and become stiffened. Thus blood cannot flow smoothly; heart has to do the extra hard pumping. This action is finally culminates in high blood pressure.

Fat accumulates inside *'superior and inferior venacova*'* and other arteries too. Passage gets narrowed. Proper amount blood cannot pass hence heart has to work extra again. Extra fats are not produced, unless there is excess of blood formation. Extra/ surplus blood raises lower instincts. Surplus blood /fat are detrimental not only to physical health but to mental health also.

* (The deoxygenated blood from the body is carried to right atrium of the heart by two venacava. Vena means vein and cavus means hollow. One which brings the deoxygenated blood from lower part of the body to our heart is called Inferior venacava while that which brings from the upper part of the body is called superior venacava.)

Liver manufactures blood, while kidneys, spleen and lungs purify it. If purifier becomes weak, pure blood becomes less and low BP is generated.

Treatment

Morning

1. SahajBastikriya with only vipreetkarni Mudra for max. 3 minutes
2. Pawanmuktasan : Perform on either leg. 4 times
3. SahajPranyam : (1 and 2)
4. After evacuation, tub Bath for 5 -10 minutes

Noon

1. Tub-Bath- 20 -30 min. (Cold tub bath for higher BP and hot tub bath for lower BP).
2. Practice Sahaj Agni Sarkriya: 50-100 times in a day.
3. Bhraman pranayama: morning and evening, ramping from 04 steps to 16 steps gradually.

Evening

Vipreetakarani Mudra

Pashchimotanasan

1. Veepreetkarni – 2-3 times, sit with one leg folded over the other leg.
2. Pawanmuktasan - 4-5 times
3. Sahaj Agni saar - 40 times, maximum 100 times in 24 hours.
4. Sahaj Pranayam = (1,2,3 7) = 2 minutes each

5. NadiShodhan
6. Ujjai in lying position: 7-11 times, 2-5 minutes.

High Blood Pressure

1. Asan:
    a. Veera –asan:
    b. Pashchimotan -Asan:
    c. YogNidra:
    d. Meditate with closed eyes.
    e. Breath through various chakras

Low Blood Pressure

2. Asans
    a. Shirshasan: 1-3 minutes, increase with practice.
    b. Salambhalasan: 25-30 seconds, 03 times.
    c. Karan- Peedaasan: join it with halasan practice itself.

Shirshasan Pashchimotansan Halasan

    d. Pachomtaanasan: 25-30 seconds, 03 times.
    e. Veerasan:
    f. Siddha- asan: As long as comfortable.

Another method for relief is explained in the figure below.

Put thumb of the same side (as ear) for support at the back of the line AB shown in the inside of the ear. With forefinger we can massage this line. If we massage it from A→B it will lower our BP and if we massage it from B→A, it will increase our BP. Thus depending upon ones requirement, one should massage. Its seen that massaging such for 10-15 minutes, it changes the BP by 5-7 points.

Diet:

Avoid Non–vegetarian diet, concentrated food, butter, ghee, sweets, and no extra salt.

Alkaline foods are best. Hence take vegetables / milk/ fruits.

Sour tasting fruits, greenish in couloir, dry fruits are all good diet in these diseases.

Jaggery/ honey in controlled quantity may be used for sugar. Fasting reduces BP.

Fast for one day/week. It may be observed on the 11th day of noon.

Night time fasting = Fast during full moon, new moon light.

If BP ≥ 160 mm/hg, then bath thrice a day with Sahaj Pranayama and Bhraman pranayama.

Reduce fat intake

Reduce total energy intake, Control Sodium Intake, (sodium – salt, baking powder, baking soda, some preservatives which are added to food (sodium glutamate), rich food like milk, eggs, meat, fish, poultry, green leafy vegetables, radish, carrot.

Common salt intake in our country is about 3-4 gm. Reduce it to = 2-3 gm. / day

Do not use medicine, which mentions sodium as its ingredients.

Further it is said that light stimulates our bodies to produce nitric acid, which dilates our blood vessels. Hence blood pressure is reduced. An approximate exposure of 50-60 minutes to sun light reduces the BP by 2-3 points and hence reduce risk of heart stroke by 10 % and heart attack by 7 %.

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Uric Acid

It is generally represented by chemical formula $C_5H_4N_4O_3$. It is produced because of oxidation of purines in the body. It is carried in the blood and is excreted by our kidneys through urine. Its active antioxidant and prevents damage to blood vessel lining. It is necessary for food metabolism. Its variation may occur in our body owing to two things, either our kidney function is not proper or its level is very high in our body.

It is checked from blood sample. Its normal range in case of men is 3.5 -7.2 mg/dl, while in case of women is 2.4 – 6.1 mg/dl.

Symptom: It could be hereditary, may be due to high stress conditions, sedentary life style, over eating especially sugary sweet drinks, white flour. Its symptoms are pain in ankles, knees, itching in big toe joints etc.

Avoid: high fat diet, oily foods, junk food, white meat products, and jams/custards, vinegar etc. Use less aspirin. Avoid tea, coffee.

Take: Vegetables and salad, low fat diet, Adrak, Ashavghandha, Nirgundi, Saunph, Pudina, guggal, pineapples, tomatoes, bananas, straw barriers, cherries, Vitamin –C food like orange, potatoes etc. Turmeric an important part in our daily cooking is good for it. Drink 2-3 liters of water daily.

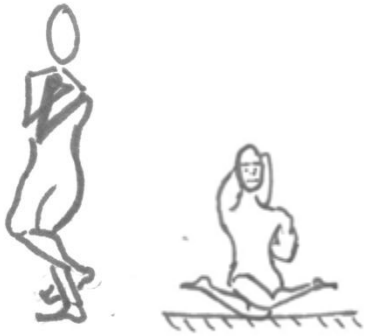
Vitamin C, D, E and K help reduces its level in our body. Its incidence is more common in men than in women.

Asan

Pashchimotan Asan

Bhujangasan

Dhanurasan



Garudasan Gaumukhasan Pawan Vimukt Asan (1 and 2 both)

1. Pashchimotanasan
2. Ardhmatsyendra
3. PawanMuktasan
4. Bhungasan
5. Gomukhasan
6. Garud – asan
7. Dhanurasan

Pranayam:

1. Kapalbhati – 500 per day.

2. Breathing through ajna chakra 11 times in a sitting, may do twice a day, morning and evening.

3. Bhastrika 21 times

Bandh:

1.Udiyan bandh

Other Kriyas:

1.Agnisar – Inhale complete and suck stomach in as long comfortable 03 times; Exhale complete and suck stomach in as long as comfortable three times; exhale and move stomach in and out for 25-100 times maximum.

2. May perform naulikriya. Move nauli three and a half circle in clockwise and three and a half circle in anti clockwise direction for seven times.

Diet : Use high fibre in diet. In India, we can use Isabgol in curd, which is very good. May consume cherries, grapes, tomatoes, amla (vitamin C neutralizes excess Uric acid) etc. Drink lot of water to help kidneys drain the unwanted out f the system. Anti oxidants are good for it. Avoid saturated fats by leaving all the junk food, soft drinks, excessive tea, hard drinks, bakery products from outside. Keep constitution of the body as alkaline and not acidic.

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Obesity

By nature women have more fat than men. They need it to build up the baby of their future off springs. But superfluous accumulation of fat leads to obstruction in normal functioning of body and leads to heart trouble blood pressure and like. Normal breathing and circulation also get seriously interfered.

Causes: reluctance to physical labour, high carbohydrate food, too much milk, butter and sweats. All the above lead to obstruction in circulation of wind, blood and other vital fluids and thus interfere in the physio-chemical functions of body. Wind cannot circulate freely in abdomen and get infuriated thus give them voracious hunger. Thus this extra burden on the system weakens the glands and the balance of is lost.

Internal secretion of pituitary, thyroid, assist our liver and spleen in the digestion. If liver and spleen fail to function than the other glands get burdened and consequently get weakened and body becomes vulnerable to all the diseases. Just Remember every pound of excess fat may mean a month of less of life.

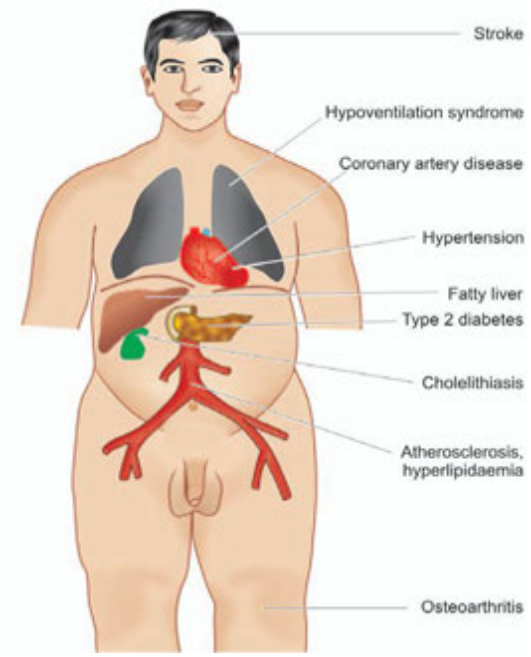
Definition: excess of fatty tissue that imparts health risk with body weight >20% than ideal body weight

Body mass index (BMI) = weight (kg)/ height (m^2): most widely used method to gauge obesity. Cut off BMI of 30 is used for obesity.

Etiopathologenesis:

Food intake and energy expenditure are both under central nervous system control
↓
Dietary imbalance & over nutrition
↓
Lead to excess fat deposition in cells called adipose cells and increase their number
↓
This increases fat content in the body
↓
Adipose cells also release substances, which affect function of some hormones in our body
↓
Over a period of time, it affects functioning of various organs
↓
These substances also increase appetite leading to a vicious cycle

Sequelae:



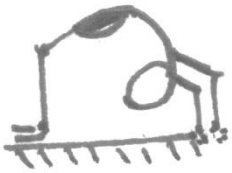
Treatment

1. SahajBastiKriya with complementary asan and mudras.

Directly after wading up if chronic constipation, mix 2 ounce lemon juice = 1 ounce command slat + 2 pint (568 gram water: 1 pint = 473.76ml) tepid water drink it. Life flat on back and perform

VipritaKarini Mudra – 3-4 minutes

Bhujangasan



Chakrasan

Mayurasna: 25-30 seconds, 3 times.

Bhujangasna: 4 times

Chakrasna – 2 times

People who are not constipated may avoid lemon juice etc.

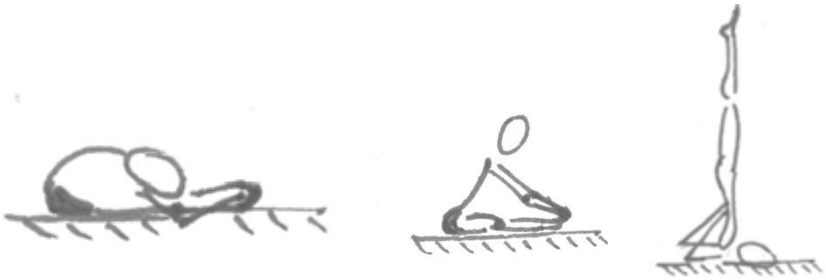
They may simply drink 2 glasses of water while sitting and do above.

Evacuation and washes

2. Sahaj Agnisara -40 times
    a. Sit in padamasna or comfortable
    b. Press the around the navel with finger , normal breathing
    c. Finger front around the navel thumbs at the back

3. Agnisar Dhouti No. 1; 10 times
    a. With inhalation, pull stomach inside after inhalation, relax and release the tension. Cures diarrhea and dysentery. Liver and spleen corrected.

4. Agnisara Dhouti No. 2
    a. 04 times Exhale, hold out breath, pull stomach in and out
    b. Repeat as many times as possible ,
    c. Then relax and breathe in
    d. Repeat
    e. Improves liver spleen and pancreas
    f. Cures indigestion acidity and gas
5. Bhraman Pranayam: progressing from 4-16 step inhalation and exhalation.
6. Yoga Mudra – 8 times
    a. Padamasna
    b. Hold right wrist with left hand at the back
    c. While exhaling bend front touch forehead at ground in front.
    d. Wait 5 seconds
    e. While inhaling go up
    f. Repeat



Janushirshasan Pashchimotan Asan Sarvangasan

7. Janushirshasna- 4 times
    a. Touch head to knee.
    b. Do both sides
8. Pashchimotanasan – 4 times
    a. Both legs front.

b. Lean front , back straight
c. Later bring chest on knees.

9. Sarvangasan – 3 minutes
10. Matasyansna –I minute. Perform padmasan. Hold both big toes with same side hands and lie backwards on the back. Raise shoulders and back from the floor and turn head inwards so tha weight is on pelvic and head. Pull the toes so that elbows are on the ground. Inhale and exhale through nose.
11. SahajPranayam : Following pranayams should progressively be done as explained below.
    No. 1 Breath with hand and leg movement. It makes our heart and lungs strong and thus makes one strong against attack of infections of cold and cough. Rheumatism of hand and feet also checked.
    No. 2 In hale deep through nose and exhale slowly through mouth for 3-5 minutes. Alleviates problems of stomach, liver, defects of lungs, skin problems especially in children.
    N0 3 Sit and inhale exhale through nose by raising and lowering of chin for 3-5 minutes. Keep exhalation longer. It cures colds, coughs, influenza, pneumonia, typhoid etc.
    No. 4 Sit comfortably, exhale fully and suck in the navel. Cures indigestion, flatulence around stomach. It tones testes in men and ovaries in women.
    No. 5 Lie down, interlock fingers over navel region. Inhale through nose and feel pranic energy entering the navel region. Exhale through nose feeling the energy radiating through all parts of the body.
    No. 7 Perform anulom and vilom starting from left nasal passage. But one must exhale first through the nasal before starting to inhale. Thus inhale through left, exhale through right, inhale through right and exhale through left. This completes one cycle. Perform 9-11 such cycles. It cure cold and cough, purifies blood.

Suksham Vyayam:

Increasing the power of stomach: Stand straight with feet close together. Put hands on the waist with thumbs pointing towards the navel and fingers towards the vertebral column at the back. Bend from waist forward through an angle of 30 degrees as in fig 1. Inhale forcefully thorough nose by extending the stomach forward so that diaphragm is used to expand the lungs. While exhaling suck the stomach in. Continue this synchronized movement for 25 times and perform 3 sets.


fig 1

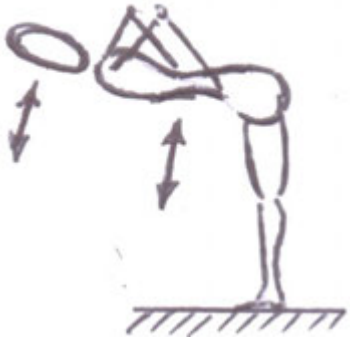


fig 2

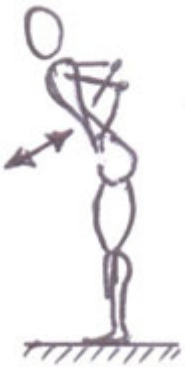


fig 3

Stand straight with hands on the waist as earlier. Inhale deep and exhale bending forward through 90 degrees as per fig 2. In the bent position, one is totally exhaled. Thus holding the breath out, quickly move the stomach in and out. A maximum of 100 times in 24 hours can be done. One may do it in one go or in small sets as convenient.

Position of hands and body is same as in figure 2. But in figure 3, one breathes in and out through nose forcefully with movement of stomach along with it. On inhalation, stomach is extended while on exhalation it I sucked inside.
Stand straight, looking on to the floor at a comfortable distance. Inhale through nose extending the stomach and exhale, sucking the stomach in. Repeat it as shown in the figure below for 25 times. May repeat 3 sets.


fig 1


fig 2

Developing Waist power: Stand straight as in fig 1 with hands at the back on either side of vertebral column. Inhale through nose and exhaling bend backwards as far as possible (fig 2) and hold position for a few seconds. Return back to position 1 and inhale. Repeat 5-7 times.

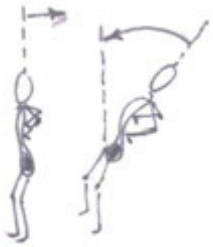


fig 1 & 2

fig 3

fig 4

Now Keeping feet one to one and half shoulder width apart as in fig 1, inhale through nose, exhaling bend forward bringing chest close to thighs and head towards the knees as in fig 3, keeping legs straight. Come back to position as per fig 1 again and inhale.

From fig 1 bend forward exhaling to fig 3 and inhaling to fig 4 (backwards). Repeat it continuously 5-7 times.

From standing position inhaling go backwards as in fig 5 and bend all the way forward exhaling through nose so that head touches ground as in fig 6.

fig 5 fig 6

Stand as in fig 7 with warms straight by the sides. Inhale and go into position as per figure 8, exhaling come to position as per fig 9 keeping arms straight.

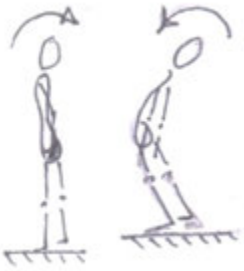


fig 7 fig 8

fig 9

Repeat 5-7 times.

Stand straight inhaled and extend arms sidewise as in figure 10. Exhaling bend from waist towards left and NOT from shoulders and try too brings left hand as closer to pelvic as possible. Inhaling return to fig 10 and bend in opposite direction towards right as shown in fig 11.

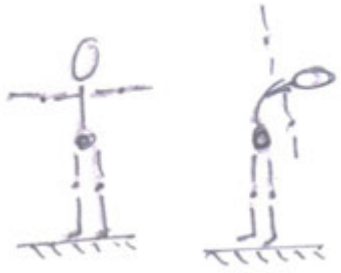


fig 10 fig 11

Repeat movements on both sides 5-7 times.

Stand about 1 to 1.5 shoulder width apart as shown in fig 12. Raise arms upwards inhaling. Exhale and bend forward from left towards right in a circle. While bending backwards moving from the right to the left, inhaling complete one circle. This way, make one circle clockwise and one circle anti clockwise. Perform 5-7 such sets.

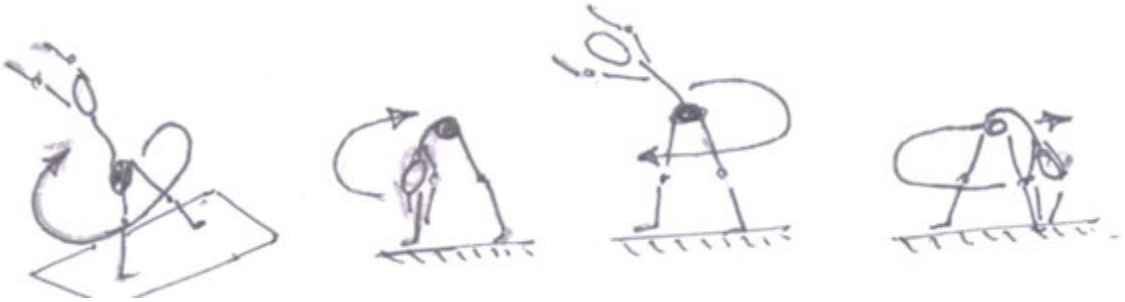


fig 12 fig 13 fig 14 fig 15

(fig 12 to 15 depicts one clockwise circle. Repeat same on the other side i.e. anti clockwise)

Diet: Use easily digestible diets. Avoid junk food, soft drinks, too much milk tea cups, excess fat content dairy or bakery products. Eat food in small bites, chew each one 32 times. Keep digestive system in proper shape. While reducing, some people loose weight first, inches later, while others may loose inches first, weight later. So proper noting of the record will help us to have a clear picture of the whole process.

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Heart Diseases

HEART DISEASE

Definition: Imbalance between supply of oxygen and demand by heart leading to insufficient oxygen and nutrients and inadequate removal of metabolites. It can be acute or chronic. Also called Coronary Artery Disease.

Coronary Heart Disease: Inadequate supply of blood to the myocardial heart muscles due the obstruction in the flow of blood through coronary arteries.

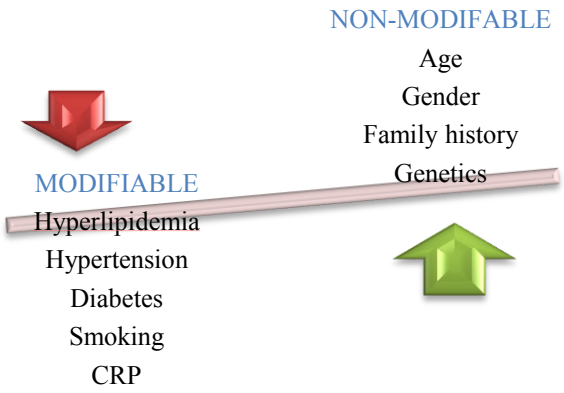
Arteries carry oxygenated blood from heart to body tissues while veins carry deoxygenated blood from body tissue to heart.

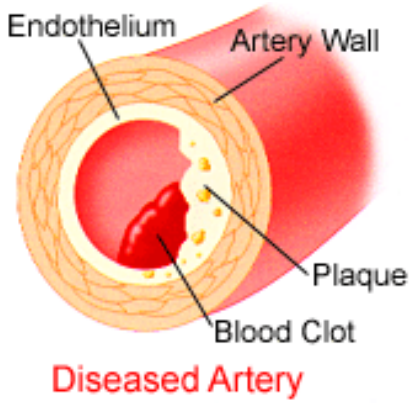
Angina Pectoris: if 60 -70% of lumen of coronary artery blocked, significant reduction of blood flow occurs. The patient experiences tight pressing severe pain across the chest after exertion or hard work.

Myocardial Infraction (heart Attack): When clot is formed in convergent artery, it results in complete blockage of blood to that part of myocardial which is being supplied by that particular artery, functional capacity of heart is reduced.

Congestive Heart Failure: The heart muscles become too weak and unable to maintain blood circulation. It results in fluid imbalance or accumulation of fluids in lungs and other parts. Added problem in breathing and more stress on heart... leads to death. Risk Factors: It is a multi-factorial disease. Various factors can be clubbed broadly under three heads.

Risk factors:





Etiopathogenesis:

All these risk factors including atherosclerosis lead to increased burden on heart thus it is unable to work efficiently leading to inadequate blood supply to various parts of body.

This leads to death of heart muscles due to reduced blood supply.

Thus leads to death of heart as well as affects other organs due to reduced blood supply.

Personal Characteristics :

Age: above middle age chances of CHD increases

Gender: Men are more prone to it.

Sedentary Life Style

Stress, Hypertension

Smoking

Obesity

Diet: Which increase fat and cholesterol in our body, which are preliminary causes of it.

Disease's like diabetes as it stresses various organs and lead to their failure.

Hi cholesterol level in blood.

Management :

Keep fat and cholesterol level in blood within limits

Prevent clinical symptoms (angina, myocardial infraction and congestive heart failure)

Recommended Diet:

Proteins: 1 g / kg body wt.

Fat: 10 -15 gm. (2-3 tsp.)/ Day

Vitamins and minerals: present in adequate quantity.

Take care of fat soluble vitamins.

Modification in diet:

Cut down intake of food.

Avoid fat rich food

Encourage whole grain cereals, whole pulses cut down refined cereals.

Milk and mild products, fresh food checked for their fat content before consumption.

Increase intake of fibrous food and vegetables

Less of sugar and sweeteners

Use baking boiling, steaming instead of frying to cook

No nuts,

No fried items and sweets

Do not use refined oils and excessive fatty products for cooking. Generally olive oil is suggested. Even taking 20 ml of olive oil raw every day reduces the cholesterol level, which is one of the primary ingredient for the disease.

Exercises:

1. Lie down on the floor or bed facing up. Inhaling raise leg upwards as comfortable and exhale bringing it down. Repeat same on both legs. Repeat 5-7 times.
2. Raise one arm taking it all the way above head so that it touches the floor/bed inhaling. Exhaling bring it back to the starting position. Repeat on both arms 5-7 times.
3. Sit comfortably, just slowly inhale through nose long and deep without strain and slowly exhale. Repeat 10-15 times.

4. In case of emergency situations, when one doesn't have any medication nearby, lie down keeping legs kept on a higher level and hold Hrid mudra. This mudra can be made by rolling the forefinger into the web of the thumb and joining the tips of middle finger, ring finger and thumb together till one reaches safe facility. It can be done on either hand or both, if patient cannot do himself, one can make his finger into such position and tie up with the help of a tape or something.

SukshamVyayam: VakshSthal Shakti vikasak

Stand with feet one shoulder width apart. Keep body straight and relaxed. Arms are straight by the sides of thighs. Now raising arms upwards and backwards inhale through nose. Lean backwards as far comfortable. Stay in that backward bended kind of position as long as comfortable. Slowly exhaling through the nose, come back to the starting position. Perform 5-7 times in one set. It removes all the problems of our lungs, makes our chest wider and cures the problems of heart and strengthens it. Those who are already suffering from such diseases should perform it after toilet and bathing in the morning. Performing it for even five minutes daily gives good results.

Make sure our digestive system in kept in the best state. There should be no indigestion or gas formation in our body. One of the easiest way is to take small bites while eating food and chew each bite 32 times before gulping it down the food pipe. Though it seems very simple but is a great cure for many of our indigestion troubles.

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Hemoglobin

Iron stands for 'Hemo' and 'Protein' stands for globin, thus the name Hemoglobin. Hence it contains both fats and proteins. It is tested from blood sampling and values are as given below. Hemoglobin deficiency reduces the capacity to bind oxygen with blood or we can say that capacity of blood to carry oxygen decreases. Thus blood carries oxygen to various tissues in our body and releases it there to help in metabolism. Iran present in the blood is responsible for binding oxygen with it. Good quantity of iron in blood is thus useful in carrying oxygen around. When we are doing tiring work, we feel burning sensation in or muscles which is due t the generation of lactic acid at those locations. Oxygen present in our blood helps us to overcome it. More the oxygen, lesser this burning sensation. Thus we can say oxygen rich blood will raise the endurance level of our body. Decrease in Hb leads to anemia.

It is tested from blood sample. Elevated values of hemoglobin can be due to increased presence of red blood cells due to many reasons like CHD, smoking, high altitude living, dehydration, advanced lung diseases etc.

For Men -> 13-18, Women –> 12-15, Pregnant women -> 11-14, Children -> 11-16 (hg) gm. / 100 ml of blood. If deficient cause lack of oxygen carrying capacity in blood . A person gets quickly tired. Difficulty in making sustained physical effort, which is anemia. Thus general symptoms can be said to be fatigue, giddiness, breathlessness on exertion, sleeplessness, Palpitation loss of appetite, feels someone is pricking the finger tips/ nails, nails of fingers and toes become brittle and spoon shaped, tongue seems glazed / smooth because of atrophy of papillal / Projection on tongue. Thus it can occur due to dietary deficiency or loss of iron. 100 ml = 1 deci-litre.

General values referred to for Hemoglobin are as follows:

New Born = 17-22 gm/dl; !week old = 15-20 gm/dl; 1 month old = 11-15 gm/dl

Adult male = 14-18 gm/dl; Adult female = 12-16 gm/dl,

Middle aged male = 12.4 – 14.9 gm/dl; Middle aged women = 11.7 – 13.8 gm/dl.

Loss of iron occurs in women during pregnancy (stored in fetus), delivery (due to blood loss and placenta), menstrual cycles(loss of blood), and lactation (iron lost in breast milk). It can occur due to deficiency of folic acid and B12. Thus folic acid and B12 tablets are given as supplement.

Clinically, Hemoglobin in the blood can be raised by giving one tablet (Ferrous sulphate 150-180mg) twice or thrice a day. Generally treatment is continued for 3 months till the levels come back to normal. Certain people have found that taking pomegranate juice every day for 10-15 days also improves it. But it may cause certain side effects like constipation, dis-coloration of stool, gastric upset like nausea. Rice

flakes, palak, amaranth, lotus stems, groundnut, are all good sources of Fe but should be supplemented with Vitamin C to enhance its absorption in our body. Generally iron(Fe) bonded with proteins is safe while that with low affinity complexes is termed as free is harmful. It is generally stored in marrow, spleen and liver. The inner lining of the intestines absorbs iron from our food. Overload of iron also damages the lining of our intestines.

Treatment:

Functioning of liver and intestines should be proper for better absorption and metabolism of iron in our body.

Thus we can follow the following asana schedule as detailed,

Ardhmatyendra, Poorn-matsayendra, Udiyan Band, Naulikriya, MayurAsan with padmasan, ParvatTrikonasan.

Ardh-matsyedrasan

Pranayam:

1. Following pranayams should progressively be done as explained below.
   No. 1 Breath with hand and leg movement. Makes the heart and lungs strong. Makes one strong against attack of infections of colds and coughs. Rheumatism of hand and feet also checked.
   No. 2 In hale deep through nose and exhale slowly through mouth for 3 minutes. Alleviates problems of stomach, liver, defects of lungs, skin problems especially in children.
   N0 3 Sit and inhale exhale through nose by raising and lowering of chin for 3-5 minutes. Keep exhalation longer. It cures colds, coughs, influenza, pneumonia, typhoid etc.
   No. 4 Sit comfortably, exhale fully and suck in the navel. It cures indigestion and flatulence around stomach. It tones testes in men and ovaries in women.
   No. 5 Lie down, interlock fingers over navel region. Inhale through nose and feel pranic energy entering the navel region. Exhale through nose feeling the energy radiating through all parts of the body.

No. 6 Perform anulom and vilom starting from left nasal passage. But one must exhale first through the nasal before starting to inhale. Thus inhale through left, exhale through right, inhale through right and exhale through left. This completes one cycle. Perform 9-11 such cycles. It cures cold and cough, purifies blood.

No . 7 Sit comfortably. Make fist with both hands and bring them together in front of the chest keeping both arms horizontal to the ground. Now inhaling through nose, pull the fists outwards so that the elbows go backwards, thus, opening the chest. Fill up the lungs with oxygen. Wait for a few seconds and then exhale bringing the fists back in front of the chest. Do this gently. It will mix more oxygen in the blood.

Diet: Eat pomegranate or have its juice daily for 2-3 weeks.

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Iodine disorder

It is just a trace element present in our diet. It is responsible for Goitre (swelling or enlargement of thyroid gland), Cretinism (if a child is born to iodine deficient mother, it interferes with the brain development of the fetus. Thus it can cause irreversible damage even before birth. The child is likely to suffer from hypothyroidism. If this condition continues further after the birth in the child, then series of disorders like retardation, growth failure, speech and hearing disorders, neuromuscular disorders, paralysis. All these effects might lead to a retarded deaf-mute or cretin), breast cysts and intellectual disability. Our thyroid gland secretes two hormones namely, thyroxin and triiodithyronine, which provide iodine to our body. Seafoods are good source of iodine while in general cases, iodine is added commonly to table salts in our households to cater to our body needs. Certain chemical substances like goitrogens(goiter producing substaces) interfere with iodine utilization by our thyroid gland. Foods like cabbage and reddish contain goitregens. Thus eating them in large quantity also cause iodine deficiency.

Low iodine may be due to pregnancy, exposure to radiations, smoking, alcohol, oral contraceptives, increased calcium intake, occurs more in women, celinium deficiency.

Various defects seen clinically due to its deficiency are

Goiter= various grades depending upon swelling size, Hypothyroidism = less secretions of thyroxin can be of variable Severity, Subdued intelligence, hearing defects, squint, spasticity, endemic cretinism = Spontaneous abortion / miscarriage.

To test a person is given iodine and his urine samples are checked in the next 24 hours. If percentage of iodine less than 90 in urine sample it means iodine has been retained by our body, which indicates its deficiency.

IDD is order; less than 150 microgram /day for men while in case of women it can be from 150~300 microgram per day. Each 10 gm of iodised salt provides 150 micro gram of iodine. We generally take 10-12 grams everyday. Even iodine injections are also given to the patient, which are good enough for 2-3 year iodine requirement of the patient. But being expensive, they are not accessible to general populace.

Ariboflavinosis

It is a condition arising out of deficiency of riboflavin i.e Vitamin B2. It is one of the most common of among the various B complex deficiencies. Its clinical features are as below.

Angular stomatitis

One of the symptoms is angular-stomatitis. Crack on both sides (angle of upper and lower) of lips. Among children it is as high as 30-35 %.

Glossitis: This prevalent more among women, especially during pregnancy. Tongue becomes raw and red, burning sensation when spice rich food consumed, tongue may develop cracks as well.

Cheilosis: Lips develop cracks and may become red. It may cause loss of the appetite.

Prevention:

B complex tablet may be given one per day for 7-10 days. Milk, Green leafy vegetables, whole cereals and pulses are a good source of it. Iodised salt should be used in deficient areas.

Yogic Cure:

Asan: Perform Ushtrasan, Matsyasan and breath through nose forcefully.

Ushtrasan

Matsyasan

Stand straight and move neck from side to side 10-15 times. After this move chin up and down 10-215 times.

Perform Jallandhar bandh while sitting comfortably 5-7 times daily.

Perform Ujjai breath in swadhishthan by contracting the neck area and emanating a sound 11-21 times daily.

Chant 'Ham' and rotate it in clockwise direction in the whole neck horizontally. Repeat 9-11 times morning and evening.

****

Cholesterol

Its origin is from Greek word Chole + Stereos + ol. 'Chole' stands for Bile, 'Stereos' stands for Solid and 'ol' stands for alcohol. It is the essential component of animal cell membrane and not found in any plant or bacterial form. It is a kind of modified steroid or an energy carrying lipid molecule. Cholesterol enables the animal cells to exist without any cell walls to uphold or protect its membrane integrity and cell viability. Hence they can change their shapes and move about unlike plant or bacterial cells, which are bound by the membranes and hence restricted.

It's a fat like substances present in our foods, different from fats and oil like triglycerides. Plant food like mustard oil, ground nut oil, Soya oil, nuts, and oil seeds do not contain it while animal foods: milk egg, ghee, butter, organ meats are all sources of cholesterol.

In Liver, cholesterol is converted in to bile, which is stored in gall bladder. It can not travel on its own inside our blood. It has to join with certain proteins to achieve that result. Cholestrol is categorized in two forms LDL(Low density Lipoproteins) and HDL(High density Lipoproteins). Generally people refer to LDL's as bad cholesterol while HDL's are referred to good cholesterol. When it joins with low density lipoproteins(Lipoproteins transfer fats around body in extracellular fluids and can be sampled from blood) it is known as LDL but when it joins with high density lipo proteins it is know as HDL. LDL, generally know as bad cholesterol clogs the arteries and makes blood flow difficult. A single LDL is about 220-275 angstrom in diameter and typically carries 3000-6000 fat molecules. Increasing concentration of the LDL particles may cause accumulation within the artery walls in the form of plaque. Sometime this plaque suddenly ruptures sending clots within the artery walls, may narrow or close the artery even. Thus, resulting in to cardiovascular diseases, strokes and vascular diseases.

The HDL contains 80-100 proteins and transport hundreds of fats molecules with it. However they carry fat molecules from the cells, which want to export fat molecules. It has been found that HDL reduces plaque formation inside the arterial walls as described above hence reducing the risk of cardiovascular diseases. Low levels of HDL in blood (< 40 mg/dL) increases rate of heart diseases. HDL carries the cholesterol back to liver for treatment and hence is called good cholesterol.

Inside digestive tracts, fats dissolve in bile salts, is digested and absorbed in intestines along with vitamins A, E, D and K. It is an important precursor molecule for synthesis of Vitamin D, Adrenal gland hormones(aldosterone, cortisol) and Sex hormones(Progesterone, estrogens and testosterone). Some researches say that it has antioxidant qualities too. Thus some cholesterol is generated inside our body while some is brought in through foods we eat.

To sum up, it plays an important part in our body:

1. It's structural component of body cells membrane.
2. It's broken down by our liver to form bile salts, which are important for digestion and absorption of fats and some vitamins.
3. Also necessary for synthesis of many body hormones

4. However, Extra Cholesterol is harmful. Within cell membranes it helps in intercellular transport, nerve conduction and cell signaling.

Its sources are Cheese, egg yolk, pork, beef, poultry, fish, Shrimp and breast milk. All foods containing animal fats contain cholesterol to varying extents. About 15-75 % of dietary cholesterol is absorbed by us. On an average 50% values is taken and rest is excreted through body in feces.

It is tested through blood sample. Safe HDL limit for both men and women is <200, while of LDL it is <70. Generally cholesterol along with blood pressure is associated with coronary heart diseases. Liver produces about 1000 milligram per day, which is used to produce vitamin D, certain hormones, cell walls, bile salts to digest fats etc.

Cholestrol level	< 200 mg/dl	Lower heart risk
,, ,,	200-239 mg/dl	Borderline risk case
,, ,,	> 240 mg/dl	High risk case

Latest studies indicate that desired LDL should be < 100.

Generally Cholesterol : HDL ration should be 5:1.

VLDL = Triglyceride/5; LDL = Total Cholestrol - Total HDL – Estimated VLDL.

But if Triglyceride value is > 400 mg/dl then it should be checked independently and not calculated.

Treatment:

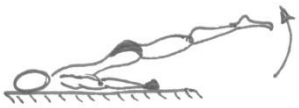
Thus a system which can enhance the functioning of the liver, improve digestive system, improve working of our kidneys and drives out toxins from our body and provide stress free living will help in combating this condition. Keep it in mind one should follow the following schedule.

Digestive system: For improving the jatharagni do the following asans regularly, namely Ardhmatsyendrasan, ParshvaUdrakarshanasan, Mayurasan, Vajrasan, Shalabhasan, Pawanvimuktasan, Chakrasan, Dhanurasan.

Ardhmatsyedrasan

Parshav Udrakarshanasna

MayurAsan



Shalabhasan

Chakrasan

Dhanurasan

Liver functioning: Pashchimotanasan. Agnisar(100 times/24 hours),

Bandh: Udiyan.Pranayam: Jal and Sutra Neti, Kapalbhati-500, Anulom Vilom-11, Bhastrika: 21, guided shavasan. Breathing through the ajna chakra.

Diet: Take 15-20 ml of raw Olive oil daily. Avoid junk foods.

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SCIATICA

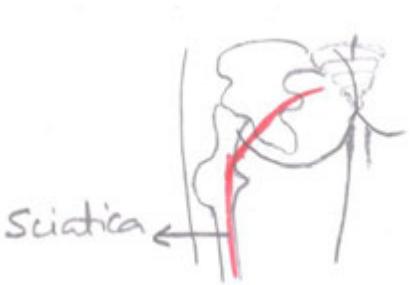
Definition: Sciatica is a pain that radiates from the low back down a lower extremity; it is caused by irritation of the sciatic nerve. It is more of a symptom than a disease.

The sciatic nerve transmits sensation from the lower extremities and lumbar area of the low back.

It is common for people to recover from sciatica without a surgical operation.

Pain typically occurs in the distribution of a dermatome and goes below the knee to the foot. It may be associated with neurological dysfunction, such as weakness.

The pain is characteristically of a shooting type, quickly traveling along the course of the nerve. Thus it is a symptom rather than a disease. Can cause bladder bowel control loss and muscle weakness. 90% of it is due to spinal disc herniation of lumber or sacral nerve. If proper system is employed to cure it , same may happen within 7-10 days.



Sciatica Nerve

Causes: It is mainly due to irritation or pressing of sciatic nerve. It is sometimes caused by disc herniation in lumber region also which irritates its nerve roots.

- 90% of it is due to Spinal disc herniation of lumber or sacral nerve.
- It may be due to bone spurs, inflammation, herniated discs
- Spinal stenosis
- Piriformis syndrome
- Pregnancy
- Tumors
-
- **Pathophysiology:** Sciatica is generally caused by the compression of lumbar nerves L4, or L5 or sacral nerves S1, S2, or S3, or by compression of the sciatic nerve itself.

General asans used are bhujangasan, Ushtrasan, Trikonasan, Veerasan, Ardhchandrasan, Marjariasan, Setubadhasan, Prashavudrakarshanasan, Titliasan, Ardhmatsyendrasan. Sit in a comfortable asan on empty stomach and perform

Agnisar 1: Inhale fully through nose and suck your stomach in. Hold as long as comfortable. After that release your breath comfortable through nose. Perform three times.

Agnisar II: Inhale fully through nose first and then exhale fully and suck the stomach in as if to touch it with spine. Hold as long as comfortable, then inhale. Perform three times.

Agnisar III: Exhale fully and move stomach in and out. Do maximum 100 times in 24 hours either in one go or in many sets, in one sitting or in many sittings, as per convenience.

General sequence of movements is being given below for help of the readers.

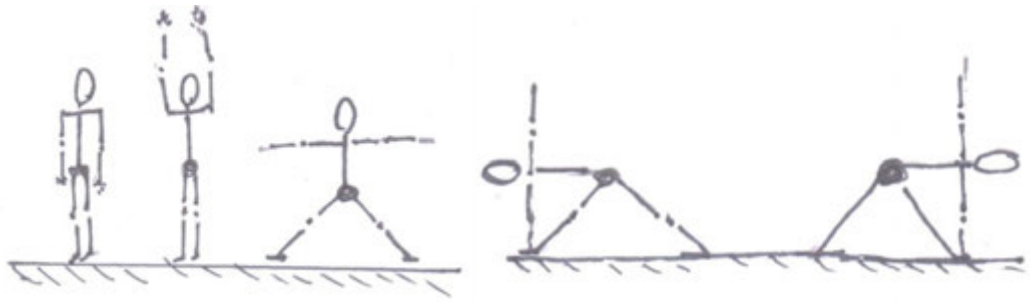


fig 1 fig 2 fig 3 fig 4

Stand as per fig 1, inhaling raise arms above head as per fig 2 and move into position 3. Exhaling bend towards left side from waist and touch right hand to the right ankle or floor as per fig 4. Twist waist in such a way that both shoulders are in vertical line and one is looking upwards with turned neck. Hold 10-15 seconds in this position and then inhaling come back to position of fig 3. Now bend into the opposite direction for touching left toe in the same way as done on the other side.

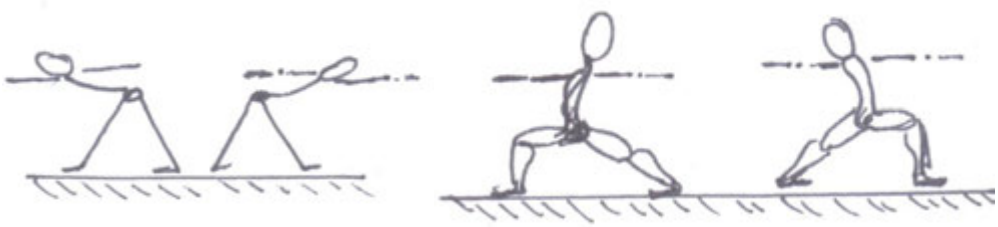


fig 5 fig 6

From fig 4, inhaling raise arms above the head and bend forwards towards right so that chest is as parallel to floor as possible along with arms which are in straight line and parallel to ground. Hold for 15-20 seconds stretching from waist to fingertip in forwards direction. Repeat on the other side too.

After completing fig 5 exercise, again inhale deep raising both arms over the head straight upwards and then bend right leg so that thigh is parallel to the ground and rear leg is straight.

Arms are in one straight line, parallel to the floor and upper body is vertical to floor. Hold for 30-45 seconds, strengthening the thighs. Repeat same on the other side too.

fig 7

fig 8

fig 9

Bend left leg, keeping right leg heel on the ground, leg straight, toes pointing up as per figure 7. 80% weight is on rear leg. Bending from waist, try to hold the toes of the front foot with both hands and pulling oneself forward, thus stretching the whole back. Hold for 15-20 seconds. Repeat on the other side also.

Sit with legs spread in front as per figure 8. Put right hand on the outer side of left thigh twisting the waist and take the other hand as back as possible giving maximum twist to waist. Keep upper body as straight as possible. Hold 15-20 seconds. Repeat on other side too. Do it 03 times.

Perform Udrakarshanasan as per figure 9. Hold on either side from 30-45 seconds. While holding position try to exhale completely, put both shoulders on the ground, folded knee should be pulled as far up as possible, lower leg should be kept straight and neck should be turned to the other side of folded leg.

fig 10

fig 11

fig 12a

fig 12b

from fig 9, lie down facing the floor with back up. Put both hands under the shoulders and inhaling curl neck up first, then slowly raise the chest off the ground, arching the back. Try to look up towards the ceiling as far back as possible. In the second stage raise the whole body on hands and both insteps so that thighs are not touching the ground. In the third stage, widen the feet a little bit and turning neck towards right shoulder, try to look at the left foot heel over the shoulder. Then inhaling turn the neck back to front and exhaling turn it towards left shoulder, look at the right foot heel. Thus repeat it for 7-10 times.

From ten bring left leg front up and put right leg knee on the ground as in fig 11. Raising arms up and backwards inhale deeply. Arch back as far as possible and then hold for 15-20 seconds. Repeat same on the other side too.

Perform Ushtraasan as per fig 12a and 12 b. Hold for 15-20 seconds. While performing asan, try to bring whole pelvic region as far front as possible and back should be arched as much backwards as possible.

fig 13

fig 14

Perform Marjariasan as per figure 13. During first figure, back is humped back and breath is exhaled while in second position back is arched and face is upwards and breath is inhaled. Perform it 8-10 times.

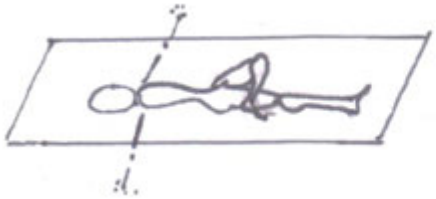


fig 15

fig 16

fig 17

Lie down on the floor with face up. Fold left knee and keep the folded leg over the straight right leg. Touch folded knee on to the ground and arms are on the floor in one straight line. Hold for 15-20 seconds, repeat on the other side too. Perform 3 sets.

From lying down position inhale and fold both legs. Exhaling hold both knees, bringing thighs close to the chest, lifting the shoulders, put chin on the knees. Hold for 10-15 seconds. Release the hold and lie down facing upwards again. Repeat three times.

Perform Ardhmasyendraasan on both sides 15-20 seconds. When in twisted pose perform 2 kapalbhati pranayama too.

fig 18

fig 19

Sit with legs straight in front on the floor. Bending knees, draw both feet towards the groin area and hold both toes with hands so that the heels are touching the space between the legs. Keeping back straight, move knees up and down like flapping of the wings of a butterfly, as shown in figure 18. Do it for 30-50 times.

After this lie down as per fig 19 in shavasan for relaxation. After that roll towards left side and raise the body by putting weight on the right knee.

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MIGRAINE

Definition: It is a mysterious disorder characterized by pulsating headache, usually restricted to one side, which comes in attacks lasting 4-48 hrs and often associated with nausea, vomiting, sensitivity to light and sound, vertigo, loose motions etc.

Generally it starts after puberty and continues till late middle life.

2 major types:

- **Migraine with aura (classical migraine):** headache is preceded by visual or other neurologicalsymptoms experienced by patient.
- **Migraine without aura (common migraine):** pulsatile dilatation of certain large cranial vessels.

Pathophysiology: In this two theories have been proposed.

1) **Vascular theory:** Initial vasoconstriction or shunting of blood through carotid arterio-venous anastomoses produces cerebral ischemia and starts the attack.
2) **Neurogenic theory:** Spreading depression of cortical electrical activity followed by vascular phenomenon. Some triggering agents produce neurogenic inflammation of affected blood vessel wall.

Causes: As per our allopathic treatment method its causes are largely unknown; Genetic predisposition and environment are also considered factors contributing to it.

Triggering agents:

- Physiological: s
- tress, hunger, fatigue, post-traumatic stress disorder, menstruation
- Dietary:
- Environmental:

As per Ayurveda, the brain nerves are affected by vitiated bile. Coolness of night/darkness of a room, ameliorates the condition as bile sis soothed by cold. Thus according to Aurveda , main causes are vitiated bile, less blood supply to brain and mucous at the root of the nose.

Treatment:

Pranayam:

1.Sahaj pranayama: inhale through nose raising one leg and exhale while lowering it down. Do in both legs, repeat same on arms too but raise and lower both arms together; Perform 11 anulom –viloma.

2.Perform bhraman pranayama. Start with completing one of the breath ramping in four steps and then exhale the breath also in four steps, while walking. Progressively increase it to 6,7…. 9,10 …up to maximum 16 i.e. perform one complete inhalation in 16 breaks in 16 steps while walking and exhale one breath in 16 breaks while walking 16 steps. Perform it twice as day.

3.Do jalneti regular as explained in the yog section of this manual. Perform Nadishodhan and sheetli too.

4.Perform Vamandhouti and Barisardhauti twice a week. Perform shankhprakshalan at least once a month for three months and then once in three months.

5.Hold cough reduction mudra (press third and fourth finger down with thumb). It can be done on either hand or both. It can be performed in any position. It should be done maximum 20 minutes in 24 hours.

6.Make load on digestive system light by abstaining from non-veg diet, alcohol, excessive masala diet, junk food, soft drinks. Eat all kinds of seasonal fruit, soups, boiled vegetables, pulses and milk.

7. When one side of the head is paining, close the opposite side of nasal passage by inserting a cotton ball or something. Thus one would continue to breath through one nostril only. This can be done at night, to avoid any inconvenience. Whichever nasal passage is to be stopped, keep any round object like a paper weight pressed in the armpit of opposite side. If that is not possible, then lie down on the opposite side.

8. Perform 400-500 kapalbati, to clear off the forehead area. 21 Bhastrika can also be done.

9.It is seen in many cases application of chandan paste on the forehead also helps in alleviating pain.

Vajrasan

SalambShirshasan

SalambVipreetakarani

10. Sit in Vajrasan or sukhasan or in chair if you can sit on floor, keeping back straight and relaxed, inhale through nose while raising our chin, exhale through nose while lowering the chin to starting position. Do it 21 times and then come to child pose or putting your knees on the floor, holding your ankles, raise your pelvic or hips up and touch the forehead to ground. Perform Salamb Shirshasan, Sarvangasan, Paschimotanasan, Marjariasan.

11.Putting feet and knees on ground, raise both arms above head. Now bending from waist, exhaling touch ground, inhale again raise your body up. Take long and deep breaths. Do it 11 times, and perform lizard pose, from where one can slide into lying pose with face up. Undergo shavasan practice under experienced directions.

Diet: Use fibrous diet, may take isabgol with curd daily. Keep digestive system in perfect order. Avoid soft drinks and hard drinks, smoking and excessive tea.

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PCOS

(Poly Cystic Ovarian Syndrome)

It's a female problem and hence understanding of functioning of ovaries is essential for it. Ovaries are reproductive glands, total two in number, and located one each on either side of the uterus. Each is size of a walnut, produces female ova(egg), female hormone estrogen, progesterone, help in development of body shape and hair. Regulate menstrual cycles and pregnancy.

The ovarian cysts are closed sack like structures, within the ovaries, contain liquid and semi-solid substances. If it is big, it may cause abdominal bloating, fullness and indigestion.

If testosterone level is higher, then hair can grow anywhere even in palms of our hands and soles of our feet. It can grow in face, in the cleavage, around nipples in women are common. It is checked through blood and saliva samples. It can be due to birth control pills, insulin and steroid like cortisone. Regular exercise is essential. Foods with low glycemic load can bring insulin down and the effect of increased endrogen production.

Testosterones are secreted by testes of men and to some extent by ovaries of women. It is also secreted by adrenal glands. Males generate 7-8 times more than adult females. High amount of endrogen causes more hair growth. Endrogens are produced by Ovaries, Adrenal glands, fat tissues. From there, it travels to blood, then to hair follicles, where testosterone is converted to active follicle form.

Causes: Stress, strain, highly ambitious women, perennial tensions, modern faulty life style, high anxiety, depression.

Symptoms: Irregular MC, ovarian cyst, dandruff, abdominal bloating, frequent mood swings.

Consequences: Hear attacks, strokes, diabetes, anxiety disorders and uterine cancer.

Androgen is increased and Progesterone decreased, which leads to increase in testosterone production.

Treatment:

Pranayam:

Perform nadishodhan 11 times twice a day, Bhramari 11 times twice a day, Kapalbhati 500 times in a day.

Bhujangasan

Asan:

Tittliasan: Sit with legs stretched in front on the floor. Draw feet in holding the toes of both feet with both hands so that heels are on the urethra area in pelvic floor. Holding the toes firmly with hands move the knees together up and down like a butterfly flapping its wings. Do it for 2-3 minutes.

Surya namaskaar: It is an important exercise pattern and is very popular throughout the world among yoga practitioners. It can be started with either leg front. If started with right leg front, it starts operating pingla and if it started with left leg front it starts operating ida.

There are 12 positions, which are held in it. Generally those positions are associated with twelve names of Sun. thus it becomes a process of salutation to Sun. It can be done in two ways, either slow or fast paced. If one wants to go into the psychic aspect of it then one is advised to do it slow, but if one wants to benefit on physical level only then one should do it quick paced. One should perform complete cycle 1-12 times as per convenience for detoxification and de-stressing.

Bhujangasan(shown above) to stimulate ovarian functioning, also do tiryak bhujangasan variation too with breath turning your neck and looking at the opposite heel over the shoulder.

Perform Agnisar variations 100 times a day on empty stomach.

Do 3-5 times Udiyanbandh on empty stomach early morning.

Dhyan: Do ajna chakra breathing for 3-5 minutes, practice shavasan under trained supervision.

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COLITIS

Inflammation of colon or large intestines occur in it. Chronic constipation preceeds it. Pain and swelling of colon occurs. With putrid poisons in the body, mucous of colon is removed. The mucous membrane tries to secrete more and more mucous which coes out with stool. Thus mucous colitis is an inevitable consequence of constipation.

Our body tries to cleanse the system by creating diarrhoea. This makes or causes ulceration of the inner lining of the colon. Thus, we can say that it is an advanced stage of the mucous colitis. Mucous, blood and pus cells pass in stools or bowel movements. Due to excessive motions, one looses weight and many essential nutrients from the body and becomes weak.

Treatment:

Sahaj Basti Kriya: Drink lemon+salt+water mixture in the early morning on empty stomach and perform Vipritakarani mudra for 3-4 minutes, Mayurasan for 2-3 times, Bhujangasan 3-4 times, Kati chakra asan for 10-15 times till one feels like passing the stools. Thus clean up the sytem right in the morning.

May perform half tub bath. Sitting there perform 50 sahaj agnisar kriya. Pressing the stomach inside outside by pressing with hands. The thumbs should at waist level and on our back while middle fingers should be on either side of the navel. This can be done without hands also by moving the stomach inside outside in exhaled position, here it is called Agnisar.

Sahaj Pranayam: Take deep , slow inhalations through nose and exhalation slow controlled through mouth for 2-3 minutes.

Sheetali Pranayam: Curl up the tongue in the form of a bird beat and forcefully suck air through it so that it hits our throat inside. After completing the inhalation, drink it or swallow down into the stomach Hold it there for 5-10 seconds and then exhale through mouth. Perform it 10-15 times continuously.

Asan: Paschimotansan (bend from waist, hold for 40-60 seconds, do 2-3 times), Mayurasan (stomach should be visible from the back, hold as long as comfortable) Ardh Matsyendrasan, Sarvangasan(if not suffering from spondylitis, hold position 50-60 seconds), Kapalbhati (300-500 times), Shavasan (learn to relax in systematic yogic manner).

Stop taking: Tea, Coffee, Soft drinks, Packaged drinks, Junk food, Spicy foods etc.

Make diet Alkaline, drink water from 2-3 litres. Maintain pH value between 7.35-7.4. All diseases thrive in the acidic constitution of the body. In acidic condition our body cannot assimilate vitamins, minerals etc, lead to emotional stress and toxic overloads. Thus body will

start using its own alkaline minerals, thus lead to acidity. Use leafy vegetables, less refined sugar, less salted/roasted nuts.

Increase lung capacity through ramping and regular pranayama, thereby improving the quality of blood and alkalinity. Perform Shankh Prakshalan, once in three months(for normal healthy person while for others depends on the severity of the situation), meditate regularly and adopt yoga to generate a healthy life style.

Abstain from drinking, smoking and non-veg food consumption.

Eat easily cooked food as they will be easily digested too. Eat less than one's hunger.

After food sit in vajrasan, lie on the left side to improve digestion. This can also be done with the help of pingla breath.

Fast at least once a week. One may consume coconut water during the day.

Exercise regularly, Increase lung capacity by different pranayams and ramping, adopt yoga, meditate.

****

Hemorrhoids/Piles/Arshrog

Symptoms: Small humifications grow on the arteries and veins of rectum and anus area. When circulation of blood and wind through these areas is obstructed, Piles/ Hemorrhoids occur. If they grow outside, its called external piles (pain and swelling around anus) and when it grows inside (painless bleeding) it is called internal piles.

Causes: Main cause in Liver trouble.

Incidental cause: Chronic constipation, sedentary life style.

Defect in all the three humors involved.

Acidic characteristic.

Dilated veins and arteries around anus / rectum due to constipation or diarrhea.

Treatment:

1. Sahaj Basti kriya : Early morning, take lemon juice + sendha salt + water. Perform Vipritakarani mudra (3-4 minutes), Pawan mukta asan (4-5 times on either leg and both legs also), Ardh Shalabhasan (5-6 times), Mayur asan (3 times holding as long as comfortable), Bhujangasan, Chakrasan (2-3 times).
2. **Sahaj Agnisar:** Moving the stomach inside outside with the help of hands. Keeping the thumbs towards back side at waist level and fingers on the stomach with middle finger on either side of the navel. Press the area around navel rhythmically. One may do it maximum 100 times in 24 hours. Generally 40-50 times is sufficient.
3. **Ashwani Mudra:** Contract and relax anus 50-100 times. This can be done any time.
4. **Uddiyan Band:** Sit comfortable, exhale complete and suck in stomach as if trying to touch navel to the spine and hold this position as long as comfortable. A good Udiyan bandh will help draw anus and neck area too thus resulting in the moolabandh and Jalandhar band too. Thus one can experience the tribandh. Do it at least three times, one after another without any pause to get good result.
5. Sahaj Pranayam: **(a)** Lie on the floor with face up, arms by the side of body and legs straight. Lift right leg up to 90 degree inhaling and return it to starting position exhaling. Make sure the action and breath are synchronized. Repeat on other leg too. This comprises one set. Perform 10 sets at least. Now perform it with arms. Raise arms up through 180 degrees inhaling and return to starting position exhaling. Repeat it 10 times. **(b)** Sit comfortably, with back straight, inhale slow and deep through nose, exhale slowly through mouth. Perform Sahaj pranayama for 2-3 minutes. **(c)** Sheetali Pranayam: Sit comfortably, curl up the tongue in a pipe like form as beak of a bird,

inhale forcefully through it into the mouth so that it hits our throat area. After complete inhalation, drink the breath or gulp down the breath in to the stomach. Hold it there for 5-7 seconds and then exhale through mouth slowly. Do it 10-15 times. **(d)** Drink 1-1.5 lit water in one go. Standing, bend front, put one hand on the stomach and with other hand fingers move Uvula to induce vomiting. Thus vomit out all the water drunk to clear the stomach of all the putrid stuff. This may be done 1-2 times in a week.

In the cases of profuse bleeding fasting with coconut water, profuse plain water, Bail fruit juice. Bed rest is very much helpful to arrest bleeding. One can have Lemon juice, Pomegranate, Grapes, Pine apple fruit or fresh juice.

Do not take fatty foods, butter, cheese, excessive tea or coffee. It is better to take lassi/butter milk and curd.

Note:

Sit in Vajra asan for 10-15 minutes after food. Put right fist in the left armpit and press it. Keep it there during the duration of the asan. After food one should lie down on the left side.

Do not sit too much on the toilet seat.

Maintain alkaline constitution of the body i.e with pH value between 7.345– 7.

Avoid white sugar, almonds etc.

Check and correct navel from time to time.

Perform Shankh Prakshalan once a month.

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Parkinson's Disease

It was specified by Dr.James Parkinson in 1871 and hence the name. It is a long-term degenerative nervous system. It mainly affects motor system. Its causes may be Genetic or Environmental causes like pesticides, head injury, low urate in blood serum.
Death of cells in 'substancia nigra' area of the mid brain. Build up of proteins occurs in te neurons. 'Alpha Synuclin protein' is accumulated inside neurons. In case of Alzheimer's disease 'Tau proteins' get accumulated.
Symptoms: Generally five stages are described which can be put together as moving from Shaking of the hands etc to rigidity of the movement, slowness in action, difficulty in sleeping, instability in holding ones posture, dementia in old age, depression, anxiety etc.
Checking done through: MRI scan, diffusion MRI to differentiate between PD and Parkinson's plus syndrome.
For Prevention : Exercise, Vit C and Vit E.

Stand with feet 1-1.5 shoulder width apart. Hold something in front for support. Move neck from side to side 10-15 times.
Fig I - Sitting, open arms so that shoulders and arms are in one straight line. Move arms straight above head to clap and bring them down. Do it 10-15 times at a speed which is convenient. Generally while raising one is inhaling and while returning one exhales.
Fig II - Sitting or standing, extend arms sideways and rotate fists in clockwise and anti clockwise direction 10-15 times. Open fists, spread fingers and move the hands from wrists in up down direction 10-15 times, side to side 10-15 times too.
Fig III - Standing with legs 1-1.5 shoulder width apart, stretch arms horizontally sidewise so that shoulders and arms in one straight line, bend from waist side ways putting one hand over the leg on shin near the ankle area while other arm is straight vertically up and one is looking also upwards. Trikonasan. Hold as long as comfortable, perform on both sides.
Fig IV - Perform Veerbhadra asan. Put your knee on the ground for support and raise the arms all the way back and bend backwards, lifting the chin to look as far back as possible. Hold the position as long as comfortable and then perform on the other leg. Do 2-3 times.
Fig V – Lie down on the floor with face up. Take left leg up inhaling upto 90 degree position where the inhalation should complete. Both breath and action should be coordinated. Exhaling bring it back to the starting position and exhalation should complete when our foot touches the floor. Repeat on the other leg. Thus do ten times.

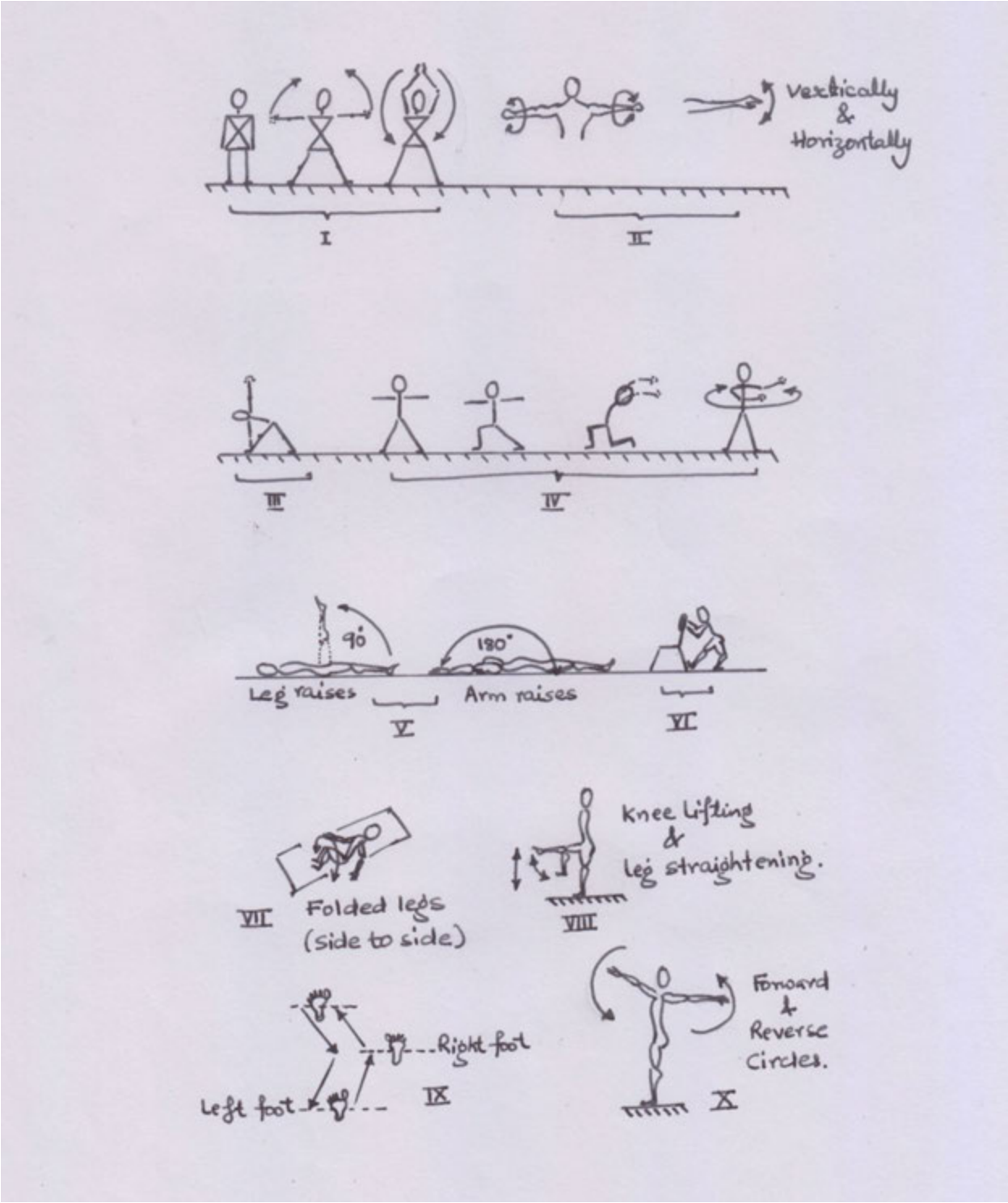


Figure 1 Exercise Chart

Now raise both the arms through 180 degrees as shown in the figure inhaling and the breath should complete by the time hands touch the floor above the head. Exhaling, bring the arms back to the ground by the side of the thighs as at start.

Fig VI – Take support of a chai, bend left leg and take 70-80% weight on it, keep other leg straight with heel on the ground and toe lifted up. Bend forward from waist as if touching chin to the front toe. Stretching the hamstrings and calf muscles all the way.

Fig VII – Lie down on the floor, fold knees and draw thighs towards the chest. Keep the arms at an angle to the body, palms down and firmly planted. Now twisting from the waste, touch knees to the floor on either side of the body. Do 10-15 times.

Fig VIII – Stand straight, lift knee till thigh is parallel to ground, straighten leg as shown, again fold it back and lower as at the start. Repeat ten times and do on both the legs.

Fig IX – Stand with feet a little apart so as to provide a balanced stance. Keeping weight on the right leg, slide the left foot to the right foot as shown in the figure and move it in the forward direction in a zig-zag path. Similarly retrace the path. Thus walk front and backwards with the zig-zag motion.

Fig – X : Stand with weight equally distributed on both the feet and slightly bend at knees. With vigor, draw front rolling circle with arms keeping hands open. One should feel the rush of blood into the fingertips. Do 10 times. Perform same on the reverse rolling too, 10 times.

****

GENU VALGUM
(Knock Knees)

It is a deformity of the knees and is taken from latin word Genu, which means knees. Two other terms associated with it are Valgum-representing inward twist and Varum-representing outward twist like in bow legs. It is seen when a person is made to stand straight with feet together if knees also touch, it is a case of this abnormalities. Children have this in young age but as they progress it is naturally corrected. But if one has disease like Rickets and Obesity it may carry on into our life. It causes pain in the leg, difficulty in walking, cracking sound, knee popping. The cartilage in the knees wears out fast and hence more chances of developing arthritis. The cartilage can regrow if given time and opportunity. Thus this condition can be improved.

Typically for men this angle with iliac bone is 12 degrees while in case of women it is 17 degrees. If this angle is more than 22 degrees and less than 9 degrees it is a serious condition.

It can be due to many reasons as listed below:

Obesity, injury or infection to leg or knee, Genetic condition (Cohen's syndrome), Vitamin D deficiency in the mother, premature birth and low diet Calcium (resulting in Scurvy), Vitamin D deficiency as it inhibits Vitamin C absorption in our body. It is more common in girls and more common in the longer bones. Femur twisting, Pelvic turning (Osteomyelitis), growth in area of Tibia (Blount's disease).

Procedure: Generally different things done for it are; Muscle strengthening-Inner thigh, Vastus medialis,; Braces to align the joints; Surgery of the knee, which is the last resort.

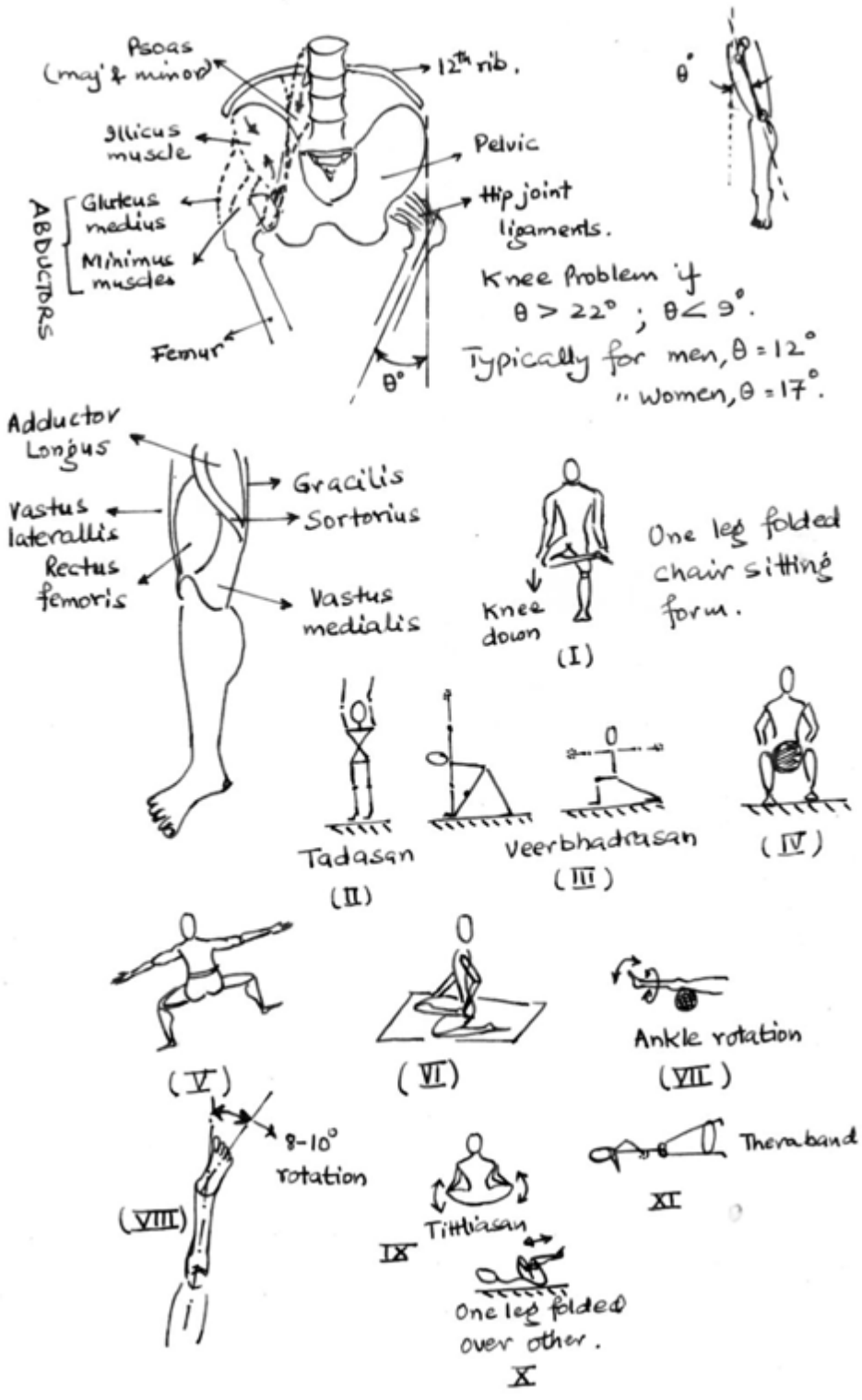
Here we will try to address it with different exercises so that a patient does not reach a situation where surgery is necessitated.

A general view of the pelvic with femur bone is given for the understanding of the patient. The angle can be measured from the top as shown or by drawing a vertical line through the iliac through the knee joint. The problem should be addressed as early as possible else it starts affecting the cartilage, which wears out unevenly and causes the joining bones to rub together and hence pain.

Sit in chair and fold the affected leg over the other as shown in **fig I**. Press the knees down wards so that foot is at a higher level. Hold position as long as comfortable.

Stand straight up, as in **fig II**, raise arms, lift heels and weight on balls of the feet and stretch as much as possible vertically.

Stand with feet 1.5-2 shoulder width apart. Turn to right side, so that right leg toe, ankle, sin, thigh and hip joint are in one line. Exhaling bend towards right over the leg, touch right hand to the right knee, keeping left arm vertical as shown. Note both arms,


Psoas (maj & minor)
12th rib.
Illicus muscle
Pelvic
Hip joint ligaments.
Gluteus medius
Minimus muscles
ABDUCTORS
Femur
θ°
θ°
Knee Problem if
θ > 22° ; θ < 9°.
Typically for men, θ = 12°
" women, θ = 17°.
Adductor Longus
Vastus lateralis
Rectus femoris
Gracilis
Sortorius
Vastus medialis
Knee down
(I)
One leg folded chair sitting form.
Tadasan
(II)
Veerbhadrasan
(III)
(IV)
(V)
(VI)
Ankle rotation
(VII)
8-10° rotation
(VIII)
Tittliasan
IX
Theraband
XI
One leg folded over other.
X

Shoulders' should be in one vertical line. Try to turn head and look upwards. Can repeat on both sides. From this position bring body up vertically, arms horizontal and bend front leg so that the thigh is parallel to ground. The knee should be over the second toe. Rear leg should e straight as shown. These are the variations of Veerbhadrasan **fig III.**

Take a medicine ball between the thighs and press it forcefully with thigh muscles as shown in the **fig IV**. This can be done while simulating a chair sitting position in air or without chair.

Hold position as in **fig V**, on a yoga mat while face is downwards. Stretch knees as far out as possible but maintain both knees and hip joint in one straight line. At start pelvic with be high above ground but as stretching improves it will descend towards ground. Best position of this stretch is when chin, chest and thighs/groin area touch the ground.

Sit on the calf or foot as per **fig VI,** fold the other leg over the lower leg. Put the knee of the folded leg on the ground. In this position bend forward touching the chest to the folded leg and forehead on to the ground. Hold the position comfortably for some time.

Sit on the floor keeping legs straight. Put a foam roller under the affected leg as shown in the **fig VII**. Stretching the toe, move it up and down in the vertical plane and also rotate it in clockwise and anti-clockwise direction 8-10 times each. Also rotate the whole leg through 8-10 degrees outwards from hip joint as in **fig VIII**. Hold position for a few seconds, relax and then repeat for 8-10 times.

Sit on the floor with legs straight front. Now fold legs so that soles of both feet are together and knees are in spread out position as shown in the **fig IX**. Keep minimum distance between heels and perennial floor holding the toes with both hands tightly. Now move the knees up and down like bating of the wings of a butterfly and hence its name **Titliasan**.

Be in position as shown in the **fig XI** and life the upper leg straight up against the force of the Thera-band to strengthen the muscles of the leg. Lift leg up, hold for 25-30 seconds, brings it down and relax. Do it for 3-5 times.

Lie down on the back with face up with legs straight. Fold left leg over the right thigh. Now folding the right knee brings it up towards the chest by pulling it with hands holding the right knee as in **fig X.** The affected leg is folded. Hold position as close and as long possible. Then relax and release the knee back to starting position.

Perform all these exercise with control, in moderation, under guidance to reap maximum benefit.

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Notes

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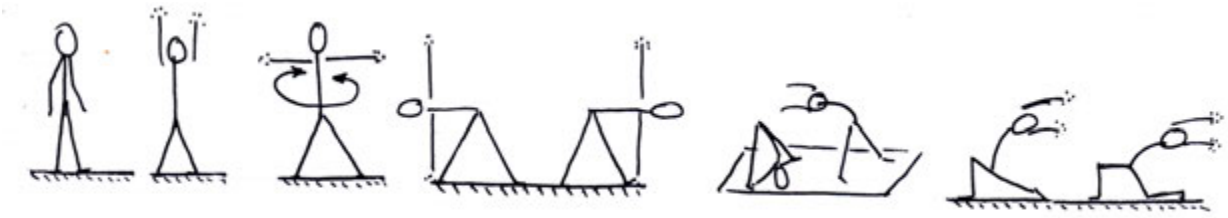
Chapter III: Physical Regimen

It is seen that most of the diseases today are a result of bad eating habits, weak digestive system. This is because people have stopped working on themselves. They move from their houses in the morning in their cars, to air conditioned offices, which are equipped with all basic amenities and attendants so they do not have to do anything at all. Apart from this, most of the jobs entail long hours sitting in front of computers, carrying of cell phones round the clock and always hooked on to them, which spoil the contour of the vertebra, eye-sight, joints of fingers and also expose us to harmful radiations and affects our mind. Sitting in one posture over a long period of time causes many problems. Apart from this, as during their work they do not have any healthy interaction, are supposed to complete the work in minimum possible time, it generate stress in everyone. Thus first digestive disorders, then stress conditions, both of them join together to pose a real health hazard for us. After office, people go back to their houses where again they get glued to televisions and social media on laptops, thus completing the ingredients of a certain march towards hospitalization.

The easiest way out is to get them involved into a physical routine first so that they get up from their sitting positions, perform some twists and turns to make their bodies supple, do some cardio activity to pump their heart rate a little bit to make it stronger, get their respiratory system going a little harder, filling the lungs with fresh air to higher capacity than their sedentary life style lungs did. When they twist around, various organs in the digestive system get massaged, thereby improving their efficiency of digestion. A well digested food keep the system free from for unnecessary doshas of vaat, pit and kaph. If tridoshas are balanced, body enjoys sound health, which in turn generates a peaceful mind.

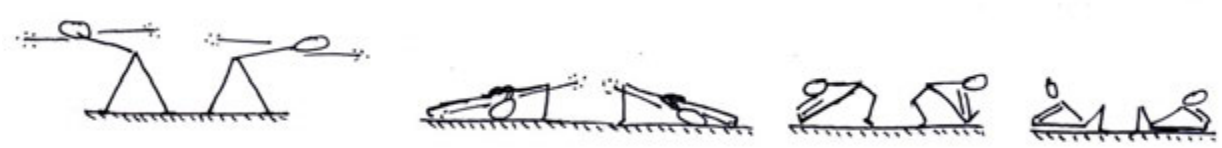
But **attention** must be paid to people who are suffering from any major disease or condition. One should plan special things for them, if necessary. The first introduction to the staff should be understanding of systematic warm up or limbering exercises. It must flow smoothly and in proper sequence. Once the body is warmed up and heart rate a little elevated, then other exercises are to be administered. Clients should progressively be taken from one module to another. As we proceed from one module to another, the level of difficulty in both physique and cardio will increase. Hence enough time should be given to them to reach one level before raising the bar for next level.

Module Zero -	General Exercise pattern for yoga floor exercise



1 2 3 4 5 6

From standing position of 1, inhale and move to position 2. Twist side to side, while twisting ,remember to exhale as in figure 3. Perform trikonasan on both sides, holding for 25-30 seconds each side. Inhale and bend backwards as much as possible maintaining balance, normal breath in maximum bend. Hold as comfortable and then slowly bring you body back in vertical position. Inhale and exhale bend front from waist and touch feet , later head to the ground, later elbows to the ground and supporting chin with both hands. In all these variation keep your legs straight and bend from waist and not you back. Coming back up again inhaling go to chandrasan as shown in fig 6 on both legs. Perform on both sides holding for 20-25 seconds stretching the spine backwards.

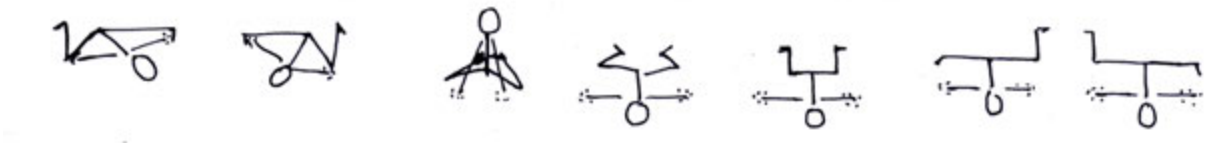


7 8 9 10

Getting up from fig 6 position, keeping both legs straight slide whole body front, keeping arms horizontal, as in fig 7. Try to stretch as far front as possible. Repeat on both sides. Now as per fig 8 bend one leg, hold other leg foot with the same side hand, stretching the opposite arm backwards, so that both arms are in a straight line. Hold for some time, enjoying the overall stretch. Perform on other side too.

Now bring both hands front holding the ankle, keeping the toe pointing up, to enjoy maximum hamstring and calf stretch along with back as shown in figure 9. Perform on both sides.

Slowly sit down , putting thigh of the stretched leg down on the floor as shown in figure 10. Bend front, bringing chest towards stretched leg thigh. Do in both sides.



11 12 13 14 15 16

Now draw the other knee also down on the floor, bringing foot backwards as per fig 11. Holding stretched foot and knees with same sand hands, bend forward to touch floor with your chest, or chin or head. Do on both sides.

Now brings both feet backwards and keeping our knees maximum apart, bob up and down to stretch the groin area as in fig 13.

Slowly bring your body down so that thighs, chest and chin touch ground as in fig 14. Fig 15 is just little variation with leg position. Try to keep torso as down as possible. Hold this position for as long as comfortable relaxing all the groin muscles.

Keeping the knee in touch with floor stretch one side leg and again bend forward as earlier. Experience a good leg stretch. Perform on both sides as shown in fig 16.

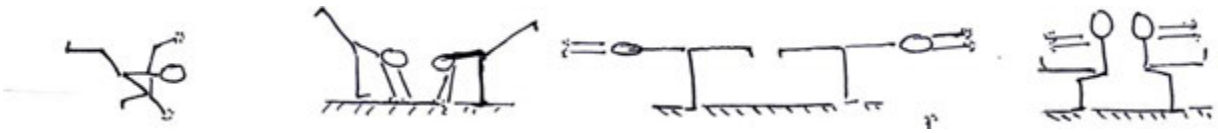
17 18 19 20 21

Once again bend both legs bringing feet backside, without reducing the distance between knees. Sit straight and try to touch thighs to the ground as per figure 17. Slowly bring knees inwards and stand on your knees and feet. Inhale, raise arms above head and exhaling bend backwards as per figure 18 in ustrasan position. Push pelvic front and throw head maximium backwards. Inhale and exhale deeply through nose. While returning bring your

arms back first and upper body after it to utilize core muscle strength. Slide into lizard pose as per figure 19, keeping chest and chin in contact with floor. Hold this position and feel the stretch of lower back and chest area. Hold for 40-50 seconds. Slowly, slide into bhujangasan position as shown in figure 20. For going into this position, curl your neck first while coming back uncurl neck last of all. While going up inhale, in top position normal breath and while coming down exhale. Perform 03 times and relax in face down lying position for a few seconds. Coming up from this position sit on folded legs as in vajrasan and bend all the way backwards to suptvajrasan. Putting hand below the shoulder push whole body up as in fig 21 into chakrasan.

22 23 24 25 26 27

From 21st come into 22nd position with chest resting on thighs and arms resting backwards. Relax for a few seconds. Roll backwards and bend one knee close to chest holding with both hands. Enjoy pawanmuktasan as in fig 23 on both sides. Then draw both legs close to chest in folded position. Hold both knees with hands and rock back and forth five times as in fig 24. After 5th rock, roll all the way front and jump into position of fig 26. From here lifting opposite hand and foot off the ground maintain balance. Perform on both sides. Hold either position for 25-30 seconds to build arms, core and increasing sense of balance. This position is often held by lizards in deserts when the sand becomes too hot to walk during mid-day.



28 29 30 31

While doing 27-28, on either leg slide backwards keeping the leg up and touching ground with both hands, maintain position 29th on both legs alternately. Also perform position 30 balance on either leg from 29. From 30, on either leg, hold 31, a single leg chair position sitting in air, keeping other leg straight front. One can perform single leg sit ups in this position if one has strong thighs.

32 33 34 35 36 37

Then sit on floor with both legs stretched front. With hands a little back from pelvic and fingers of both hands pointing front, lift whole body up like and plank and hold for 25-30 seconds. Repeat three times as in 33. Then lift one leg straight up as per fig 34 and hold for 25-30 second. Repeat on both legs. Turning to one side balance on one hand and feet as per fig 35, hold for 25-30 seconds on both sides. Later fold one leg over other and hold position as per fig 36. Repeat on both sides. For next variation hold toe with same side hand and stretch leg as per fig 37 maintaining balance, hold 25-30 seconds. Perform on both sides.

38 39 40 41

Coming back on all fours with face down, balance body weight on head and feet, keeping hands on the back. Hold keeping neck muscles tight, for as long as comfortable. Twist in a way that now your weight is on opposite elbow and foot, while other leg is lifted up from floor along with torso as per fig 39. Do on both sides. Move to position as per figure 40, balancing weight of the body on elbows and feet, keeping whole body clear off the ground, holding plank like position. Hold for 40 second – 1 minute. In the same position, lift either leg up straight back as per figure 41 for 40-50 seconds. Repeat on both sides.

42 43 44 45 46 47

From 41, rolling on the shoulder, coming into face up lying position as per position 3 in fig 42. Raise legs 90 degrees straight up and hold for 30-40 seconds. Twisting waist, keeping legs straight, touch feet to hands as per fig 44-45 on either side. Hold position for a 25-30 seconds. After this bend both legs with thighs close to chest and twisting waist bring them on to the floor on either side again, holding 25-30 seconds in both positions.

48 49 50 51 52 53 54

From 47, holding both thighs close to chest with folded legs again rock for 5 times as per fig 48. This time roll backwards, landing with legs stretched wide apart as per fig 50-51. Bring head front to touch ground. Interlock fingers at the back head and raise straight legs. Keep them in different positions of 30 degrees, 45 degrees and 90 degrees to give good exercise to abdominal muscles. After this do flies like 53-54 for ten times and then lie down, face up.

55 56 57 58 59

Fold legs and put hands on the waist with thumbs pointing towards vertebral column and fingers outward as in fig. 56. Raise torso upwards from the floor as per fig.57 supporting the pelvic with both hands with elbows firmly on ground. Now raise left leg straight up and hold for 25-30 seconds before changing it to right leg, as shown in fig.58. Slowly stretch both legs straight on the ground, holding the pelvic up. Once legs are straight, hold pelvic up and remove the support of hands, making arms straight on the floor. Hold this position as per figure 59 for as long as comfortable and then slowly descend pelvic down on to the floor and relax.




60 61 62 63

Relax as per figure 60. Raise both legs up over the head on to the floor in halasan as shown in figure 61. Walk feet on to left as well as right side three times as in figure 61. After this roll over all the way back as in fig 62 and come up into sitting position as in 63.




64 65 66 67

Putting hands front and coming on the knees, take both feet on one side of the body as in figure 65. Now body is balanced on hands and feet. Jump from this position so that feet land up in the opposite side as in fig 66. Thus jump from side to side, controlling the body and try to spend more time in air. Do it ten times. After this sit in sukhasan or padmasan as convenient, observe breath flowing through the nose. Keep eyes lightly closed and offer your thanks to the lord for this healthy practice.

****

Module I - Work Station

1 2 3 4

FIG 1: Sit comfortably keeping back straight. Interlock fingers of the hands and do wrist rolls 20 times. Do 10 repetitions of moving neck side to side, draw 10 upper half circles with chin, 10 repetitions of lower half circles with chin and 10 with clockwise and anticlockwise circular rotations of neck.

Fig 2: Sit straight and hold back rest of the chair and arch back, hold for 10-15 seconds and return to normal. Repeat three times.

Fig 3: Sitting in the chair twist waist clockwise and hold left corner of the chair back rest with right hand and right corner with left hand. Hold 5 seconds. Now twist in anticlockwise direction and again hold the back rest by opposite hands. Hold for 5 second. Exhale while twisting, inhale while returning to normal position. Do 5 times.

Fig 4: Keeping one's face up, hold seat of the chair as shown in plank type position and thrust pelvic as upwards as possible and hold for 5 seconds. Do 3 times.

5 6 7 8

Fig 5: Hold chair position as shown, keeping the back straight and thighs parallel to ground. Perform 3 sets of 20 sit-ups.

Fig 6: From above position, straiten left leg in air so the total weight is on right leg. Now from here, perform 10x3sets, 60-degree squats from horizontal thigh position.

Fig 7: Keeping body in plank position so that heels, hips, shoulders and head are in one straight line, do 10x3sets of push-ups holding seat of the chair.

Fig 8: Bring Right leg front and extend left leg all the way back so that front thigh is parallel to the ground, Holding the seat of the chair bend backwards looking up and backwards towards the ceiling, as far as possible. Hold for 5-10 seconds. Repeat same on left leg also.

9

10

11

12

Fig 9: Sitting in the chair, fold left leg over right leg and twist upper body from side to side five times. Repeat same by folding right leg over left leg.

Fig 10: Keep left leg on the set of the chair and keep it straight. Keeping other leg also straight, holding knee/shin/ankle or toes bend front from waist. Feel hamstring, lower back stretch. Hold for 5-7 seconds and repeat on the other leg too.

Fig 11: Keeping back straight and hands on waist, inhale exhale through nose 05 times. Now raise the hands to arm pit level and deep breath 05 times. Keep hands on the shoulders and inhale raising elbows backwards and exhale bringing them back down in front. Perform 05 times. Now raise the hands up towards ceiling and lift chin up, rolling head backwards, inhale deeply through nose feeling the bottom most part of the lungs and slowly exhale. Repeat 05 times.

Fig 12: Sit comfortably, do 11 anulom viloma, 11 bhastrika and 3 deep breaths and three times make sound of Mmmmmm…… so that whole forehead area is vibrated.

****

MODULE II - Work Station




1 2 3 4

Repeat fig 1 to fig 4 as done earlier in module I.




5 6 7 8

Fig 5: Holding the seat, or firm armrest, taking deep inhalation raise yourself up from the seat as much as possible for a count of 10 and lower back. Repeat it 03 times.

Fig 6: Holding seat of the chair, keeping one foot on to the floor, try to raise the other leg as high as possible five times, repeat same on the other leg too.

Fig 7: Hold back rest of the chair and swing left leg backwards as high as possible 05 times. Repeat on the right leg also five times. While raising up inhale and bringing down exhale.

Fig 8: Holding the back rest balancing on left leg, stretch right leg backwards so that upper body and leg both are parallel to ground. Hold for 10 seconds. Repeat on left leg too.



9 10 11

Fig 9: Holding the backrest of the chair with right hand, catch left big toe with left hand and try to stretch the leg as much as possible, comfortably. Then repeat same on the other side.

Fig 11: Perform Agnisar 1 – Inhale through nose fully. Hold breath and suck stomach in. Hold aslong as comfortable. Repeat three times. Agnisar 2 – Exhale fully through nose and suck stomach in. Hold comfortably. Repeat three times. Agnisar 3 – Exhale fully and move stomach in and out without breathing. Can do maximum 100 times in one go or in a number of sets. Relax and deep breath three times and chant MMmmmmmm to fil up forehead with its vibrations.

****

MODULE III - Work Station

1 2 3 4

Repeat 1-4 as done in earlier modules.

5 6 7 8

Fig 5: Holding the seat of the chair keep sliding feet outwards experiencing the stretch of legs coming down to sitting position on the floor. Keep back straight and try to bend front from waist and not back 5-7 times.

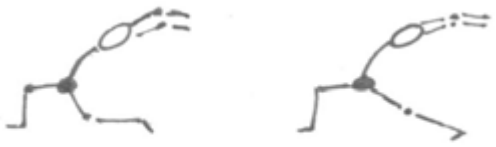
Fig 6: Holding back rest of the chair, lift left knee opening the hip joint. When one has opened this joint maximum, then lock the thigh part of leg, open and close the knee joint ten times. Repeat on the right leg too ten times.

Fig 7: Instead of folding and unfolding, move the leg straight both sides 5-7 times.

9 10 11 12

Hold the backrest of the chair with left hand, right hand on waist, raise left leg in horizontal position for a count of 15. Now folding it as in Fig 10, kick it backwards (fig 11) and forwards continuously 7 times. Do 03 sets.

Fig 12: Hold chair seat at point 'X' and keep both feet at point 'a'. Taking the weight on hands jump with both feet to point 'b'. Repeat it continuously 10 times. Do three sets.



13 14

Fig 13: Put right knee on the ground, sliding left foot front so that thigh becomes parallel to the ground, stretch backwards. Arching the back, throwing the head backwards and also exten tongue in the mouth too to touch soft palate. Hold position for 10 seconds. Repeat on the other side. Perform 3 sets.

Fig 14: Perform the above exercise with rear leg straight, instead of bent with knee on the ground as in Fig 13, arch back, stretch tongue in the mouth and hold for 10 seconds. Repeat on both side just once.

15 16 17

Fig 15: From fig 14 change position to fig 15, by holding front foot with same side and hand and raising the other arm up so that shoulders are above each other. Try to keep both shoulders, pelvic, chest and feet in one plane. One should look upwards.

Fig 16: Place hands on the waist, keeping elbows backwards, back straight and chest completely expanded, deep breath 10 times.

Fig 17: Perform 21 bhastrika. Then sit still and straight, eyes lightly closed and chant Mmmmm…..three times.

****

MODULE IV - Work Station

1 2 3 4

Repeat 1-4 as done in earlier modules.

5 6 7

Fig 5: Perform Garuda san variation by first wrapping left leg around right leg and holding for a count of 05. Repeat on right leg also for a count of 5. Do three times, keeping back straight.

Fig 6: Fold left leg over right leg thigh as shown and bend forward from waist, holding the backrest of the chair 05 times. Repeat on right leg also for a count of 5.

Fig 7: Holding similar starting position as above, instead of bending front from waist, squat down till the supporting leg thigh is horizontal to ground. Hold for a count of 20. Repeat on the other leg too for a count of 20. May perform three sets.

8 9 10 11

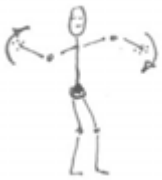
Fig 8& Fig 9: Stand straight and inhaling raise arms up above the head and and arch backwards as much as possible without losing balance and hold that position. Then come back to starting position 8.

Fig 10: Stand straight with knees about 5-10 % bent. Arms are held close to rib cage. Lock the upper arms in this position and do not move them. Now move the fore arms quickly with speed and power as if hitting shoulders. Do 100 times either in one go or in sets.

Fig 11: Stand as explained above, make both fists, left front and right backwards so that forearms are straight and parallel to the ground. Imagine piston of the railway engine moving back and forth horizontally with full power. Now in one inhale, bring right punch forward by extending the right elbow only 50-60 %, similarly exhale and bring left punch front by extending left elbow 50-60 %. Repeat it continuously without stopping, with full muscle power as well as strongest of the breath. Perform it 100 times either in one go or in many sets as comfortable.

12

13



14

15

Fig 12: Stand in horse stance with knees directly above respective toes. Interlock fingers of both hands and pressing them together with full strength move them forward extending both arms. Once extended relax and then bring them back again pressed together with full power. Do it three times.

Fig 13: Hold stance as in the above, now move arms sideways with slow speed and full power and withdraw also in same manner three times. Extend elbows 80 %, keeping palm down, press downwards against imaginary resistance with full power and slow speed. When completely down relax, turn palms upwards and lift imaginary weight with full power and slow speed bringing hands up. Repeat it three times to complete this set of isokinetics.

Fig 14 & 15: Stand as shown, extending arms 80% outwards on the sides with left palm pointing front and right palm pointing backwards. Now rotating the shoulders in one twitch movement, hit and imaginary opponent at the back with left palm and right back hand

simultaneously. Do 03 sets of 10 times each with power and snap. Use only shoulders in generating power.

16

Fig 16: Sit back on the chair comfortably. Lightly close both eyes. Take three deep breaths. Exhale all the tiredness and inhale relaxation, fresh energy, joy and happiness. Do five anulom-viloma. Chant MMmmmmm…..three times.

****

MODULE V - Work Station

1 2 3 4

Repeat 1-4 as done in earlier modules.

5 6 7

Fig 5: Sit in the middle with two chairs around. Put hands on the seats of the two chairs as shown and jump with both feet as far front as possible. From that position only jump backwards bring both legs simultaneously. Repeat it for 10-15 times.

Fig 7: When feet come in front position in the previous exercise, bring whole body front leaving the chair cushions. Put hands on either side of the feet and jump backwards to put both feet on the chairs as shown. Perform 10-15 push-ups.

8 9 10

Fig 8: put bath arms on the chair cushions and head downwards. Slowly raise the legs up to balance in vertical position as shown. Maintain balance as long as possible. It will improve sense of balance and also bring more blood to our brain area.

11

12

13

Fig 11: Putting one leg back, hands on the waist keeping elbows backwards so as to open the chest area maximum, bend front knee to make thigh horizontal to ground. Play on front knee to move body up and down stretching illipsus muscles.

14

Fig 14: After finishing all the exercises, sit in cross legged or half lotus or full lotus or just simple chair sitting position. Close eyes gently, breath three times through nose and exhaling from mouth. Inhale should be long and deep while exhale should be short and abrupt. Breath three times through eye brow center, three times through neck and three times through navel. Perfom 5 times anulom viloma. Chant long Mmmm……..together with all in one intonation.

****

MODULE VI - Work Station

1 2 3 4

Repeat 1-4 as done in earlier modules.

5 6 7 8

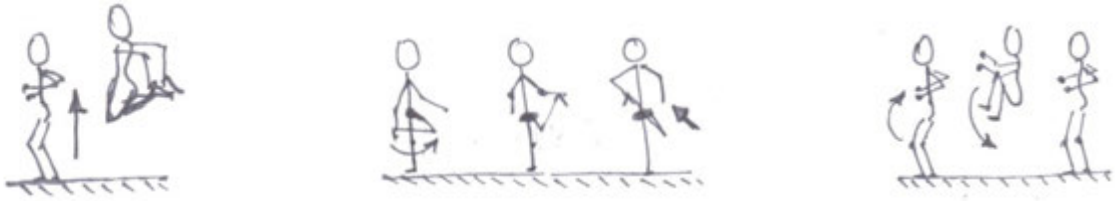
Fig 5: Raise left knee up, making thigh horizontal to ground. Move lower leg front back, opening and closing the knee joint. Repeat on left leg too. Do 10 times.

Fig 6 & 7: Lift left knee up and stretch leg towards left side. Draw in the knee again and extend again. Do 10 times. Repeat same on right leg also.

Fig 8: Similar stretching on both legs is to be done here but backwards looking at the back foot heel over the shoulders.

9 10 11 12 13 14

Fig 9: Put hands on to the waist and feet one and half shoulder width apart. Jump and cross the legs bringing left leg behind the right leg. Jump back into starting position. From here jump again and this time bring right leg at the back of left leg. Thus keep jumping and repeating this alternate leg movement. Do 10 times.



15 16 17 18 19 20 21 22

Fig 15 & 16: From standing position, jump up and strike feet of bent legs in air at the back. Repeat 10 times.

Fig 17-18-19: Touch left foot with right hand in front of the body, left foot with right hand at the back and left foot with right hand at the back of the body. Repeat it 10 times.

Now changing the sequence, touch right foot with left hand in front of the body, right foot with right hand at the back of the body and right foot with left hand at the back of the body. Repeat 10 times.

Fig 20, 21 & 22: From standing position jump with both legs to touch thighs to the chest. Do 05 times.

23 24 25 26 27

Fig 23-24: Bend knees, bend from waist front keeping both hands on knees. Exhaling. Open chest to inhale fully as in 24. Again crouch into figure 23 position exhaling. Repeat it 3-5 times to bring pulse back to normal.

Fig 25: Perform duck walk, 10 steps.

Fig 25 – 26: Perform 10 frog jumps.

28 29 30

Fig 28 – 29: Perform 10 side jumps towards left and then towards right.

Fig 30: Lie down face up position.

31 32 33 34

Fig 31 – 32 – 33 – 34: Bring both thighs close to chest bending knees and hold with both hands. Rock 5 times back and forth. From position 33, jump front into figure 34. Perfomr 5 plank push ups.

35 36 37 38 39

Fig 35 – 39: From 34 roll forward to 36 opening legs wide open. Again fold legs closer and roll backwards again into 38, 39 to sit back on the floor.

41 42 43

Fig 41 – 43: Interlock fingers and put your hands back of the neck. Raise shoulder and legs off the ground as in 41. Brings chest and thighs close to each other and again return to 41. Perform it for 10 times.

After this relax and sit in comfortable position and chant breath 3 times through nose and exhaling through mouth. Close both eyes gently and chant Mmmm…… together in same intonation.

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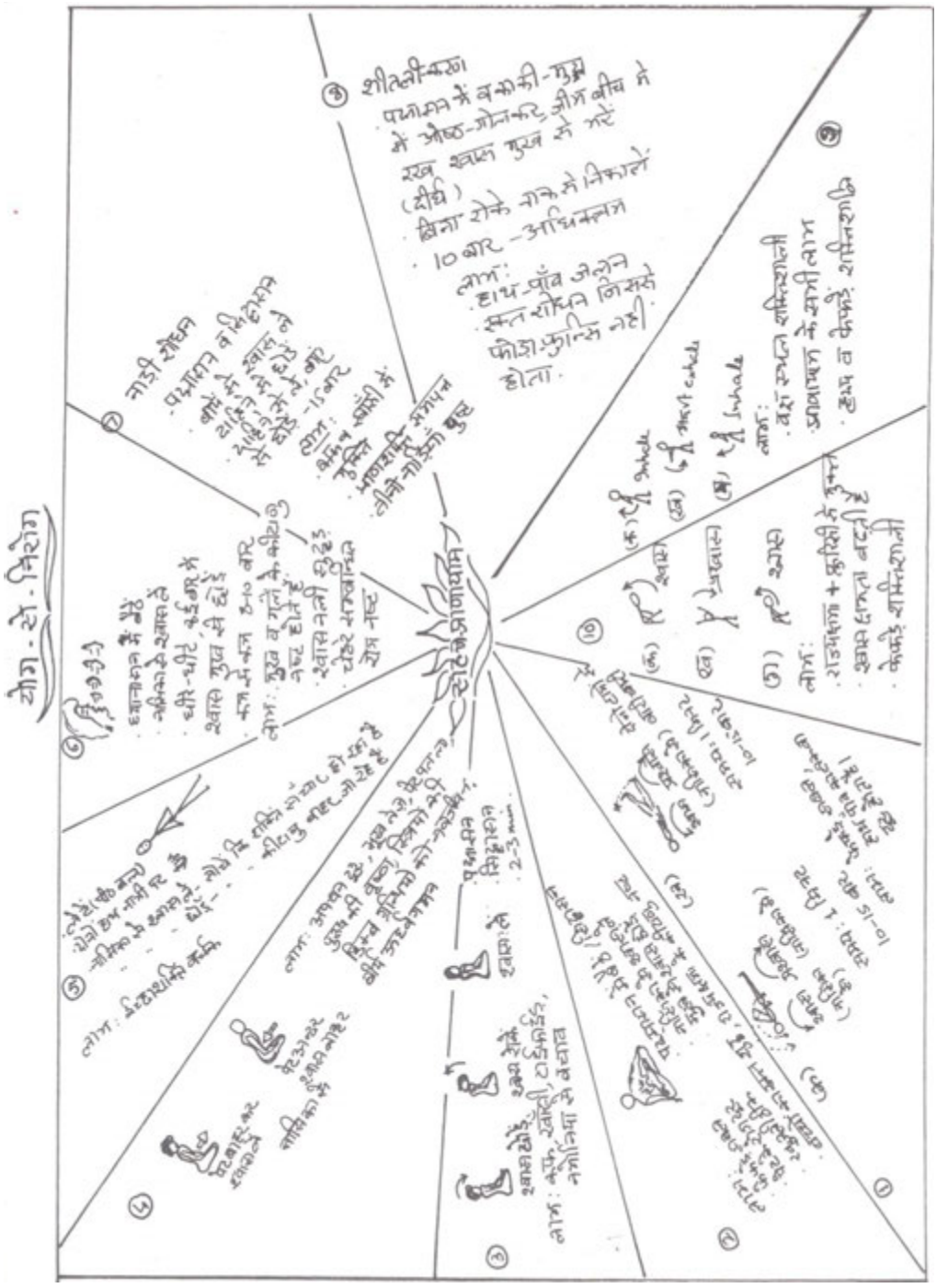
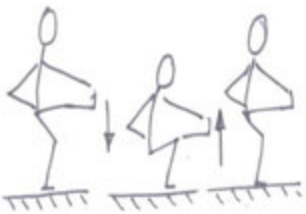
Following easy breathing exercises shall be taught to the clients. These will provide benefits of most of the pranayams.



Module VII	**LEG STRENTHENING EXERCISES**

Hold on either Leg

15 sec x 3 sets



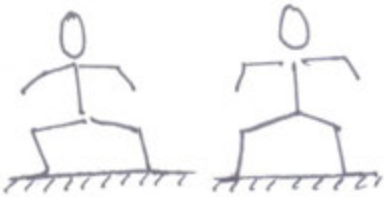
Single leg squats

on either side, 3 times

Horse stance knees above the

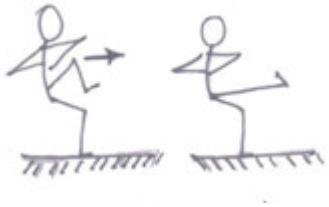
thighs parallel to ground

Back Straight , 45sec-1min, 3 sets



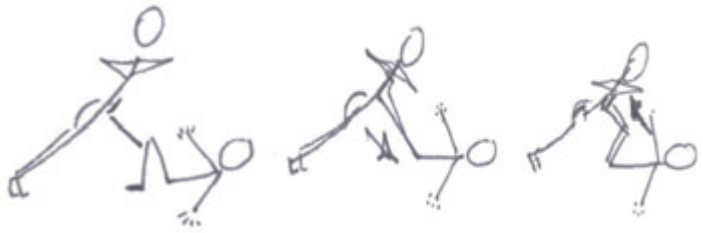
Shift weight slightly to either

Side and hold, hold 45sec-1min, 3times



Show heel front with

tight thighs, 10 x 3 sets



Leg Presses

(Both Sides), 10x3sets.

Both Thighs (together).

15x3 sets

For Calf muscles

(50~100 no's x 3 sets)

(7x3) on each leg

Side kick (50x3)

Hold on Both Side

15 seconds

****

Module VIII	**ARM STRENGTHENING EXERCISES**

Straight arms, that open,

Move in circle from shoulder

(30 each clockwise/anti clock wise)

Pushing Palms

10 x 3

Pushing backhands

10 x 3

10-15 ponds for boys, 10x3 sets5-7 pounds for girls.

Forward rolls ,*Hand clenching power*

Reverse rolls, *(15 times front, side, up)*

(Single Arms)

Weighted centre

line punching with 5 lbs

15 X 3 sets

for boys and girls, 15x3 sets

&both Arms , 10 each.

(Front)

Move with

Full power &

Very slow speed

Veerasan or Horse

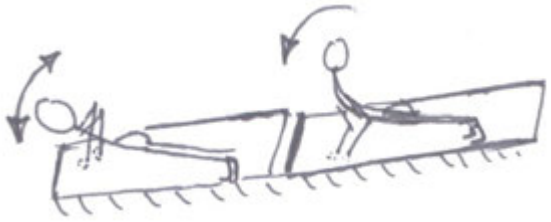
Stance, 03 times

(Side)

Horse stance,

Extend arms with full power

03 times



Upper body

Movement only

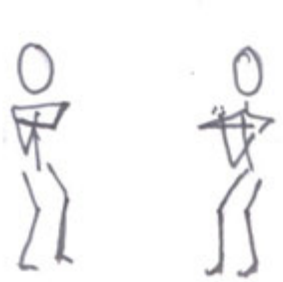
Push-ups, 25 x 3sets

One leg lifted push-ups.

25x3 sets

(Single Hand on both sides)

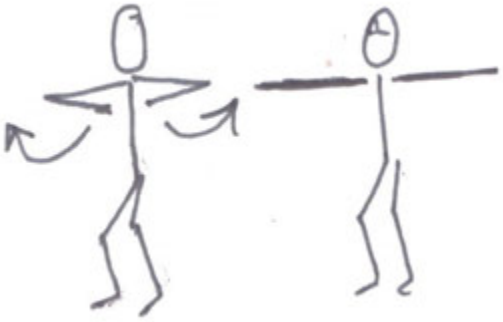
legs 2-3 shoulders width apart, 05x3 sets



Back Hand strike

Monk opens the doors

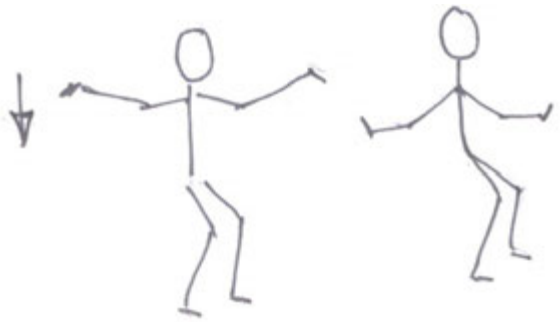
Elbow strikes with waist twist



Opening the arm s, striking with chop/ forearm

Monk closes the doors

Holding the globe



Downward palm hits

Upward movement, hit with wrists

Strike with ridge hand/ chop

Outside to inside single slap

Twistig from shoulders

Speed striking with palms,

Back side of hands

Alternate punching with

breath co-ordination.

Double palm slaps

Stand In horse stance, with 10-15lbs

(boys), 5-10 lbs (girls), 10 x 3 sets

Speed Stepping,

25 sec, F, B, Sides , 3 set

Simply climb a rope up and down for arm strength. If one can hold a rope in midair with only one's hand grip and without using legs encircling, and stay in that position for 10-15 minutes, one will develop a steel grip. Famous Indian wrestlers Gama used to do it and his grip ever one knew.

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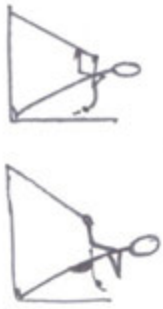
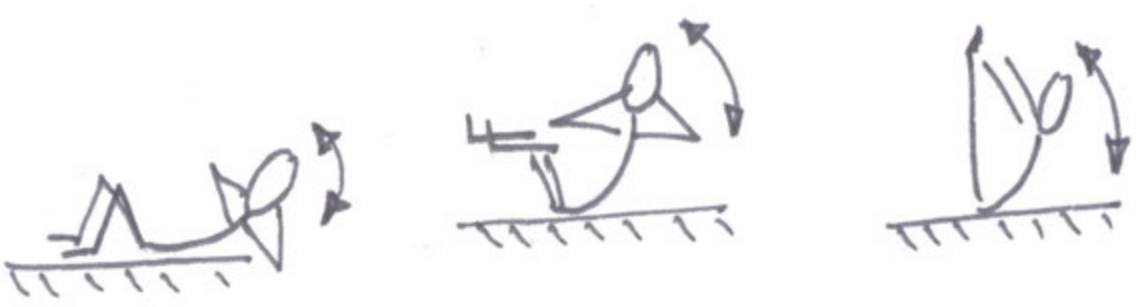
Module IX CORE MUSCLES



Place feet along the wall to arrest their movement/slide, hold the rope with both hand, make back perfectly straight and feel there is no waist joint. Like a log, descend your body down wards till you reach the floor. Now with hands pull yourself up and bring yourself down 5-10 times.

Hold your body around 45 degrees from the floor and with both hands grabbing the rope and elbows bent. Wait for 1 minute (girls), 2-3 minutes (boys).

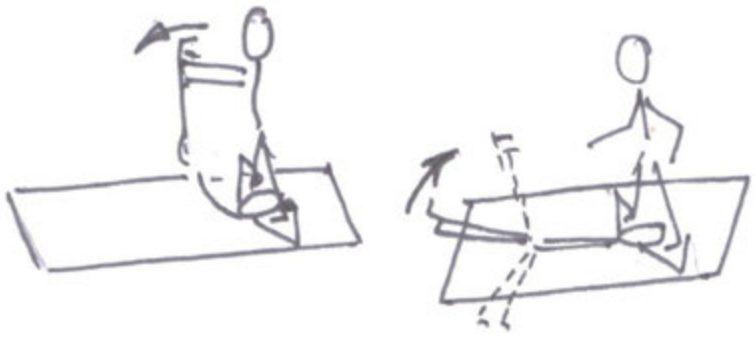
Repeat same exercise but with one hand holding the rope. Stay with bent elbow to strain the arm muscles. May do 45 seconds (girls), 1-2 minutes (boys). May perform three sets.



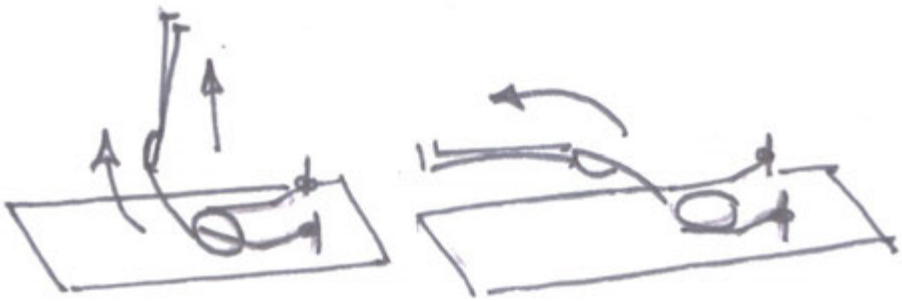
Hands at the back of the head *Raise both legs so that shins are horizontal* Legs Vertical,

Raise shoulder, look at navel, *Touch elbow to opposite knee,* inhale, rise up and

10 x 3 sets. *10 x 3 sets*. touch feet, 10 x 3 sets.

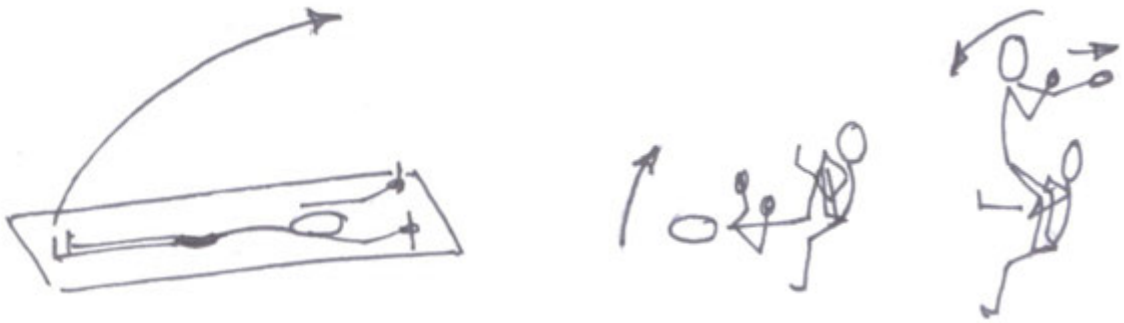


Lying person, holds the ankle of the standing person. Raise both the legs straight up towards chest of the person standing, who will with force throw both the legs down. Standing person's endeavor is to touch his partner's feet to the ground by throwing his legs in different directions, while lying person should not allow him to do so. He should use his core muscles to stop them on the way howsoever hard his legs are pushed down. Perform 20 X 3 sets.



1 2

Perform these dragon flies as shown in figure 1-2-3 10 x 3 sets.



3 1 2

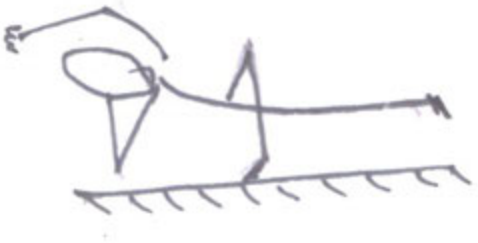
Sit on the feet of the lying person, pull his shins, strongly towardds one's chest. Oher person has to get up, 10 times, also do 10 punches each time. Another person can stand behind hlding punching pads for the exercising person to hit.

3

Hold position on both elbows and feet. Hold for 1 minute.

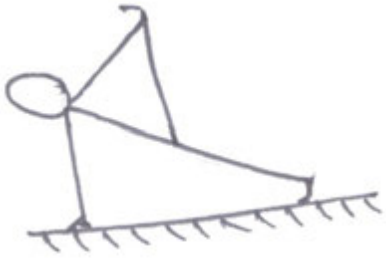
1

Balance on one elbow, keeping both feet together.



2

Weight on left elbow, right foot, left leg up in air.

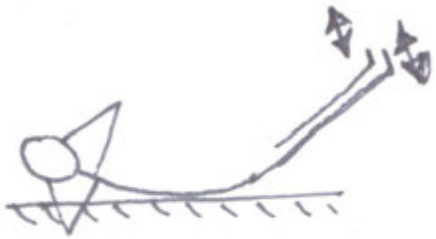


Wton same leg and hand, while other is stretched

Wrap legs around waist of partner tightly,

And help straight up.

Move body up and down. 10 x 3.



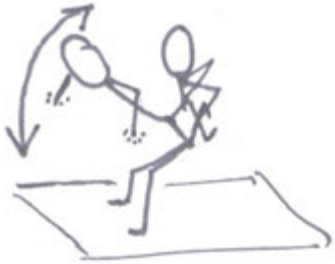
Rest on all fours, waist above ground.

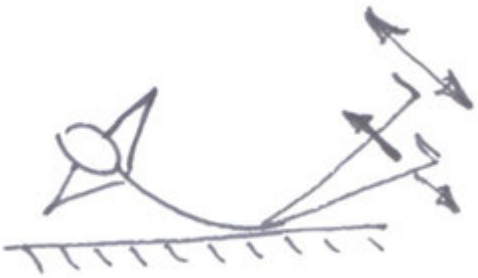
Lift opposite hand and foot, balancing

Body on other hand and foot. Repeat on both sides.

Hands behind the head, legs at 45 degrees,

move legs up and down for 25 times x 3 sets.



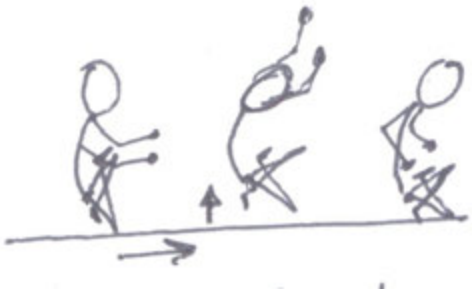


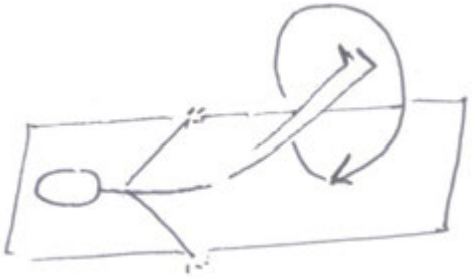
Wrap legs around waist, face down.

Lift body in air 10 ties x 3 sets.

Body as above, but now move legs sidewise, crossing

Each other, 25 times x 3 sets.





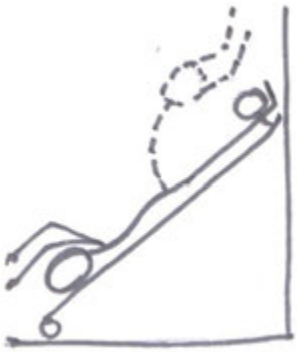
Sit in padmasan, jump front, back, side 10 times .

Legs 45 degree and straight, draw biggest

Possible circles, both direction 10 times x 3set

1 **2** **3**

Perform the sequence shown in 1-2-3, 10 times x 3 sets.



Do crunches on inclined plane

10 x 3 sets.

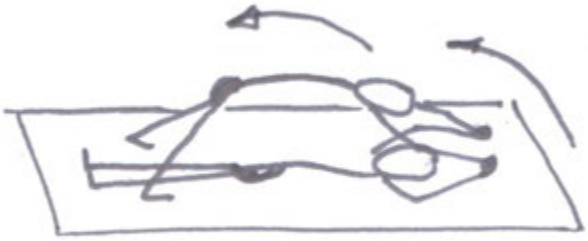
*Perform nauli 3.5 circles on both sides

clockwise/anticlockwise, perform 7 sets.

*Put a folded muslin cloth over the navel and wrap another cloth around it to keep it a little tight.

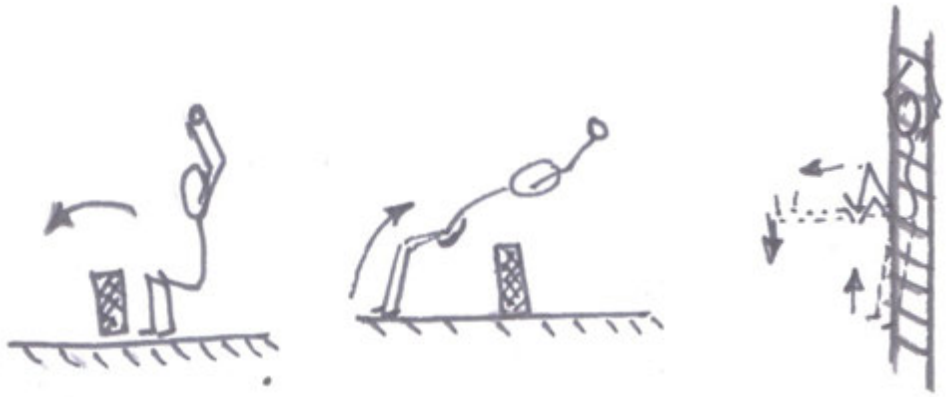
From Sarvangasan, hold 25 sec x 3 sets

Make a person stand on abdomen Move him up and down 15 x 3.



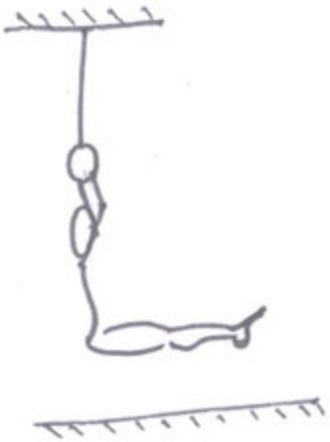
Perform this exercise 07 times x 3 sets.

Alternating leg jumps, maximize time in air, do 10 times x 3 sets

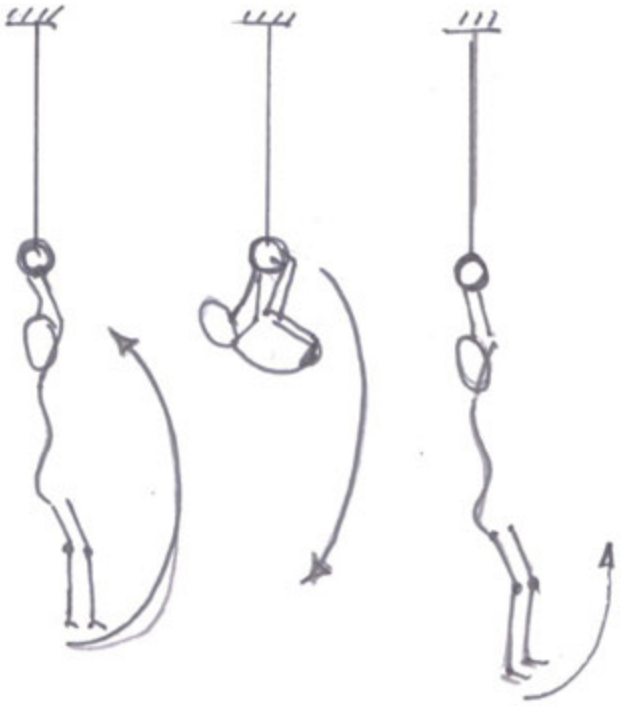


*Perform 10 times x 3 sets 10 x 3 sets

Holding a parallel bar jump, over an obstruction as shown above with both feet, using core muscles. Repeat movements of a set without stopping, maximizing the time in air and landing with very light feet without any sound

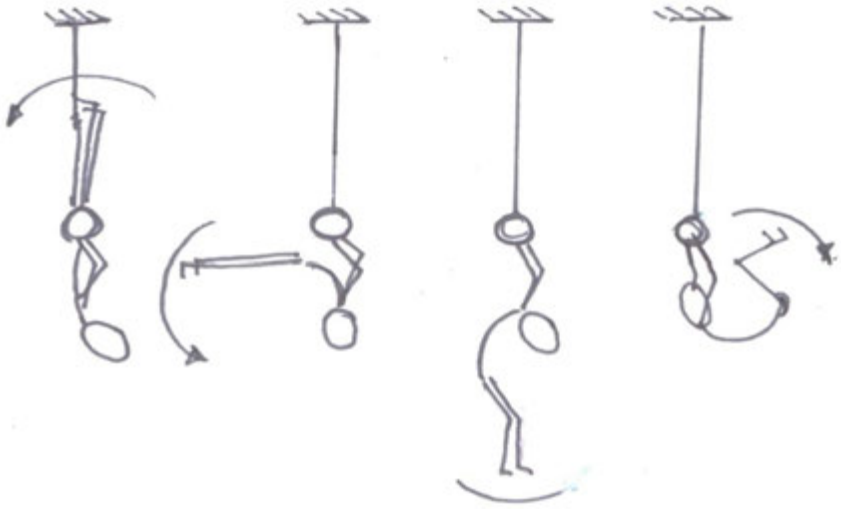


Hold position on the rings for 30 – 50 seconds, 3 sets. Perform the following routine on the rings for power, balance, control, suppleness and grace.



1 2 3

Hang from roman rings as in figure 1. Raise legs up and touch feet to the rings as in figure 2 and come down as in figure 3. Do it slowly, repeat 10 times.



4 5 6 7

Jump from position 3 into position 4. Hold legs horizontally as in figure 5 as long comfortable. Keep moving the legs downwards till one comes to position 6. Again left torso and legs back up till one comes back into position 7.

8

9

10

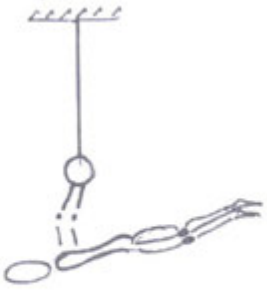
11

After 7, come into position 8 and hold it as long as possible. Then come to position 9. From 9 lift legs up and hook feet into the rings and move torso all the way, so that on is hanging with face front as in fig 11.

12

13

14



15

Repeat 9-5-6-7-9, five times very slowly. Feel each muscle used in the movement, stretch and strain of each one, experience the movement. Here, we have taken only a few exercises, though one can devise many variations with experience and innovation. With experience one can develop one's own exercise pattern depending upon particular need etc.

Hold position of front kick as in fig 13, in air alternately for as long as possible.

Raise front leg as high as possible as in figure 14. Repeat in both legs.

Raise whole body with face down in plank form as shown in fig 15. Hold position as long as possible.

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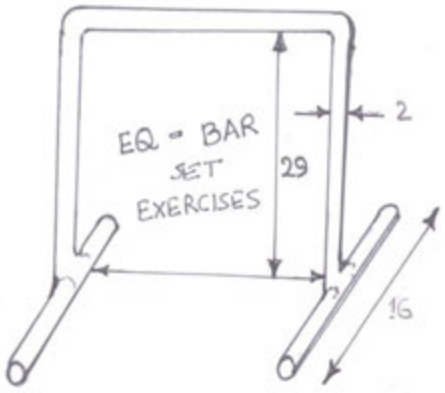
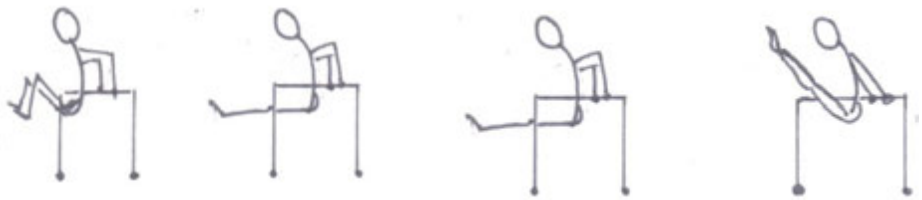
Module X EQUILIZER BAR EXERCISES



One can design an equalizer bar as shown above. One can also make the height adjustable to fit taller people. This variance can be from 29 inches to 33 inches 2-2 inches increments. As for exercises, one is giving a set but actually one's own imagination can help develop many newer innovative exercise sets. Exercises are self-explanatory and hence no explanation is provided.

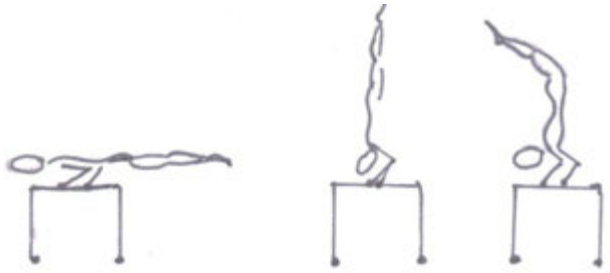


1 2 3 4

Fig 1: Balance on the equalizer bar and then stretch legs front horizontally as in fig.2. From fig 3, raise legs as in position in figure 4.

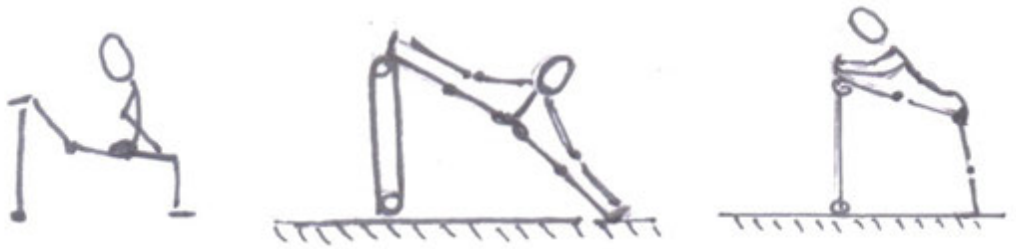
5 6 7

Fig.5 : Lower the body in horizontal position as shown in figure 5 and hold as long as possible. Now raise the body as per fig 6 and balance. Shift to position 7 and maintain running position in air and holding it. Repeat on both legs.



8 9 10

Fig 8: from figure 7, move into fig 8 for balancing on both hands by putting both elbows in the rib cage. Hold as long as possible. Now change position as per fig 9 bringing the body vertically up. Maintain it as long comfortable. Slowly lean the legs forwards to come into position as shown in figure 10. Hold as long as comfortable and then bring feet back to ground to come into standing position.

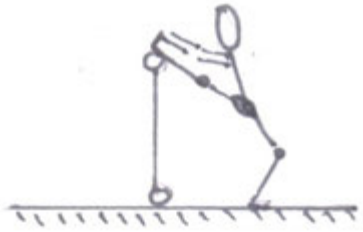


11 12 13

Fig 11: Put left leg on the equalizer bar and bring right foot front so that front thigh becomes parallel to ground. Keeping upper body vertical, play the groin joint to stretch illiopsus muscles in front thigh.

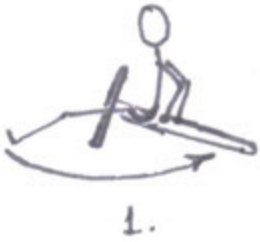
Fig 12: Turn the hip joint to come into position as per figure 12. Hold ankles with both hands and bring chest front bending from waist.

Fig 13: Put left leg on the equalizer bar and bend front from back touching chest to the front thigh. Keep front leg straight and experience the hamstring stretch. Repeat on the other leg too.



14

Fig 14: Exercise is same as earlier one but here the lower leg knee is also bent to make stretch of muscles of the upper leg more acute.



15 16 17

Fig 15: Put the bar on the ground and perform plank push-ups. 10 x 3 sets.

Fig 16: Hold the position as shown in fig and then jump bring bot feet together as far back as possible. From there jump front bringing them as far front as possible. Keep repeating it. Perform 15 x 3 sets.

18

Fig 18: One can put a number of such bars side by side and then can improve stepping efficiency on both sides, moving right and then left.

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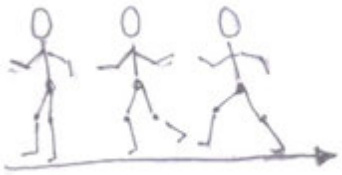
Module XI Running Trail

This can be performed on any running trail. Fall in a single file and start slowly walking first and then start jogging to warm up.

1

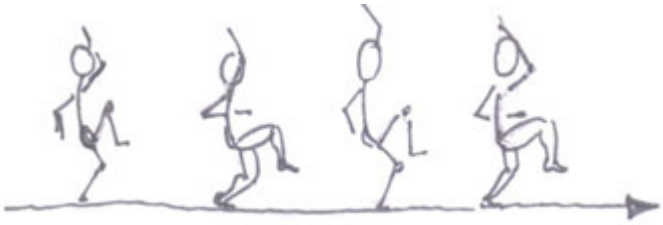


2

Bending front as in fig 1, moving as if picking something from the ground with both hands, keep running for 1 minute. After that straighten up to continue normal jog for a few seconds.

Start jogging sidewise, first left side and then right side. Continue for 1 minute each side.

3

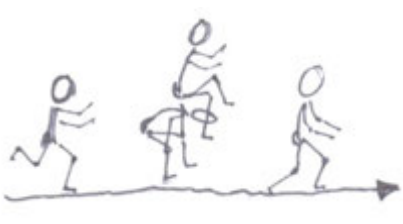


4

Start running backwards for 1 minute as shown in figure 2 above. Turning again back into normal running direction. Now jump with left knee drawn up and left arm raised up. Bringing the left leg down, jumping raise right leg and same arm up. Thus keep jumping, moving and alternating for 2 minutes.

5

All the people in the line should continue jogging at normal speed while the last person should increase his speed and run zig-zag through all people as shown in the figure 5 like a snake. All should follow the same. Thus whole line of people will be moving front as well as running snake like too. Do 2 minutes.



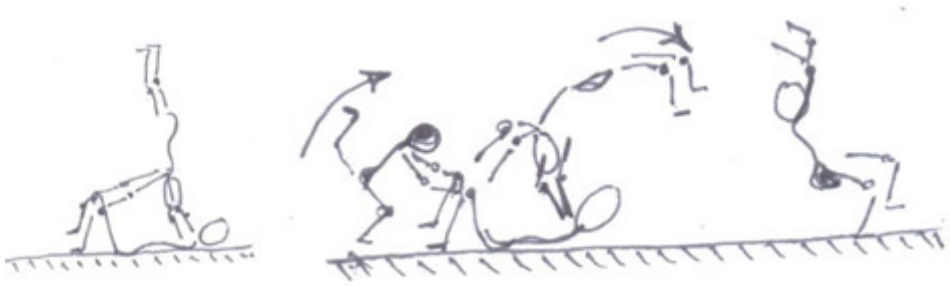
6

7

Person in the front should bend knees, put hand on the knees, arm a little bent, tuck his head in. Person running behind should put his hands on his back and hop over as shown in fig 5 and stand in front in similar position. This way, everyone will keep on jumping and standing for the other to hop. When the first standing person becomes last he should, get up run and hop over all to again come in front and stand with bent knees again for others to jump over. One can complete 3-5 sets of such jump running.

8

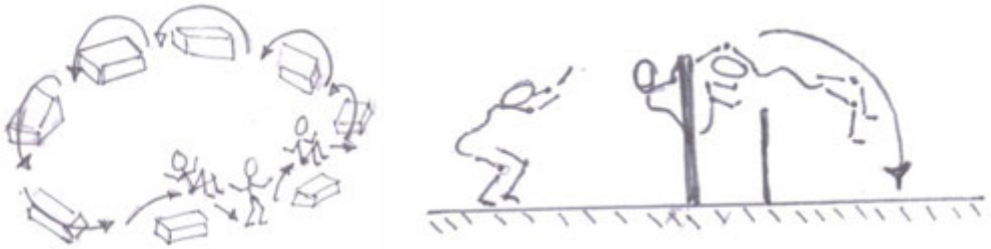
Fig 8: Repeat similar running pattern, with person standing instead of in bent position as done in previous pattern. Make at least five jumps per person. Standing person should cover ears with both hands, keeping elbows close to body. Now the hopping person has to jump and put his hands on the shoulders of the standing person and hop over his head. All care must be taken while landing front and not lose balance and fall on one's face.



9 10

Fig 9: One person should lie down with folded legs and other person should come front between his legs, put hands on his knees while the lying person should support upper person's shoulders. From this position, upper person should raise his legs all the way up and balance. Try to make whole body, shoulders, hips, legs and feet in one straight line.

Fig 10: Now instead of trying to hold the whole body in a straight line as in fig 9, one should step in, put hands on the knees and try to flip over. The lower person should, spot both the shoulders and push up and backwards. Thus upper person will flip over in air and be thrown backwards landing on his feet. Care should be taken while landing on the ground. Keep feet about 1-1.5 shoulder width apart maintaining balance as not to topple front on one's face.



10 11

In running line of people, the first person should crouch down on hands and knees and the person coming from behind should jump over him keeping left side front and sit in similar position as first person. Thus continue doing it till one is at the end of the line. Then one should get up and jump over all people with left side forward. In the next cycle, jump, keeping right side front. Repeat this 2-2 times on each side.

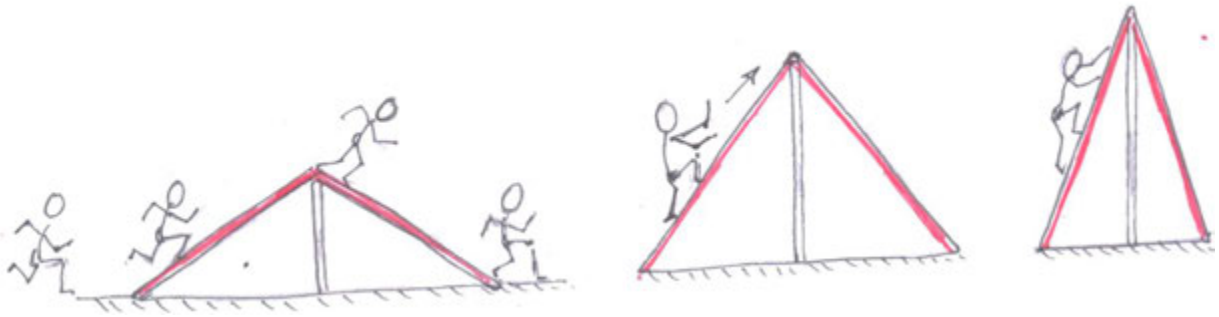


fig.12

Fig 12: Prepare two wooden inclines hinged at the top as shown in the figure 12. First keeping it in 30 degree, run and cross it over. In the next stage, make it 45 degrees and cross over. In the later stage, make it 60 degrees and try to jump over. Practice till one succeeds.

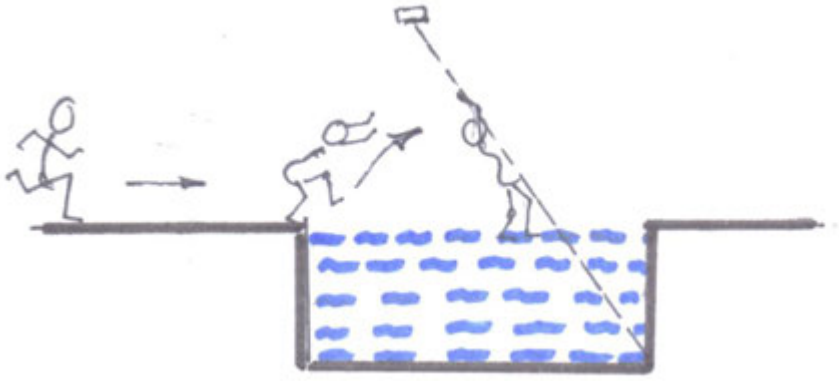


fig.13

Prepare a water obstacle to cross over with rope or a drill of jumping on to a net. If one is not successful in holding the net one would fall down into the water tank below. It is just an idea and can be modified in many ways.

One should perform crock walk-below a barbed wire net.

One should swing along hanging down a horizontally erected ladder and complete the obstacle.

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Module XII Balance Improvement Drills

Balance is the key to life, whether we talk of physical balance, in day-to-day activities, or mental balance in our psychological behavior. Both balances are a must for healthy living and both of them are also interconnected. Actually, breath is the key. While performing finer physical balancing, one's breath is extremely subtle. Similarly to counter emotional imbalance, control of the breath is a great tool. Anyway, a few drills are being shared below to achieve or improve our balance in life.

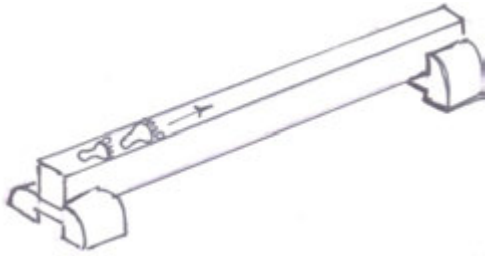

fig.1 Straight Walk and Balance

fig.2 Balance (Front-Back)

Fig.1: Walk forward by putting front foot heel close to the rear foot toe. In the same way, walk backwards too. Once proficiency is achieved in this balance, then lift heels and repeat same walking on the balls of the feet.

Fig.2: Take a board, which is balanced in the middle. Put feet on the either side of the fulcrum point and stand in horse riding kind of stance. Now balance in such a way that the board should not touch the ground. Vary stances by changing the distance between both feet along the length of the board. It will improve our front-back balance.

fig.3 Balance (sideways)

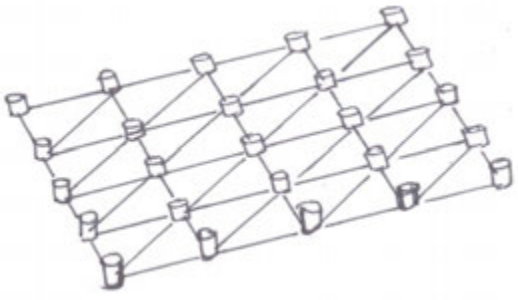

fig.4 Plum-Blossom Walking

fig.3: Now instead of standing in horse stance perpendicular to the board length, stand along the length of the board as shown. Again try to balance by not letting the board touch the ground. It will improve our side balance.

Fig.4: A number of poles are arranged as shown. The taller their heights the more difficult it will become to balance. Just walk steadily on them in all directions.

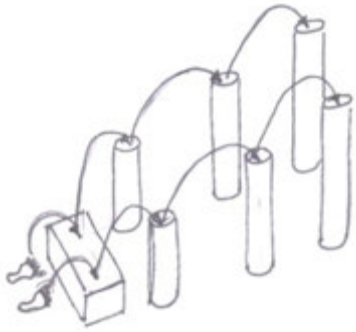

fig.5 Plum Blossom Jumping

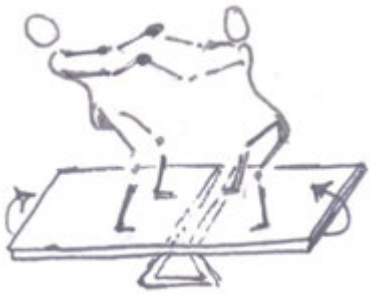

fig.6 Engaging With Partner On Board

Fig.5: Arrange the poles in increasing heights as shown in the picture. Stand with both feet comfortably placed and knees a little bent and back straight and relaxed. Control breath and jump from one to the next cog. Take all care not to fall or miss footing, as it might result in injury. Thus this is an advanced exercise, which should be performed only after earlier ones are mastered.

Fig.6: Now instead of a straight log have a board which is hinged at the centre. Both partners should stand on either side of the fulcrum point and try to level the board so that it does not touch the ground. If both the partners are of equal weight, it will be easier and better. First stage is to just balance each other's weight on it. Once that is achieved, the second stage is to practice a little hand combat movements without power and speed at the start. As one progresses more and more, speed and power elements can also be added.

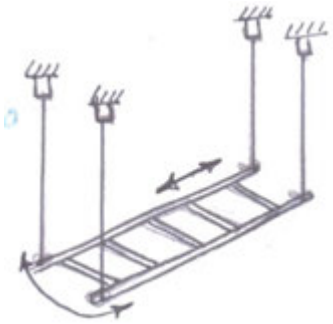

fig.7 One Legged Pull-Push fig.8 Suspended Ladder Practice

fig.7: This is a preliminary kind of balance improvement exercise. Stand facing the partner, hold each other's hand (same), lift one leg off the ground and start pulling and pushing each other. Make sure not to put the foot down and not to fall despite all the jostling.

Fig.8: Suspend a ladder from the ceiling as shown in the figure. Make sure that the rungs attached in the ladder should be hinged and not fixed so that both long members of the ladder on which all the rungs are hinged can move front and back parallel to each other also. Due to hanging, the ladder can swing in all directions. The hanging points on the ceiling should be firm to take the weight of about 300 kg safely. Now both persons should stand on the ladder and engage with each other moving forward and backward. In the first stage they can engage with hands but in the later advanced stage they can add foot engagement also.

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Chapter IV: Diet & Nutrition

It is a scientific study of food and how it is utilized in our body. It is the science of foods, its nutrients and other substances carried by it. Their action, interaction, balances in relationship to health and diseases. We **need** to understand their ingestion, digestion, absorption, transportation, utilization and disposition of their end product.

Food can broadly be divided in to two categories i.e. 1. Nutrients and 2. Non-nutrients.

Nutrients : There are around 40 essential nutrients broadly classified as Proteins, Carbohydrates, Fats, Vitamins, Minerals and Water.

Non-Nutrients: They can be named as Colour, Flavors and Taste.

Our food has physiological, social, cultural and psychological implication as enumerated below.

1. **Physiological**
    a. Energy giving (body fuel Provided by carbohydrate and fats)
    b. Body building (growth and repair of body cells)
    c. Protection (preventing infections, help in recovery)
    d. Regulation (pulse, temperature, Muscle contraction)
2. **Social**
    a. Community free food service
    b. Parsad
    c. Brahm Bhoj as carried out in villages during marriages etc.
    d. Sharing Food
3. **Psychological**
    a. May act as reward
    b. Favorite food , prepared well, one eats more

Body Requirement: To fulfill the requirements of our physical body various nutrients are required in different quantities.

Macro Nutrients: Like Carbohydrate, proteins, fat, water etc are needed in large quantity by our body to keep up our basic metabolism rate and attend to other energy needs while performing various actions.

Micro Nutrients: Like Vitamins and Minerals needed in small quantity.

Handling of Food by body: Body needs various nutrients for different functions as enumerated below:

Action: Calcium needed for bones and teeth

Interaction: Phosphorus with calcium help in growth of bones and teeth

Balance: If phosphorus is more than required amount, less calcium will be absorbed in our body, hence correct percentage of phosphorus is essential.

Since body cannot handle food as it is; it has to be broken down into utilizable form. This process is called digestion. When several nutrients become available for usage, they move from intestine into blood, this process is called absorption. Then blood carries them to all the body cells to utilize for different functions. During absorption, certain substances or by products are produced which are harmful or useless, are expelled in the form of urine, feces and this process is called excretion.

As a chronically ill person can be judged from appearance alone, similarly we can also judge good health of a person from certain outer indicators as tabled below:

Signs of Good health

Sn.	Body Part	Sign of good health
1	Hair	Shiny and lustrous
2	Neck Gland	Not enlarged
3	Skin	Smooth, slightly moist good color
4	Eyes	Bright, clean, no Fatigue, circles
5	Lips	Good color and moist
6	Tongue	Good pink color, no lesions
7	Gums	No swelling, no bleedings, pink

8	Teeth	Strong, No discoloration, even
9	Abdomen	Flat
10	Legs and Feet	No swellings
11	Skelton	No malformation
12	Weight	Normal as per height and age
13	Posture	Straight , abdomen in, chest out
14	Muscles	Well developed and firm
15	Nervous Control	Good power of concentration not irritable or restless
16	Appetite	Good
17	Digestion and absorption	Normal
18	Sleep	Sound sleep, one feels fresh after getting up

Malnutrition: Apart from Nutrition, we have malnutrition also, facing the lower strata of populace. This also can be of two types:

1. **Under:** In our country it is quite spread and is generally Vitamin A deficiency in which eyes get affected and lead to blindness.
2. **Over:** Obesity comes under it. This is the disease of wealthier strata of society. It used to be spread in western countries earlier but these days it is observed in our country too.

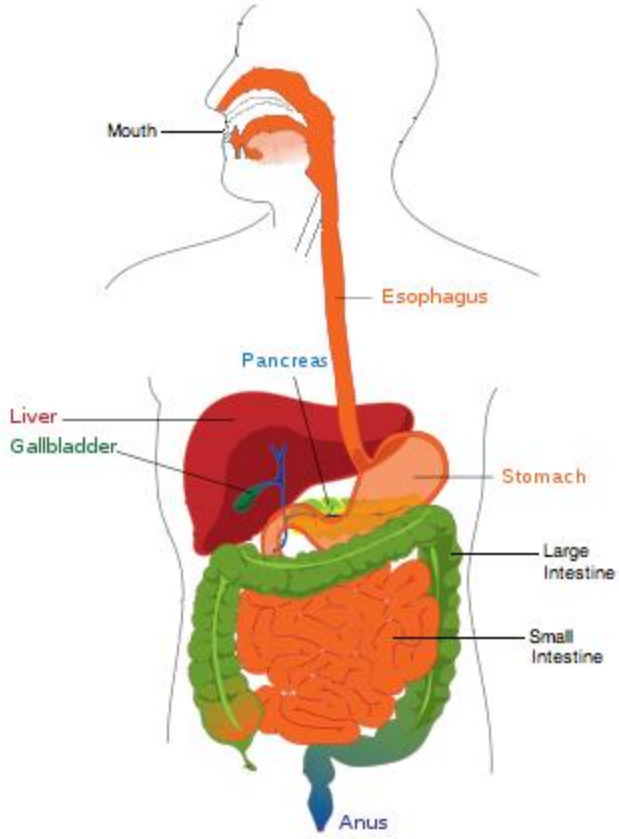
Enzyme:

1. An Enzyme is a protein substance in living cells, helps quicken chemical reactions.
2. Bring about change in other substances w/o undergoing any change itself.

General Standards used:

1 oz = 28 gm; 3.5 oz = 100 gm; 8 oz = 227 gm; 1 pound = 454 gm; 1 kg = 2.2 pounds; 1 gallon = 3.79 litres; 1 quart = 0.95 litre = 950 ml; 1 cup = 240 ml = 0.25 litre; 1 table spoon = 15 ml; 1 tea spoon = 05 ml; Fahrenheit = {(9/5)degree centigrade+ 32}; Centigrade = {(5/9) degree Farenheit-32}; 1 gm fat = 9 kilo calories, 1 gm protein = 4.1 kilo calories , 1 gram of Carbohydrate = 4 kilo calories;8.8 kilo calories = 37 kilo joules of energy.

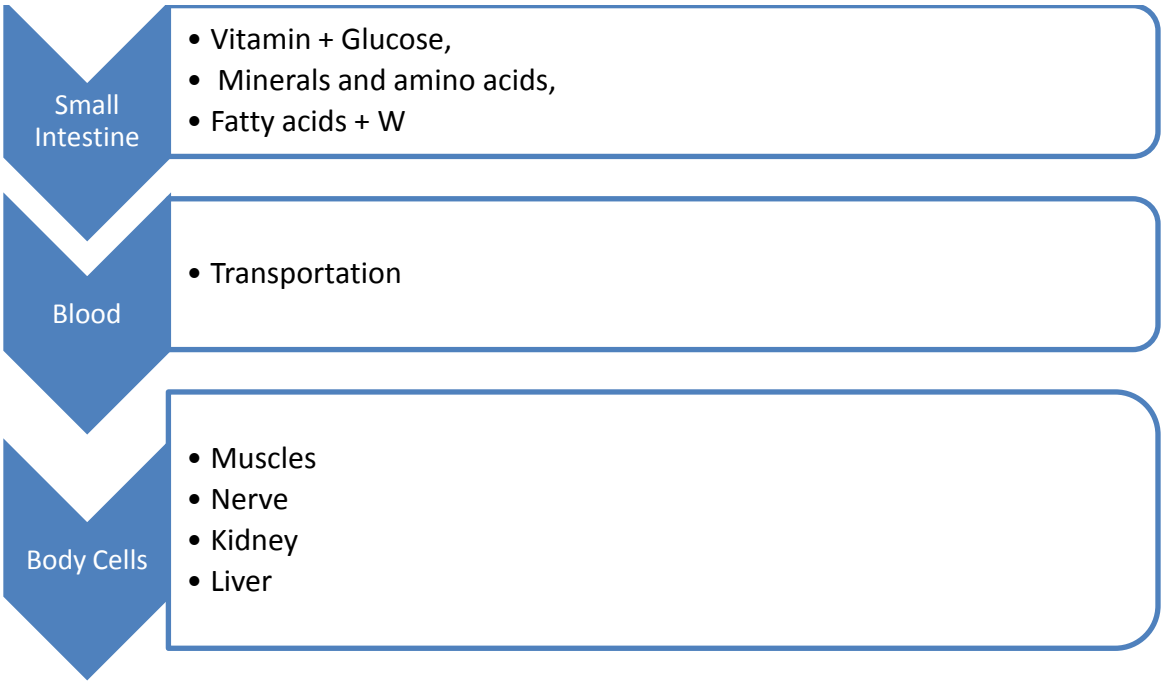
Diagram of Digestive system



- Mouth: Saliva contains Enzymes "amylase" acts on cooked carbohydrate; break them to smaller parts, best when Ph. value varies between 4-9.
- Food Pipe or Esophagus
- Liver secrets Bile juice sent to small intestines.
- Stomach: Gastric juices contain HCL enzymes, water. Makes food soup like, enzyme breaks protein for partial digestion
- Pancreas secrets pancreatic juice, which is delivered to small intestines.
- Small intestine:
    - Intestinal juice: breaks fat, proteins and carbohydrate to simpler substances
    - Bile: Digest and absorbs fats.
    - Pancreatic juices/Amylase: It acts on sugar and partially digested and cooked starch. It also
        - breaks fat, proteins and carbohydrates to simpler substances for easier digestion
        - Breaks down starch in to glucose and proteins into amino acids.
        - Fat converted into smaller units, nutrients absorbed.

- Large Intestine: Excess water is absorbed here while remaining water, solid waste eliminated in stool. Undigested food mainly cellulose excreted out of the body.
- Appendix: A small extension at the base of large intestines whose function still not very clear to our medical fraternity.
- Anus: an opening at the opposite end of digestive tract from the mouth. Its function is to control the expulsion of feces.

Diagram-2: Diagram below clearly shows the movement of various nutrients absorbed through the inner lining of small intestines and mixed in blood to be carried to various body cells.



Once the blood carries the nutrients with it into various cells, they undergo further chemical changes inside those cells before being absorbed. Generally two types of changes take place during this process.

1. **Anabolism:** When simple substances join to produce complex substances.
2. **Catabolism:** When complex substances are broken to give simple substances.

All nutrients made of elements (which are 103 in number as we see in the periodic table) and elements are made of atoms. Atoms pair with each other to form various molecules and compounds. The elements then form bonds with other elements to give rise to two different compounds, namely, Organic and Inorganic. Organic compounds are those, which involve Carbon in bonding while inorganic are those which do not involve any Carbon atom in its structure.

1. Organic compounds: They use Carbon atoms in its molecules – (Carbohydrates, Proteins, Vitamins, Fats)
2. Inorganic compounds: They do not use any Carbon atom in its molecules- (Mineral, and Water)

Proteins, fats and carbohydrates are oxidized in our body to provide energy. Proteins provide energy but their main function is to provide amino acids for building body proteins. Fats, especially oil, which we use in cooking has also vitamin like function in our body. At least 10% fat is needed in our body to provide padding for safeguard of various delicate organs.

GROUP	CATEGORY	Body Weight (Kg)		Energy (Kcal/Day)		Proteins (g/day)	
		Revised	Old	Revised	Old	Revised	Old
MAN	Sedentary	60	60	2320 ↓	2425	60	60
	Moderate			2730 ↓	2875		
	Heavy			3490 ↓	3800		
WOMAN	Sedentary	55 ↑	50	1900	1875	55 ↑	50
	Moderate			2230	2225		
	Heavy			2850 ↓	2925		
	Pregnant			+350 ↑	+300	78 ↑	65
	Lact. <6 mths			+600 ↑	+550	74	75
	Lact. 6-12 mths			+520 ↑	+400	68	68
INFANTS	0 – 6 mths	5.4	-	92/kg ↓	108/kg	1.16/kg ↓	2.05/kg
	6 – 12 mths	8.4	8.6	80/kg ↓	98/kg	1.69/kg	1.65/kg
CHILDREN	1 - 3 yrs	12.9	12.2	1060 ↓	1240	16.7 ↓	22
	4 - 6 yrs	18.0	19.0	1350 ↓	1690	20.1 ↓	30
	7 - 9 yrs	25.1	26.9	1690 ↓	1950	29.5 ↓	41
BOYS	10 - 12 yrs	34.3	35.4	2190	2190	39.9 ↓	54
GIRLS	10 - 12 yrs	35.0	31.5	2010 ↑	1970	40.4 ↓	57
BOYS	13 - 15 yrs	47.6	47.8	2750 ↑	2450	54.3 ↓	70
GIRLS	13 - 15 yrs	46.6	46.7	2330 ↑	2060	51.9 ↓	65
BOYS	16 - 17 yrs	55.4	57.1	3020 ↑	2640	61.5 ↓	78
GIRLS	16 - 17 yrs	52.1	49.9	2440 ↑	2060	55.5 ↓	63

A. Carbohydrate

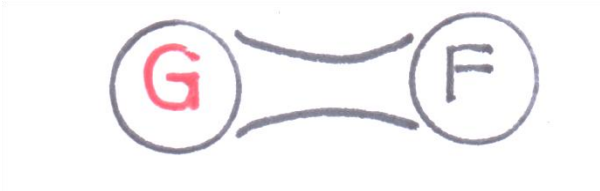
As the name itself shows Carb-O-Hydrate, that it is a molecule of Carbon-Oxygen-Hydrogen. Its chemical formula is C4O4H8. When we have only one molecule of Carbohydrate it is called Monosaccharide, when two molecules are inter connected it is called Di-saccharide, when 8-20 molecules are interconnected, the grouping is called Polysaccharides. But if the number of molecules becomes more than 20, the grouping is called Oligosaccharides.

Simpler carbohydrates can be broken down by our body to extract energy, hence are called Available Carbohydrates but more complex like Poly or Oligosaccharides form long chains or loop structure with trapped in sugars sometimes, cannot be broken down and hence are Non-available one's for our body.

Monosaccharides	Description
Glucose	basic sugar unit
Fructose	fruit sugar
Galactose	derived from lactose
Disaccharides	**Description**
Sucrose	Common table sugar
Maltose	product of starch Hydrolysis
Lactose	Main sugar in milk
Oligosaccharides	**found in legumes**
Polysaccharides	**Description**
Starch	amylase, amylopectin
Non-starch	cellulose,pectin

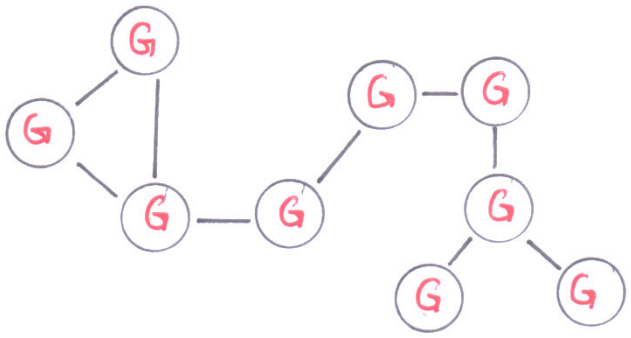
These are widely distributed in plant foods. Mainly three type of compounds:

- Sugar: Glucose and fructose joined together.



1. Starches
   a. Straight chained

b. Crooked chained



*G stands for Glucose

2. Fiber (cellulose) : similar to starch, but inner glucose linkage are different.

Since 1 and 2 (sugar and starch) can be absorbed, hence are called available carbohydrates; while 3 (fibre/cellulose) cannot be absorbed, so are called unavailable carbohydrates. Cellulose and such other large Carbohydrate come under second category.

Sugar	Cereal	Routes and Tubes	Fruits
Cane Sugar (99.4)	Wheat(whole)– 71.2	Potato - 22.6	Banana(ripe)- 27.2
Honey (79.5)	*Rice: 78.2	Sweet Potato: 28.2	Sapota- 21.4
Jaggary (cane) (95.0)		Tapioca- 38.1	Mango (ripe) – 16.9

- (gms/ edible 100 grams of food); * Raw or milled

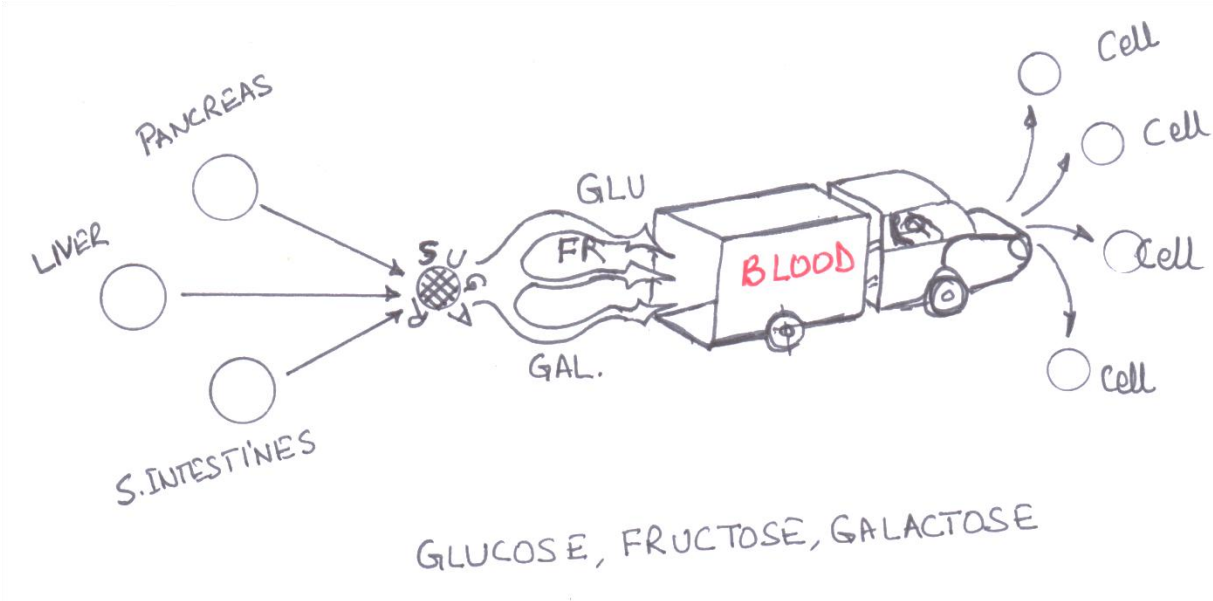
Function of Carbohydrate: Carbohydrates perform various functions in our body like, energy giving, fat utilizing and protein protecting.

1. **Energy:**
   a. **01 gm. Of Carbohydrate = 4 kilo Cal energy**. (1 kcal= amount of energy to raise the temperature of 01 kg water through 01 degree centigrade).
   b. Carbohydrates provide **60 to 70 percentage of total energy** in our food.
   In nutrition, kilo calories and calories mean one and the same thing.

Main function of Proteins in our body is for building and growth. But if carbohydrates are less in our body, then proteins are broken to give energy instead. Thus they are utilized for energy giving function rather than body building function. Thus carbohydrates protect proteins in our body.

Fat utilization: Carbohydrates also prevent unnecessary breakdown of Fats. In case of carb deficiency, more fat is broken down to provide energy.

Excessive fat breaking can result in accumulation of by products of fat metabolism. This accumulation causes a problem and can affect health. This is the case of too much fat reduction in too little a time.



Pancreatic Juice + bile + amylase of intestines breaks sugar to Glucose, Fructose, Galactose, which are carried by blood to various Cells (where they are converted to glucose). Glucose goes to cells and some percentage remains in blood. Cell Glucose is burnt to provide energy and excess is stored as Glycogen in liver and muscles. It can be converted to energy. But if it's in excess it gets converted to fat.

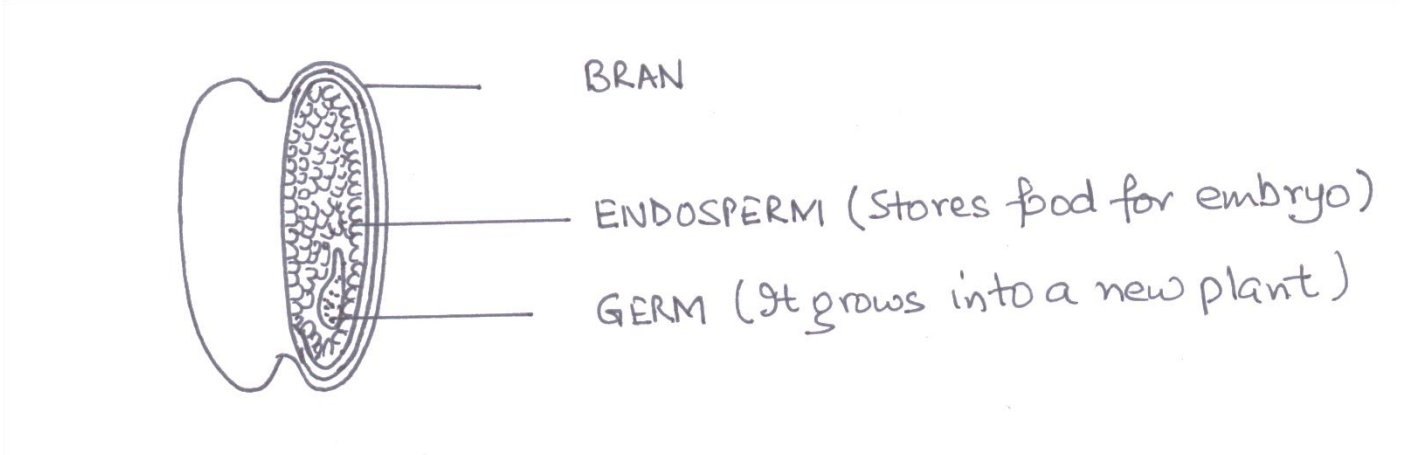
Non Available Carbs: These are the Fibers, like cellulose present in plant foods. Most of them cannot be digested.

Functions: The above Carbohydrate help to provide,

1. Satiety value
2. Elimination
3. Prevent diseases like cancer, diabetes, and heart diseases, colon cancer / large intestine.

Sources: Outer coverings of cereals and pulses.

Whole wheat grain, whole wheat flour, Whole pulses, like black gram, Rajmah, Lobia contains appreciable amounts of fiber. Maida, Suji, washed(dhuli) daal do not contain any fiber.



Parts of Grain food

1. Bran
2. Endosperm (stores food for growing embryo)
3. Germ (it grows into a new plant)

B. Proteins

Protein is derived from a Greek word called 'Proteios' which means Primary/in the lead/standing front. Basically proteins are biomolecules or macromolecules, of one or more long chains of amino acids. There are around 22 different types of amino acids discovered. The proteins differ from each other only in the arrangement of amino acids in the chain. Linear chains of amino acids are called peptides/oligopeptides, which are joined together with peptide linkages/bonding. If these amino acids are less than 20 joined Lysine in a chain it is rarely called a protein. These specific sequence of bonding is called Genetic code. Proteins contain carbon, hydrogen, oxygen and nitrogen. Basic buildings blocks are amino acids, $C_6H_{14}N_2O_2$ is lysine out of around 20 amino acids. Amino acids are joined by linkages called peptide linkages. Some amino acids are used for protein synthesis inside our body, while some is converted to glucose. Under severe condition of starvation only, the body converts. Within our body, they perform a number of functions as given below:-

Functions of Proteins:

Body building: Proteins supply Amino acids which are essential for building new body tissues and replacing worn-out tissues. Thus it helps in growth and maintenance. Hence for constant growth, till adulthood, they are very important for body. Once this body building function is complete, then they are needed mainly for maintaining function, i.e. replacing the worn out tissues. They help in metabolic reactions, DNA replication, responding to stimuli.

Regulatory and protective: Proteins are part of some chemical substances essential for the regulation of vital body processes, namely digestion, absorption and metabolism.

a. Enzymes help in digestion, they are proteins in nature.

b. Similarly hormones are chemicals which are needed for metabolism.

c. Insulin is also a Protein.

d. The antibodies, which protect our body, are also proteins.

Proteins as Carriers: Hemoglobin, which is a red colored protein, carries oxygen from lungs to body tissues and carbon dioxide from blood tissues to our lungs. It transports molecules from one site to another inside our body.

Energy Giving: In case of extreme malnutrition, vitamins are also broken down for energy.

a. 1 gram Protein = 4.1 Kcal

They exist only for a certain period of time, which many range from a few minutes to years. On average life span in mammalian cells is 1-2 days.

Long distance runners have thin bodies and small muscle mass. In their cases, the proteins are used up and not allowed to build inside the body. Or we can say that they are great runners because there bodies are like that. To keep good muscle mas they have to keep working on the body on regular basis for muscle strengthening and not only running. Long distance running is aerobic in nature while 100 or 400 met running is anaerobic in nature as body hardly gets time to pass on the oxygen to the muscles.

There are 20 types of Proteins, out of which only 08 cannot be manufactured inside our body and hence needed in external food and are called *essentials*. Animals cannot synthesize it inside their bodies and hence they need it from outside and then break them in to smaller amino acids.

Those which our body make are called non –essentials.

Amino Acids

S.No.	Essential	Non- Essentials
1	Isoleucine	Alamine
2	Leucine	Asparagine
3	Lysine	Aspartic acid
4	Methionine	Cystine
5	Phenylalamine	Cysteine

6	Threonine	Glutamic Acid
7	Tryptophan	Glycine
8	Valine	Hydroxy proline
9	Histidine (essential for infants)	Hydroxy Lysine
10	X	Proline
11	X	Serine
12	X	Tyrosine
13	X	Glutamine

Quality of food Proteins = no. of proportion of amino acids contained in it.

Animal food proteins contain all essential amino acids in quality and percentage while plant food proteins, generally lack in 1-2 essential amino acids. Cereals are poor in lysine/ rich in methionine, Pulses are poor in methionine and rich in lysine. So cereal and pulses together in our Indian food is a good combination. Hence Daal- Roti, Rice- fish, Dosa (Udad + Rice) , Dalia + milk give a balanced diet.

Proteins: Sources of different quality of proteins is received from different sources as below.

1. Good quality (Animal food sources > for body protein synthesis)
2. Poor Quality (Plant food sources > for tissues protein synthesis)

As is clear from above that good quality of protein which is used for body-building is carried mainly by animal foods but poor quality of protein which is received from vegetable kingdom is good only for giving energy.

Proteins Values (in gm/100 gm of edible item)

1. Milk and milk Products(3.2), Cheese (24.1), Curd(cow's milk)(3.1), Khoya (24.1)
2. Meat ,poultry, fish(20.3), goat meat(lean)(21.4)
3. Eggs(hen)(13.3)
4. Nuts and oil seed : Groundnut (25.3), Badam(20.8), Kaaju (21.2), Akhrot(15.6)
5. Pulses: Black dal (24.1), Moongi dal(24.5), Rajmah (22.9), Soyabean (43.2)

Dietary Protein

These are proteins of small & large chains of amino acids. Digestion involves breaking down of those amino acid chains to its constituent amino acids.

Saliva contains Proteolytic enzymes (which break down Proteins partially). Hence it is said that some digestion of the food takes place in our mouth itself.

Digestion of Proteins takes place mainly in stomach and large intestines with the help of gastric juices, which contains Pepsin and several enzyme in intestines.

1. **Small Intestine:**

Several enzymes called as Proteases act on partly digested proteins and convert them to even smaller amino acids chains initially. Then smaller amino acids chains to amino acids.

Peptidases, act on amino acids chains to break down to basic amino acids. Metabolism of proteins is actually a metabolism of amino acid.

Amino acids are carried by blood to our Liver. We can say that, out of the total amino acids in our body,

1. Some are used for building blood proteins,
2. Some are retained in liver,
3. Some circulate in blood as amino acids. Some of them may be taken by body tissues, for protein synthesis whenever or wherever needed. Proteins of good quality are optimally utilized by body for synthesis of its own proteins.

Protein Malnutrition (0-6 yr. children) causes blurred vision of eye, shorter height attained, Marasmus, Lower body weight (50% or less), Gross muscles wasting and loss of subcutaneous fat and is observed more frequently in infants and young children.

Kwashiorkor or Odema caused - excessive fluid accumulation in lower limbs inter cellular spaces of tissues which gives swelling like condition in feet etc, will suffer from Vit A and B12 deficiency, cause watery diarrhea and severe respiratory infections. It occurs mostly in children of the age group of 1-3 years. These children will weigh 60% of the normal children of their age group.

Some children exhibit characteristics of both, they are said to be suffering from Marasmic Kwashiorkor. Generally irritable and has no interest in the surroundings, thick varnished skin may peel of easily leaving crack and sores, Hair loses blackness and become reddish brown, also become sparse and can be pulled off easily. Puffy face /cheeks sagging i.e. moon faced, Severe respiratory infection. Will also suffer from Vitamin A, B-complex deficiencies. Generally brought to hospitals with watery diarrhoea and severe cough.

Generally to identify severity of cases from weight and nutrition point of view, a standard which has been laid is given below:

Status	Criteria (National Centre Of Health Statistics)
Normal	more than 80% of weight for age suggested by NCHS
Mild malnutrition	70-80 % ,, ,, ,,
Moderate malnutrition	60-70 % ,, ,, ,,
Moderately severe	50-60 %,, ,, ,,
Severe malnutrition	< 50 %,, ,, ,,

Features	Kwashiorkor	Marasmus
Edema	Present	Absent
Muscle wasting	Moderate	Severe
Hair changes	Present	Absent
Body weight	60% of normal	50% of normal
Moon face	Present	Absent

C. Vitamins

These are organic in nature and are present in small quantities in many foods. They are vital as they perform vital function in our body and hence the name suggests. They perform different functions in our body as detailed below:

1. Regulate Metabolism
2. Growth
3. Maintenance of body
4. Protect against diseases

Vitamins are co-enzymes, which help in *carbon, protein and fat metabolism*. Coenzymes needed by enzymes to do their job efficiently. Hence they are helpers of specific enzymes.

Vitamins are of two types, namely, water-soluble and fat-soluble.

1. **Water Soluble (B1, B2, B12, C)**
    a. B-1- Thiamine: found in Meat, Poultry, Eggs yolk, whole wheat flour, sela rice, sprouted grains, fermentation, idli, dhokla.
    b. B-2- Riboflavin: Whole grain cereals, Pulses, milk, eggs, liver kidney, green leafy vegetables.
    c. B 12 –Folic acid, Niacin: Cobalamine only in animal foods, liver, kidney, milk eggs, sea food (shrimp, crab and lobsters), also synthesized in our body in intestine by certain bacteria.
    d. Vitamin C: Orange, green Chili, Tomato, Guava, Capsicum, Amla, Lemon, Spinach, Coriander.
2. **Fat Soluble (A, K, E D)**
    a. Vitamin A: Milk, Butter, ghee, Eggs, Fish, Liver oil of Halibut, Cord, Shark, insoluble in water and hence no loss through it.
    b. Vitamin K: sources are Spinach, cabbage, Lettuce, egg yolk, liver, meat, Milk. 50% body makes. Fifty percent of it is made inside our body and rest 50% is generated from outside sources.
    c. Vitamin E: sources are Ground nut Oil, Soya Oil, Cotton Seed, Sun Flower, whole grain pulses, dark green leafy vegetables, nuts, oil seeds. Animal foods are generally low in Vitamin E. Thus egg yolk, butter, liver contain some amount of this vitamin.
    d. Vitamin D: Also called sunshine vitamin. Its sources are Egg , liver and butter.

Below a table is being given to show the solubility, exposure to light, air and heat of different vitmains.

Vitamin	Water solubility	Exposure to air	Exposure to light	Exposure to heat
A	No	Partially	Partially	Relatively stable
C	very unstable	yes	Yes	Yes
D	No	No	No	No
E	No	Yes	Yes	No
K	No	No	Yes	No
Bi,Thiamine	Highly	No	X	>100 deg cent.
B2, Riboflavin	Slightly	No	in solution	No
B3, Niacin	Yes	No	No	No
B5,Pantothenic	Quite stable	X	No	Yes

Acid.				
B6	Yes	X	Yes	X
B7, Biotin	Somewhat	X	X	No
B9, Folic Acid	Yes	X	When dry	At high temperature
B12	Yes	X	Yes	No

C1. Vitamin A

It is a group of unsaturated nutritional compounds which include retinol, retinal, retinoic acid and provitamin A, carotenoids and beta-carotene. Vitamin A in the form of retinal joins with vitamin Opsin to form Rhodopsin which is essential for seeing in dark. It is associated with Rods in our retina. In light, Rhodospin breaks down to form Opsin and retinal. In the absence of adequate vitamin A, the outer white layer of the eyeball loses its moist white appearance and becomes dry and wrinkled. It may result in redness and inflammation and later may lead to loss of vision gradually. The cornea may also loose its transparency, become opaque and soft, leading to total blindness. Normally retinol is not present in food but is generated inside or body from Beta-carotene. The efficiency of this conversion is only 50%. Depending upon the fat content in the diet, the amount of available beta-carotene also varies from 25-50%. Thus we can say that one unit of beta-carotene may yield 25% retinol only. About 50 gms of common leafy vegetables provide enough beta-carotene for the day. 100 gms of mango or 200 gms of papaya also fulfill the requirement of the vitamin A for a day. Atmospheric oxygen and ultraviolet light destroys it. Fresh greens contain more beta-carotene, so use fresh vegetables.

Taking vitamin A in large quantities for a longer duration of time may lead to toxic symptoms like irritability, nausea, vomiting and headaches.

Retinal is mostly found in animal foods. Plants do not contain retinal, but contain an orange or yellow colored pigment called *carotenoids*, which can be converted to retinal inside out body; beta carotene is widely distributed in plant food. Ripe fruits like mango, papaya; yellow/ orange vegetables like carrot pumpkin; green leafy vegetables also contain the pigment. Chlorophyll makes this pigment in spinach, mustard and fenugreek.

Generally children between the ages of 1-5 years are administered massive doses of Vitamin A i.e. 200,000 IU once every six months. For vitamin A rich diet, green leafy vegetables (palak, amaranth), yellow vegetables (pumpkin and carrots), fruits(papaya, mango) are good sources of beta-carotene which is a precursor of Vitamin A.

Vitamin A ingested in the form of two compounds:

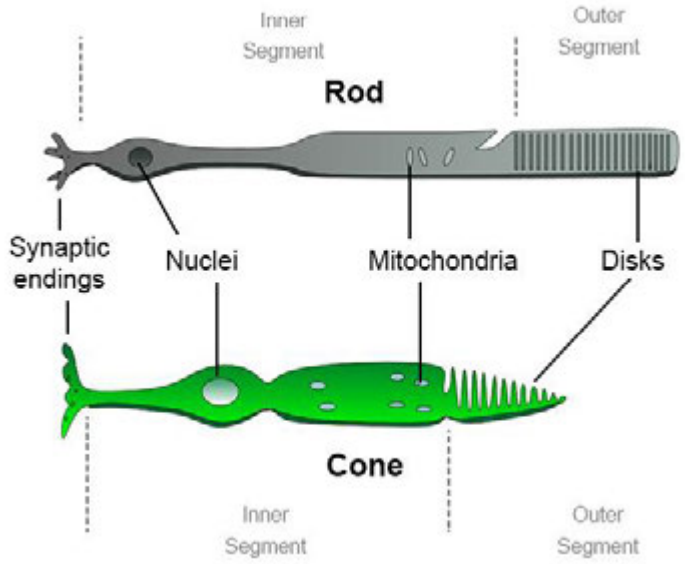
1. Retinol (from intestines) --> joins with certain fat containing particles 'chylomicrons' --> goes with blood stream to our Liver. 90% of it is stored here and the rest 10% gets distributed to kidneys, lungs and adrenal glands.
2. Carotenes> Absorbed and converted to retinol in intestinal cells.

Note:

1. Vitamin A being fat soluble, therefore, Bile and fats aids in its absorption.
2. Protein help to transfer vitamin A from liver >body tissues.

Functions:

1. Normal Vision: Retina



Rods (Dim light vision)

Cones (Bright Light Vision)

Metabolism

Rhodopsin --> in light > Protein + Vitamin
Rhodopsin (in dark) ← Protein + Vitamin

International Units: 1 IU = 0.3 microgram Retinol

= 0.6 microgram beta–carotene

= 1.2 microgram of pro vitamins –A carotenoid

2. Supporting growth: Soft Tissue and Skelton

3. Disease Protection: Epithelial tissues are kept Moist and healthy, I.e. lining of eyes lining of organs like intestines and lining of lungs. Without Vitamin – A linings becomes dry and cracks up. This germs enter and cause diarrhea, respiratory infections , eye infections.

As per *USDA data base* amount of Vitamin A in various foods is as follows:

Cod liver oil-30000 micro grams	Liver (turkey) – 8058 micro grams
Liver (Chicken) – 3296 micro grams	Liver(beef, pork, fish) – 6500 micro grams
Carrot – 8840 micro grams	Eggs – 140 micro grams
Sweet potatoes - 961 micro grams	Broccoli leaf – 800 micro grams
Papaya – 55 micro grams	Cheddar cheese – 265 micro grams
Mango – 38 micro grams	Butter – 684 micro grams
Milk - 28 micro grams	Spinach 469 micro grams
Pumpkin - 400 micro grams.	

Note: 1 micro gram= 1/106 gm ; 1 micro gram = 3 IU

Recommended dietary intake for various categories of people is also given below:

Gender/Age group	**Adequate need/day**	**Maximum need/day**
INFANTS		
0-6 MONTHS	400 micro gram	600 micro gram
7-12 MONTHS	500 micro gram	600 ,,
CHILDREN		
1-3 YEARS	300	600 ,,
4-8 YEARS	600 micro grams	900 micro grams
MALES		
9-13 YEARS	600 ,, ,,	1700 ,, ,,

14-18 YEARS	900	,,	,,	2800	,, ,,
19 -70 YEARS	900	,,	,,	3000	,, ,,
FEMALES					
9-13 YEARS	600	,,	,,	1700	,, ,,
14-18 YEARS	700	,,	,,	2800	,, ,,
19-70 YEARS	700	,,	,,	3000	,, ,,
PREGANANT WOMEN					
< 19 YEARS	750	,,	,,	2800	,, ,,
19-50 YEARS	770	,,	,,	3000	,, ,,
LACTATING FEMALES					
< 19 YEARS	1200	,,	,,	2800	,, ,,
19-50 YEARS	1300	,,	,,	3000	,, ,,

International Units: 1 IU = 0.3 microgram Retinol

= 0.6 microgram beta–carotene

= 1.2 microgram of pro vitamins –A carotenoid

4. Supporting growth: Soft Tissue and Skelton
5. Disease Protection: Epithelial tissues are kept Moist and healthy, i.e. lining of eyes lining of organs like intestines and lining of lungs. Without Vitamin – A linings becomes dry and cracks up. This germs enter and cause diarrhoea, respiratory infections, eye infections.

C2 . Vitamin B

These are water soluble vitamins which play an important role in the cell metabolism, proper utilization of energy, carbohydrates, proteins and fats. Though different vitamins under this category carry same name but are chemically different. Each B vitamin is necessary for some or the other metabolism in our body. They are total eight in number, namely B1, B2, B3, B5, B6 B7, B9 and B12.

Vitamin	(thiamine)	A coenzyme in the catabolism of sugars and amino acids

B1		
Vitamin B12	(various cobalamins; commonly cyanocobalamin or methylcobalamin in vitamin supplements)	A coenzyme involved in the metabolism of every cell of the human body, especially affecting DNA synthesis and regulation, but also fatty acid metabolism and amino acid metabolism
Vitamin B2	(riboflavin)	A precursor of cofactors called FAD and FMN , which are needed for flavoprotein enzyme reactions, including activation of other vitamins
Vitamin B3	(niacin or nicotinic acid)	A precursor of coenzymes called NAD and NADP, which are needed in many metabolic processes
Vitamin B5	(pantothenic acid)	A precursor of coenzyme A and therefore needed to metabolize many molecules
Vitamin B6	(pyridoxine, pyridoxal, pyridoxamine)	A coenzyme in many enzymatic reactions in metabolism
Vitamin B7	(biotin)	A coenzyme for carboxylase enzymes, needed for synthesis of fatty acids and in gluconeogenesis
VitaminB9	(Folic acid)	A precursor needed to make, repair and methylate DNA. Aid in rapid cell division in growth and pregnancy, a cofactor in various cell divisions

Source : en.wikipedia.org

B1 – Thiamine :B1 + thiamine – acts as coenzymes and help in metabolism of carbohydrates, proteins and fats. Co-enzymes are needed by enzymes to do their job. Its prolonged deficiency results in beriberi. Outer layer of rice, wheat and millet, yeast, cereals, pulses nuts like ground nut are good sources of it. Fruits, vegetables, animal foods are poor sources of thiamine. Whole grains should be used. It is basically needed in utilization of carbohydrates. Thus more the carbohydrates in diet, more the requirement of thiamine in our body. If we use parboiled rice or

wheat 100 gm/day provides enough thiamine. 60-70gm of pulse in rice diet can also provide sufficient amount.

B2 – Riboflavin: Essential for many oxidation processes inside our cells and also used for energy and protein metabolism in our body. Safe requirement varies from 0.7 – 2.2 mg per day, depending upon age, level of activity. It goes to body tissues and rest is expelled out of body through urine.

B6 – It exists in three interchangeable forms in our body, namely pyridoxal, pyridoxamine and pyridoxine. It is utilized in metabolism of proteins and fats. Daily intake of 0.6 – 2.5 mg of B6 meets all the daily requirement of a person. Meat, liver, vegetables and whole-wheat grains are a good source of B6.

B12: Folic acid, Niacin. Niacin is found in Fish, Poultry, Nuts and oil seeds. Tryptophan in milk inside our body is converted to Niacin. Folic Acid, after absorption is taken through blood to various body tissues, stored in liver for requirement of several months. It helps in blood formation. Our blood comprises of

1. Red Blood cells
2. White Blood cells
3. Platelets

Folic acid is required for multiplication and maturation of red cells. Its deficiency causes anemia seen in children and pregnant women. Its requirement varies from 50-100 micro grams. In pregnant women it may vary from 150 – 300 micro gram. Fresh green vegetable, pulses and liver are good sources of it.

B1 (thiamine) – acts as coenzymes and help in metabolism of carbohydrates, proteins and fats

Co-enzymes and needed by enzymes to do their job.

B2 > body tissues > excess is thrown out through urine.

Niacin: Fish, Poultry, Nuts, oil seeds

Tryptophan (Milk) --- Inside body > Niacin

Folic Acid: After absorption taken through blood to various body tissues, stored in liver for requirements of several months. Helps in blood formation

Composition of blood

- Red Blood cells
- White Blood cells
- Platelets

Helps in development of red blood cells:

1. Vitamin B-12, Cobalamin: Can be absorbed in the presence of specific chemical substances called intrinsic factors. It is secreted by parietal cells of stomach along with HCL and help in absorption of B_{12}. B12 in absorbed in small intestine. A bacteria in intestines also produces B 12 but it cannot be absorbed in absence of intrinsic factor and hence ejected through stools.
2. Functions
   Proper function of digestive tract, Nervous system, bone marrow, inside bone narrow it produces red blood cells.

C3 . Vitamin C

It is an essential form for humans as we do not have capacity to produce it, Ascorbic acid is also called Fresh Food vitamin as fresh fruits and vegetables are its source. Its deficiency causes scurvy, which is characterized by weakness, bleeding gums, defective bone growth. It also helps in absorption of dietary iron. Dry grains do not contain vitamin C, but when they are made to germinate, Vitamin C is generated in the grain and growing sprout. About 15% of it is in the grain and rest 85% is in the sprout. Of all the acids ascorbic acid is most susceptible to oxidation in air. It is an intense reducing agent and hence is oxidized very quickly in atmospheric air. Hence if the vegetables are cut and left, or are stale, dry then most of vitamin C is destroyed. Amla and Guava are the best sources of Vitamin C. Infact, Amla is the best source of it. It contains 20 times more vitamin C as compared to an orange. Heating destroys Vitamin C. But Amla is an exception where it is protected and not allowed to be destroyed. Hence even in dry state it carries vitamin C.

Sprouted green gram is about 3 times richer in vitamin C as compared to bengal gram.

Green chilies = cheap vitamin C

Amla = 20 times more supplier of Vitamin C than any other source

Absorbed from digestive tract and distributed to various body tissues.

Spleen, bone marrow, liver, pancreas, retina of eye contain high concentration of ascorbic acid.

Functions:

Wound Healing: Forms collagen at wound site, makes strong blood vessels,

Help in absorption of Iron, which play a role in blood formation.

Help overcome conditions of injury, stress and infection.

Also protects Vitamin A and saturated acids from being destroyed.

C4 . Vitamin D

This is going to be a major disease of the modern world. Our pineal gland in brain secretes Melatonin and Serotonin. Serotonin gives us mental wellness. It is secreted in the presence of sun light. But we have moved from the open work place culture and got addicted to air-conditioned work spaces, where there is no sun light and continuous sitting at the computer terminals for long hours without getting up. People enter their office in the morning and work late evenings. They hardly get chance to get sun light contact with their skins, rather they hardly see sun or moon for days at end. Apart from this we also see young girls covering their faces, arms etc. with whatever they can when out in open to protect their skins, completely forgetting that sun light is an essential part of our daily life. Whatever gifts of nature which were free and essential have been forgotten and one has to pay for this misunderstanding on our part by diseases caused by deficiency of Vitamin D in our body.

Vitamin D is formed in our body by the ultraviolet rays of the Sun. It converts cholesterol derivative beta dehydrocholestrol in the skin to Vitamin D (cholecalciferol).

Symptoms of its deficiency: A person suffering from this will generally have dark skin, feel blue (depressive state of mind), above 50 years of age less vitamin D is generated in our body, kidneys also become less efficient in converting Vitamin D to a form which can be utilized by our body. Further, Vitamin D is a fat soluble hormone like vitamin. Our body fat acts a sink for collecting it. Thus the amount of Vitamin D available to such a body is higher than a thinner body frame. Same holds true for a person with bigger muscle mass. Both require more Vit D.

In its deficiency aches and pains also occur in combination with fatigue. We may experience throbbing, aching bone pains. One may suffer from head sweating and gut trouble. Classic signs of it is head sweating. As it is fat soluble, if we have gut problem them ability to absorb fats and hence fat soluble vitamins like B. This includes IBD(inflammatory bowel syndrome).

It helps in fighting colds and infections as it regulates the expression of our genes which our immune system fight and destroy bacteria and viruses. Thus optimizing vitamin D will benefit us as follows:

Reduces hypertension and heart diseases, prevents autoimmune diseases, multiple sclerosis and IBD, it reduces severity of asthma attacks, in case of chronic gum swelling or bleeding (it lowers the bacteria in mouth).

Optimal level is 50-70 ng/ml, <50 ng/ml is deficient, 70-100 ng/ml is used to treat cancer and heart diseases while > 100ng/ml is excess.. One can say that if take in sunshine for 15 minutes every day, our requirement of Vitamin D will be fulfilled. One gram of pure Vitamin D is equal 400 millon IU, 400 IU = 10 microgram of Vitamin.

C5 . VITAMIN E

It is a group of compounds that include both Tocopherols and Tocotrienols. Its functions are as follows,

Acts as an antioxidant, disabling the production of free radicals in tissues.

Its fat soluble, hence incorporated in cell membranes and protect from oxidative damage, brings smooth muscle growth to halt, it affects GENE EXPRESSION, responsible for repair of wounds, regenerator of extracellular tissues lost or damaged, neurological functions and protects lipids.

Its deficiency causes red blood cell destruction, impairment of immune response, skeletal mayopathy etc.

Sources	**mg/100gm**	**Source**	**mg/100gm**	**Source**	**mg/100gm**
Wheat germ oil	150	Almond	90	Tomato	1.4
Canola/Rapeseed	44	Hazel nut	26	Papaya	0.3
Sunflower	41	Sesame seed	1.4	Green leafy Veg.	0.13-.22
Almond oil	90	Broccoli	0.78---1.5		
Safflower	34	Sweet potato	0.24--0.94		

C6 . Vitamin K

These are fat soluble vitamins our body required for complete synthesis of certain proteins that are required for blood coagulation and binding of calcium in bones and teeth. Without it, blood coagulation is severely impaired and uncontrollable bleeding occurs. In German general on discovery it was named as Koagulations vitamin, hence came to be known as Vitamin K. It is of two types, K1 and K2. K2 is generated inside our body, converting K1 in testes, pancreas and arterial walls. Synthetic types of Vitamin K are K3, K4 and K5.K1 and K2 are Homologues, K4

and K5 are non-toxic while K3 is toxic in nature. Also it weakens bones, promotes calcification of arteries or other soft tissues.

It is synthesized by plants and found in abundance in green leafy vegetables, spinach etc. Other sources are Liver, egg yolk.

Its daily requirement in 25 year old young males is 120 micrograms/day, in women it is 90 micrograms/day and in infants it is 10-20 micrograms/day. For adolescents and children 15-100 microgram/day.

General list of items with Vitamin K content:

Item	Amount	Value(Vit.K1)
Cooked Spinach	½ cup	444micro gram
Raw Spinach	1 cup	145 microgram
Cooked turnip greens	½ cup	265 micrograms
Cooked cabbage	½ cup	82 micrograms
Asparagus	4 spears	48 micrograms
Raw broccoli	1 cup	89 micrograms
Cooked		220 micrograms
Green leafy lettuce	1 cup	71 micrograms
Raw parsley	¼ cup	246 micrograms

Supplements of this vitamin are given orally as well as injected to reverse their deficiency. For maximum effect of vitamin K requires 3~5 days, however minimum 24 hours is given to have good effect. Infants are given shots of Vitamin K at birth to tide them over till their colon gets established at 5~7 days from consumption of mother's milk. Babies blood coagulation is 30~60% of adults. Human milk contains 100 microgram/lit of it. In US infants are given 0.5 to 1. Mg Vitamin K shortly after birth.

Effects: It prevents osteoporosis, slows tumor growth, help in treatment of poisoning by rodenticide. Its deficiency linked to build up of calcium deposits in blood vessels.

Its seen tat average diets lack in Vitamin K but its deficiency is rare in adults. Its deficiency causes liver damage, Cystic fibrosis, inflammatory bowel disease(IBD), many times occur in people who have abdominal surgeries, in people who are on stringent diets.

Its symptoms can be anemia, bruising, bleeding of nose and gums in both sexes, heavy menstrual bleeding caused by long term use of Aspirin.

OVERALL LIST OF ALL VITAMINS WITH DOSES

Vitamin	Name		Recommended	Overdose
A	Retinol/Retinal/ Beta Carotene	Water soluble	900 micro gm	3000 micro gm
B1	Thiamine	,, ,,	1.2 mg	N/D
B2	Riboflavin	,, ,,	1.3 mg	N/D
B3	Niacin	,, ,,	16 mg	35 mg
B5	Pantothenic acid	,, ,,	05 mg	N/D
B6	Pyridoxine	,, ,,	1.3~1.7 mg	100 mg
B7	Biotin	,, ,,	30 micro gm	>100 micro gm
B9	Folic acid	,,	400 micro gm	1000 ,, ,,
B12	Methylcoblamin	,, ,,	2.4 micro gm	N/D
C	Ascorbic acid	,, ,,	90 mg	2000 mg
D	Fat soluble	,,	10 micro gm	50 micro gm
E	Tocopherois	,, ,,	15 mg	1000 mg
K		,, ,,	120 micro gm	N/D

Vitamin	Deficinecy	Overdose	Sources
A	Nightblindness,hyper -keratosiss	Hypervitam -inosis	Liver,orange, milk, Yellow ripe fruit, fish, carrot,spinach,
B1	Beriberi	Drowsiness,muscle relaxation With large dose	Egg,liver,pork, Oatmeal,brown rice,
B2	Glossitis,Angular(tongue inflammation)		Dairy pds, Banana,asparagus

		Stomatitis.	Popcorn,green beans.
B3	Pellagra	Liver damage	Meat, fish, eggs,mushroom
B5	Parosthesia	Diarehea,nausea Heartburns.	Meat,broccoli,avocado
B6	Anemia, peripherial Neuropath.	Nerve damage (> 100mg/day)	Meat,banana,vegetables
B7	Dermititis,Enteritis	X	Peanuts,raw egg yolk, green leafy vegetables
B9	Megolobastic anemia Defective pregnancy	Symptoms of B12 deficiency	Liver,pasta,brea,cereal Leafy vegetables
B12	Megalobastic	X	X
C	Scurvy	Vit.C megadosage	Amla, fruits,vegetables
D	Rickets, Osteomalacia	Hypervitaminosis	Fish,egg,liver,mushrrom
E	Very rare. Sterility In males, abortion in females.	Congestive heart failures (CHF)	Vegetables, nuts, seeds, Fruits.

Note: Beta Carotene supplements can be harmful.

A, D, B12 are stored in sufficient quantities in our body.

B3 not stored in enough quantity, just for a few days to a week.

D. Fats

They are an important source of energy and provide per unit weight more than twice the energy furnished by proteins and carbohydrates. It supplies palatability and retards the time of stomach emptying. Some of the fats are visible and some are invisible. Butter, ghee and oils are examples of visible fats while cereals, pulses, oil seeds, meat, eggs etc are sources of invisible fats. A cereal-pulse diet, not containing any visible fat, can meet 50% needs of essential fats for a person. During growth, pregnancy and lactation requirement of fats is more. During such times

intake of visible fats should be 15-25 g/day. *However, upper limit of fat in our diet should not exceed 30% of calories i.e. less than 80 g/day.*

Like Carbohydrates fats are also a combination of Carbon, Hydrogen and Oxygen, but differ in structure and properties. They are also called triglycerides and are esters of alcohol, glycerol. Generally Oils, Fats and Lipids are taken as same but they have differences. Fats are solid at room temperatures, Oils have unsaturated fatty acid chains which are liquid at room temperatures while lipids are generally hydrophobic, are soluble in organic solvents and insoluble in water. Saturated fats have no double bonding between carbon chains while unsaturated fats have one or more double bond. For example if we say Omega 3 fatty acid, it means a fatty acid indicating 3rd carbon from this side is double bonded. Generally fats melt at 30-40 degree centigrade. Trans fats increase the risk of coronary heart diseases (CHD). Fats and oils are greasy to feel and insoluble in water. Cholesterol is also a kind of fat.

Vitamin A, E, D and K are fat soluble i.e they can be digested, absorbed and transported inside our body with the help of fats. Fat in abdomen is called visceral fat while fat under the skin is called subcutaneous fat.

1gm fat = 9 kcal. Each gram of fat when burnt gives 9 food calories = 37 kilo joules = 8.8 kilo calories. In other way round we can say that when our body spends 8.8 kilo calories of energy, one gram of fat is used up. It means if we ingest 8.8 kilo calories of energy in our body above BMR, then body weight will increase by 01 gm. Reverse is also true. This way we can design the work out and diet pattern of person we can help to shed or increase body weight.

1. Fatty acids (Chains of carbon atoms with hydrogen and oxygen)
2. Glycerol

Common fatty acid: (Palmitic acids, Citric acid, Oleic acids, Linolenic acid). These fatty acids are structured in form of chains.

1. Shorter chains contain less than 06 Carbon atoms in structure.
2. Medium chains contain 6-12 Carbon atoms in the structure.
3. Longer chains contain 13-21 Carbon atoms in structure.
4. Very long chain contains more than 22 Carbon atoms in structure.

These fatty acids can further be of two types, namely saturated if many hydrogen atoms involved; unsaturated as it has capacity to accommodate more hydrogen i.e. some are missing in carbon chain.

Essential Fatty acids, LINOLENIC and LINOLEIC both are unsaturated and cannot be synthesized in body. Hence these are required from outside. When three molecules of fat get bonded with a Glyceride it is called a Triglyceride.

FATs are generally solid at room temperature and contain high proportion of saturated fatty acids. OILs are liquid at room temperature and contain high proportion of unsaturated fatty acids.

Food sources which provide fats in our diet can be detailed as below:

Ghee, Vanaspati, Mustard Oil, Ground nut oil, Soya oil, Coconut oil. These all are almost 100% fat. Milk and milk products(Curd, Cheese, Khoya), Nuts, oil seeds (almonds, ground nut, coconut and mustard seeds).

Eggs flesh food- These are fat rich food with fat content ranging from 8% to 50%. The amount of fats content carried by various sources is as below.

Almonds* - 58.9 gm/100gm	Cashew nut – 46.9 gm/100gm
Ground Nut- 40.6 gm/100gm	Mustard – 39.1 gm/100gm
Soya bean – 19.5 gm/100gm	Egg – 13.3 gm/100gm

Mutton – 12.3 gm/100gm

* Means that 100 gm of Almonds intake will provide 58.9 gms of fat to our body. Further 01 gm of fat can provide us 9 kcal of energy.

Functions :

Energy Sources: Doubles energy in muscles as compared to carbohydrate and proteins. Excess stored in adipose tissues, present under skin, in abdominal region too.

Satiety value: fat remains longer in stomach and take time to digest.

1. Insulation and paddling: layer of saturated facts provide insulation padding to various vital organs.
2. Source of essential fat: provides essential fatty acids
3. Carrier of fat soluble Vitamins and help in their absorption

During Digestion: Bile and Pancreatic lipase in intestines breaks up fats in to fatty acids and glycerol. Enzymes which help in fat digestion in small intestines are Gastric lipase and Pancreatic lipase.

Bile(from Liver) breaks fatty acids in to Micells which enter in to intestinal cells. From there it enters in to blood vessels of Villi of small intestine cells of lymph vessels, which carry it to heart. Heart pumps it along with blood to *Adipose tissues to store as concentrated energy and to cells where it is broken down to provide energy.

*Adipose is made up of Aedipous, which means fat. It acts as connective tissues, cushions and insulates the body. But its main function is to store energy in the form of lipids. Lipids bind with

proteins as some of them cannot circulate freely in solutions. They are often biosynthesized 'on demand' at their intended sites. Adipose tissues are of two kinds, one is White called WAT, they store energy while others are Brown, called BAT, they generate heat in our body.

1. Adipose tissue to store as concentrated sources of energy
2. Cells where they are broken down to provide energy

E. Minerals

They are defined as element or compound which is crystalline and has been formed by geological process only. Apart from Vitamin, carbohydrates fats and proteins and many other inorganic elements are needed for body, called minerals. These are those elements which largely remain as ash when plant / animal tissues are completely burnt.

Minerals are micro nutrients which perform regulatory and protective functions.Our body requires I9 minerals. Some are required in less quantity and some are required in large quantity. Total mineral content in out body is 4-6% of total body weight.

They are defined as element or compound which is crystalline and has been formed by geological process only.

1. Large Amount: Calcium, Phosphorus, Sodium, Potassium,Chlorides, Magnesium
2. Small amount: Iron, Zinc, Iodine, Copper

E1 . Calcium and Phosphorus

75% of total mineral weight. Calcium weight in body is approximate 1200 gm. which is present in bones / teeth and soft tissues. Phosphorous amount in body is about 400 -700 gm. This is also present in same places as calcium as it binds Calcium with it in the form of Calcium Phosphate.

Development function: It takes place in bones and teeth. Their percentage in these places is

Calcium : Phosphorus = 2:1.

Cal + phosphorus + other minerals + water form compound, which provide rigidity and firmness to our bones and teeth. Maximum required during growing years.

20-30% absorbed by our body and rest passed in stools and very small amount of it is passed out in urine. Efficiency of absorption increases during rapid growth, infancy, childhood, pregnancy and lactation. Vitamin D, Proteins and Carbohydrate improves its absorption.

Inhibitors: they hinder calcium absorption in our body. All calcium is given leafy vegetables is no absorbed. Phytates in cereals, oxalates in green leafy vegetables bind calcium and hence inhibit its absorption.

Calcium

Calcium is an alkaline element with atomic number of 20. Abundantly found in earth's crust as well as in sea water. Most important for bones and teeth in our body. Essential in cell physiology and movement of this ion indicates signal for many cellular processes. 90 % of calcium is stored in our bones and teeth. Long time calcium deficiency may lead to rickets and blood clotting, in case of menopausal women it may give rise to osteoporosis where bone deteriorates with chances/risk of fractures. While excess of it affects, as in hypercalcemia, kidney functions and decreased retention of other minerals. Vitamin D is needed to absorb calcium.

1. Contraction and relaxation of heart muscles.
2. Regulates the passage of substances into and out of the cells.
3. Signaling or message transmission across cells.
4. Blood Clotting.

Recommended intake of calcium:-

Age	**Calcium(mg/day)**
0-6 months	200
7-12 months	260
1-3 years	700
4-8 years	1000
9-18 years	1300
19-50	1000
51-70 years(male)	1000
51-70 years(females)	1200
71+ years	1200

As per Indian Council of Medical Research, the daily recommended dietary allowance is 1 gm. Eating beetle leave with slated lime (calcium hydroxide) increases the amount of calcium. It can be used during pregnancy and lactation.

Milk, cheese, soymilk, orange juice, broccoli, hazel nuts, almonds, in some seaweeds, breakfast cereals and bread is also fortified with it. An egg shell is also a good source of Calcium. It can be ground and then mixed with anything and taken. Richest source of calcium in our diet can be

milk and green leafy vegetables, fenugreek and drumsticks in particular are rich in it. High intake of calcium generates kidney stones but these days researchers say it reduces kidney stone risks.

Phosphorus

In periodic table this element is represented by P and has got atomic number 15. It is highly active and is never found in free state in the nature but found as maximum oxidized state, inorganic phosphate rocks. Utilization of Calcium is closely associated with that of phosphorus as most of the calcium in our body is in the form of Calcium phosphate in bones and teeth. Cereals, pulses, nuts and oil seeds are rich sources of it. Generally, 01 gram of phosphorus is needed by a person, which is supplied by even our poor vegetarian diets.

The name phosphorus is derived from ancient Greek, meaning planet Venus. It also means morning star, something, which gives light. It shines in dark. It is generally of two types white and red. White phosphorus gives out smoke when it comes in contact with air. Essential for life as phosphates are needed in DNA and RNA etc. Our urine contains about 94% of NPK.

In medicine, low-phosphate syndromes are caused by malnutrition, by failure to absorb phosphate, and by metabolic syndromes that draw phosphate from the blood (such as re-feeding after malnutrition) or pass too much of it into the urine. All are characterized by hypophosphatemia, which is a condition of low levels of soluble phosphate levels in the blood serum, and therefore inside cells. Symptoms of hypophosphatemia include neurological dysfunction and disruption of muscle and blood cells due to lack of ATP. Too much phosphate can lead to diarrhea and calcification (hardening) of organs and soft tissue, and can interfere with the body's ability to use iron, calcium, magnesium, and zinc.

Phosphorus is an essential macro mineral for plants, which is studied extensively in edaphology in order to understand plant uptake from soil systems. Inecological terms, phosphorus is often a limiting factor in many environments; i.e. the availability of phosphorus governs the rate of growth of many organisms. In ecosystems an excess of phosphorus can be problematic, especially in aquatic systems, resulting in eutrophication, which sometimes lead to algal blooms.

Food sources:

The main food sources for phosphorus are foods containing protein, although proteins do not contain phosphorus. For example, milk, meat, and soya typically also have phosphorus. As a rule, if one holds a meal plan providing sufficient amount of protein and calcium then the amount of phosphorus is also likely sufficient.

1. Forms a substance to transport fat in blood.
2. Synthesis of …..Co-enzymes for crucial role in metabolism.
3. Forms certain generic material to pass on certain characteristics from parents to children

4. Store vital energy in cells

Sources: Milk, mild Products, Khoya, fish especially dried, crab, shrimp, bengal gram, green gram, rajmah, moth beans, soybean, green leafy vegetables, fenugreek & amaranth leaves, mustard leaves, Til (sesame seeds), coconut , almond, walnut. Eggs and poultry are good sources of phosphorus too. Diet which carries enough proteins and calcium, also carries enough phosphorous.

E2 . Sodium:

It's a Greek word represented by Na in periodic table, column one alkali metal which quite reactive and bears atomic no 11. It was discovered by Humphary Davy in 1897.It is the 6th most abundant matter in the earth's crust. It is used in soaps, de-icing agent and as common table salt as sodium chloride (Nacl).

It is an essential element along with phosphorus to maintain ***osmotic pressure*** in our body. Its usually lost in sweat and urine by our body. Osmotic pressure is a process by which a solvent moves across a semi-impermeable membrane towards the area of higher solute concentration and thus try to balance the concentration of solute across the membrane. The separating wall allows the flow of solvent but not the solute. IF we mix salt in a glass of water, salt is solute and water is solvent.

In adult body 120 gm of it is present as extracellular fluid (Blood Plasma is extra cellular fluid). 10 gm - 15gm per day is good enough. But on the other hand, high salt intake is not good in case of hypertension, hence 8-10 gm per day intake is safe enough for any person working in hot environment where one sweats a lot.

Functions: It maintains fluid balance across the cells It maintains alkalinity /acidity of our body.

Sodium(Na) is Alkaline in nature while Chloride(Cl)is acidic I nature. Alkaline body is more disease free than acidic body. Satvic diets are all alkaline in nature.

I TSP tablet salt = 1400mg of sodium

Required amount immediately absorbed and rest is flushed out through sweat, urine, feces. Excessive loss is not good, as it affects fluid balance like in vomiting and severe diarrhoea. As more and more gets excreted without fresh ingestion, sodium level in the blood start rising. Recommended level of sodium in an adult or elderly person is about 135-145 mEq/L. But if it rises above 150mEq/L it will give lethargy, weakness, irritability, edema(manifest as swelling due to fluid accumulation under the skin or in various cavities of the body. Can be seen by pressing the skin of the affected part. An indentation or a pit will be formed there for quite some time.), seizures, coma brain damage and even death. Amount of potassium inside the cells is 40 times that outside and amount of sodium outside the cells is 10 times that of inside. For every 3

sodium ions forced out of a cell, 2 potassium ions are pumped in. Due to this movement of ions charge travels across the cell membrane.

Kidneys control its level. If less than it does not allow it to go out of body, if Sodium is excessive it flushes it out through urine. Thus it maintains its balance in our body.

E3 .Potassium

Potassium, represented by symbol K is one the seven elements of column one of alkali metals of periodic table. Oxidizes rapidly in air and reacts vigorously with water. It is highly soluble in water. After taking crops from earth, potassium levels deplete in the soil and it is re-injected in to the soil through fertilizers rich in potassium.

It affects the heart beat and function of the muscles in our body. There movement across the nerve cell membrane is essential for nerve transmission. Its depletion as well as excess leads to many abnormalities. Increased potassium abnormality is called hyperkalemia and decreased is called hypokalemia. It is generally secreted by our kidneys , hence if kidney function is reduced it may lead to hyperkalemia. Hypokalemia can occur due to excessive sweating, vomiting, diarrhea, eating disorders. Thus, its deficiency leads to hypertension while its excess may impair the kidney function as it is handled at the kidney end only.

Its said that diets high in potassium reduces the risk of stroke. Dietary reference intake = 4700 mg. Approximately amount in body 250 gm. mostly present in intra cellular fluid of cells. Its level in our blood is 3.5-5 mEq/L i.e milli Equivalents per liter.

Functions

1. Regulates intra and extra cellular fluid balance
2. Na + cl > Nacl
3. K + cl > Kcl
4. Maintains ph value of our body
5. Function of skeletal and heart muscles
6. It helps in transmission of messages which result in contraction of the muscle tissues.

Sources:

Its food sources are Meat, Poultry, Fish; Pulses, fruits, green leafy vegetables. Coconut water is the best source. Other sources are banana, potatoes, carrots, tomatoes, lemons, whole grain cereals, dried milk, chocolate, bamboo shoots, almonds, pistachio. Dry apricots have the highest concentration of potassium by weight.

E4 . Chloride

This ion is represented by abbreviation Cl with –ve sign. An essential electrolyte present in all fluids in our body and is responsible for acid/base balance, regulates movement of fluids in out of cells and transmission of nerve impulses. It's concentration in our body is regulated by kidneys. It present in the amylase enzyme also, thus part of certain proteins too. It exists in salts of Sodium, Potassium and Magnesium. It exists in sea water too. It's presence in sea water aggravates corrosion of all metals.

A chloride test involves measuring it in our blood and urine. Its an important electrolyte which helps in maintaining blood volume, blood pressure and pH of body fluids. Most of it comes in our body from salt intake. It is absorbed in our intestines and rest is excreted out of body in our urine.

Approximately 100 gm., mostly found in extracellular fluids especially plasma in blood. Rest is present inside the cell, best source table salt and plant foods. It is highly soluble in water.

It is to be tested when we have symptoms like muscle twitch or spasm, weakness, breathing problems.

High pH can be due to loss of acid from our body, due to vomiting or diarrhea. It can also be due to loss of too much sodium or intake of excessive baking soda (Sodium bicarbonate).

E5 . Magnesium

It is present in very small quantities in our body cells and is responsible for cell metabolism. It has similar qualities like Calcium and presentation bones along with it. RDI of magnesium is said to be 350mg/day. Cereals, pulses and nuts contain 40-200 mg per 100 gm of it. Its content is much higher in food as compared to Calcium. Our dietary system takes good care of it.

Its total quantity in an adult body is 20-25 gram; 60% is in bones in combination with calcium and phosphorus while 30% is in tissues, body fluids, mostly intracellular.

Functions

1. it regulates substance passage into and out of cells,
2. Functions as coenzymes in metabolism,
3. Build our bones and teeth,
4. Involved in bones mineralization,
5. Maintain the smooth muscles action,
6. Builds and protects Vitamin- D.

Sources:

Nutries, oil seeds, pulses,

Presence of inhibitors in diet reduces its absorption,

E6 . Iron

Its chemical symbol is Fe. Its total presence in our body is about 35 gm. Out of which, 70% is in blood and 25% in body organs and 5% in muscles and tissue. Some of it goes to storage sites like liver, spleen, kidney and bone marrow while Some goes to various body cells rest is execrated through sweat and urine.

In women substantial amount is lost in menstrual cycles.

Functions: transport oxygen present in muscles as myoglobin, has the capacity to store oxygen. Oxygen is used in muscle contraction and immediateness of muscle cells, promotion of oxidation within cells, oxidation of fats, carbohydrates, proteins inside cells hence released the energy , necessary in physical exertion, help maintain the immediate memory, aid in metabolism, prevent infections.

Sources

Non veg, animal liver is the best sources but Kidney and spleen are also good sources.

Veg: Leafy vegetables, cereals, white wheat, Jwar, Bajra, Pulses-whole ones.

Soybean, Jaggerry.

Absorption and excretion:

Absorption from animal food is good while absorption from plant foods is less, because certain substances present in food (plants) bind iron and hinders its absorption. These are called inhibitors.

While proteins and Vitamin C are called Enhancers as they help in its absorption. Some of it goes to -storage sites like liver, spleen, kidney and bone marrow and some goes to various body cells. Extra is execrated through sweat and urine.

E7 . Iodine

Iodine, Zinc, Copper, Manganese, Flouride are all human body established trace elements, though there are many others which are found to be present in traces. They can be now checked with the help of modern machines like atomic absorption spectrophotometry. Chromium iodine RDI is 100-150 micrograms. 60-70 % of iodine needs are met through our diet and rest is provided by water intake. Total amount in our body is 20-25 gm.

Maximum concentration in or body is in thyroid gland.

Thyroid gland secretes thyroxin. Thyroxin regulates rate of oxidation in the cells, affects both mental and physical growth, help in functioning of nerve and muscles tissues.

Sources:

Sea food like fish, coastal areas are high in iodine content while hilly areas are generally low in iodine content.

Absorption: It takes place in small intestine in the form of iodides. They are carried by blood to thyroid gland. 1/3 of it is picked up and rest is excreted.

E8 . Chromium

Chromium content in cereal based diets in our country varies from 70-150 microgram per day though low income groups may have lower rate say 25%. 70-80% of chromium present in our diets is absorbed by our body. Its deficiency seems to lead to impaired glucose tolerance. Its effect in diabetes is under study.

E9 . Manganese

It participates in lipid and carbohydrate metabolism. Its presence in Indian diets, vary from 4-10 mg per day. Its absorption varies from 5-20%. Its excess is toxic in nature. We do not have to worry about its deficiency as its provided enough in our diets. In pineapple, helps prevent Osteoporosis.

E10 . Flouride

It is an important element in our diet. It is essential for prevention of dental caries. Its higher presence (> 2-3 ppm)in bones is responsible for hardening of the bones. Its excess caues flourosis thus must be controlled in our water. It is said that our pineal gland acts like a magnet for flourides in our body. That is why that in early age its self it gets blocked and become inactive.

F. Water

It's a molecule of Hydrogen and Oxygen, with two atoms or Hydrogen joining with one atom of Oxygen to form a stable molecule of water. It is an inorganic compound: and contains other nutrients like Na (Sodium) and K (potassium). It amounts to 60% of total wt. in adult and about 75% of total weight in an infant.

1. Major components for tissues and cells though varies for different categories
2. Medium for all fluids, blood/ urine/ feces/ sweat/ saliva etc.
3. Temperature regulation: As burning of carbohydrate, proteins and fat produces heat in body, water distributes it in whole body.
4. It is a Universal Solvent.

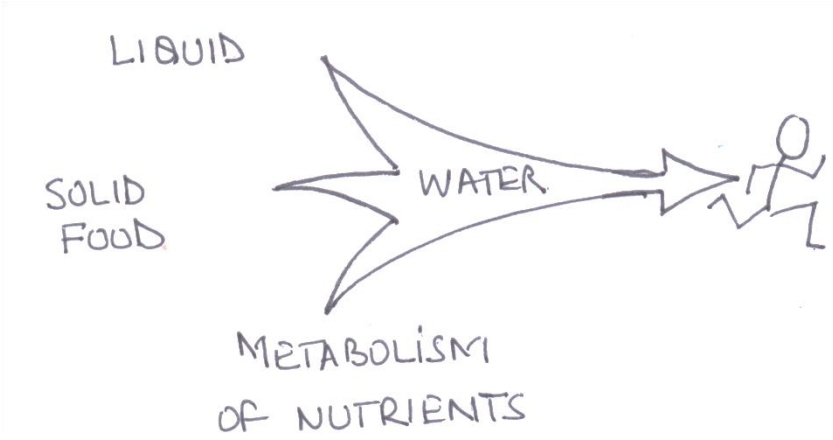
5. Acts as lubricants to bath all cells and keeps them moist. Lubricates our joints too.
6. Under goes no digestive change in body but is absorbed as such.

Source:

1. Liquid intake; water, milk, tea, coffee, fruit, juices, aerated water/soft drinks.
2. Present in solid foods as moisture content

Vegetable		Moister (com/100gm)
	Spinach	92.1
	Pumpkin	92.6
	Peas	72.1
Fruits	Apple	84.6
Milk	Cow's	87.5
Cereals	Wheat	12.8
	Rice	13.7
Pulses	Bengal Gram	9.8

Water formed by various metabolisms.



While water is lost through,

1. Kidneys (Urine)

2. Skin
3. Lungs
4. Digestive Track (feces)

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TABLE – 1

PROXIMATE PRINCIPLES: COMMON FOODS

All values are per 100 gms. of edible portion

Sl. No.	Name of the food stuff	Mois-ture g.	Protein (Nx6.25) g.	Fat g.	Mine-rals g.	Crude Fibre g.	Carbo hydrates g.	Energy Kcal.	Calcium mg.	Phos-phorus mg.	Iron mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
CEREAL GRAINS AND PRODUCTS											
1.	BAJRA	12.4	11.6	5.0	2.3	1.2	67.5	361	42	296	8.0
2.	BARLEY	12.5	11.5	1.3	1.2	3.9	69.6	336	26	215	1.67
3.	ITALIAN MILLET	11.2	12.3	4.3	3.3	8.0	60.9	331	31	290	2.8
4.	JOWAR	11.9	10.4	1.9	1.6	1.6	72.6	349	25	222	4.1
5.	MAIZE, dry	14.9	11.1	3.6	1.5	2.7	66.2	342	10	348	2.3
6.	MAIZE, tender	67.1	4.7	0.9	0.8	1.9	24.6	125	9	121	1.1
7.	PANIVARAGU	11.9	12.5	1.1	1.9	2.2	70.4	341	14	206	0.8
8.	RAGI	13.1	7.3	1.3	2.7	3.6	72.0	328	344	283	3.9
9.	RICE, parboiled, handpounded	12.6	8.5	0.6	0.9	–	77.4	349	10	280	2.8
10.	RICE, parboiled, milled	13.3	6.4	0.4	0.7	0.2	79.0	346	9	143	1.0
11.	RICE, raw, handpounded	13.3	7.5	1.0	0.9	0.6	76.7	346	10	190	3.2
12.	RICE, raw, milled	13.7	6.8	0.5	0.6	0.2	78.2	345	10	160	0.7
13.	RICE, bran	11.0	13.5	16.2	6.6	4.3	48.4	393	67	1410	35.0
14.	RICE, flakes	12.2	6.6	1.2	2.0	0.7	77.3	346	20	238	20.0
15.	RICE, puffed	14.7	7.5	0.1	3.8	0.3	73.6	325	23	150	6.6
16.	SAMAI	11.5	7.7	4.7	1.5	7.6	67.0	341	17	220	9.3
17.	SANWA MILLET	11.9	6.2	2.2	4.4	9.8	65.5	307	20	280	5.0
18.	VARAGU	12.8	8.3	1.4	2.6	9.0	65.9	309	27	188	0.5
19.	WHEAT, bulgar (parboiled)	9.8	8.2	1.6	1.5	1.7	77.2	356	37	298	4.9
20.	WHEAT, whole	12.8	11.8	1.5	1.5	1.2	71.2	346	41	306	5.3
21.	WHEAT flour (whole)	12.2	12.1	1.7	2.7	1.9	69.4	341	48	355	4.9
22.	WHEAT, flour (refined)	13.3	11.0	0.9	0.6	0.3	73.9	348	23	121	2.7
23.	WHEAT, germ	5.2	29.2	7.4	3.5	1.4	53.3	397	40	846	6.0
24.	WHEAT, semolina	–	10.4	0.8	–	0.2	74.8	348	16	102	1.6
25.	WHEAT, vermicelli	11.7	8.7	0.4	0.7	0.2	78.3	352	22	92	2.0
26.	WHEAT, bread (brown)	39.0	8.8	1.4	–	1.2	49.0	244	18	–	2.2
27.	WHEAT, bread (white)	39.0	7.8	0.7	–	0.2	51.9	245	11	–	1.1
PULSES AND LEGUMES											
28.	BENGAL GRAM, whole	9.8	17.1	5.3	3.0	3.9	60.9	360	202	312	4.6
29.	BENGAL GRAM, dhal	9.9	20.8	5.6	2.7	1.2	59.8	372	56	331	5.3
30.	BENGAL GRAM, roasted	10.7	22.5	5.2	2.5	1.0	58.1	369	58	340	9.5
31.	BLACK GRAM, dhal	10.9	24.0	1.4	3.2	0.9	59.6	347	154	385	3.8
32.	COW PEA	13.4	24.1	1.0	3.2	3.8	54.5	323	77	414	8.6
33.	FIELD BEAN, dry	9.6	24.9	0.8	3.2	1.4	60.1	347	60	433	2.7
34.	GREEN GRAM, whole	10.4	24.0	1.3	3.5	4.1	56.7	334	124	326	4.4

Sl. No.	Name of the food stuff	Mois-ture g.	Protein (Nx6.25) g.	Fat g.	Mine-rals g.	Crude Fibre g.	Carbo hydrates g.	Energy Kcal.	Calcium mg.	Phos-phorus mg.	Iron mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
35.	GREEN GRAM, dhal	10.1	24.5	1.2	3.5	0.8	59.9	348	75	405	3.9
36.	HORSE GRAM, whole	11.8	22.0	0.5	3.2	5.3	57.2	321	287	311	6.77
37.	KHESARI, dhal	10.0	28.2	0.6	2.3	2.3	56.6	345	90	317	6.3
38.	LENTIL	12.4	25.1	0.7	2.1	0.7	59.0	343	69	293	7.58
39.	MOTH BEANS	10.8	23.6	1.1	3.5	4.5	56.5	330	202	230	9.5
40.	PEAS green	72.9	7.2	0.1	0.8	4.0	15.9	93	20	139	1.5
41.	PEAS dry	16.0	19.7	1.1	2.2	4.5	56.5	315	75	298	7.05
42.	PEAS roasted	10.1	22.9	1.4	2.4	4.4	58.8	340	81	345	6.4
43.	RAJMAH	12.0	22.9	1.3	3.2	(4.8)	60.6	346	260	410	5.1
44.	REDGRAM, dhal	13.4	22.3	1.7	3.5	1.5	57.6	335	73	304	2.7
45.	REDGRAM (tender)	65.1	9.8	1.0	1.0	6.2	16.9	116	57	164	1.1
46.	SOYABEAN	8.1	43.2	19.5	4.6	3.7	20.9	432	240	690	10.4
LEAFY VEGETABLES											
47.	AGATHI	73.1	8.4	1.4	3.1	2.2	11.8	93	1130	80	3.9
48.	AMARANTH caudatus	90.0	3.0	0.7	3.3	1.0	2.0	26	200	40	–
49.	AMARANTH gangeticus (tender)	85.7	4.0	0.5	2.7	1.0	6.1	45	397	83	3.49
50.	AMARANTH gangeticus (stem)	92.5	0.9	0.1	1.8	1.2	3.5	19	260	30	1.8
51.	AMARANTH Paniculatus	78.6	5.9	1.0	3.8	2.1	8.6	67	530	60	18.4
52.	AMARANTH polygonoides	90.0	2.8	0.3	2.1	–	4.8	33	251	55	27.3
53.	AMARANTH spinosus	85.0	3.0	0.3	3.6	1.1	7.0	43	800	50	22.9
54.	AMARANTH species (Chakravarthikeerai)	80.6	4.5	0.6	4.2	1.6	8.5	57	321	71	18.0
55.	AMARANTH species (Koyakeerai)	88.0	2.8	0.5	1.2	2.2	5.3	37	292	51	2.5
56.	AMARANTH tristis	87.0	2.8	0.4	2.4	_	7.4	44	364	52	38.5
57.	AMARANTH viridis	81.8	5.2	0.3	2.8	6.1	3.8	38	330	52	18.7
58.	AMBAT CHUKA	95.2	1.6	0.3	0.9	0.6	1.4	15	63	17	0.75
59.	BATHUA LEAVES	89.6	3.7	0.4	2.6	0.8	2.9	30	150	80	4.2
60.	BEET GREENS	86.4	3.4	0.8	2.2	0.7	6.5	46	380	30	16.2
61.	BENGAL GRAM LEAVES	73.4	7.0	1.4	2.1	2.0	14.1	97	340	120	23.8
62.	BETEL LEAVES	85.4	3.1	0.8	2.3	2.3	6.1	44	230	40	10.6
63.	BOTTLE GOURD LEAVES	87.9	2.3	0.7	1.7	1.3	6.1	39	80	59	–
64.	BROAD BEAN LEAVES	77.6	5.6	0.3	1.3	3.7	11.5	71	111	149	–
65.	BRUSSELS SPROUTS	85.5	4.7	0.5	1.0	1.2	7.1	52	43	82	1.8
66.	CABBAGE	91.9	1.8	0.1	0.6	1.0	4.6	27	39	44	0.8
67.	CARROT LEAVES	76.6	5.1	0.5	2.8	1.9	13.1	77	340	110	8.8
68	CAULIFLOWER GREENS	80.0	5.9	1.3	3.2	2.0	7.6	66	626	107	40.0

Sl. No.	Name of the food stuff	Mois-ture g.	Protein (Nx6.25) g.	Fat g.	Mine-rals g.	Crude Fibre g.	Carbo hydrates g.	Energy Kcal.	Calcium mg.	Phos-phorus mg.	Iron mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
69.	CELERY LEAVES	88.0	6.3	0.6	2.1	1.4	1.6	37	230	140	6.3
70.	CELERY STALK	93.5	0.8	0.1	0.9	1.2	3.5	18	30	38	4.8
71.	CHEKKUR MANIS	73.6	6.8	3.2	3.4	1.4	11.6	103	570	200	28.0
72.	COLOCASIA LEAVES (black variety)	78.8	6.8	2.0	2.5	1.8	8.1	77	460	125	0.98
73.	COLOCASIA LEAVES (green variety)	82.7	3.9	1.5	2.2	2.9	6.8	56	227	82	10.0
74.	COLOCASIA LEAVES (dried)	9.3	13.7	5.9	12.8	16.0	42.3	277	1546	308	–
75.	CORIANDER LEAVES	86.3	3.3	0.6	2.3	1.2	6.3	44	184	71	1.42
76.	COW PEA LEAVES	89.0	3.4	0.7	1.6	1.2	4.1	38	290	58	20.1
77.	CURRY LEAVES	63.8	6.1	1.0	4.0	6.4	18.7	108	830	57	0.93
78.	DRUMSTICK LEAVES	75.9	6.7	1.7	2.3	0.9	12.5	92	440	70	0.85
79.	FENUGREEK LEAVES	86.1	4.4	0.9	1.5	1.1	6.0	49	395	51	1.93
80.	FETID CASSIA-(fresh)	84.9	5.0	0.8	1.7	2.1	5.5	49	520	39	12.4
81.	FETID CASSIA (dried)	9.7	20.7	3.9	11.8	10.4	43.5	292	3200	292	–
82.	GARDEN CRESS	82.3	5.8	1.0	2.2	–	8.7	67	360	110	28.6
83.	GARDEN SORREL (sepals)	91.9	0.6	0.2	0.9	1.3	5.1	25	130	20	1.7
84.	GOGU	86.4	1.7	1.1	0.9	–	9.9	56	172	40	2.28
85.	IPOMOEA STEMS	93.7	0.9	0.2	1.8	–	3.4	19	80	30	0.8
86.	IPOMOEA LEAVES	90.3	2.9	0.4	2.1	1.2	3.1	28	110	46	3.9
87.	KNOL-KHOL GREENS	86.7	3.5	0.4	1.2	1.8	6.4	43	740	50	13.3
88.	KUPPAMENI	80.5	6.7	1.4	3.1	2.3	6.0	64	667	99	17.3
89.	LETTUCE	93.4	2.1	0.3	1.2	0.5	2.5	21	50	28	2.4
90.	LETTUCE TREE LEAVES, mature	81.7	5.1	0.4	2.6	–	10.2	65	320	80	2.6
91.	LETTUCE TREE LEAVES, tender	90.2	3.6	0.2	2.2	0.6	3.2	29	170	60	3.6
92.	MANATHAKKALI LEAVES	82.1	5.9	1.0	2.1	–	8.9	68	410	70	20.5
93.	MAYALU	90.8	2.8	0.4	1.8	–	4.2	32	200	35	10.0
94.	MINT	84.9	4.8	0.6	1.9	2.0	5.8	48	200	62	15.6
95.	MODAKANTHAN KEERAI	83.3	4.7	0.6	2.3	–	9.1	61	–	–	–
96.	MUKARRATE KEERAI	84.5	6.1	0.9	1.3	–	7.2	61	667	99	18.4
97.	MUSTARD LEAVES	89.8	4.0	0.6	1.6	0.8	3.2	34	155	26	16.3
98.	NERRINGI	79.1	7.2	0.5	4.6	–	8.6	68	1550	82	9.2
99.	PARSLEY	74.6	5.9	1.0	3.2	1.8	13.5	87	390	175	17.9
100.	PARUPPU KEERAI	90.5	2.4	0.6	2.3	1.3	2.9	27	111	45	14.8
101.	PONNANGANNI	77.4	5.0	0.7	2.5	2.8	11.6	73	510	60	1.63
102.	PUMPKIN LEAVES	81.9	4.6	0.8	2.7	2.1	7.9	57	392	112	–
103.	RADISH LEAVES	90.8	3.8	0.4	1.6	1.0	2.4	28	265	59	0.09
104.	RADISH LEAVES table	89.1	3.9	0.6	1.6	0.6	4.2	38	310	60	18 0
105.	RAPE stem	91.4	3.1	0.1	1.4	–	4.0	29	100	100	1.2
106.	RAPE LEAVES	84.9	5.1	0.4	2.5	1.2	5.9	48	370	110	12.5

Sl. No.	Name of the food stuff	Mois-ture g.	Protein (Nx6.25) g.	Fat g.	Mine-rals g.	Crude Fibre g.	Carbo hydrates g.	Energy Kcal.	Calcium mg.	Phos-phorus mg.	Iron mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
107.	RAPE LEAVES (dried)	7.4	27.0	2.9	15.3	6.7	40.7	297	3095	500	–
108.	SAFFLOWER LEAVES	91.1	2.5	0.6	1.3	–	4.5	33	185	35	5.7
109.	SHEPU	88.0	3.0	0.5	2.2	1.1	5.2	37	190	42	17.4
110.	SPINACH	92.1	2.0	0.7	1.7	0.6	2.9	26	73	21	1.14
111.	SPINACH stalks	93.4	0.9	0.1	1.8	–	3.8	20	90	20	1.6
112.	SUSNI SAG	86.9	3.7	1.4	2.1	1.3	4.6	46	53	91	–
113.	TAMARIND LEAVES, tender	70.5	5.8	2.1	1.5	1.9	18.2	115	101	140	0.30
114.	TURNIP GREENS	81.9	4.0	1.5	2.2	1.0	9.4	67	710	60	28.4
ROOTS AND TUBERS											
115.	ARROW ROOT FLOUR	16.5	0.2	0.1	0.1	–	83.1	334	10	20	1.0
116.	BANANA RHIZOME	85.1	0.4	0.2	1.4	1.1	11.8	51	25	10	1.1
117.	BEET ROOT	87.7	1.7	0.1	0.8	0.9	8.8	43	18.3	55	1.19
118.	CARROT	86.0	0.9	0.2	1.1	1.2	10.6	48	80	530	1.03
119	COLOCASIA	73.1	3.0	0.1	1.7	1.0	21.1	97	40	140	0.42
120.	KHAMALU	79.6	1.3	0.1	0.8	0.1	18.1	79	16	31	0.5
121.	MANGO GINGER	85.0	1.1	0.7	1.4	1.3	10.5	53	25	90	2.6
122.	ONION big	86.6	1.2	0.1	0.4	0.6	11.1	50	46.9	50	0.60
123.	ONION small	84.3	1.8	0.1	0.6	0.6	12.6	59	40	60	1.2
124.	PARSNIP	72.4	1.3	0.3	1.1	1.7	23.2	101	50	40	0.5
125.	POTATO	74.7	1.6	0.1	0.6	0.4	22.6	97	10	40	0.48
126.	RADISH pink	90.8	0.6	0.3	0.9	0.6	6.8	32	50	20	0.37
127.	RADISH rat-tailed	92.3	1.3	0.3	0.7	1.1	4.3	25	78	24	–
128.	RADISH table	94.9	0.5	0.1	0.7	0.6	3.2	16	20	20	1.0
129.	RADISH white	94.4	0.7	0.1	0.6	0.8	3.4	17	35	22	0.4
130.	SWEET POTATO	68.5	1.2	0.3	1.0	0.8	28.2	120	46	50	0.21
131.	TAPIOCA	59.4	0.7	0.2	1.0	0.6	38.1	157	50	40	0.9
132.	TAPIOCA chips dried	12.0	1.3	0.3	2.0	1.8	82.6	338	91	70	3.6
133.	TURNIP	91.6	0.5	0.2	0.6	0.9	6.2	29	30	40	0.4
134.	YAM, elephant	78.7	1.2	0.1	0.8	0.8	18.4	79	50	34	0.6
135.	YAM, ordinary	69.9	1.4	0.1	1.6	1.0	26.0	111	35	20	1.19
136.	YAM, wild	70.4	2.5	0.3	1.4	1.0	24.4	110	20	74	1.0
OTHER VEGETABLES											
137.	ASH GOURD	96.5	0.4	0.1	0.3	0.8	1.9	10	30	20	0.8
138.	BEANS, scarlet runner	58.3	7.4	1.0	1.6	1.9	29.8	158	50	160	2.6
139.	BITTER GOURD	92.4	1.6	0.2	0.8	0.8	4.2	25	20	70	0.61
140.	BITTER GOURD small	83.2	2.1	1.0	1.4	1.7	10.6	60	23	38	2.0
141.	BOTTLE GOURD	96.1	0.2	0.1	0.5	0.6	2.5	12	20	10	0.46
142.	BRINJAL	92.7	1.4	0.3	0.3	1.3	4.0	24	18	47	0.38
143.	BROAD BEANS	85.4	4.5	0.1	0.8	2.0	7.2	48	50	64	1.4
144.	CAULIFLOWER	90.8	2.6	0.4	1.0	1.2	4.0	30	33	57	1.23
145.	CHO-CHO-MARROW	92.5	0.7	0.1	0.4	0.6	5.7	27	140	30	0.6
146.	CLUSTER BEANS	81.0	3.2	0.4	1.4	3.2	10.8	16	130	57	1.08

Sl. No.	Name of the food stuff	Mois-ture g.	Protein (Nx6.25) g.	Fat g.	Mine-rals g.	Crude Fibre g.	Carbo hydrates g.	Energy Kcal.	Calcium mg.	Phos-phorus mg.	Iron mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
147.	COLOCASIA STEM	94.0	0.3	0.3	1.2	0.6	3.6	18	60	20	0.5
148.	COWPEA PODS	85.3	3.5	0.2	0.9	2.0	8.1	48	72	59	2.5
149.	CUCUMBER	96.3	0.4	0.1	0.3	0.4	2.5	13	10	25	0.60
150.	DOUBLE BEANS	73.8	8.3	0.3	1.0	4.3	12.3	85	40	140	2.3
151.	DRUMSTICK	86.9	2.5	0.1	2.0	4.8	3.7	26	30	110	0.18
152.	DRUMSTICK flowers	85.9	3.6	0.8	1.3	1.3	7.1	50	51	90	–
153.	FIELD BEANS, tender	86.1	3.8	0.7	0.9	1.8	6.7	48	210	68	0.83
154.	FIGS, red (Ficus cunia)	79.4	1.2	0.6	1.6	6.4	10.8	53	187	39	–
155.	FRENCH BEANS	91.4	1.7	0.1	0.5	1.8	4.5	26	50	28	0.61
156.	GHOSALA	93.2	1.2	0.2	0.5	2.0	2.9	18	36	19	1.1
157.	GIANT CHILLIES (capsicum)	92.4	1.3	0.3	0.7	1.0	4.3	24	10	30	0.567
158	JACK FRUIT, tender	84.0	2.6	0.3	0.9	2.8	9.4	51	30	40	1.7
159.	JACK FRUIT, seeds	64.5	6.6	0.4	1.2	1.5	25.8	133	50	97	1.5
160.	KANKODA	84.1	3.1	1.0	1.1	3.0	7.7	52	33	42	4.6
161.	KARONDA fresh	91.0	1.1	2.9	0.6	1.5	2.9	42	21	28	–
162	KARONDA dry	18.2	2.3	9.6	2.8	–	67.1	364	160	60	39.1
163.	KHEKSA	90.4	0.6	0.1	0.9	1.6	6.4	29	27	38	–
164.	KOVAI	93.5	1.2	0.1	0.5	1.6	3.1	18	40	30	0.38
165.	KNOL-KHOL	92.7	1.1	0.2	0.7	1.5	3.8	21	20	35	1.54
166.	LADIES FINGERS	89.6	1.9	0.2	0.7	1.2	6.4	35	66	56	0.35
167.	LAKUCH, raw	89.4	1.6	1.2	1.1	2.8	13.9	73	67	25	–
168.	LEEKS	78.9	1.8	0.1	0.7	1.3	17.2	77	50	70	2.3
169.	LOTUS STEM, dry	9.5	4.1	1.3	8.7	25.0	51.4	234	405	128	60.6
170.	MANGO, green	87.5	0.7	0.1	0.4	1.2	10.1	44	10	19	0.33
171.	ONION STALKS	87.6	0.9	0.2	0.8	1.6	8.9	41	50	50	7.43
172.	PAPAYA, green	92.0	0.7	0.2	0.5	0.9	5.7	27	28	40	0 9
173.	PARWAR	92.0	2.0	0.3	0.5	3.0	2.2	20	30	40	1 7
174.	PINK BEANS	86.8	3.1	0.4	0.6	2.1	7.0	44	54	70	1 5
175.	PLANTAIN flower	89.9	1.7	0.7	1.3	1.3	5.1	34	32	42	1.6
176.	PLANTAIN green	83.2	1.4	0.2	0.5	0.7	14.0	64	10	29	6.27
177.	PLANTAIN stem	88.3	0.5	0.1	0.6	0.8	9.7	42	10	10	1.1
178	PUMPKIN fruit	92.6	1.4	0.1	0.6	0.7	4.6	25	10	30	0.44
179.	PUMPKIN flowers	89.1	2.2	0.8	1.4	0.7	5.8	39	120	60	–
180.	RIDGE GOURD	95.2	0.5	0.1	0.3	0.5	3.4	17	18	26	0.39
181.	SNAKE GOURD	94.6	0.5	0.3	0.5	0.8	3.3	18	26	20	1.51
182.	SUNDAKAI, dry	12.3	8.3	1.7	5.1	17.6	55.0	269	390	180	22.2
183.	SWORD BEANS	87.2	2.7	0.2	0.6	1.5	7.8	44	60	40	2.0
184.	TINDA, tender	93.5	1.4	0.2	0.5	1.0	3.4	21	25	24	0.9
185.	TOMATO, green	93.1	1.9	0.1	0.6	0.7	3.6	23	20	36	1.8
186.	VEGETABLE MARROW	94.8	0.5	0.1	0.3	0.8	3.5	17	10	30	0.6
187.	WATER CHESTNUT, fresh	70.0	4.7	0.3	1.1	0.6	23.3	115	20	150	1.35
188.	WATER CHESTNUT, dry	13.8	13.4	0.8	3.1	–	68.9	330	70	440	2.4

Sl. No.	Name of the food stuff	Moisture g.	Protein (Nx6.25) g.	Fat g.	Minerals g.	Crude Fibre g.	Carbohydrates g.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
228.	MANGO POWDER	6.8	2.8	7.8	4.9	13.7	64.0	337	180	16	45.2
229.	NUTMEG fruit	14.3	7.5	36.4	1.7	11.6	28.5	472	120	240	2.03
230.	NUTMEG rind	86.8	1.0	0.4	0.6	–	11.2	52	40	10	2.0
231.	OMUM	7.4	17.1	21.8	7.9	21.2	24.6	363	1525	443	12.5
232.	PEPPER DRY (black)	18.2	11.5	6.8	4.4	14.9	49.2	304	460	198	12.4
233.	PEPPER GREEN	70.6	4.8	2.7	1.8	6.4	13.7	98	270	70	2.4
234.	PIPPALI	12.2	6.4	2.3	4.8	8.5	65.8	310	1230	190	62.1
235.	POPPY SEEDS	4.3	21.7	19.3	9.9	8.0	36.8	408	1584	432	15.9
236.	TAMARIND PULP	20.9	3.1	0.1	2.9	5.6	67.4	283	170	110	17.0
237.	TURMERIC	13.1	6.3	5.1	3.5	2.6	69.4	349	150	282	67.8
FRUITS											
238.	AMBADA	90.3	0.7	3.0	0.5	1.0	4.5	48	36	11	3.9
239.	AMLA	81.8	0.5	0.1	0.5	3.4	13.7	58	50	20	1.2
240.	APPLE	84.6	0.2	0.5	0.3	1.0	13.4	59	10	14	0.660
241.	APRICOT fresh	85.3	1.0	0.3	0.7	1.1	11.6	53	20	25	2.2
242.	APRICOT dry	19.4	1.6	0.7	2.8	2.1	73.4	306	110	70	4.6
243.	AVOCADO PEAR	73.6	1.7	22.8	1.1	–	0.8	215	10	80	0.7
244.	BAEL FRUIT	61.5	1.8	0.3	1.7	2.9	31.8	137	85	50	0.6
245.	BANANA, ripe	70.1	1.2	0.3	0.8	0.4	27.2	116	17	36	0.36
246.	BANYAN TREE FIGS	74.1	1.7	2.0	1.9	8.5	11.8	72	364	43	–
247.	BILIMBI	94.4	0.5	0.3	0.3	1.0	3.5	19	15	10	1.2
248.	BREAD FRUIT	79.5	1.5	0.2	0.9	2.1	15.8	71	40	30	0.5
249.	BULLOCK'S HEART	76.8	1.4	0.2	0.7	5.2	15.7	70	10	10	0.6
250.	CAPE GOOSEBERRY	82.9	1.8	0.2	0.8	3.2	11.1	53	10	67	2.0
251.	CASHEW FRUIT	86.3	0.2	0.1	0.2	0.9	12.3	51	10	10	0.2
252.	CHERRIES, red	83.4	1.1	0.5	0.8	0.4	13.8	64	24	25	0.57
253.	CURRANTS, black	18.4	2.7	0.5	2.2	1.0	75.2	316	130	110	8.5
254.	DATES dried	15.3	2.5	0.4	2.1	3.9	75.8	317	120	50	7.3
255.	DATES fresh	59.2	1.2	0.4	1.7	3.7	33.8	144	22	38	0.96
256.	FIGS (Ficus carcia)	88.1	1.3	0.2	0.6	2.2	7.6	37	80	30	1.0
257.	GRAPES blue variety	82.2	0.6	0.4	0.9	2.8	13.1	58	20	23	0.5
258.	GRAPES pale green variety	79.2	0.5	0.3	0.6	2.9	16.5	71	20	30	0.52
259.	GRAPE FRUIT marsh's seedless	88.5	1.0	0.1	0.4	–	10.0	45	30	30	0.2
260.	GRAPE FRUIT triumph	92.0	0.7	0.1	0.2	–	7.0	32	20	20	0.2
261.	GUAVA, country	81.7	0.9	0.3	0.7	5.2	11.2	51	10	28	0.27
262.	GUAVA, hill	85.3	0.1	0.2	0.6	4.8	9.0	38	50	20	1.2
263.	HARFAROWRIE	91.2	0.7	0.6	0.5	1.1	5.9	32	6	6	–
264.	JACK FRUIT	76.2	1.9	0.1	0.9	1.1	19.8	88	20	41	0.56
265.	JAMB, safed	93.5	0.1	0.4	0.1	2.2	3.7	19	17	3	0.1
266.	JAMBU FRUIT	83.7	0.7	0.3	0.4	0.9	14.0	62	15	15	0.43
267.	KORUKKAPALLI	79.2	2.7	0.4	0.7	1.0	16.0	78	14	49	1.0
268.	LAKUCH	82.1	0.7	1.1	0.8	2.0	13.3	66	50	20	0.5
269.	LEMON	85.0	1.0	0.9	0.3	1.7	11.1	57	70	10	0.26
	kiwi		0·99	0·4			14·8	61	26	40	0·4

Sl. No.	Name of the food stuff	Mois-ture g.	Protein (Nx6.25) g.	Fat g.	Mine-rals g.	Crude Fibre g.	Carbo hydrates g.	Energy Kcal.	Calcium mg.	Phos-phorus mg.	Iron mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
270.	LEMON SWEET	90.5	0.7	0.3	0.5	0.7	7.3	35	30	20	0.7
271.	LICHI	84.1	1.1	0.2	0.5	0.5	13.6	61	10	35	0.7
272.	LICHIES, bastard	83.9	1.4	0.3	0.8	0.5	13.1	61	15	35	–
273.	LIME	84.6	1.5	1.0	0.7	1.3	10.9	59	90	20	0.3
274.	LIME, sweet malta	90.3	0.7	0.2	0.4	0.6	7.8	36	30	20	1.0
275.	LIME, sweet musambi	88.4	0.8	0.3	0.7	0.5	9.3	43	40	30	0.7
276.	LOQUAT	88.2	0.6	0.3	0.5	0.8	9.6	43	30	20	1.3
277.	MAHUA, ripe	73.6	1.4	1.6	0.7	–	22.7	111	45	22	0.23
278.	MANGO, ripe	81.0	0.6	0.4	0.4	0.7	16.9	74	14	16	1.3
279.	MANGOSTEEN	84.9	0.5	0.1	0.2	–	14.3	60	10	20	0.2
280.	MELON, musk	95.2	0.3	0.2	0.4	0.4	3.5	17	32	14	1.4
281.	MELON, water	95.8	0.2	0.2	0.3	0.2	3.3	16	11	12	7.9
282.	MULBERRY	86.5	1.1	0.4	0.6	1.1	10.3	49	70	30	2.3
283.	ORANGE	87.6	0.7	0.2	0.3	0.3	10.9	48	26	20	0.32
284.	ORANGE juice	97.7	0.2	0.1	0.1	–	1.9	9	5	9	0.7
285.	PALMYRA FRUIT ripe (mesocarp)	77.2	0.7	0.2	0.7	0.5	20.7	87	9	33	–
286.	PALMYRA FRUIT tender	92.3	0.6	0.1	0.2	0.3	6.5	29	10	20	0.5
287.	PAPAYA, ripe	90.8	0.6	0.1	0.5	0.8	7.2	32	17	13	0.5
288.	PASSION FRUIT	76.3	0.9	0.1	0.7	9.6	12.4	54	10	60	2.0
289.	PASSION FRUIT juice	89.0	1.2	0.2	0.7	1.2	7.7	37	10	30	0.7
290.	PEACHES	86.0	1.2	0.3	0.8	1.2	10.5	50	15	41	2.4
291.	PEARS	86.0	0.6	0.2	0.3	1.0	11.9	52	8	15	0.5
292.	PERSIMMON	80.0	0.7	0.2	0.3	0.9	17.9	76	15	10	0.3
293.	PHALSA	80.8	1.3	0.9	1.1	1.2	14.7	72	129	39	3.1
294.	PINE APPLE	87.8	0.4	0.1	0.4	0.5	10.8	46	20	9	2.42
295.	PLUM	86.9	0.7	0.5	0.4	0.4	11.1	52	10	12	0.6
296.	POMEGRANATE	78.0	1.6	0.1	0.7	5.1	14.5	65	10	70	1.79
297.	PRUNES	85.3	0.5	0.3	0.6	0.5	12.8	56	10	18	–
298.	PUMMELO	88.0	0.6	0.1	0.5	0.6	10.2	44	30	30	0.3
299.	QUINCE	85.7	0.3	0.1	0.3	1.7	11.9	50	10	20	0.4
300.	RAISINS	20.2	1.8	0.3	2.0	1.1	74.6	308	87	80	7.7
301.	RASPBERRY	84.8	1.0	0.6	0.9	1.0	11.7	56	40	110	2.3
302.	ROSE APPLE	89.1	0.7	0.2	0.3	1.2	8.5	39	10	30	0.5
303.	SAPOTA	73.7	0.7	1.1	0.5	2.6	21.4	98	28	27	1.25
304.	SEETHAPHAL	70.5	1.6	0.4	0.9	3.1	23.5	104	17	47	4.31
305.	STRAWBERRY	87.8	0.7	0.2	0.4	1.1	9.8	44	30	30	1.8
306.	TOMATO, ripe	94.0	0.9	0.2	0.5	0.8	3.6	20	48	20	0.64
307.	TOMATILLO	91.7	0.7	0.6	0.6	0.6	5.8	31	7	40	1.4
308.	TREE TOMATO	86.2	1.5	0.2	1.2	4.2	6.7	35	12	46	1.0
309.	WOOD APPLE	64.2	7.1	3.7	1.9	5.0	18.1	134	130	110	0.48
310	ZIZYPHUS	81.6	0.8	0.3	0.3	–	17.0	74	4	9	0.50
FISHES AND OTHER SEA FOODS											
311.	AIR	78.1	15.9	1.3	1.2	–	3.5	89	380	180	0.7

Sl. No.	Name of the food stuff	Mois-ture	Protein (Nx6.25)	Fat	Mine-rals	Crude Fibre	Carbo hydrates	Energy	Calcium	Phos-phorus	Iron
		g.	g.	g.	g.	g.	g.	Kcal.	mg.	mg.	mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
312.	ANCHOVY	69.3	19.3	9.6	1.6	–	0.2	164	143	174	1.5
313.	BACHA	68.8	18.1	5.6	1.4	–	6.1	147	520	180	0.7
314.	BAM	74.8	16.1	0.9	1.3	–	6.9	100	330	240	0.8
315.	BASPATA MACHLI	76.1	18.2	4.4	1.4	–	0	112	175	225	–
316.	BATA, small varieties	79.0	14.3	2.5	2.0	–	2.2	89	790	200	1.1
317.	BELEY	79.7	14.5	0.6	2.3	–	2.9	75	370	330	1.0
318.	BHAGON fresh	70.6	14.8	8.8	2.0	–	3.8	154	182	190	1.2
319.	BHAGON dried	17.9	61.5	2.3	16.5	–	1.8	274	6235	207	9.3
320.	BHANGAN BATA	67.3	19.4	4.4	2.2	–	6.7	144	580	310	1.1
321.	BHEKTI fresh	79.9	14.9	0.8	1.4	–	3.0	79	480	350	3.1
322.	BHEKTI dried	20.1	60.2	2.0	15.9	–	1.8	266	939	347	15.0
323.	BHOLA	78.1	15.2	1.1	1.9	–	3.7	86	550	580	0.4
324.	BIG JAWED JUMPER	73.3	19.4	5.8	1.4	–	0.1	130	214	306	3.4
325.	BOAL	73.3	15.4	2.7	1.3	–	7.6	116	160	490	0.6
326.	BOMBAY DUCK, dried	16.7	61.7	4.0	15.1	–	2.5	293	1389	240	19.1
327.	BLUE MUSSEL	81.5	9.9	2.0	3.0	–	3.6	72	1134	286	8.0
328.	CAT FISH	77.1	21.4	–	–	–	–	86	10	230	–
329.	CHELA	77.5	14.6	4.3	2.1	–	1.5	103	590	340	2.0
330.	CHELA dried	4.7	64.8	17.0	13.4	–	0.1	413	3590	2342	–
331.	CHINGRI small dried	17.9	62.4	3.9	13.9	–	1.9	292	3539	354	27.9
332.	CHINGRI goda, dried	14.9	60.0	3.2	17.3	–	4.6	287	3847	828	49.6
333.	CHITAL	75.0	18.6	2.3	1.0	–	3.1	108	180	250	3.0
334.	CRAB muscle	83.5	8.9	1.1	3.2	–	3.3	59	1370	150	21.2
335.	CRAB small	65.3	11.2	9.8	4.6	–	9.1	169	1606	253	–
336.	FOLUI	73.0	19.0	1.0	2.5	–	3.7	109	590	450	1.7
337.	GHOL	69.7	18.4	0.9	–	–	–	82	90	150	2.1
338.	GOGGLER	76.9	18.7	1.6	1.8	–	1.0	93	437	349	8.2
339.	HERRING, Indian	72.8	20.3	3.2	1.5	–	2.2	119	429	305	9.3
340.	HERRING ox-eyed	73.7	20.7	2.2	1.6	–	0.8	106	429	131	6.3
341.	HILSA	53.7	21.8	19.4	2.2	–	2.9	273	180	280	2.1
342.	HORSE MACKEREL	76.9	21.2	1.6	1.3	–	0	99	357	262	2.0
343.	INDIAN WHITING	77.1	19.2	0.6	1.5	–	1.6	89	71	262	2.2
344.	JEW FISH (kora)	78.3	18.8	0.8	1.9	–	0.2	83	286	305	4.4
345.	JEW FISH (pallikora)	77.0	20.0	2.2	1.6	–	–	100	214	262	4.8
346.	KALABASU	81.0	14.7	1.0	1.3	–	2.0	76	320	380	0.8
347.	KATLA	73.7	19.5	2.4	1.5	–	2.9	111	530	235	0.9
348.	KHORSULA	75.3	16.3	5.1	1.8	–	1.5	117	410	160	0.6
349.	KHOYRA fresh	72.0	18.0	3.0	1.8	–	5.2	120	590	220	0.7
350.	KHOYRA dried	17.3	58.9	6.2	16.4	–	1.2	296	–	–	–
351.	KOI	70.0	14.8	8.8	2.0	–	4.4	156	410	390	1.4
352.	KOOCHA MACHLI	76.7	18.7	0.8	1.4	–	2.4	92	185	119	–
353.	LATA	74.0	19.4	0.6	2.6	–	3.4	97	610	530	1.3
354.	LOBSTER	77.3	20.5	0.9	1.4	–	0	90	16	279	–
355.	MACKEREL	77.3	18.9	1.7	1.6	–	0.5	93	429	305	4.5
356.	MAGUR	78.5	15.0	1.0	1.3	–	4.2	86	210	290	0.7
357.	MAHASOLE	70.3	25.2	2.3	1.2	–	1.0	126	130	280	3.8

Sl. No.	Name of the food stuff	Mois-ture g.	Protein (Nx6.25) g.	Fat g.	Mine-rals g.	Crude Fibre g.	Carbo hydrates g.	Energy Kcal.	Calcium mg.	Phos-phorus mg.	Iron mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
358.	MANDELI, dried	31.1	52.5	5.4	–	–	–	259	143	259	11.9
359.	MRIGAL	75.0	19.5	0.8	1.5	–	3.2	98	350	280	1.1
360.	MULLET	69.9	19.1	7.8	1.1	–	2.1	155	357	175	4.4
361.	MUSHI dried	9.6	67.0	4.9	–	–	–	312	541	507	2.7
362.	MUSSEL, fresh water	79.5	14.5	1.6	2.3	–	2.1	81	592	406	–
363.	MUTIJELLA, dried	19.2	63.6	2.4	11.8	–	3.0	288	7240	834	1.0
364.	OIL SARDINE	76.5	19.6	2.0	1.8	–	0.1	97	357	349	6.1
365.	PABDA	73.0	19.2	2.1	1.1	–	4.6	114	310	210	1.3
366.	PANGAS	72.3	14.2	10.8	1.0	–	1.7	161	180	130	0.5
367.	PARSEY fresh	70.8	17.5	5.9	1.5	–	4.3	140	850	490	2.7
368.	PARSEY dried	11.8	65.0	4.4	15.8	–	3.0	312	2231	396	17.4
369.	POMFRETS, black	74.5	20.3	2.6	1.1	–	1.5	111	286	306	2.3
370.	POMFRETS, white	78.4	17.0	1.3	1.5	–	1.8	87	200	290	0.9
371.	PRAWN	77.4	19.1	1.0	1.7	–	0.8	89	323	278	5.3
372.	PUTI	75.0	18.1	2.4	1.4	–	3.1	106	110	96	1.0
373.	RAVAS	71.4	22.2	1.1	2.0	–	3.3	112	405	335	2.0
374.	RAY	75.3	20.9	0.5	1.2	–	2.1	97	214	262	5.3
375.	RIBBON FISH fresh	76.6	18.1	3.2	1.5	–	0.6	104	214	218	13.9
376.	RIBBON FISH dried	6.7	76.1	8.7	–	–	–	383	739	700	4.2
377.	ROHU	76.7	16.6	1.4	0.9	–	4.4	97	650	175	1.0
378.	SARDINE	78.1	21.0	1.9	1.7	–	–	101	90	360	2.5
379.	SARPUTI	70.2	16.5	9.5	1.5	–	2.3	161	220	120	0.5
380.	SHARK	76.0	21.6	0.4	1.2	–	0.8	93	357	262	1.4
381.	SHRIMP (small, dried)	6.9	68.1	8.5	17.4	–	–	349	4384	1160	–
382.	SEER	72.7	22.5	4.0	1.5	–	–	126	71	572	5.4
383.	SILVER BELLY	76.4	19.2	1.6	3.2	–	0	91	715	741	2.2
384.	SINGHALA	61.0	20.9	3.1	1.1	–	13.9	167	98	152	1.8
385.	SINGHI	68.0	22.8	0.6	1.7	–	6.9	124	670	650	2.3
386.	SOLE	78.0	16.2	2.3	1.3	–	2.2	94	140	95	0.5
387.	SOLE (malahar)	78.0	19.5	4.7	3.1	–	–	120	1072	524	0.5
388.	SURMAI fresh	63.0	19.9	1.4	–	–	–	92	92	161	2.0
389	SURMAI dried	43.3	38.6	6.2	–	–	–	210	148	172	4.4
390.	TAPRA (dried)	12.6	62.3	9.0	15.1	–	1.0	334	771	552	19.3
391.	TAPSI (dried)	16.2	58.5	12.1	17.2	–	–	343	1597	595	41.2
392.	TARTOOR	78.3	18.2	0.2	2.1	–	1.2	79	1072	218	4.9
393.	TENGRA fresh	70.0	19.2	6.4	2.1	–	2.3	144	270	170	2.0
394.	TENGRA dried	13.8	54.9	3.9	27.5	–	–	255	843	400	–
395.	TUNNY	71.9	23.8	1.6	1.8	–	0.9	113	429	349	6.8
396.	WHITE BAIT	79.1	14.5	1.4	2.5	–	2.5	81	643	437	3.8
MEAT AND POULTRY											
397.	BEEF meal	8.2	79.2	10.3	1.6	0.5	0.2	410	68	324	18.8
398.	BEEF muscle	74.3	22.6	2.6	1.0	–	–	114	10	190	0.8
399.	BUFFALO MEAT	78.7	19.4	0.9	1.0	–	–	86	3	189	–
400.	DUCK	72.3	21.6	4.8	1.2	–	0.1	130	4	235	–
401.	EGG, duck	71.0	13.5	13.7	1.0	–	0.8	181	70	260	2.5

Sl. No.	Name of the food stuff	Mois-ture g.	Protein (Nx6.25) g.	Fat g.	Mine-rals g.	Crude Fibre g.	Carbo hydrates g.	Energy Kcal.	Calcium mg.	Phos-phorus mg.	Iron mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
402.	EGG, hen	73.7	13.3	13.3	1.0	–	–	173	60	220	2.1
403.	EGG, turtle	76.0	12.2	6.7	1.5	–	3.6	124	93	299	–
404.	FINCH	68.8	26.6	3.0	1.7	–	–	133	90	347	–
405.	FOWL	72.2	25.9	0.6	1.3	–	–	109	25	245	–
406.	GOAT MEAT (lean)	74.2	21.4	3.6	1.1	–	–	118	12	193	–
407.	GREY QUAIL	75.0	21.9	1.7	1.4	–	–	103	22	282	–
408.	LIVER GOAT	76.3	20.0	3.0	1.3	–	–	107	17	279	–
409.	LIVER SHEEP	70.4	19.3	7.5	1.5	–	1.3	150	10	380	6.3
410.	MUTTON, muscle	71.5	18.5	13.3	1.3	–	–	194	150	150	2.5
411.	PIGEON	70.4	23.3	4.9	1.4	–	–	137	12	290	–
412.	PORK, muscle	77.4	18.7	4.4	1.0	–	–	114	30	200	2.2
413.	RUFF AND REEVE	70.3	25.9	2.3	1.5	–	–	124	3	321	–
414.	SNAIL, small	78.9	12.6	1.0	3.8	–	3.7	74	1321	147	–
415.	SNAIL, big	74.1	10.5	0.6	2.4	–	12.4	97	870	116	–
416.	TURTLE'S MEAT	79.4	16.5	1.5	1.1	–	1.5	86	7	162	–
417.	VENISON	75.3	21.0	0.6	1.2	–	1.9	97	3	233	–
MILK AND MILK PRODUCTS											
418.	MILK ass's	89.9	2.1	1.5	–	–	6.5	48	80	–	–
419.	MILK buffalo's	81.0	4.3	6.5	0.8	–	5.0	117	210	130	0.2
420.	MILK cow"s	87.5	3.2	4.1	0.8	–	4.4	67	120	90	0.2
421.	MILK goat"s	86.8	3.3	4.5	0.8	–	4.6	72	170	120	0.3
422.	MILK human	88.0	1.1	3.4	0.1	–	7.4	65	28	11	–
423.	CURDS (cow's milk)	89.1	3.1	4.0	0.8	–	3.0	60	149	93	0.2
424.	BUTTER MILK	97.5	0.8	1.1	0.1	–	0.5	15	30	30	0.1
425.	SKIMMED MILK, liquid	92.1	2.5	0.1	0.7	–	4.6	29	120	90	0.2
426.	CHANNA, cow's milk	57.1	18.3	20.8	2.6	–	1.2	265	208	138	–
427.	CHANNA, buffalo"s milk	54.1	13.4	23.0	1.6	–	7.9	292	480	277	–
428.	CHEESE	40.3	24.1	25.1	4.2	–	6.3	348	790	520	2.1
429.	KHOA (whole buffalo milk)	30.6	14.6	31.2	3.1	–	20.5	421	650	420	5.8
430.	KHOA (skimmed buffalo milk)	46.1	22.3	1.6	4.3	–	25.7	206	990	650	2.7
431.	KHOA (whole cow milk)	25.2	20.0	25.9	4.0	–	24.9	413	956	613	–
432.	SKIMMED MILK POWDER (cow's milk)	4.1	38.0	0.1	6.8	–	51.0	357	1370	1000	1.4
433.	WHOLE MILK POWDER (cow's milk)	3.5	25.8	26.7	6.0	–	38.0	496	950	730	0.6
FATS AND EDIBLE OILS											
434.	BUTTER	19.0	–	81.0	2.5	–	–	729	–	–	–
435.	GHEE (cow)	–	–	100.0	–	–	–	900	–	–	–
436.	GHEE (buffalo)	–	–	100.0	–	–	–	900	–	–	–
437.	HYDROGENATED OIL (fortified)	–	–	100.0	–	–	–	900	–	–	–

Sl. No.	Name of the food stuff	Mois-ture g.	Protein (Nx6.25) g.	Fat g.	Mine-rals g.	Crude Fibre g.	Carbo hydrates g.	Energy Kcal.	Calcium mg.	Phos-phorus mg.	Iron mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
438.	COOKING OIL (Groundnut, Gingelly, Palmolein, Mustard, Coconut, etc)	–	–	100.0	–	–	–	900	–	–	–
SUGARS											
439.	SUGAR CANE	0.4	0.1	0	0.1	–	99.4	398	12	1	0.155
440.	HONEY	20.6	0.3	0	0.2	–	79.5	319	5	16	0.696
441.	JAGGERY (cane)	3.9	0.4	0.1	0.6	–	95.0	383	80	40	2.64
442.	JAGGERY (coconut palm)	10.3	1.0	0.2	5.0	–	83.5	340	1638	62	–
443.	JAGGERY (date palm)	9.6	1.5	0.3	2.6	–	86.1	353	363	62	–
444.	JAGGERY (fan palm)	8.6	1.0	0.1	1.8	–	98.5	359	225	44	–
445.	JAGGERY (sago palm)	9.2	2.3	0.1	3.7	–	84.7	349	1252	372	–
446.	SAGO	12.2	0.2	0.2	0.3	–	87.1	351	10	10	1.3
BEVERAGES (Alcoholic)											
447.	PACHWAI (Assam)	88.2	3.0	1.8	0.6	0.6	5.8	51	12	100	4.5
448.	TODDY, fermented	97.6	0.1	0.3	0.2	–	1.8	38	–	–	–
449.	TODDY, sweet	84.7	0.1	0.3	0.7	–	14.3	59	150	10	0.3
BEVERAGES (Non-Alcoholic)											
450.	NEERA	–	0.4	–	0.5	–	10.9	45	0	140	0.1
451.	SUGAR CANE JUICE	90.2	0.1	0.2	0.4	–	9.1	39	10	10	0.1

TABLE – 2

VITAMIN CONTENT: COMMON FOODS

All values are per 100 gms. of edible portion

Sl. No.	Name of the food stuff	Carotene	Thia-mine	Ribofla-vin	Niacin	Total B_6	Folic Acid (µg)		Vitamin C	Choline
		µg.	mg.	mg.	mg.	mg.	Free	Total	mg.	mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CEREAL GRAINS AND PRODUCTS										
1.	BAJRA	132	0.33	0.25	2.3	–	14.7	45.5	0	–
2.	BARLEY	10	0.47	0.20	5.4	–	–	–	0	–
3.	ITALIAN MILLET	32	0.59	0.11	3.2	–	4.2	15.0	0	–
4.	JOWAR	47	0.37	0.13	3.1	(0.21)	14.0	20.0	0	–
5.	MAIZE, dry	90	0.42	0.10	1.8	–	14.0	20.0	0	–
6.	MAIZE, tender	32	0.11	0.17	0.6	–	–	–	6	–
7.	PANIVARAGU	0	0.20	0.18	2.3	–	–	–	0	748
8.	RAGI	42	0.42	0.19	1.1	–	5.2	18.3	0	–
9.	RICE, parboiled, handpounded	9	0.27	0.12	4.0	–	–	–	0	–
10.	RICE, parboiled, milled	–	0.21	0.05	3.8	(0.24)	8.9	11.0	0	–
11.	RICE, raw, handpounded	2	0.21	0.16	3.9	–	–	–	0	77
12.	RICE, raw, milled	0	0.06	0.06	1.9	–	4.1	8.0	0	–
13.	RICE, bran	–	2.70	0.48	(29.8)	–	–	–	0	–
14.	RICE, flakes	0	0.21	0.05	4.0	–	–	–	0	–
15.	RICE, puffed	0	0.21	0.01	4.1	–	–	–	0	–
16.	SAMAI	0	0.30	0.09	3.2	–	2.2	9.0	0	–
17.	SANWA MILLET	0	(0.33)	(0.10)	4.2	–	–	–	0	–
18.	VARAGU	0	0.33	0.09	2.0	–	7.4	23.1	0	–
19.	WHEAT, bulgar (parboiled)	–	(0.74)	0.11	4.8	–	–	–	0	206
20.	WHEAT, whole	64	0.45	0.17	5.5	(0.57)	142	36.6	0	–
21.	WHEAT, flour (whole)	29	0.49	0.17	4.3	–	12.1	35.8	0	–
22.	WHEAT, flour (refined)	25	0.12	0.07	2.4	–	–	–	0	–
23.	WHEAT, germ	–	1.40	0.54	2.9	–	–	–	0	–
24.	WHEAT, semolina	–	0.12	0.03	1.6	–	–	–	0	–
25.	WHEAT, vermicelli	0	0.19	0.05	1.8	–	–	–	0	–
26.	WHEAT, bread (brown)	–	0.21	–	2.5	–	–	–	–	–
27.	WHEAT bread (white)	–	0.07	–	0.7	–	–	–	–	–
PULSES AND LEGUMES										
28.	BENGAL GRAM, whole	189	0.30	0.15	2.9	–	34.0	186.0	3	194
29.	BENGAL GRAM, dhal	129	0.48	0.18	2.4	–	32.0	147.5	1	–
30.	BENGAL GRAM, roasted	113	0.20	–	1.3	–	22.0	139.0	0	–
31.	BLACK GRAM, dhal	38	0.42	0.20	2.0	–	24.0	132.0	0	206
32.	COW PEA	12	0.51	0.20	1.3	–	69.0	133.0	0	202
33.	FIELD BEAN, dry	0	0.52	0.16	1.8	–	–	–	0	352
34.	GREEN GRAM, whole	94	0.47	0.27	2.1	–	–	–	0	167
35.	GREEN GRAM, dhal	49	0.47	0.21	2.4	–	24.5	140.0	0	–
36.	HORSE GRAM, whole	71	0.42	0.20	1.5	–	–	–	1	–

Sl. No.	Name of the food stuff	Carotene	Thia-mine	Ribofla-vin	Niacin	Total B_6	Folic Acid (µg)		Vitamin C	Choline
		µg.	mg.	mg.	mg.	mg.	Free	Total	mg.	mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
37.	KHESARI, dhal	120	0.39	0.17	2.9	–	–	–	0	–
38.	LENTIL	270	0.45	0.20	2.6	–	14.5	36.0	0	299
39.	MOTH BEANS	9	0.45	0.09	1.5	–	–	–	2	–
40.	PEAS	83	0.25	0.01	0.8	–	–	–	9	20
41.	PEAS, dry	39	0.47	0.19	3.4	–	4.6	7.5	0	235
42.	PEAS, roasted	18	0.47	0.21	3.5	–	–	–	0	–
44.	REDGRAM, dhal	132	0.45	0.19	2.9	(0.54)	19.0	103.0	0	183
45.	REDGRAM, tender	469	0.32	0.33	3.0	–	–	–	25	72
46.	SOYABEAN	426	0.73	0.39	3.2	–	8.65	100.0	–	–
	LEAFY VEGETABLES									
47.	AGATHI	5,400	0.21	0.09	1.2	–	–	–	169	–
49.	AMARANTH, tender gangeticus	5,520	0.03	0.30	1.2	–	41.0	149.0	99	31
50.	AMARANTH, stem gangeticus	255	0.01	0.18	0	–	–	–	10	–
51.	AMARANTH Paniculatus	14,190	0.01	0.24	1.1	–	–	–	81	–
53.	AMARANTH spinosus	3,564	0	–	–	–	–	–	33	–
57.	AMARANTH viridis	–	–	–	–	–	–	–	179	–
58.	AMBAT CHUKA	3,660	0.03	0.06	0.2	–	40.0	125.0	12	–
59.	BATHUA LEAVES	1,740	0.01	0.14	0.6	–	–	–	35	–
60.	BEET GREENS	5,862	0.26	0.56	3.3	–	–	–	70	–
62.	BETEL LEAVES	5,760	0.07	0.03	0.7	–	–	–	5	–
65.	BRUSSELS SPROUTS	126	0.05	0.16	0.4	–	–	–	72	–
66.	CABBAGE	120	0.06	0.09	0.4	–	13.3	23.0	124	120
67.	CARROT LEAVES	5,700	0.04	0.37	2.1	–	–	–	79	–
69.	CELERY LEAVES	3,990	0	0.11	1.2	–	–	–	62	–
70.	CELERY STALK	520	0.12	0.05	0.3	–	–	–	6	–
71.	CHEKKUR MANIS	5,706	0.48	0.32	2.6	–	–	–	247	–
72.	COLOCASIA LEAVES (black variety)	12,000	0.06	0.45	1.9	–	–	–	63	–
73.	COLOCASIA LEAVES (green variety)	10,278	0.22	0.26	1.1	–	–	–	12	–
75.	CORIANDER LEAVES	6,918	0.05	0.06	0.8	–	–	–	135	–
76.	COW PEA LEAVES	6,702	0.05	0.18	0.6	–	–	–	4	–
77.	CURRY LEAVES	7,560	0.08	0.21	2.3	–	23.5	93.9	4	–
78.	DRUMSTICK LEAVES	6,780	0.06	0.05	0.8	–	–	–	220	–
79.	FENUGREEK LEAVES	2,340	0.04	0.31	0.8	–	–	–	52	–
80.	FETID CASSIA (fresh)	10,152	0.08	0.19	0.8	–	–	–	82	–
82.	GARDEN CRESS	–	0.15	–	–	–	–	–	–	–
84.	GOGU	2,898	0.07	0.39	1.1	–	–	–	20	–
86.	IPOMOEA LEAVES	1,980	0.05	0.13	0.6	–	–	–	37	–
87.	KNOL-KHOL GREENS	4,146	0.25	–	3	–	–	–	157	–
88.	KUPPAMENI	–	–	–	–	–	–	–	147	–
89.	LETTUCE	990	0.09	0.13	0.50	–	–	–	10	178

Sl. No.	Name of the food stuff	Carotene	Thia-mine	Ribofla-vin	Niacin	Total B_6	Folic Acid (µg)		Vitamin C	Choline
		µg.	mg.	mg.	mg.	mg.	Free	Total	mg.	mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
92.	MANATHAKKALI LEAVES	–	–	0.59	0.90	–	–	–	11	–
93.	MAYALU	7,440	0.03	0.16	0.5	–	–	–	87	–
94.	MINT	1,620	0.05	0.26	1.0	–	9.7	114.0	27	–
96.	MUKARRATE KEERAI	–	–	–	–	–	–	–	27	–
97.	MUSTARD LEAVES	2,622	0.03	–	–	–	–	–	33	–
98.	NERRINGI	–	–	–	–	–	–	–	41	–
99.	PARSLEY	1,920	0.04	0.18	0.5	–	–	–	281	–
100.	PARUPPU KEERAI	2,292	0.10	0.22	0.7	–	–	–	29	–
101.	PONNANGANNI	1,926	0	0.14	1.2	–	–	–	17	–
103.	RADISH LEAVES	5,295	0.18	0.47	0.8	–	–	–	81	–
104.	RADISH LEAVES table	5,742	0.18	0.35	5.5	–	–	–	106	–
106.	RAPE PLANT LEAVES	1,380	0.01	0.03	0.9	–	–	–	65	–
108.	SAFFLOWER LEAVES	3,540	0.04	0.10	0	–	–	–	15	–
109.	SHEPU	7,182	0.03	0.13	0.20	–	–	–	–	25
110.	SPINACH	5,580	0.03	0.26	0.5	–	51.0	123.0	28	–
113.	TAMARIND LEAVES, tender	250	0.24	0.17	4.1	–	–	–	3	–
114.	TURNIP GREENS	9,396	0.31	0.57	5.4	–	–	–	180	–
	ROOTS AND TUBERS									
116.	BANANA RHIZOME	16	0	0.03	0.2	–	–	–	1	–
117.	BEET ROOT	0	0.04	0.09	0.4	–	–	–	10	242
118.	CARROT	1,890	0.04	0.02	0.6	–	5.0	15.0	3	168
119	COLOCASIA	24	0.09	0.03	0.4	–	16.0	54.0	0	–
121.	MANGO GINGER	20	0.01	0.03	0	–	–	–	1	–
122.	ONION, big	0	0.08	0.01	0.4	–	1.5	6.0	11	–
123.	ONION, small	15	0.08	0.02	0.5	–	–	–	2	–
124.	PARSNIP	18	0.06	–	0.4	–	–	–	16	–
125.	POTATO	24	0.10	0.01	1.2	–	3.0	7.0	17	100
126.	RADISH, pink	3	0.06	0.02	0.4	–	–	–	17	–
128.	RADISH, table	4	0.02	0.03	1.4	–	–	–	21	–
129.	RADISH, white	3	0.06	0.02	0.5	–	–	–	15	63
130.	SWEET POTATO	6	0.08	0.04	0.7	–	–	–	24	–
131.	TAPIOCA	–	0.05	0.10	0.3	–	–	–	25	–
132.	TAPIOCA chips dried	0	0.23	0.10	1.4	–	–	–	0	–
133.	TURNIP	0	0.04	0.04	0.5	–	–	–	43	137
134.	YAM, elephant	260	0.06	0.07	0.7	–	–	–	0	–
135.	YAM, ordinary	78	0.07	–	0.7	–	0.9	17.5	–	–
136.	YAM, wild	565	0.19	0.47	1.2	–	–	–	1	–
	OTHER VEGETABLES									
137.	ASH GOURD	0	0.06	0.01	0.4	–	–	–	1	–
138.	BEANS, scarlet runner	34	0.34	0.19	0	–	–	–	27	–
139.	BITTER GOURD	126	0.07	0.09	0.5	–	–	–	88	–
140.	BITTER GOURD small	126	0.07	0.06	0.4	–	–	–	96	–

Sl. No.	Name of the food stuff	Carotene	Thia-mine	Ribofla-vin	Niacin	Total B_6	Folic Acid (µg)		Vitamin C	Choline
		µg.	mg.	mg.	mg.	mg.	Free	Total	mg.	mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
141.	BOTTLE GOURD	0	0.03	0.01	0.2	–	–	–	0	–
142.	BRINJAL	74	0.04	0.11	0.9	–	5.0	34.0	12	52
143.	BROAD BEANS	9	0.08	–	0.8	–	–	–	12	5
144.	CAULIFLOWER	30	0.04	0.10	1.0	–	–	–	56	127
145.	CHO-CHO-MARROW	0	0	0.04	0.4	–	–	–	4	–
146.	CLUSTER BEANS	198	0.09	0.03	0.6	–	50.0	144.0	49	–
147.	COLOCASIA STEM	104	0.07	0.07	0.1	–	–	–	3	–
148.	COWPEA PODS	564	0.07	0.09	0.9	–	–	–	14	–
149.	CUCUMBER	0	0.03	0	0.2	–	12.6	14.7	7	–
150.	DOUBLE BEANS	–	–	–	–	–	–	–	22	–
151.	DRUMSTICK	110	0.05	0.07	0.2	–	–	–	120	–
153.	FIELD BEANS, tender	187	0.10	0.06	0.7	–	–	–	9	4
155.	FRENCH BEANS	132	0.08	0.06	0.3	–	15.5	45.5	24	–
156.	GHOSALA	120	0.02	0.06	0.4	–	–	–	0	–
157.	GIANT CHILLIES (capsicum)	427	0.55	0.05	0.1	–	–	–	137	–
158	JACK FRUIT, tender	0	0.05	0.04	0.2	–	–	–	14	–
159.	JACK FRUIT, seed	–	–	–	–	–	–	–	–	52
160.	KANKODA	1620	0.05	0.18	0.6	–	–	–	–	–
164.	KOVAI	156	0.07	0.08	0.7	–	18.0	59.0	15	–
165.	KNOL-KHOL	21	0.05	0.09	0.5	–	–	–	85	–
166.	LADIES FINGERS	52	0.07	0.10	0.6	–	25.3	105.1	13	–
168.	LEEKS	18	0.23	–	–	–	–	–	11	–
169.	LOTUS STEM, dry	0	0.82	1.21	1.9	–	–	–	3	–
170.	MANGO, green	90	0.04	0.01	0.2	–	–	–	3	–
171.	ONION STALKS	595	0	0.03	0.3	–	–	–	17	–
172.	PAPAYA, green	0	0.01	0.01	0.1	–	–	–	12	–
173.	PARWAR	153	0.05	0.06	0.5	–	–	–	29	–
174.	PINK BEANS	453	0.06	0.02	0.6	–	–	–	12	–
175.	PLANTAIN flower	27	0.05	0.02	0.4	–	–	–	16	–
176.	PLANTAIN green	30	0.05	0.02	0.3	–	1.6	16.4	24	–
177.	PLANTAIN stem	0	0.02	0.01	0.2	–	–	–	7	–
178	PUMPKIN	50	0.06	0.04	0.5	–	3.0	13.0	2	136
180.	RIDGE GOURD	33	–	0.01	0.2	–	–	–	5	–
181.	SNAKE GOURD	96	0.04	0.06	0.3	–	7.5	15.5	0	–
182.	SUNDAKAI, dry	450	–	–	–	–	–	–	0	–
183.	SWORD BEANS	24	0.08	0.08	0.5	–	–	–	12	–
184.	TINDA, tender	13	0.04	0.08	0.3	–	–	–	18	–
185.	TOMATO, green	192	0.07	0.01	0.4	–	–	–	31	–
186.	VEGETABLE MARROW	–	0.02	0	0.4	–	–	–	18	–
187.	WATER CHESTNUT, fresh	12	0.05	0.07	0.6	–	–	–	9	–
	NUTS AND OILSEEDS									
189.	ALMOND	0	0.24	0.57	4.4	–	–	–	0	–
190.	ARECANUT	3	–	–	–	–	–	–	–	–

Sl. No.	Name of the food stuff	Carotene	Thia-mine	Ribofla-vin	Niacin	Total B_6	Folic Acid (ug)		Vitamin C	Choline
		µg.	mg.	mg.	mg.	mg.	Free	Total	mg.	mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
192.	CASHEWNUT	60	0.63	0.19	1.2	–	–	–	0	–
193.	CHILGOZA	–	0.32	0.30	3.6	–	–	–	0	–
194.	COCONUT dry	0	0.08	0.01	3.0	–	15.3	16.5	7	–
195.	COCONUT fresh	0	0.05	0.10	0.8	–	11.7	12.5	1	–
197.	COCONUT milk	0	0.08	0.04	0.6	–	–	–	3	–
198.	COCONUT water	0	0.01	0	0.1	–	–	–	2	–
199.	COCONUT meal, deoiled	0	0.13	0.57	6.0	–	–	–	5	–
200.	GARDEN CRESS SEEDS	27	0.59	0.61	14.3	–	–	–	0	–
201.	GINGELLY SEEDS	60	1.01	0.34	4.4	–	51.0	134.0	0	–
202.	GROUNDNUT	37	0.90	0.13	19.9	–	16.0	20.0	0	224
203.	GROUNDNUT roasted	0	0.39	0.13	22.1	–	–	–	0	–
205.	LINSEED	30	0.23	0.07	1.0	–	–	–	0	–
206.	MUSTARD SEEDS	162	0.65	0.26	4.0	–	–	–	0	211
207.	NIGER SEEDS	–	0.07	0.97	8.4	–	–	–	0	–
208.	PISTACHIO NUT	144	0.67	0.28	2.3	–	–	–	–	–
209.	PIYAL SEEDS	0	0.69	0.53	1.5	–	–	–	5	–
211.	SUNFLOWER SEEDS	0	0.86	0.20	4.5	–	–	–	1	–
212.	WALNUT	6	0.45	0.40	1.0	–	–	–	0	–
	CONDIMENTS AND SPICES									
215.	ASAFOETIDA	4	0	0.04	0.3	–	–	–	0	–
216.	CARDAMOM	0	0.22	0.17	0.8	–	–	–	0	1550
217.	CHILLIES dry	345	0.93	0.43	9.5	–	–	–	50	–
218.	CHILLIES green	175	0.19	0.39	0.9	–	6.0	29.0	111	–
219.	CLOVES dry	253	0.08	0.13	0	–	–	–	0	–
220.	CLOVES green	72	–	–	–	–	–	–	–	–
221.	CORIANDER	942	0.22	0.35	1.1	–	27.4	32.0	0	1077
222.	CUMIN SEEDS	522	0.55	0.36	2.6	–	–	–	3	1065
223	FENUGREEK SEEDS	96	0.34	0.29	1.1	–	14.5	84.0	0	1161
224.	GARLIC dry	0	0.06	0.23	0.4	–	–	–	13	–
225.	GINGER fresh	40	0.06	0.03	0.6	–	–	–	6	–
227.	MACE	3027	0.25	0.42	1.4	–	–	–	0	–
229.	NUTMEG	0	0.33	0.01	1.4	–	–	–	0	–
231.	OMUM	71	0.21	0.28	2.1	–	–	–	–	–
232.	PEPPER DRY (black)	1080	0.09	0.14	1.4	–	–	–	–	–
233.	PEPPER GREEN	540	0.05	0.04	0.2	–	–	–	1	–
236.	TAMARIND PULP	60	–	0.07	0.7	–	–	–	3	–
237.	TURMERIC	30	0.03	0	2.3	–	10.0	18.0	0	–
	FRUITS									
238.	AMBADA	270	0.02	0.02	0.3	–	–	–	21	–
239.	AMLA	9	0.03	0.01	0.2	–	–	–	600	256
240.	APPLE	0	–	–	0	–	–	–	1	321
241.	APRICOT fresh	2160	0.04	0.13	0.6	–	–	–	6	–
242.	APRICOT dried	58	0.22	–	2.3	–	–	–	2	–

Kiwi

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Sl. No.	Name of the food stuff	Carotene	Thiamine	Riboflavin	Niacin	Total B_6	Folic Acid (ug)		Vitamin C	Choline
		µg.	mg.	mg.	mg.	mg.	Free	Total	mg.	mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
244.	BAEL FRUIT	55	0.13	0.03	1.1	–	–	–	8	–
245.	BANANA, ripe	78	0.05	0.08	0.5	–	–	–	7	–
247.	BILIMBI	18	0.09	0.04	0.6	–	–	–	32	–
248.	BREAD FRUIT	9	0.04	0.07	–	–	–	–	21	–
249.	BULLOCK'S HEART	67	–	0.07	0.6	–	–	–	5	–
250.	CAPE GOOSEBERRY	1428	0.05	0.02	0.3	–	–	–	49	–
251.	CASHEW FRUIT	23	0.02	0.05	0.4	–	–	–	180	–
252.	CHERRIES, red	0	0.08	0.08	0.3	–	–	–	7	–
253.	CURRANTS, black	21	0.03	0.14	0.4	–	–	–	1	–
254.	DATES dried	26	0.01	0.02	0.9	–	–	–	3	–
256.	FIGS (Ficus carcia)	162	0.06	0.05	0.6	–	–	–	5	–
257.	GRAPES blue variety	3	0.04	0.03	0.2	–	–	–	1	–
258.	GRAPES pale green variety	0	–	–	0	–	–	–	1	–
259.	GRAPE FRUIT marsh"s seedless	–	0.12	0.02	0.3	–	–	–	–	–
260.	GRAPE FRUIT triumph	–	0.12	0.02	0.3	–	–	–	31	–
261.	GUAVA, country	0	0.03	0.03	0.4	–	–	–	212	–
262.	GUAVA, hill	0	0.02	0.02	0.3	–	–	–	15	–
264.	JACK FRUIT	175	0.03	0.13	0.4	–	–	–	7	–
265.	JAMB, safed	–	0.01	0.02	0.2	–	–	–	30	–
266.	JAMBU FRUIT	48	0.03	0.01	0.2	–	–	–	18	7
267.	KORUKKAPALLI	0	0.22	0.06	1.6	–	–	–	108	–
268.	LAKUCH	254	0.02	0.15	0.3	–	–	–	135	–
269.	LEMON	0	0.02	0.01	0.1	–	–	–	39	–
270.	LEMON SWEET	0	–	0.04	0	–	–	–	45	–
271.	LICHI	0	0.02	0.06	0.4	–	–	–	31	–
273.	LIME	15	0.02	0.03	0.1	–	–	–	63	–
274.	LIME, sweet malta	0	–	–	0	–	–	–	54	–
275.	LIME, sweet musambi	0	–	–	0	–	–	–	50	–
276.	LOQUAT	559	–	–	0	–	–	–	0	–
277.	MAHUA	307	–	–	–	–	–	–	40	–
278.	MANGO, ripe	2743	0.08	0.09	0.9	–	–	–	16	–
280.	MELON, musk	169	0.11	0.08	0.3	–	–	–	26	–
281.	MELON, water	0	0.02	0.04	0.1	–	–	–	1	–
282.	MULBERRY	57	0.04	0.13	0.5	–	–	–	12	–
283.	ORANGE	1104	–	–	–	–	–	–	30	–
284.	ORANGE juice	15	0.06	0.02	0.4	–	–	–	64	–
286.	PALMYRA FRUIT, tender	0	0.01	0.01	0.2	–	–	–	4	–
287.	PAPAYA, ripe	666	0.04	0.25	0.2	–	–	–	57	–
288.	PASSION FRUIT	54	0.07	0.14	1.6	–	–	–	25	–
289.	PASSION FRUIT juice	1968	0.01	0.02	0	–	–	–	13	–
290.	PEACHES	0	0.02	0.03	0.5	–	–	–	6	–
291.	PEARS	28	0.06	0.03	0.2	–	–	–	0	–
292.	PERSIMMON	2268	0.03	0.01	0	–	–	–	33	–
293.	PHALSA	419	–	–	0.3	–	–	–	22	–

Sl. No.	Name of the food stuff	Carotene	Thia-mine	Ribofla-vin	Niacin	Total B_6	Folic Acid (µg)		Vitamin C	Choline
		µg.	mg.	mg.	mg.	mg.	Free	Total	mg.	mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
294.	PINE APPLE	18	0.20	0.12	0.1	–	–	–	39	8
295.	PLUM	166	0.04	0.1	0.3	–	–	–	5	–
296.	POMEGRANATE	0	0.06	0.10	0.3	–	–	–	16	–
298.	PUMMELO	120	0.03	0.03	0.2	–	–	–	20	–
299.	QUINCE	–	0.02	0.02	0.2	–	–	–	11	–
300.	RAISINS	2.4	0.07	0.19	0.7	–	–	–	1	–
301.	RASPBERRY	1248	–	–	0.8	–	–	–	30	–
302.	ROSE APPLE	141	0.01	0.05	0.4	–	–	–	3	–
303.	SAPOTA	97	0.02	0.03	0.2	–	–	–	6	–
304.	SEETHAPHAL	0	0.07	0.17	1.3	–	–	–	37	–
305.	STRAWBERRY	18	0.03	0.02	0.2	–	–	–	52	–
306.	TOMATO, ripe	351	0.12	0.06	0.4	–	14.0	30.0	27	–
307.	TOMATILO	48	0.05	0.02	2.1	–	–	–	2	–
308.	TREE TOMATO	324	0.11	0.06	2.1	–	–	–	0	–
309.	WOOD APPLE	61	0.04	0.17	0.8	–	–	–	3	–
310	ZIZYPHUS	21	0.02	0.05	0.7	–	–	–	76	–
FISHES AND SEA FOODS										
311.	AIR	–	–	–	0.5	–	–	–	11	–
313.	BACHA	–	–	–	0.6	–	–	–	13	–
314.	BAM	–	–	–	0.9	–	–	–	3	438
317.	BELEY	–	–	–	0.3	–	–	–	3	388
318.	BHANGER, fresh	–	–	–	1.8	–	–	–	12	–
320.	BHANGAN BATA	–	–	–	0.6	–	–	–	–	–
321.	BEKTI fresh	–	–	–	0.7	–	–	–	10	349
323.	BHOLE	–	–	–	0.5	–	–	–	14	–
325.	BOAL	–	–	–	1.0	–	–	–	8	108
328.	CAT FISH	–	–	–	2.5	–	–	–	–	–
333.	CHITAL	–	–	–	–	–	–	–	–	943
334.	CRAB muscle	780	–	–	3.1	–	–	–	–	–
336.	FOLUI	–	–	–	0.8	–	–	–	6	1018
341.	HILSA	–	–	–	2.8	–	–	–	24	1364
342.	HORSE MACKEREL	–	–	–	2.9	–	–	–	–	–
346.	KALABASU	–	–	–	0.6	–	–	–	11	716
347.	KATLA	–	–	–	0.8	–	–	–	–	611
349.	KHOYRA fresh	–	–	–	0.5	–	–	–	–	–
351.	KOI	–	–	–	0.8	–	–	–	32	891
353.	LATA	–	–	–	1.0	–	–	–	0	–
356.	MAGUR	–	–	–	–	–	–	–	–	639
357.	MAHASOLE									
359.	MRIGAL	–	–	–	0.7	–	9.7	16.7	–	480
360.	MULLET	–	–	–	2.6	–	–	–	–	–
365.	PABDA	–	–	–	–	–	–	–	–	1018
366.	PANGAS	–	–	–	0.6	–	–	–	7	913
367.	PARSEY, fresh	–	–	–	0.8	–	–	–	6	–
370.	POMFRETS, white	–	–	0.15	2.6	–	–	–	–	–

Sl. No.	Name of the food stuff	Carotene	Thia-mine	Ribofla-vin	Niacin	Total B_6	Folic Acid (µg)		Vitamin C	Choline
		µg.	mg.	mg.	mg.	mg.	Free	Total	mg.	mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
371.	PRAWN	0	0.01	0.10	4.8	–	–	–	–	542
372.	PUTI	–	–	–	0.3	–	–	–	15	393
375.	RIBBON FISH fresh	–	–	–	2.1	–	–	–	–	–
377.	ROHU	–	0.05	0.07	0.7	–	–	–	22	819
378.	SARDINE	–	–	–	2.6	–	–	–	–	–
379.	SARPUTI	–	–	–	–	–	–	–	14	–
380.	SHARK	–	–	–	2.5	–	–	–	–	–
381.	SHRIMP (small, dried)	–	–	–	–	–	15.7	18.6	–	–
382.	SEER	–	–	–	1.2	–	–	–	–	–
385.	SINGHI	–	–	–	0.8	–	–	–	9	64
386.	SOLE	–	–	–	0.5	–	–	–	9	572
393.	TENGRA fresh	–	–	–	–	–	–	–	18	783
396.	WHITE BAIT	–	–	–	2.3	–	–	–	–	–
	MEAT AND POULTRY*									
397.	BEEF meal	0	0.03	0.44	5.8	–	–	–	0	–
398.	BEEF muscle (lean meat)	18	0.15	0.04	6.4	–	–	–	2	–
399.	BUFFALO MEAT	–	–	–	–	–	4.6	7.8	–	–
401.	EGG, duck	405	0.12	0.26	0.2	–	80.0	80.0	–	–
402.	EGG, hen	420	0.10	0.40	0.1	–	70.3	78.3	0	–
405.	FOWL	–	–	0.14	–	–	3.2	6.8	–	–
406.	GOAT MEAT	–	–	–	–	–	0.5	4.5	–	–
408.	LIVER GOAT	–	–	–	–	–	61.2	176.2	–	–
409.	LIVER SHEEP	6690	0.36	1.70	17.6	–	65.5	188.0	20	–
410.	MUTTON	9	0.18	0.14	6.8	–	1.0	5.8	–	–
412.	PORK	0	0.54	0.09	2.8	–	–	–	2	–
	MILK AND MILK PRODUCTS*									
418.	MILK ass's	–	0.06	0.03	0.1	–	–	–	10	–
419.	MILK buffalo's	48	0.04	0.10	0.1	–	3.3	5.6	1	–
420.	MILK cow"s	53	0.05	0.19	0.1	–	5.6	8.5	2	–
421.	MILK goat"s	55	0.05	0.04	0.3	–	0.7	1.3	1	–
422.	MILK human	41	0.02	0.02	–	–	1.3	–	3	–
423.	CURDS (cow's milk)	31	0.05	0.16	0.1	–	3.3	12.5	1	–
425.	SKIMMED MILK, liquid	–	–	–	0.1	–	–	–	1	–
426.	CHANNA, cow's milk	110	0.07	0.02	–	–	–	–	3	–
428.	CHEESE	82	–	–	–	–	–	–	–	–
431.	KHOA (whole cow's milk)	149	0.23	0.41	0.4	–	–	–	6	–
432.	SKIMMED MILK POWDER (cow's milk)	0	0.45	1.64	1.0	–	–	–	5	–
433.	WHOLE MILK POWDER (cow's milk)	420	0.31	1.36	0.8	–	–	–	4	–

Sl. No.	Name of the food stuff	Carotene	Thia-mine	Ribofla-vin	Niacin	Total B_6	Folic Acid (µg)		Vitamin C	Choline
		µg.	mg.	mg.	mg.	mg.	Free	Total	mg.	mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
FATS AND EDIBLE OILS*										
434.	BUTTER	960	–	–	–	–	–	–	–	–
435.	GHEE (cow)	600	–	–	–	–	–	–	–	–
436.	GHEE (buffalo)	270	–	–	–	–	–	–	–	–
437.	HYDROGENATED OIL (fortified)	750	–	–	–	–	–	–	–	–

* **These values represent µg of vitamin A**

TOTAL AND BETA CAROTENE CONTENTS OF SOME FOODSTUFFS**

S. No.	Name of the Foodstuff	Carotene		S. No.	Name of the Foodstuff	Carotene	
		Total	Beta			Total	Beta
47.	Agathi	45,000	15,440	130.	Sweet Potato (yellow)	2,200	1,810
48.	Amaranthus Gangeticus, Tender	20,160	8,340	157.	Giant Chillies	690	140
58.	Ambat Chuka	9,400	2,800	178.	Pumpkin	2,100	1,160
73.	Colocasia Leaves, Green variety	15,700	5,920	218.	Chillies, green	2,430	1,007
75.	Coriander leaves	15,000	4,800	252.	Cherries, red	470	140
77.	Curry leaves	21,000	7,110	261.	Guava, country	400	0
78.	Drumstick leaves	42,000	19,690	264.	Jack fruit	510	130
79.	Fenugreek leaves	11,800	9,100	266.	Jambu fruit	60	40
84.	Gogu	17,700	6,970	278.	Mango, ripe	2,210	1,990
89.	Lettuce	7,000	1,100	283.	Orange	2,240	190
93.	Mayalu	9,360	2,840	287.	Papaya, ripe	2,740	880
94.	Mint	18,950	5,480	293.	Phalsa	481	0
101.	Ponnaganti	24,000	5,440	306.	Tomato, ripe	3,010	590
103.	Radish leaves	13,000	2,200				
110.	Spinach	9,440	2,740				
118.	Carrot	8,840	6,460				

** All values are µg per 100 g of edible portion, based on HPLC analysis.

TABLE – 3

MINERAL AND TRACE ELEMENTS: COMMON FOODS

All values are mg. per 100 gms. of edible portion

Sl. No.	Name of the food stuff	Mg.	Sod.	Pot.	Cu.	Mn.	Mo.	Zn.	Cr.	S.	Cl.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
CEREAL GRAINS AND PRODUCTS											
1.	BAJRA	137	10.9	307	1.06	1.15	0.069	3.1	0.023	147	39
2.	BARLEY	21	–	-	1.19	1.03	–	1.2	0.016	130	91
3.	ITALIAN MILLET	81	4.6	250	1.40	0.60	0.070	2.4	0.030	171	37
4.	JOWAR	171	7.3	131	0.46	0.78	0.039	1.6	0.008	54	44
5.	MAIZE, dry	139	15.9	286	0.41	0.48	0.038	2.8	0.004	114	33
6.	MAIZE, tender	40	51.7	151	–	–	–	–	–	61	34
7.	PANIVARAGU	153	8.2	113	1.60	0.60	–	1 4	0.020	157	19
8.	RAGI	137	11.0	408	0.47	5.49	0.102	2.3	0.028	160	44
9.	RICE, parboiled, handpounded	157	–	–	0.24	1.10	0.078	1.4	0.009	–	–
10.	RICE, parboiled, milled 5%	91	–	–	0.17	0.80	0.068	1.4	0.006	–	–
	RICE, parboiled, milled 10%	61	–	–	0.17	0.66	0.054	1.3	0.005	–	–
12.	RICE, milled 5%	90	–	–	0.14	0.59	0.058	1.4	0.004	–	–
	RICE, milled 10%	64	–	–	0.07	0.51	0.045	1.3	0.003	–	–
14.	RICE, flakes	101	10.9	154	0.37	–	–	–	–	105	17
16.	SAMAI	133	8.1	129	1.00	0.68	0.016	3.7	0.180	149	13
17.	SANWA MILLET	82	–	–	0.60	0.96	–	3.0	0.090	–	–
18.	VARAGU	147	4.6	144	1.60	1.10	–	0.7	0.020	136	11
19.	WHEAT, bulgar (parboiled)	144	4.5	260	0.56	–	–	–	–	143	22
20.	WHEAT, whole	138	17.1	284	0.68	2.29	0.051	2.7	0.012	128	47
21.	WHEAT, flour (whole)	132	20.0	315	0.51	2.29	0.039	2.2	0.006	122	29
22.	WHEAT, flour (refined)	54	9.3	130	0.21	0.62	0.011	0.6	0.001	115	47
24.	WHEAT, semolina	–	21.0	83	–	–	–	–	–	–	–
25.	WHEAT, vermicelli	42	7.9	138	0.29	–	–	–	–	145	46
PULSES AND LEGUMES											
28.	BENGAL GRAM, whole (desi)	119	37.3	808	1.18	1.21	0.154	6.1	0.008	179	58
	BENGAL GRAM, whole (kabuli)	169	–	–	1.01	0.74	–	2.9	0.032	–	–
29.	BENGAL GRAM, dhal	130	73.2	720	1.34	1.05	0.195	1.7	0.001	160	39
31.	BLACK GRAM, whole	154	–	–	1.05	1.01	0.810	3.3	0.012	–	–
	BLACK GRAM, dhal	130	39.8	800	0.93	0.96	0.425	3.0	0.029	174	9
32.	COW PEA	210	23.2	1131	0.87	1.34	1.890	4.6	0.029	165	10
34.	GREEN GRAM, whole	127	28.0	843	0.39	2.47	0.304	3.0	0.014	188	12
35.	GREEN GRAM, dhal	122	27.2	1150	0.39	1.02	0.446	2.8	0.010	214	25
36.	HORSE GRAM	156	11.5	762	1.81	1.57	0.749	2.8	0.024	181	8
37.	KHESARI, dhal	92	37.7	644	0.77	–	–	–	–	144	36

Sl. No.	Name of the food stuff	Mg.	Sod.	Pot.	Cu.	Mn.	Mo.	Zn.	Cr.	S.	Cl.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
38.	LENTIL, whole	80	40.1	629	1.87	1.04	0.171	2.8	0.024	104	19
	LENTIL, dhal	74	–	–	1.37	0.81	–	3.1	0.020	–	–
39.	MOTH BEANS	225	29.5	1096	0.85	–	–	–	–	180	9
40.	PEAS green	34	7.8	79	0.23	–	–	–	–	95	20
41.	PEAS dry	100	20.4	725	1.29	0.58	0.638	2.3	0.032	189	59
42.	PEAS roasted	122	14.7	750	1.32	–	–	–	–	200	73
43.	RAJMAH	184	–	–	1.45	1.60	–	4.5	0.029	–	–
44.	REDGRAM, whole	86	–	–	1.23	0.96	0.222	3.1	0.010	–	–
	REDGRAM, dhal	90	28.5	1104	1.20	0.69	0.283	0.9	0.001	177	5
45.	REDGRAM (tender)	58	93.0	463	0.40	–	–	–	–	494	22
46.	SOYABEAN (black)	238	–	–	1.38	2.35	–	4.4	0.029	–	–
	SOYABEAN (white)	175	–	–	1.12	2.11	–	3.4	0.028	–	–
LEAFY VEGETABLES											
49.	AMARANTHUS, Gangeticus	122	230.0	341	0.08	0.36	0.130	0.18	0.007	61	88
58.	AMBAT CHUKA	123	–	–	0.04	0.40	–	0.27	0.006	–	–
62.	BETAL LEAVES	447	–	–	2.32	4.47	–	3.44	0.137	–	–
65.	BRUSSELS SPROUTS	26	7.9	477	0.07	–	–	–	–	212	22
66.	CABBAGE	31	–	–	0.02	0.18	0.078	0.30	0.005	–	–
69.	CELERY LEAVES	52	35.5	210	0.30	–	–	–	–	102	19
72.	COLOCASIA LEAVES	32	–	–	0.18	–	–	–	0.011	–	72
75.	CORIANDER LEAVES	31	58.3	256	0.14	0.50	1.120	0.32	0.014	49	43
77.	CURRY LEAVES	44	–	–	0.10	0.15	–	0.20	0.006	81	198
78.	DRUM STICK LEAVES	42	–	259	0.07	0.37	–	0.16	0.010	137	423
79.	FENUGREEK LEAVES	33	76.1	31	0.10	0.23	0.400	0.36	0.006	167	165
84.	GOGU	66	–	–	0.08	0.30	–	0.27	0.005	60	19
89.	LETTUCE	30	58.0	33	0.08	–	–	–	–	27	23
94.	MINT	60	–	–	0.18	0.57	–	0.44	0.008	84	34
100.	PARUPPU KEERAI	120	67.2	716	0.19	–	–	–	–	63	73
101.	PONNANGANNI	46	–	–	0.19	0.46	–	–	–	13	–
103.	RADISH LEAVES	22	–	–	0.02	0.01	–	0.08	0.002	–	–
108.	SAFFLOWER LEAVES	51	126.4	181	0.22	–	–	–	–	–	235
110.	SPINACH	64	58.5	206	0.10	0.56	0.010	0.30	0.005	30	54
113.	TAMARIND LEAVES, tender	26	–	–	0.02	0.12	–	0.26	0.009	63	94
ROOTS AND TUBERS											
115.	ARROW ROOT flour	–	30.0	20	–	–	–	–	–	–	–
117.	BEET ROOT	9	59.8	43	0.29	0.19	–	0.91	0.012	14	24
118.	CARROT	17	35.6	108	0.10	0.16	–	0.36	0.017	27	13
119.	COLOCASIA	28	9.0	550	0.18	0.28	–	0.31	0.005	–	–
122.	ONION, (big)	16	4.0	127	0.18	0.18	0.030	0.41	0.009	–	–
125.	POTATO	30	11.0	247	0.16	0.13	0.070	0.53	0.007	37	16
126.	RADISH, pink	196	63.5	10	0.07	0.15	–	0.68	0.009	–	–
129.	RADISH, white	–	33.0	138	0.40	–	–	–	–	–	–
130.	SWEET POTATO	27	9.0	393	0.02	0.22	–	0.11	0.006	–	–
132.	TAPIOCA, chips dried	66	7.5	764	0.15	–	–	–	–	58	10

Sl. No.	Name of the food stuff	Mg.	Sod.	Pot.	Cu.	Mn.	Mo.	Zn.	Cr.	S.	Cl.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
135.	YAM, ordinary	17	9.0	237	0.12	0.12	–	0.45	0.016	–	–
136.	YAM, wild	34	11.0	450	0.16	–	–	–	–	35	29
OTHER VEGETABLES											
139.	BITTER GOURD (white)	36	17.8	152	0.10	0.08	–	0.46	0.005	15	8
140.	BITTER GOURD (green)	33	2.4	171	0.09	0.08	–	0.39	0.005	21	8
141.	BOTTLE GOURD	26	1.8	87	0.03	0.06	–	0.22	0.046	10	5
142.	BRINJAL	15	3.0	200	0.12	0.13	–	0.22	0.007	44	52
143.	BROAD BEANS	33	43.5	39	0.17	–	–	–	–	53	43
144.	CAULIFLOWER	18	53.0	138	0.13	0.10	–	0.40	0.003	231	34
146.	CLUSTER BEANS	47	–	–	0.08	0.10	–	0.36	0.004	–	–
149.	CUCUMBER	14	10.2	50	0.09	0.14	0.070	0.23	0.002	17	15
151.	DRUM STICK	28	–	259.	0.01	0.05	–	0.16	0.003	137	423
153.	FIELD BEANS, tender	17	55.4	74	0.10	0.12	–	0.40	0.004	40	31
155.	FRENCH BEANS	38	4.3	120	0.06	0.12	0.020	0.42	0.006	37	10
157.	GIANT CHILLIES	12	–	–	0.12	0.06	–	0.13	0.006	–	–
158.	JACK FRUIT, tender	–	35.0	328	–	–	–	–	–	–	–
159.	JACK FRUIT, seeds	54	63.2	246	0.19	–	–	–	–	356	14
164.	KOVAI	36	–	–	0.07	0.22	–	0.26	0.004	–	–
165.	KNOL-KHOL	33	112.0	37	0.05	0.11	–	0.24	0.019	143	67
166.	LADIES FINGERS	53	6.9	103	0.11	0.15	–	0.42	0.005	30	41
169.	LOTUS STEM, dry	168	438.0	3007	1.22	–	–	–	–	258	444
170.	MANGO, green	16	43.0	83	0.03	0.07	–	0.07	0.050	15	2
171.	ONION STALKS	104	2.2	109	0.45	0.74	–	2.29	0.039	33	7
172.	PAPAYA, green	–	23.0	216	–	–	–	–	–	–	–
173.	PARWAR	9	2.6	83	1.11	–	–	–	–	17	4
174.	PINK BEANS	–	32.2	117	0.13	–	–	–	–	182	47
175.	PLANTAIN flower	54	20.1	185	0.10	–	–	–	–	68	68
176.	PLANTAIN green	13	15.0	193	0.03	0.30	–	0.05	0.004	15	6
178	PUMPKIN fruit	38	5.6	139	0.05	0.05	–	0.26	0.005	16	4
180.	RIDGE GOURD	32	2.9	50	0.08	0.07	–	0.38	0.003	14	7
181.	SNAKE GOURD	28	25.4	34	0.27	0.14	–	0.31	0.004	35	21
183.	SWORD BEANS	–	29.0	1800	–	–	–	–	–	–	–
184.	TINDA, tender	14	35.0	24	0.12	–	–	–	–	–	44
185.	TOMATO, green	15	45.8	114	0.19	–	–	–	–	24	38
186.	VEGETABLE MARROW	13.0	27.3	94	0.22	–	–	–	–	11	9
187.	WATER CHESTNUT, fresh	72	–	–	1.31	0.85	–	1.56	0.011	–	–
NUTS AND OIL SEEDS											
189.	ALMOND	373	–	–	0.97	1.88	–	3.57	0.161	–	–
190.	ARECANUT (raw)	66	–	–	0.92	1.46	–	0.81	0.473	–	–
	ARECANUT (processed)	83	–	–	2.54	2.83	–	1.30	0.386	–	–
192.	CASHEW NUT	349	–	–	1.66	1.42	–	5.99	0.163	–	–

Sl. No.	Name of the food stuff	Mg.	Sod.	Pot.	Cu.	Mn.	Mo.	Zn.	Cr.	S.	Cl.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
194.	COCONUT, dry	–	–	–	1.00	6.24	0.021	5.00	–	–	–
199.	COCONUT meal, deoiled	355	72.5	2003	–	–	–	–	–	431	374
200.	GARDEN CRESS SEEDS	430	–	–	–	–	–	–	–	1	41
201.	GINGELLY SEEDS	–	–	–	2.29	1.32	0.204	12.20	0.087	–	–
202.	GROUNDNUT	–	–	–	0.90	1.10	0.166	3.90	0.048	–	–
206.	MUSTARD SEEDS	–	–	–	0.83	2.56	0.089	4.80	0.063	–	–
209.	PIYAL SEEDS	373	10.2	436	0.86	–	–	–	–	186	25
210.	SAFFLOWER SEEDS	–	–	–	1.58	1.10	0.054	5.20	0.045	–	–
212.	WALNUT	302	–	–	1.67	2.62	–	2.32	0.101	–	–
CONDIMENTS AND SPICES											
215.	ASAFOETIDA	80	–	–	0.43	1.12	–	0.83	0.079	–	–
216.	CARDAMOM	173	–	–	0.47	8.92	–	2.81	0.031	–	–
217.	CHILLIES dry	–	14.0	530	–	–	–	–	–	–	–
218.	CHILLIES green	272	–	–	1.40	1.38	0.070	1.78	0.040	–	–
219.	CLOVES dry	130	–	–	1.01	4.75	–	1.47	0.056	–	–
221.	CORIANDER SEEDS	239	32.0	990	1.01	1.67	–	3.26	0.050	–	–
222.	CUMIN SEEDS	475	126.0	980	0.71	1.02	–	2.66	–	–	–
223	FENUGREEK SEEDS	124	19.0	530	0.71	1.03	–	3.08	0.064	–	–
224.	GARLIC dry	71	–	–	0.63	0.86	–	1.93	0.020	–	–
225.	GINGER fresh	405	–	–	0.74	5.56	–	1.93	0.057	–	–
	GINGER, dry (sonti)	187	–	–	0.33	12.91	–	0.82	0.144	–	–
227.	MACE	213	–	–	1.56	1.54	–	1.26	0.039	–	–
229.	NUT MEG, fruit	229	–	–	0.71	1.78	–	1.22	0.234	–	–
231.	OMUM	141	–	–	0.96	3.40	–	4.52	0.057	–	–
232.	PEPPER, dry (black)	171	–	–	1.42	4.14	–	1.31	0.074	–	–
235.	POPPY SEEDS (khas khas)	257	–	–	0.63	4.31	–	4.34	0.108	–	–
236.	TAMARIND PULP	41	–	–	0.20	0.55	–	–	0.056	–	–
237.	TURMERIC	278	–	–	0.39	8.38	–	2.72	0.069	–	–
FRUITS											
239.	AMLA	–	5.0	225	–	–	–	–	–	–	–
240.	APPLE	7	28.0	75	0.10	0.14	–	0.06	0.008	7	1
241.	APRICOT fresh	–	–	430	0.11	–	–	–	–	–	–
244.	BAEL FRUIT	–	–	600	0.21	–	–	–	–	–	–
245.	BANANA, ripe	41	36.6	88	0.16	0.20	–	0.15	0.004	7	8
247.	BILIMBI	–	–	130	0.05	–	–	–	–	–	–
250.	CAPE GOOSEBERRY	31	0.9	320	0.19	–	–	–	–	43	12
252.	CHERRIES, red	27	–	320	0.08	0.08	–	0.33	0.005	–	–
255.	DATES fresh	12	–	–	0.05	0.03	–	0.03	0.004	–	–
258.	GRAPES pale green variety	82	–	–	0.20	0.11	–	0.10	0.007	–	–
261.	GUAVA, country	24	5.5	91	0.14	0.14	–	0.16	0.009	14	4
264.	JACK FRUIT, ripe	24	–	–	0.12	0.06	–	0.07	0.013	69	9
266.	JAMBU FRUIT	39	26.2	55	0.07	0.15	–	0.16	0.005	13	8

Sl. No.	Name of the food stuff	Mg.	Sod.	Pot.	Cu.	Mn.	Mo.	Zn.	Cr.	S.	Cl.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
267.	KORUKKEPALLI	40	37	377	0.60	–	–	–	–	109	51
269.	LEMON	19	–	270	0.06	0.07	–	0.07	0.007	–	–
270.	LEMON SWEET	–	–	210	0.11	–	–	–	–	–	–
271.	LICHI	10	124.9	159	0.30	–	–	–	–	19	3
274.	LIME, sweet malta	–	–	170	0.51	–	–	–	–	–	–
275.	LIME, sweet musambi	–	–	490	0.17	–	–	–	–	–	–
276.	LOQUAT	–	–	390	0.13	–	–	–	–	–	–
278.	MANGO, ripe	270	26.0	205	0.11	0.13	–	0.27	0.006	17	3
280.	MELON, musk	31	104.6	341	0.03	–	–	–	–	32	80
281.	MELON, water	13	27.3	160	0.05	–	–	–	–	42	21
283.	ORANGE	9	4.5	9.3	0.58	–	–	–	–	7	5
287.	PAPAYA, ripe	11	6.0	69	0.20	–	–	–	–	13	11
290.	PEACHES	21	2.0	453	0.06	–	–	–	–	26	0
291.	PEARS	7	6.1	96	0.40	–	–	–	–	14	1
293.	PHALSA	72	4 4	351	0.12	–	–	–	–	13	86
294.	PINE APPLE	33	34.7	37	0.13	0.56	–	0.11	0.011	20	13
295.	PLUM	147	0.8	247	0.13	–	–	–	–	33	0
296.	POMEGRANATE	44	0.9	133	0.34	0.77	–	0.82	0.022	12	2
302.	ROSE APPLE	2 4	34.1	50	0.01	–	–	–	–	13	4
303.	SAPOTA	25	5.9	269	0.08	0.68	–	0.16	0.008	17	26
304.	SEETHAPHAL	84	–	–	0.43	0.64	–	0.80	0.026	–	–
306.	TOMATO, ripe	–	12.9	146	0.19	0.26	–	0.41	0.015	11	6
307.	TOMATILLO	23	0.4	243	0.09	–	–	–	–	27	14
308.	TREE TOMATO	34	1.7	539	0.17	–	–	–	–	37	10
309.	WOOD APPLE	41	–	–	0.21	0.18	–	0.46	0.006	–	–
310	ZIZYPHUS	13	–	–	0.12	0.17	–	0.10	0.007	–	–
FISHES AND OTHER SEA FOODS											
311.	AIR	–	–	–	0.06	–	–	–	–	–	–
313.	BACHA	–	–	–	0.11	–	–	–	–	–	–
314.	BAM	–	–	–	0.06	–	–	–	–	–	–
316.	BATA, small varieties	–	–	–	0.17	–	–	–	–	–	–
321.	BHEKTI	–	66.0	173	0.11	–	–	–	–	–	–
323.	BHOLA	–	–	–	0.05	–	–	–	–	–	–
325.	BOAL	–	–	–	0.08	–	–	–	–	–	–
330.	CHELA, dried	–	–	–	0.51	–	–	–	–	–	–
332.	CHINGRI, goda dried	–	–	–	1.40	–	–	–	–	–	–
333.	CHITAL	–	34.0	119	0.17	–	–	–	–	–	–
341.	HILSA	–	52.0	183	0.14	–	–	–	–	–	–
347.	KATLA	–	50.0	151	0.12	–	–	–	–	–	–
348.	KHORSULA	–	–	–	0.13	–	–	–	–	–	–
351.	KOI	–	64.0	195	0.16	–	–	–	–	–	30
356.	MAGUR	–	58.0	147	–	–	–	–	–	–	–
357.	MAHASOLE	–	–	–	0.12	–	–	–	–	–	–
359.	MRIGAL	–	–	–	0.12	–	–	–	–	–	–
365.	PABDA	–	–	–	0.09	–	–	–	–	–	–
366.	PANGAS	–	–	–	0.05	–	–	–	–	–	–
367.	PARSEY, fresh	–	–	–	0.14	–	–	–	–	–	–

Sl. No.	Name of the food stuff	Mg.	Sod.	Pot.	Cu.	Mn.	Mo.	Zn.	Cr.	S.	Cl.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
371.	PRAWN	–	66.0	262	–	–	–	–	–	–	–
377.	ROHU	13	101.0	288	0.13	–	–	–	–	103	3
379.	SARPUTI	–	–	–	0.08	–	–	–	–	–	–
385.	SINGHI	–	53.0	223	0.15	–	–	–	–	–	–
386.	SOLE	–	–	–	0.11	–	–	–	–	–	–
390.	TAPRA, dried	–	–	–	0.71	–	–	–	–	–	–
391.	TAPSI, dried	–	–	–	1.20	–	–	–	–	–	–
394.	TENGRA, dried	–	–	–	0.58	–	–	–	–	–	–
MEAT AND POULTRY											
398.	BEEF MUSCLE	–	52.0	214	–	–	–	–	–	–	–
408.	LIVER GOAT	–	73.0	160	–	–	–	–	–	–	–
410.	MUTTON, muscle	–	33.0	270	–	–	–	–	–	–	–
MILK AND OTHER PRODUCTS											
419.	MILK buffalo's	–	19.0	90	–	–	–	–	–	–	–
420.	MILK, cow's	–	73.0	140	–	–	–	–	–	–	–
421.	MILK, goat's	–	11.0	110	–	–	–	–	–	–	–
423.	CURD (cow's milk)	–	32.0	130	–	–	–	–	–	–	–
BEVERAGES (ALCOHOLIC)											
447.	PACHWAI (assam)	51	–	110	–	–	–	–	–	25	–

TABLE – 4

ESSENTIAL AMINO ACIDS: COMMON FOODS

Sl. No.	Name of the food stuff	Approximate total N g/ 100 gms	Argi-nine	Histi-dine	Lysine	Trypto-phan	Phenyl-alanine	Tyro-sine	Methi-onine	Cys-tine	Threo-nine	Leu-cine	Isoleu-cine	Valine
			mg. per gm N											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CEREAL GRAINS AND PRODUCTS														
1.	BAJRA	1.86	300	140	190	110	290	200	150	110	240	750	260	330
2.	BARLEY	1.84	300	180	230	100	310	180	100	100	200	420	240	310
3.	ITALIAN MILLET	1.97	220	130	140	060	420	–	180	100	190	1040	480	430
4.	JOWAR	1.66	240	160	150	070	300	180	100	090	210	880	270	340
5.	MAIZE, dry	1.78	290	160	200	040	290	240	120	100	280	720	240	300
7.	PANIVARAGU	2.00	290	110	190	050	310	–	160	–	150	760	410	410
8.	RAGI	1.17	300	130	220	100	310	220	210	140	240	690	400	480
10.	RICE, parboiled, milled	1.02	640	190	220	070	350	300	220	100	290	560	310	460
12.	RICE, raw, milled	1.09	480	130	230	080	280	290	150	090	230	500	300	380
16.	SAMAi	1.23	250	120	110	060	330	–	180	090	190	760	370	350
18.	VARAGU	1.33	270	120	150	050	430	–	180	110	200	650	360	410
20.	WHEAT, whole	1.89	290	130	170	070	280	180	090	140	180	410	220	280
22.	WHEAT, flour (refined)	1.76	190	120	110	060	290	130	090	140	150	400	220	240
23.	WHEAT, germ	4.67	460	160	380	070	230	190	110	100	260	410	240	300
PULSES AND LEGUMES														
28.	BENGAL GRAM (whole)	2.74	570	160	440	050	360	180	080	080	220	580	320	310
31.	BLACK GRAM dhal	3.84	520	170	400	070	310	140	090	080	220	500	340	310
32.	COW PEA	3.86	420	200	430	070	320	230	090	080	230	480	270	310
33.	FIELD BEAN	3.98	530	180	500	030	330	–	040	080	250	550	360	310
34.	GREEN GRAM whole	3.84	500	170	460	060	350	100	080	060	200	510	350	320
36.	HORSE GRAM	3.52	530	190	520	070	380	–	070	130	230	540	370	390
37.	KHESARI DHAL	4.51	490	160	470	050	260	–	030	070	140	410	410	250
38.	LENTIL	4.02	540	160	440	060	270	200	050	070	220	470	270	310
39.	MOTH BEANS	3.78	–	210	340	040	280	–	060	030	–	420	310	200
40.	PEAS	1.15	570	130	400	060	250	220	060	080	240	380	290	290
41.	PEAS (dry)	3.15	570	130	440	060	280	170	050	070	240	430	280	300
43.	RAJMAH	3.66	370	180	460	060	340	100	060	040	270	470	300	330
44.	REDGRAM DHAL	3.57	360	250	480	040	460	130	060	060	200	450	250	260
46.	SOYA BEAN	6.91	450	150	400	080	300	210	080	100	240	480	320	320
LEAFY VEGETABLES														
47.	AGATHI	1.34	360	120	250	100	380	–	090	090	300	560	390	430
49.	AMARANTH, gangeticus tender	0.64	240	130	250	070	180	190	070	040	140	370	290	280

TABLE - 4

ESSENTIAL AMINO ACIDS: COMMON FOODS

Sl. No.	Name of the food stuff	Approximate total N g/ 100 gms	Argi-nine	Histi-dine	Lysine	Trypto-phan	Phenyl-alanine	Tyro-sine	Methi-onine	Cys-tine	Threo-nine	Leu-cine	Isoleu-cine	Valine
			mg. per gm N											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CEREAL GRAINS AND PRODUCTS														
1.	BAJRA	1.86	300	140	190	110	290	200	150	110	240	750	260	330
2.	BARLEY	1.84	300	180	230	100	310	180	100	100	200	420	240	310
3.	ITALIAN MILLET	1.97	220	130	140	060	420	–	180	100	190	1040	480	430
4.	JOWAR	1.66	240	160	150	070	300	180	100	090	210	880	270	340
5.	MAIZE, dry	1.78	290	160	200	040	290	240	120	100	280	720	240	300
7.	PANIVARAGU	2.00	290	110	190	050	310	–	160	–	150	760	410	410
8.	RAGI	1.17	300	130	220	100	310	220	210	140	240	690	400	480
10.	RICE, parboiled, milled	1.02	640	190	220	070	350	300	220	100	290	560	310	460
12.	RICE, raw, milled	1.09	480	130	230	080	280	290	150	090	230	500	300	380
16.	SAMAI	1.23	250	120	110	060	330	–	180	090	190	760	370	350
18.	VARAGU	1.33	270	120	150	050	430	–	180	110	200	650	360	410
20.	WHEAT, whole	1.89	290	130	170	070	280	180	090	140	180	410	220	280
22.	WHEAT, flour (refined)	1.76	190	120	110	060	290	130	090	140	150	400	220	240
23.	WHEAT, germ	4.67	460	160	380	070	230	190	110	100	260	410	240	300
PULSES AND LEGUMES														
28.	BENGAL GRAM (whole)	2.74	570	160	440	050	360	180	080	080	220	580	320	310
31.	BLACK GRAM dhal	3.84	520	170	400	070	310	140	090	080	220	500	340	310
32.	COW PEA	3.86	420	200	430	070	320	230	090	080	230	480	270	310
33.	FIELD BEAN	3.98	530	180	500	030	330	–	040	080	250	550	360	310
34.	GREEN GRAM whole	3.84	500	170	460	060	350	100	080	060	200	510	350	320
36.	HORSE GRAM	3.52	530	190	520	070	380	–	070	130	230	540	370	390
37.	KHESARI DHAL	4.51	490	160	470	050	260	–	030	070	140	410	410	250
38.	LENTIL	4.02	540	160	440	060	270	200	050	070	220	470	270	310
39.	MOTH BEANS	3.78	–	210	340	040	280	–	060	030	–	420	310	200
40.	PEAS	1.15	570	130	400	060	250	220	060	080	240	380	290	290
41.	PEAS (dry)	3.15	570	130	440	060	280	170	050	070	240	430	280	300
43.	RAJMAH	3.66	370	180	460	060	340	100	060	040	270	470	300	330
44.	REDGRAM DHAL	3.57	360	250	480	040	460	130	060	060	200	450	250	260
46.	SOYA BEAN	6.91	450	150	400	080	300	210	080	100	240	480	320	320
LEAFY VEGETABLES														
47.	AGATHI	1.34	360	120	250	100	380	–	090	090	300	560	390	430
49.	AMARANTH, gangeticus tender	0.64	240	130	250	070	180	190	070	040	140	370	290	280

Sl. No.	Name of the food stuff	Approximate total N g/ 100 gms	Argi-nine	Histi-dine	Lysine	Trypto-phan	Phenyl-alanine	Tyro-sine	Methi-onine	Cys-tine	Threo-nine	Leu-cine	Isoleu-cine	Valine
			mg. per gm N											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
59.	BATHUA LEAVES	0.59	–	–	750	020	110	–	050	–	170	410	440	290
60.	BEET GREENS	0.54	180	090	210	060	190	150	050	060	200	300	180	210
63.	BOTTLE GOURD LEAVES	0.37	280	140	300	–	310	–	090	070	220	410	260	040
65.	BRUSSELS SPROUTS	0.75	390	140	340	080	230	–	060	040	270	340	310	300
66.	CABBAGE	0.29	450	130	240	070	200	120	060	070	220	340	230	260
67.	CARROT LEAVES	0.82	270	120	280	090	410	–	110	–	280	440	280	340
69.	CELERY LEAVES	0.13	250	090	150	080	280	–	140	–	210	430	240	300
72.	COLOCASIA LEAVES	1.09	250	130	260	040	180	–	060	–	150	360	310	280
78.	DRUMSTICK LEAVES	1.07	380	140	320	100	290	–	110	130	250	460	280	350
79.	FENUGREEK LEAVES	0.70	350	110	300	080	300	–	090	–	200	390	330	320
84.	GOGO	0.27	310	090	400	040	200	–	070	–	210	440	320	240
87.	KNOL-KHOL GREENS	0.56	–	–	540	370	160	–	050	–	130	500	330	310
89.	LETTUCE	0.34	300	110	310	050	280	170	070	–	270	390	320	320
102.	PUMPKIN LEAVES	0.74	430	100	340	080	340	310	110	060	310	630	310	360
108.	SAFFLOWER LEAVES	0.40	–	–	610	030	160	–	060	–	170	700	540	410
109.	SHEPU	0.48	–	–	450	030	090	–	020	–	120	290	350	280
110.	SPINACH	0.32	350	140	400	100	330	310	110	080	290	530	300	350
113.	TAMARIND LEAVES, tender	0.92	370	140	300	–	390	220	080	060	290	580	330	360
114.	TURNIP GREENS	0.64	300	120	320	080	260	220	080	070	240	410	240	280
ROOTS AND TUBERS														
117.	BEET ROOT	0.27	320	100	410	060	210	170	070	120	250	330	200	230
118.	CARROT	0.14	250	090	230	040	210	140	070	060	210	310	230	310
119.	COLOCASIA	0.48	470	110	300	110	320	230	080	160	280	510	270	380
122.	ONION	0.19	170	070	290	090	180	–	070	–	090	170	090	140
125.	POTATO	0.26	330	100	320	100	270	170	090	050	220	380	270	310
129.	RADISH	0.11	700	160	270	020	270	–	050	–	230	420	300	390
130.	SWEET POTATO	0.19	280	090	260	110	270	150	100	030	280	360	290	380
131.	TAPIOCA	0.12	580	110	290	080	180	100	050	090	200	300	250	240
133.	TURNIP	0.08	250	070	230	080	180	–	050	010	210	340	220	230
135.	YAM (ordinary)	0.22	480	120	280	070	300	200	100	–	220	400	230	290

Sl. No.	Name of the food stuff	Approximate total N g/ 100 gms	Argi-nine	Histi-dine	Lysine	Trypto-phan	Phenyl-alanine	Tyro-sine	Methi-onine	Cys-tine	Threo-nine	Leu-cine	Isoleu-cine	Valine
			mg. per gm N											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
OTHER VEGETABLES														
137.	ASH GOURD	0.06	190	040	070	030	160	–	060	–	190	380	350	310
139.	BITTER GOURD	0.26	270	080	210	040	240	–	150	–	250	420	370	370
141.	BOTTLE GOURD	0.03	100	040	350	030	140	–	030	–	170	350	320	230
142.	BRINJAL	0.22	210	130	330	060	250	240	070	030	230	380	270	320
144.	CAULIFLOWER	0.42	290	120	360	090	230	–	100	–	260	440	300	350
149.	CUCUMBER	0.06	470	090	270	050	140	–	060	–	160	260	190	210
155.	FRENCH BEANS	0.27	280	150	360	090	260	210	080	060	250	430	280	340
158.	JACK FRUIT, tender	0.42	120	060	300	080	480	–	090	090	360	500	450	550
159.	JACK FRUIT seed	1.06	–	–	360	070	260	–	050	060	270	330	300	410
166.	LADIES FINGERS	0.30	230	110	210	040	140	270	080	060	140	240	150	190
176.	PLANTAIN green	0.22	260	280	350	040	280	–	040	–	170	340	320	280
178.	PUMPKIN	0.2	230	100	270	070	210	–	050	–	170	330	230	300
185.	TOMATO green	0.30	190	050	160	020	150	–	050	–	190	210	420	270
NUTS AND OILSEEDS														
189.	ALMOND	3.33	660	140	160	050	300	180	100	050	170	450	250	310
192.	CASHEW NUT	3.39	650	130	290	110	270	–	090	–	200	510	320	360
194.	COCONUT, dry	1.09	850	130	240	070	280	170	100	080	180	430	240	320
201.	GINGELLY SEEDS	2.93	750	170	170	080	370	230	180	120	230	500	250	290
202.	GROUND NUT	4.05	690	140	230	060	310	240	060	080	170	400	240	280
205.	LINSEED	3.25	560	120	230	100	270	180	100	120	210	360	310	320
207.	NIGER SEED	3.82	660	140	230	–	300	–	090	100	210	380	250	320
208.	PISTACHIO NUT	3.17	590	140	320	060	320	190	080	110	200	550	300	370
209.	PIYAL SEEDS	3.04	1230	170	240	070	330	–	100	–	200	740	350	410
211.	SUNFLOWER SEEDS	3.17	500	150	230	090	280	120	120	090	230	400	270	320
212.	WALNUT	2.50	770	120	100	060	260	–	080	–	170	470	240	280
213.	WATER MELON SEEDS	5.46	900	130	170	090	270	–	160	–	140	400	310	260
FRUITS														
240.	APPLE	0.03	170	120	370	060	160	090	050	080	230	390	220	250
241.	APRICOT	0.16	080	100	180	–	100	080	030	–	130	180	110	150
243.	AVOCADO PEAR	0.27	210	110	310	060	220	140	090	–	180	340	210	290
245.	BANANA	0.19	360	370	270	070	260	160	080	170	190	320	250	260
254.	DATES	0.40	150	050	190	–	170	050	050	120	180	260	150	220
256.	FIGS	0.21	140	090	250	050	150	270	050	100	200	270	190	240
258.	GRAPES	0.08	460	230	140	030	130	110	210	100	170	130	050	170
261.	GUAVA COUNTRY	0.14	–	–	190	060	–	–	060	–	–	–	–	–
278.	MANGO RIPE	0.10	–	–	830	130	–	–	070	–	–	–	–	–

Sl. No.	Name of the food stuff	Approximate total N g/ 100 gms	Argi-nine	Histi-dine	Lysine	Trypto-phan	Phenyl-alanine	Tyro-sine	Methi-onine	Cys-tine	Threo-nine	Leu-cine	Isoleu-cine	Valine
			mg. per gm N											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
287.	PAPAYA	0.10	–	–	400	130	–	–	030	–	–	–	–	–
290.	PEACHES	0.19	130	130	230	030	140	160	240	070	210	220	100	310
292.	PERSIMMON	0.11	360	130	320	110	290	150	060	150	380	400	280	290
305.	STRAW BERRY	0.11	270	120	250	070	180	210	010	050	190	320	140	180
OTHER FLESH FOODS														
398.	BEEF	3.60	410	200	540	070	260	220	160	080	280	510	320	330
402.	EGG, hen	2.13	400	150	440	090	360	250	210	140	320	520	410	450
405.	FOWL	4.14	350	160	500	060	250	210	160	080	250	460	330	320
410.	MUTTON	2.96	430	170	510	080	250	210	150	080	290	480	310	320
412.	PORK	2.99	410	190	570	090	280	230	180	080	310	520	340	360
MILK AND MILK PRODUCTS														
419.	MILK, buffalo's	0.69	200	130	490	090	270	–	170	090	300	640	330	380
420.	MILK, cow's	0.51	220	170	500	090	320	300	160	050	280	600	340	400
421.	MILK, goat's	0.53	210	180	470	080	240	200	110	–	350	560	250	340
422.	MILK, human	0.18	250	170	420	110	230	230	100	110	290	520	330	310
423.	CURD	0.50	200	160	480	080	330	370	170	060	310	680	320	470
428.	CHEESE	3.86	240	200	520	080	350	340	180	040	260	640	360	480
433.	WHOLE MILK POWDER	4.13	220	180	490	090	310	300	170	050	280	630	360	420
591.	YEAST, dried (Brewers)	6.32	310	160	570	–	300	260	100	060	350	500	370	460

TABLE – 5

FATTY ACID COMPOSITION OF SOME IMPORTANT EDIBLE OILS AND FATS

(Values are percentage of total methylester of fatty acid)

Sl. No	Oil / Fats	Palmitic 16:0	Stearic 18:0	Arachidic 20:0	Behenic 22:0	Lignoceric 24:0	Total Saturates	Palmitoleic 16:1	Oleic 18:1	Total Monounsaturates	Linoleic 18:2	α-Linolenic 18:3	Total Polyunsaturates
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1.	COCONUT OIL	7.8	2.3	–	–	–	89.5*	–	7.8	7.8	2.0	–	2.0
2.	CORN OIL	10.7	1.7	–	–	–	12.7	–	29.6	29.6	57.4	–	57.4
3.	COTTON SEED OIL	23.4	1.1	1.3	–	0.1	25.9	–	22.9	22.9	50.9	–	50.9
4.	GROUNDNUT OIL	12.6	1.7	4.2	2.1	0.3	20.9	1.4	47.9	49.3	29.9	–	29.9
5.	MUSTARD or RAPESEED OIL	2.9	0.9	6.9	–	–	10.7	0.6	8.9	56.0**	18.1	14.5	32.6
6.	OLIVE OIL	12.5	2.3	–	–	–	14.8	–	74.5	74.5	10.0	–	10.0
7.	PALM OIL	42.0	4.3	–	–	–	46.3	–	43.7	43.7	10.0	–	10.0
8.	PALMOLEIN	42.3	3.5	–	–	–	47.7	0.4	41.0	41.4	10.3	0.3	10.6
9.	RICE BRAN OIL	19.5	2.6	–	–	–	22.1	–	41.0	41.0	34.3	1.4	35.7
10.	SAFFLOWER OIL	7.8	2.1	0.8	–	–	10.7	–	16.7	16.7	73.5	–	73.5
11.	GINGELLY OIL	9.7	4.0	–	–	–	13.7	0.1	41.2	41.3	44.5	–	44.5
12.	SOYABEAN OIL	9.8	2.4	0.9	–	–	13.1	–	28.9	28.9	50.7	6.5	57.2
13.	SUNFLOWER OIL	5.6	2.2	0.9	–	0.4	9.1	–	25.1	25.1	66.2	–	66.2
14.	BUTTER	29.4	13.5	–	–	–	69.4*	–	28.0	28.0	2.5	–	2.5
15.	LARD	26.2	20.0	–	–	–	46.2*	–	45.2	45.2	11.0	–	11.0
16.	TALLOW	27.9	21.3	–	–	–	54.9*	–	40.9	40.9	4.2	–	4.2

* Includes lower chain fatty acid

** Includes 46.5% of Erucic acid (22:1)

TABLE – 6

VITAMIN B_{12} CONTENT OF FOODS

(µg. Per 100 grams edible portion)

Sl. No.	Name of the food stuff	Vitamin B_{12}	Sl. No.	Name of the food stuff	Vitamin B_{12}
(1)	(2)	(3)	(1)	(2)	(3)
FISHES					
359.	MRIGAL	1.4	555.	LIVER, sheep	91.9
381.	SHRIMP, fresh	9.0	556.	MUTTON	2.6
OTHER FLESH FOODS			**MILK AND MILK PRODUCTS**		
399.	BUFFALO meat	1.7	567.	MILK buffalo	0.14
402.	EGG, hen, whole	1.8	568.	MILK, cow	0.14
	EGG, white (hen)	0.2	569.	MILK, goat	0.05
	EGG, yolk (hen)	4.4	570.	MILK, human	0.02
406.	GOAT, meat	2.8	572.	CURD, buffalo milk	0.10
				CURD, cow milk	0.13
408.	LIVER, goat	90.4	582.	SKIM MILK POWDER	0.83

TABLE – 7

DIETARY FIBRE : COMMON FOODS

All the values are per 100 g of edible portion

Sl. No.	Name of the food stuff	TDF g.	IDF g.	SDF g.
(1)	(2)	(3)	(4)	(5)
CEREALS, GRAINS AND PRODUCTS				
1.	BAJRA	11.3	9.1	2.2
4.	JOWAR	9.7	8.0	1.7
5.	MAIZE, dry	11.9	11.0	0.9
8.	RAGI	11.5	9.9	1.6
12.	RICE	4.1	3.2	0.9
20.	WHEAT	12.5	9.6	2.9
PULSES AND LEGUMES				
28.	BENGAL GRAM, whole	28.3	25.2	3.1
29.	BENGAL GRAM, dhal	15.3	12.7	2.6
31.	BLACK GRAM, dhal	11.7	7.6	4.1
	BLACK GRAM, whole	20.3	15.4	4.9
34.	GREEN GRAM, whole	16.7	14.7	2.0
35.	GREEN GRAM, dhal	8.2	6.5	1.7
38.	LENTIL, whole	15.8	13.5	2.3
	LENTIL, dhal	10.3	8.3	2.0
44.	RED GRAM, dhal	9.1	6.8	2.3
45.	RED GRAM, whole	22.6	19.8	2.8
LEAFY VEGETABLES				
47.	AGATHI	8.4	6.3	2.1
49.	AMARANTH	4.0	3.1	0.9
58.	AMBAT CHUKKA	3.2	2.4	0.8
66.	CABBAGE	2.8	2.0	0.8
73.	COLOCASIA, green	6.6	5.1	1.5
75.	CORIANDER	4.3	3.0	1.3
77.	CURRY LEAVES	16.3	13.4	2.9
78.	DRUMSTICK	9.0	6.8	2.2
79.	FENUGREEK	4.7	3.2	1.5
84.	GOGU	3.8	2.6	1.2
93.	MAYALU	2.5	1.6	0.9
94.	MINT	6.3	5.0	1.3
100.	PARUPPU KEERAI	3.9	2.9	1.0
101.	PONNAGANNI	7.9	6.9	1.0
110.	SPINACH	2.5	1.8	0.7
113.	TAMARIND LEAVES, tender	10.6	9.4	1.2
ROOTS AND TUBERS				
117.	BEETROOT	3.5	2.6	0.9
118.	CARROT	4.4	3.0	1.4
125.	POTATO	1.7	1.1	0.6
128.	RADISH	2.3	1.8	0.5

Sl. No.	Name of the food stuff	TDF g.	IDF g.	SDF g.
(1)	(2)	(3)	(4)	(5)
130.	SWEET POTATO	3.9	2.6	1.3
135.	YAM	4.2	3.2	1.0
147.	COLOCASIA	3.0	2.3	0.7
OTHER VEGETABLES				
7.	BANANAPITH	2.2	2.0	0.2
139.	BITTER GOURD	4.3	3.2	1.1
141.	BOTTLEGOURD	2.0	1.7	0.3
142.	BRINJAL	6.3	4.6	1.7
143.	BROAD BEAN	8.9	6.7	2.1
144.	CAULIFLOWER	3.7	2.6	1.1
145.	CHOCHOMARROW	1.3	0.9	0.4
146.	CLUSTER BEAN	5.7	4.2	1.5
149.	CUCUMBER	2.6	2.0	0.6
149.(a)	KEERA, green	1.1	0.8	0.3
151.	DRUMSTICK	5.8	4.8	1.0
157.	GIANT CHILLIES	2.2	2.0	0.2
164.	KOVAI	2.5	1.5	1.0
166.	LADIES FINGER	3.6	2.6	1.0
170.	MANGO, raw	3.0	1.4	1.6
171.	ONION STALKS	5.1	3.7	1.4
40.	PEAS, green	8.6	7.2	1.4
176.	PLANTAIN, green	3.5	2.6	0.9
180.	RIDGE GOURD	1.9	1.4	0.5
181.	SNAKE GOURD	2.1	1.6	0.5
306.	TOMATO	1.7	1.2	0.5
NUTS AND OILSEEDS				
46.	SOYA BEAN	23.0	17.9	5.1
195.	COCONUT fresh	13.6	12.7	0.9
201.	GINGELLY SEEDS	16.8	13.6	3.2
202.	GROUNDNUT	11.0	8.5	2.5
206.	MUSTARD	13.6	10.2	3.4
CONDIMENTS AND SPICES				
214.	ANISEED	43.4	34.3	9.1
214. (b)	CARAWAY SEEDS	38.8	33.1	5.7
214. (c)	CINNAMOM	48.5	44.6	3.9
122.	ONION	2.5	1.7	0.8
216.	CARDAMOM	23.0	20.4	2.6
219.	CLOVES	35.1	28.9	6.2
221.	CORIANDER	47.4	42.5	4.9
222.	CUMIN SEEDS	30.0	25.2	4.8
223.	FENUGREEK	48.6	28.6	20.0
224.	GARLIC	5.1	2.6	2.5
225.	GINGER	6.0	4.7	1.3
231.	OMUM	47.2	43.9	3.3

Sl. No.	Name of the food stuff	TDF g.	IDF g.	SDF g.
(1)	(2)	(3)	(4)	(5)
232.	PEPPER DRY	35.3	32.4	2.9
235.	POPPY SEEDS	33.6	22.4	11.2
237.	TURMERIC	20.0	17.6	2.4
FRUITS				
207.	PAPAYA	2.6	1.3	1.3
213.	ZIZYPHUS	3.8	2.8	1.0
239.	AMLA	7.3	5.8	1.5
240.	APPLE	3.2	2.3	0.9
245.	BANANA	1.8	1.1	0.7
252.	CHERRY	1.5	0.9	0.6
254.	DATES, dry	8.3	6.9	1.4
255.	DATES, fresh	7.7	6.9	0.8
256.	FIG	5.0	2.6	2.4
258.	GRAPES, green	1.2	0.8	0.4
261.	GUAVA	8.5	7.1	1.4
264.	JACKFRUIT	3.5	2.1	1.4
266.	JAMBU	3.5	2.6	0.9
274.	SWEETLIME	2.7	1.3	1.4
278.	MANGO	2.0	1.0	1.0
280.	MUSK MELON	0.8	0.5	0.3
281.	WATER MELON	0.6	0.3	0.3
283.	ORANGE	1.1	0.6	0.5
290.	PEACH	1.6	1.1	0.5
291.	PEAR	4.3	4.0	0.3
294.	PINEAPPLE	2.8	2.3	0.5
295.	PLUM	2.8	1.7	1.1
296.	POMEGRANATE	2.8	2.3	0.5
303.	SAPOTA	10.9	9.1	1.8
304.	CUSTARD APPLE	5.5	4.0	1.5
305.	STRAWBERRY	2.3	1.6	0.7

TDF: Total Dietary Fibre
IDF: Insoluble Dietary Fibre
SDF: Soluble Dietary Fibre

RECOMMENDED DIETARY ALLOWANCES FOR INDIANS

Group	Particulars	Body wt.	Net energy	Pro-tein	Visible Fat	Cal-cium	Iron	Vit. A μg/d		Thia-min	Ribo-flavin	Nico-tinic acid	Pyri-doxin	Asc-orbic acid	Free folic acid	Vit. B_{12}
								Ret-inol	β-caro-tene							
		kg	Kcal/d	g/d	g/day	mg/d	mg/d			mg/d	mg/d	mg/d	mg/d	mg/d	μg/d	μg/d
Man	Sedentary work		2425							1.2	1.4	16				
	Moderate work	60	2875	60	20	400	28	600	2400	1.4	1.6	18	2.0	40	100	1
	Heavy work		3800							1.6	1.9	21				
Woman	Sedentary work		1875							0.9	1.1	12				
	Moderate work	50	2225	50	20	400	30	600	2400	1.1	1.3	14	2.0	40	100	1
	Heavy work		2925							1.2	1.5	16				
	Pregnant woman	50	+300	+15	30	1000	38	600	2400	+0.2	+0.2	+2	2.5	40	400	1
	Lactation															
	0-6 months	50	+550	+25	45	1000	30	950	3800	+0.3	+0.3	+4	2.5	80	150	1.5
	6-12 months		+400	+18						+0.2	+0.2	+3				
Infants	0-6 months	5.4	108/kg	2.05/kg		500		350	1200	55μg/kg	65μg/kg	710μg/kg	0.1	25	25	0.2
	6-12 months	8.6	98/kg	1.65/kg						50μg/kg	60μg/kg	650μg/kg	0.4			
Children	1-3 years	12.2	1240	22			12	400	1600	0.6	0.7	8	0.9		30	
	4-6 years	19.0	1690	30	25	400	18	400		0.9	1.0	11		40	40	0.2-1.0
	7-9 years	26.9	1950	41			26	600	2400	1.0	1.2	13	1.6		60	
Boys	10-12 years	35.4	2190	54	22	600	34	600	2400	1.1	1.3	15	1.6	40	70	0.2-1.0
Girls	10-12 years	31.5	1970	57			19			1.0	1.2	13				
Boys	13-15 years	47.8	2450	70	22	600	41	600	2400	1.2	1.5	16	2.0	40	100	0.2-1.0
Girls	13-15 years	46.7	2060	65			28			1.0	1.2	14				
Boys	16-18 years	57.1	2640	78	22	500	50	600	2400	1.3	1.6	17	2.0	40	100	0.2-1.0
Girls	16-18 years	49.9	2060	63			30			1.0	1.2	14				

CHAPTER V: ON SELF DEFENSE

Introduction:

Right from the earliest time, we had to fight in some or the other way for our survival. Primitive men had to fight with animals for food as well as for their own defense. Slowly, as we developed, this part of living became more structured that ultimately it evolved into a kind of an art. In the face of attacks of the enemies, one has to stand, fight to defend and win. Thus need of martial artists has been there for centuries. Kings used to have their own favorite commanders to enforce law and order in their kingdoms. Thus when times of peace reigned, these martial artists still practiced their art and slowly general people also started learning from them. Thus a war specific art became a sport and fitness regimen in the modern times.

Throughout the world, every country has some or the other kind of fighting system. The most popular fighting styles practiced in the world can be named as **Karate, Taekwondo, Judo and Kung-fu** though there may be many other styles too. In Malay, Silat was practiced; in Indonesia, Philipines - Escrima; in Burma - Bando; in Thailand - Mui Thai, in Cambodia - Bokator; in Israel – Kwar Maga; in India Kalaripet and Kushti or wrestling, In Iran apart from traditional forms Kung-fu To'a was spread which was developed by Ibrahim Mirzai, who was personal guard of Shah of Iran.

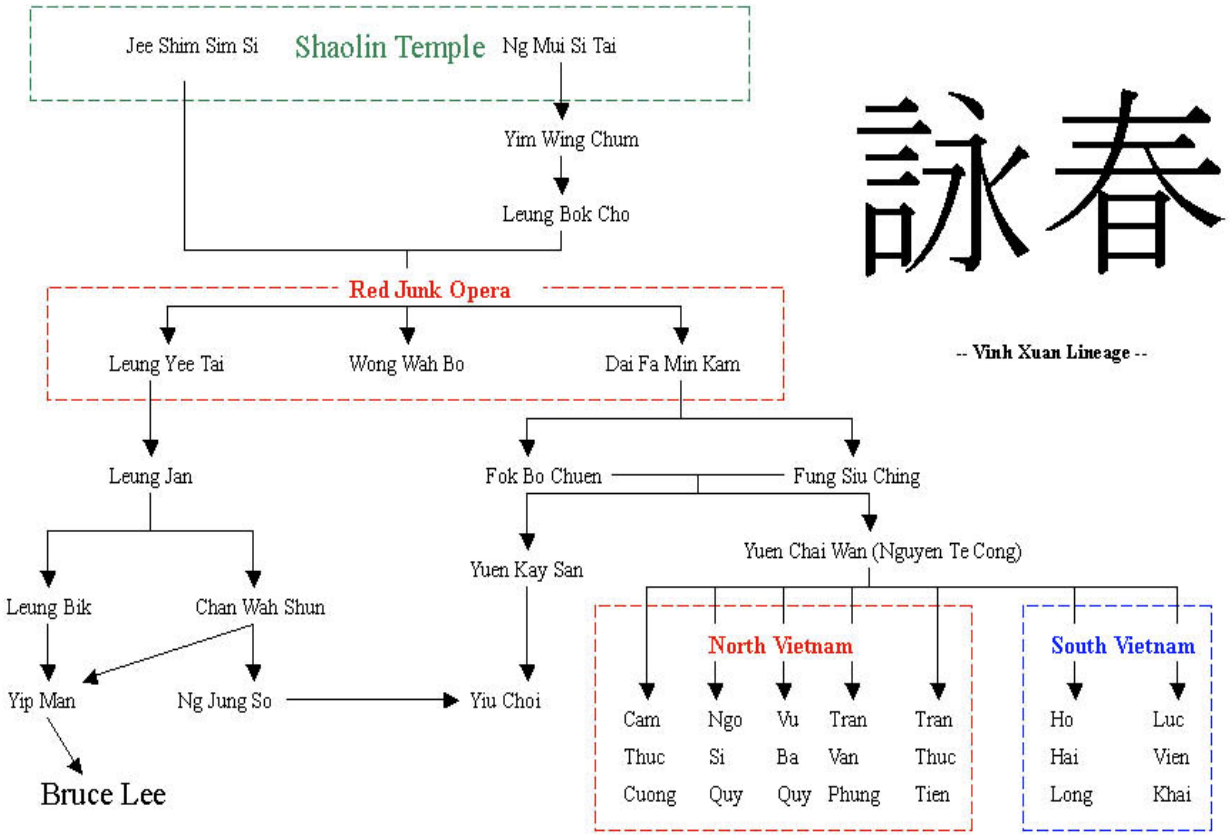
Talking about the main four systems of fighting prevalent in the world, **Karate**, as the name suggests is an art of 'empty hand'. It was an indigenous art of Ryuku Island, Okinawa. It was developed under the influence of Chinese Fujian white crane style and brought to Japan in 20th century. Shotokan ryu (involves wider stances), Wadoryu(short and natural stances), Shitoryu(involves wider stances) and Gojuryu(grappling and close range techniques) are different styles of karate practiced. Most popular among it is Shotokan style, which was founded by master G.Funakoshi.

Taekwando, the world itself is a combination of **Tae-Kwon-Do**, meaning to '**Stomp or trample'**-'**Fist**'-'**Way or discipline**'. Thus we can say that it is an art of kicking punching and breaking. It was practiced by nine different kwans after world war II. Many of the practitioners migrated to west and opened their own schools with little differences and named the styles after their own names. All the styles of Taekwondo are associated with different bodies like World Taekwondo Federation-WTF (full contact practitioners), International Taekwondo Federation (ITF) and GTF. Latest addition to this is Choi Kwando, established by a Korean Master Choi in Atlanta, USA. It is generally seen that taekwondo form of art employs more use of kicks than hands.

Judo is an ancient art of japan, is a mix of two words Ju and Do, which means an art of breaking the balance of the opponent. Though it was practiced much earlier but still, Jugono Kano (1860-1938) is considered to be the founder of it as he was the main person in systematizing it. According to him, a powerful opponent can be overcome by a weaker person, by using the art of evasion and breaking his balance. The judokas fight with each other and practice throws, holds and locks. Mitsuyo Maeda

introduced judo in Brazil in 1914 and taught to Carlos Gracie(1902-1994) which presently is seen as Brazilian jujutsu.

Next one of the most famous martial art styles is Kung-fu, which is associated with China. This art is based on five animal forms of tiger, deer, monkey, bear and crane. Though snake style, monkey style, praying mantis etc various other styles are also known today. It is said around 24 different fighting styles of kung fu are practiced. Some popular known forms, apart from the above, are Pa Kua, Baguazhang, Drunken boxing, Long fist and Short fist styles, Wingchun or Wing Tsun, Taijiquan which developed from Quigong etc. Tai chi and Wingtsun art forms are quite popular in the modern times. Wingtsun was developed by a budhist nun of Shaolin monastery Ng Mui, who was inspired by watching a fight between a snake and a crane. She taught it to a girl named Yim Wing Chun meaning 'eternal spring'. She taught it to her husband Leung Bac Chou and later the style was known by her name itself as Wing Chun or Wing Tsun. Its lineage goes as follows.



Out of the whole lineage of Wingtsun practitioners, in modern times, YIP-man is considered to be the most famous teacher of his time. He learned it from many masters and imbibed their techniques well. He also was teacher of Bruce lee. Bruce learned from him for some time and then developed his own art of fighting under the name of Jet Kune Do.

Earliest scripture of Dhanurveda in India also referred to martial art practice. It is said that Bodhidharma, an Indian Budhist mendicant from Kerala, a dhyan yogi, went to China to spread budhism. There, when

he met various monks, he found that they were not strong enough to sit for long durations of meditations. It is said that he, therefore, sat for nine years meditating facing a wall and developed an art of exercising after coming out of it. It was taught to the monks there, who developed it over years into the present form of kung fu. Kung fu does not talk of the way of empty hand or of kicking punching and breaking or of breaking the balance of the opponent but it means polished and perfected personality. Thus it is a way of life, a philosophy unto itself.

Philosophy of Wingstun is that 'he who excels as a warrior does not appear formidable. One who excels in fighting is never aroused in anger. One who excels in defeating his enemy does not join issues. One who excels in employing others, humbles himself before them. This is the virtue of non-contention and matching the sublimity of heaven'. A correct Wing Chun stance is like a piece of bamboo, firm but flexible, rooted but yielding. This structure is used to either deflect external forces or redirect them.

The most famous learning places associated with Kung-fu in China are Shaolin monastery, a Chan budhist center and Wudang mountains, a center of Tao philosophy. Shaolin monastery was built in 477 AD in the central peak of Song mountains, established by first abbot Budhabhadra or Bodhidharma, though some historians contest this. It is located in Dengfeng county of Zhangzhou in Henan province, China. It is around 1500 years old. Bodhidharma is also known as Damo in Chinese literature.

Zhang Sen Feng, the first patriarch of Wudang monastery was from Shaolin temple too. He integrated *kung fu, Chi kung and meditation practices* to develop a comprehensive style which later came to be know as Taijiquan. This Wudang mountain monastery is the center of Taoism and developed Taoist version of martial art shortly called/known as Taichi. This monastery was built around year 1100 to 1300 AD. After being declared a heritage site, a UNESCO funded building was build there in 1994. The latest construction took place in 2003 when a building was accidently burnt down.

Bruce lee, a student of Yip-man was the main person to bring this art out in the open and taught to western people. Prior to him most of the martial art films were produced in Hongkong but after his popularity, Hollywood also fell into this race and produced many great movies. In fact Bruce lee's real carrier in films started from Hollywood only. Hundreds of great films have been made on martial arts. Many popular martial art films are Bruce lee's Enter the Dragon, Return of the Dragon etc; Jackie Chan's Karate Kid, Young master, Police story, Drunken Master etc.; Tony ja's Ong-bak series; Donnie Yen's Ip-man-I, Ip-man II and Ip man III, apart from many other successful titles, Choi Li fut and Michele Yong's popular Crouching Tiger Hidden Dragon; Gordon Liu's 36th Chamber of Shaolin; Jet Li's Once upon a time in China, The One, The Shaolin master, The Romeo must die etc and Shogun's Ninja on Samurai warriors. Other famous martial artists turned actors are Chuck Noris, Benny Urquidez, Bill Wallace, Sho Kasugi, Joe Lewis, Samo Hung to name a few.

Thus from above we can say that fighting is quite an ancient art practiced all over the world. Its relevance in the ancient and modern world is equal. A weak person is, generally bullied by all while a strong person is looked at with respect. Hence for upholding peace in the present turbulent times, one has to be strong enough to defend oneself, one's loved ones and weak defenseless ones.

Recently, we have seen a spurt of violence involving women all over the world. It may be due to their changing role and life styles in the modern times. Thus a woman is also supposed to fend for herself in dangerous situations. Keeping it in view, they also must develop certain basic skills, which can help them in such emergency situations. But still one advocates that martial art is not only an art of 'how to fight' but it is an art of 'how not to fight' too. In Sanskrit it is said 'Vidya Yogen Rakshyate' means any art is guarded by continuous practice. Thus by continuous practice, one develops confidence in ones skills which grants an assured aura and gate, which in themselves are a great deterrent for any attacker. One's conduct, way of carrying and speech becomes an important part in this overall purview.

Thus our aim here is to help the women learn some basic drills for such situations, which do not require much strength, athleticism and difficulty in execution. Keeping this in mind, a few modules are being generated here for administering a 10-12 hour martial skill development program for women employees as they have to travel, to and fro from their offices during odd hours, in company taxis or private vehicles.

In view of the above, we can train the willing executives or general work force as per following program;

1. **Theory class**:

Different martial arts, differences and their philosophies, popular actors or practitioners associated with them, basics of physiology. Though the best way is that of non-violence, it should be tried if possible.

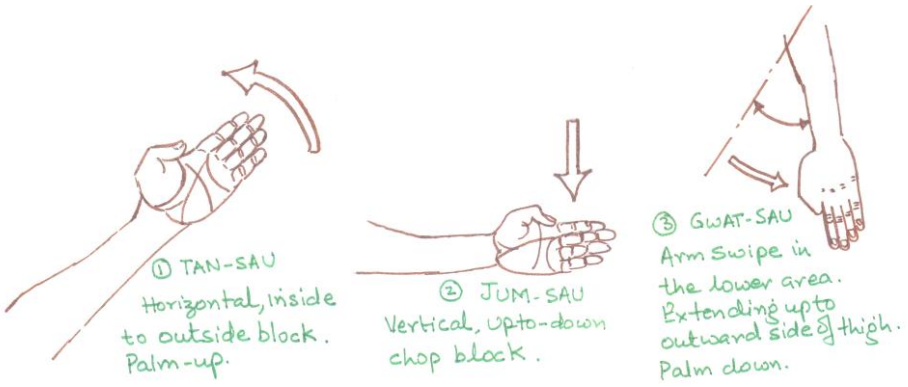
Basics:

Importance of a Stance : Balance, Defense/Offense orientation, Natural posture, Usage of environment.

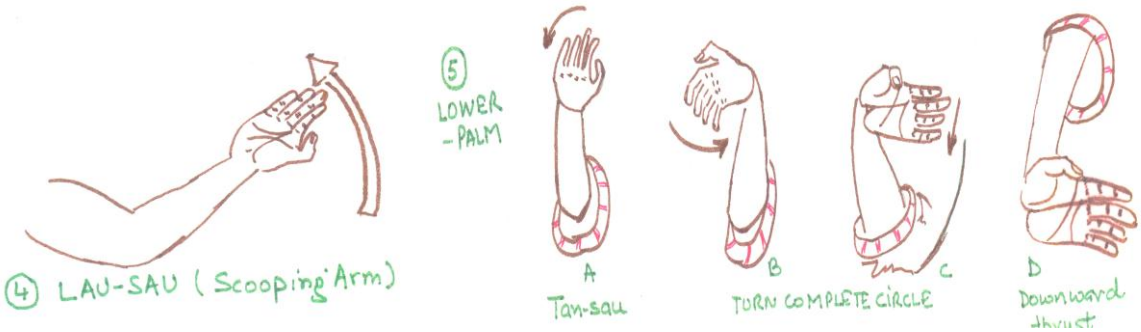
General stances: Kung fu Stance with four gate guards, T stance, Horse stance, Centre line principle

(keeping the opponent on one's center line).

Various blocks like Bong sau, Faksau, Lansau, Tan-sau, Jumsau, GwatSau, Lau sauetc are shown below.



Tan Sau Jum Sau Gwat Sau



Lau Sau Lower Arm

Bong Sau Fak Sau Lan Sau

Ball practice to improve blocking form.

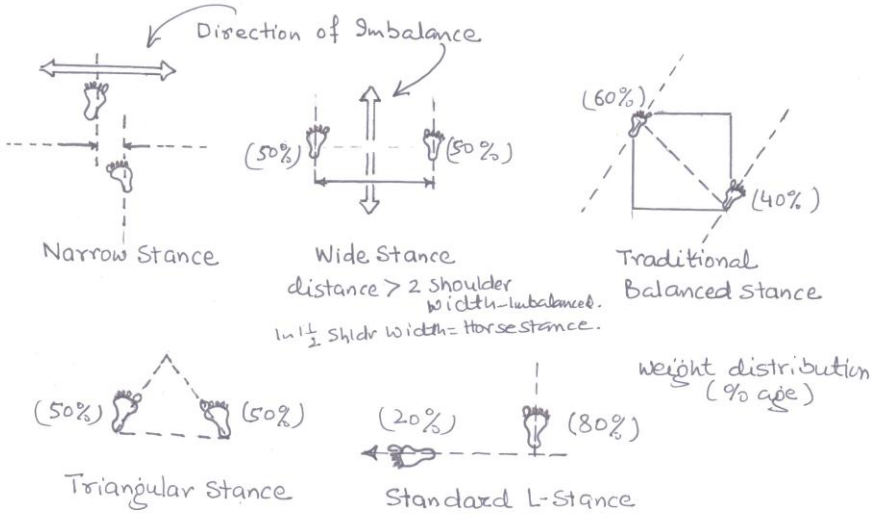
Understanding the opponent from stance, how to engage with single attacker.

Engagement with multiple attackers: When ever one is faced by multiple attackers, first target the weakest link in the chain to neutralize. Second try to keep them on one side by moving among them. Keep changing position in them so that they have to move around each other to get to you. Thus we can manipulate so that only 1-2 out of the group are really engaged at any time. One should always try to keep others at the back of the one with which engaged at any time. Try to hit at the right laces with full force to make the engagement time as much short as possible.

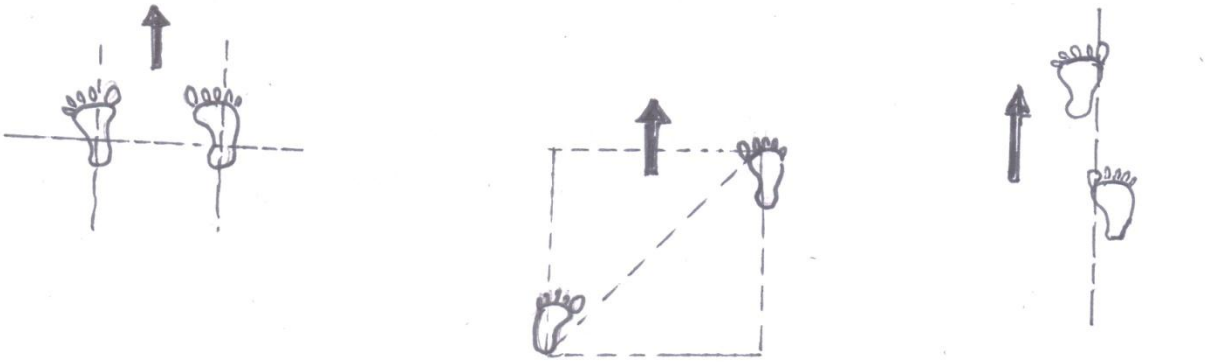
Form, Attitude and Gaze.:

While standing gauge the stance of the opponent as to which leg is front which hand is leading. Generally stronger leg and hand is kept backwards while weaker is kept at front as guard. But some times this is altered to confuse the other person. Mostly people are right handed and hence both will

stand with left leg front. But if one wants the opponent to get confused and break his rhythm, then one should change stance to opposite leg instead, provided ones is good at it.



Standing Stance:

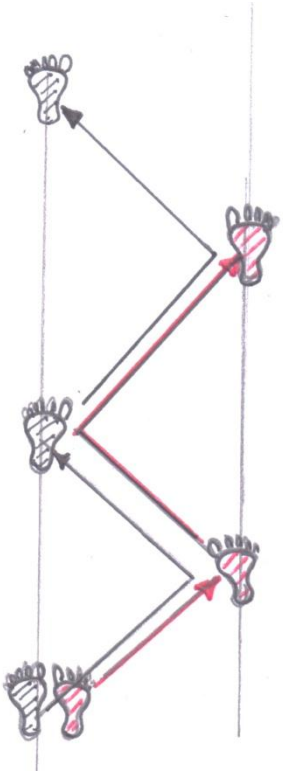


1 2 3

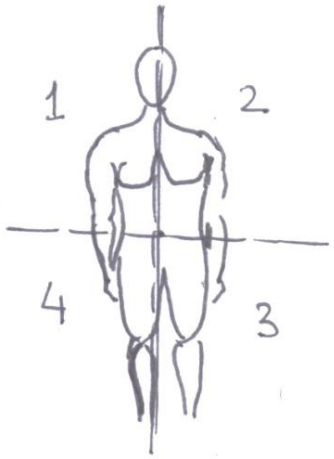
While standing, if our feet are on a straight line as in figure 1, we will loose balance if we are pushed forward or back ward, but are balanced for sidewise forces; if we are standing as per fig 3, then we can be made to fall if we are pushed to left or right, but are balanced for front and rear pushing forces; if we stand as per figure 2 then our stance is more balanced as it carries the balancing aspects of both 1 & 3 and eradicates unbalancing aspects of both. A balanced stance is very essential both while standing as well as during engagement with the opponent. Traditionally in kungfu feet position as in figure 2 is used**.**

4 **5**

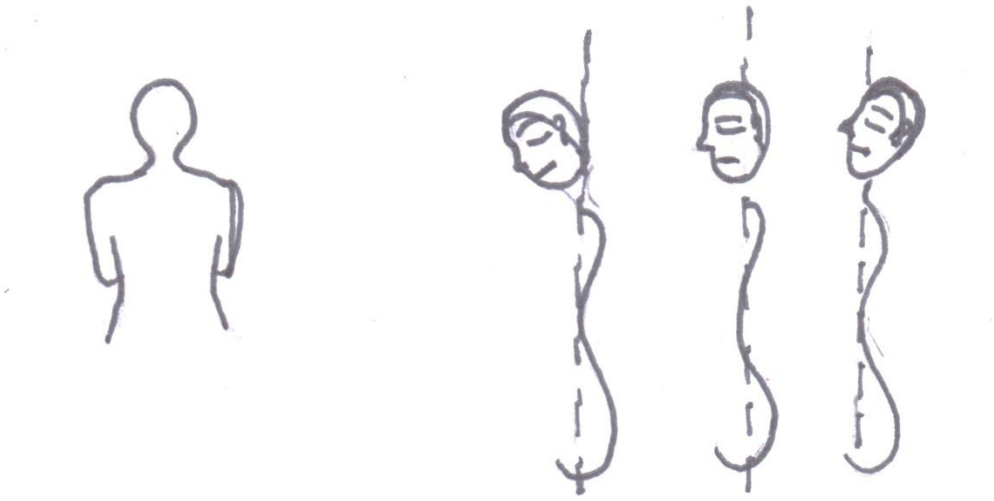
To make stance further balanced, Wingtsun employs triangular stance by turning the toes inwards from figure 1. While during movement, T stance type movement is employed. This is also used in Shotokan Karate. One brings the rear foot forward and then moves the front foot ahead.



General movement during fight is generally Zig-Zag as shown above. At start both feet represented by Black and Red are together. Then red is moved across as shown. After this left black foot is slid in a zigzag manner to front position. After that red right foot is moved on the red zigzag path as shown and moved to front. Thus we move front as well as back in this manner. This manner provides a very good groin protection during moving front or back during fight. We can block any kind of kick delivered to our groin area.



Our whole body can be divided into four quadrants. Upper two quadrants, 1 and 2 may be guarded by our hands and lower two, 3 and 4 by our respective legs.



1 **2** **3** **4**

While standing in stance as per 1, we should keep our elbows within our body width or close to body. We should not keep them outside our body width exposing our rib cage to the opponent. This is a good tactic for block as well as attack. While standing head position can be seen in three ways. If we want to keep our head position a little front tilted as in 2, we must lift our shoulders a little to protect our jaw from the side attacks. Else we can keep our head a little backwards as depicted in figure 4 to keep it out of range of opponents attack.

1 (Side) 2 (Top)

Leading hand should be at the level of our mouth/nose level, while rear block should be at the level of adam's apple. Further they should be within the body width and crosses on the centre line as shown in figure 2 showing position from top. This has been made amply clear in the lower sketch.

Hand position Engaged hand position Triangular foot stance

1 2 3

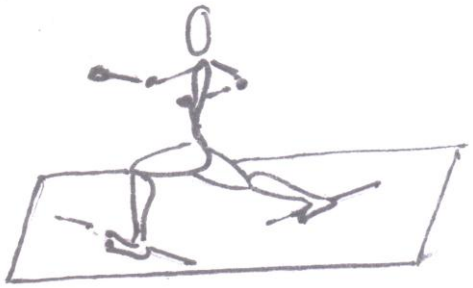
In position no 1, standing in triangular stance and keeping the knees inside, arms little crossed at centre line, forward hand at the level of nose to guard face and rear hand at the chin level to counter or defend the attack which has slipped through the front guard.

In position no 2, While engaging, keep a positive contact with the opponent, generally through hands. One keeps close to the opponent and not allowing to raise leg for kick etc. Kicks are to be blocked by kicks and hands by hands. Same hands are engaged in front to defend.

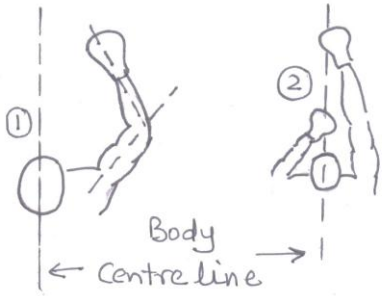
In position no 3, toes of the feet are turned inwards and heels are outwards, to give a triangular stance for more balance.

Stand with gaze at the opponent's neck to see him completely from head to foot. Back is straight and relaxed. Fingers of the hands are in their natural position. All the muscles relaxed. Knees are slightly bent. Body flexed and like a spring to jump back.

Blocking of leg with foot



Traditional wide Kung fu stance



(2): Shoulder, Elbow and punch in one straight line and hence power is more.

Punching position

fig.1

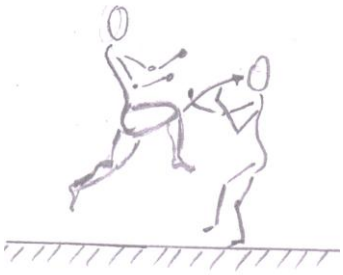
fig.2

As per figure 1, leading leg and same arm should be front. As per figure 2, open the blocks and kick chest to face.

Hip throw

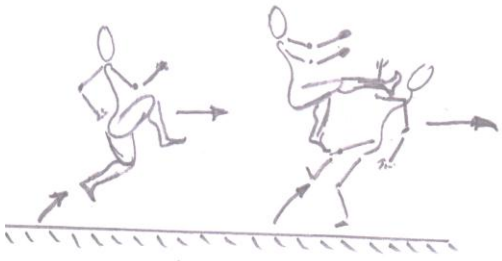
Holding the opponent by his waist with you arm, raising the pelvic and taking his weight on it and swinging all the way to the floor through the air as shown by the arrow.

Knee Kick:



Take a quick running jump bringing one knee on one's centre line and in front of the chest while other leg is down protecting the groin area. Hands should be kept in front of the body to tackle the opponent as shown in the figure above. While in flight, in the air keep the body balanced and under control. One may land on the face or the chest of the opponent.

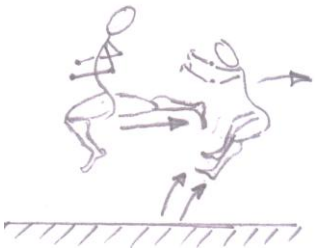
Jumping front leg kick: Take a quick one step jump raising the front foot itself up on one's centre line in front of the chest.



The same front leg is opened up on reaching the opponent, hitting the opponent with full weight of the body behind the kick. One may target face or chest area. The kick form is shown above

Jumping Back kick:

It can be done from standing as well as running position also. Idea is to keep the chest as high as possible, look at the opponent over the shoulder by turning the neck. Open the



backward leg with great force and snap to deliver a kick with the heel of the foot. Best area for hitting an opponent is rib cage as this kick can be executed from short distance.

Striding kick:

Take running jump and jump on to the shoulders of the opponent as shown and one can

strike with elbow on crown of the head and toppling over the opponent.

Rolling Kick:

This technique is quite clear from the figure given below.

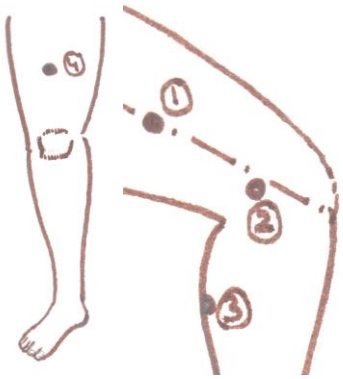
Movements:

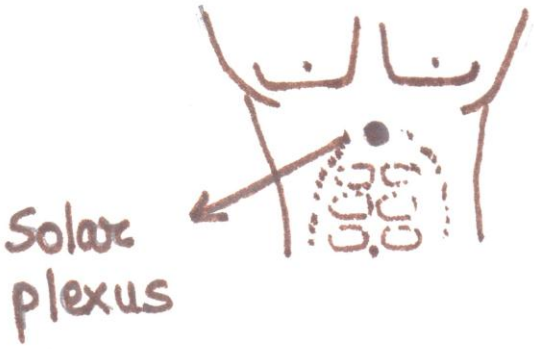
Forward, Backward, Zig-Zag. While straight movement in T-stance.

Striking Areas:

Face: Temples, Jaw, Nose base, Ears, Side of the neck, Larynx, Back of the head, Pressure point areas in neck and jaw.

Front part of body: Two fingers above the nipples, Solar plexus, Rib cage side areas, Rectus femoris tendons above patella, Central part of front thigh and side, Shin line, toes, Middle of outer side of thighs.





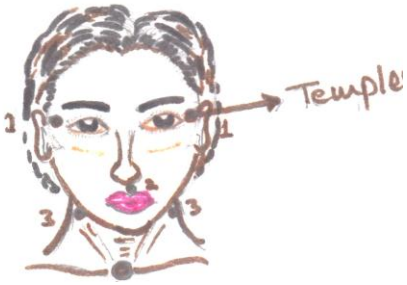
Middle of front Thigh muscle.

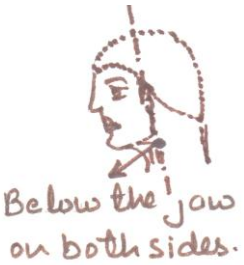
1.Outer side of thigh(middle).

2.Muscle attachment point.

3. Centre of calf muscle.

Solar Plexus below the sternum





Below Adam's apple & temple areas

Just under the jaw on both sides.

Back: Occipital protuberance, Ligament in neck (plate 145, Netters), Tricep muscle-long head (plate 145), C7 vertebra, L1-L3 area (plate 1=54), Achilles tendons, along the vertebral line, back of heart, kidney areas on either side.

Striking methods:

Blocks forms: Already explained earlier.

Centre line punching; ridge hand, back hand, open hand, knuckle head blocks 1

and attacks, Elbow strike; four blocks, Speed hands.

Front kick, Side kick, Heel kick, Knee kicks, head butt, 2

Back kick(low) and traditional.

Choke lock from back, Arm lock in pin down, fore lock hold on self. 3

Strengthening of breath through Pranayams, Isometrics and Core development 4

exercises.

Front rolls, rear-rolls, side rolls, roll to get up 5

Chi Sau movements- single arm and double arm, Hand work 6

When we do free controlled sparring, first stress should be on increasing speed and not power. Power can be added any time but speed is the main criteria. When we are talking of speed, the most important things are flexibility and softness. One can experience that when we are using a muscle set for repeated movements is a short period of time, it has a tendency to loose its flexibility and become stiffer and stiffer. As it looses its flexibility, its speed becomes less and less. Hence to keep the speed up, we must keep the concerned muscle soft and flexible.

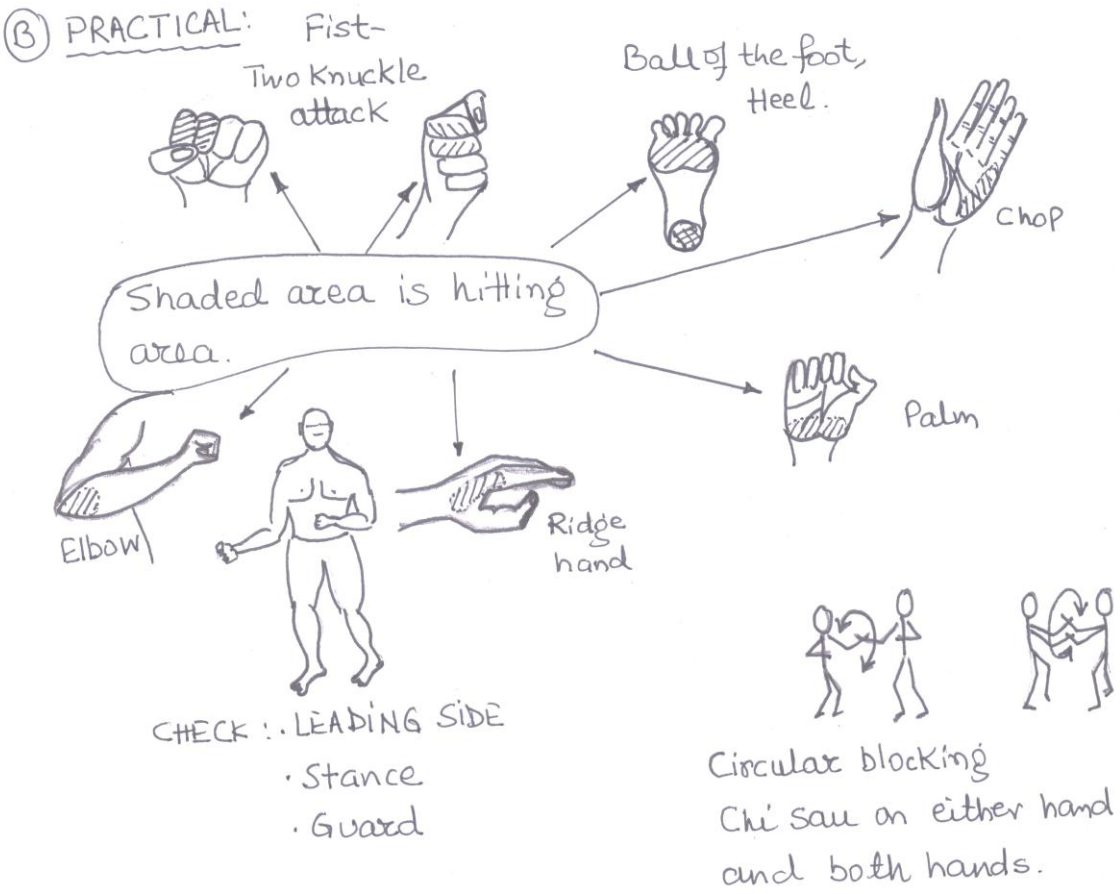
To keep the muscles soft and flexible, may try following things,

.Do not make the muscles hard during engagement, keep them soft.

. As they get hard, for micro seconds disengage and shake them.

. Mind is stronger than our body. It should able to command any part of the body to perform desired action.

For speed training during sparring, partners should engage with each other without moving in i.e. they should keep in touch with each other through finger tips only. Once speed it achieved, then one should move closer so that one can use full hand also. After this one, one should move still closer to use forearms also. Thus one should progressively moving closer in sparring and clearly observing the implications.

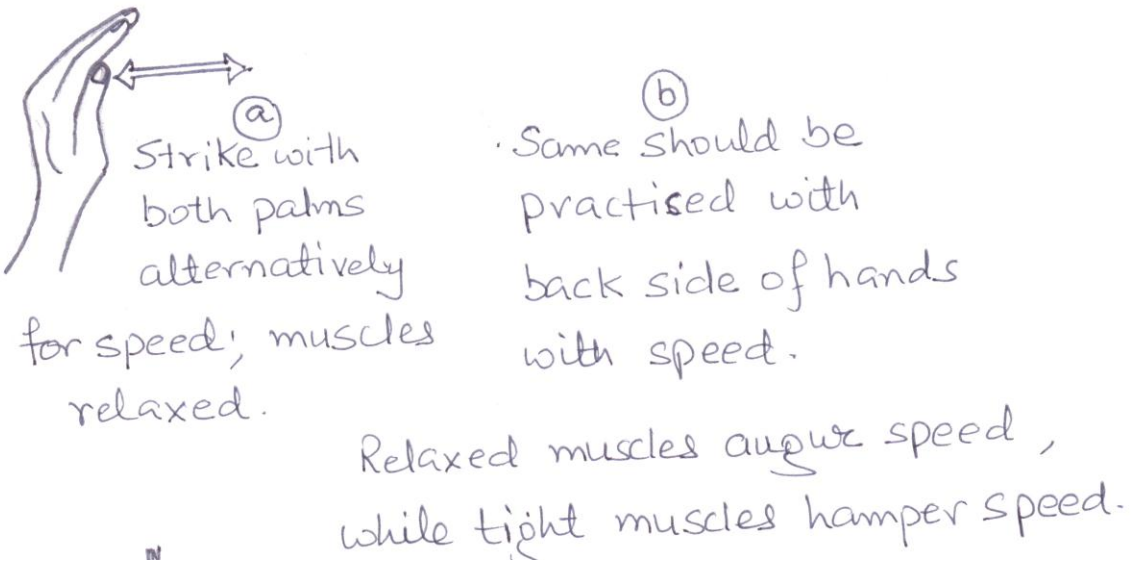


(Areas of body useful for hitting the opponent)

An important aspect of sparring is visualization. One should be able to imagine the whole of the opponent by just touching any part of his body. Once we engage, our hands must know whole of his body, muscles, contours etc. so that even if we are in pitch darkness, we need not see with our eyes but with visualization of our trained mind. Thus his whole art of fighting will become an art of meditation. To simulate the darkness sparring, one can close one's eyes and then practice with opponent. Some idea about parts of body to be used for attacks etc. is being given below.

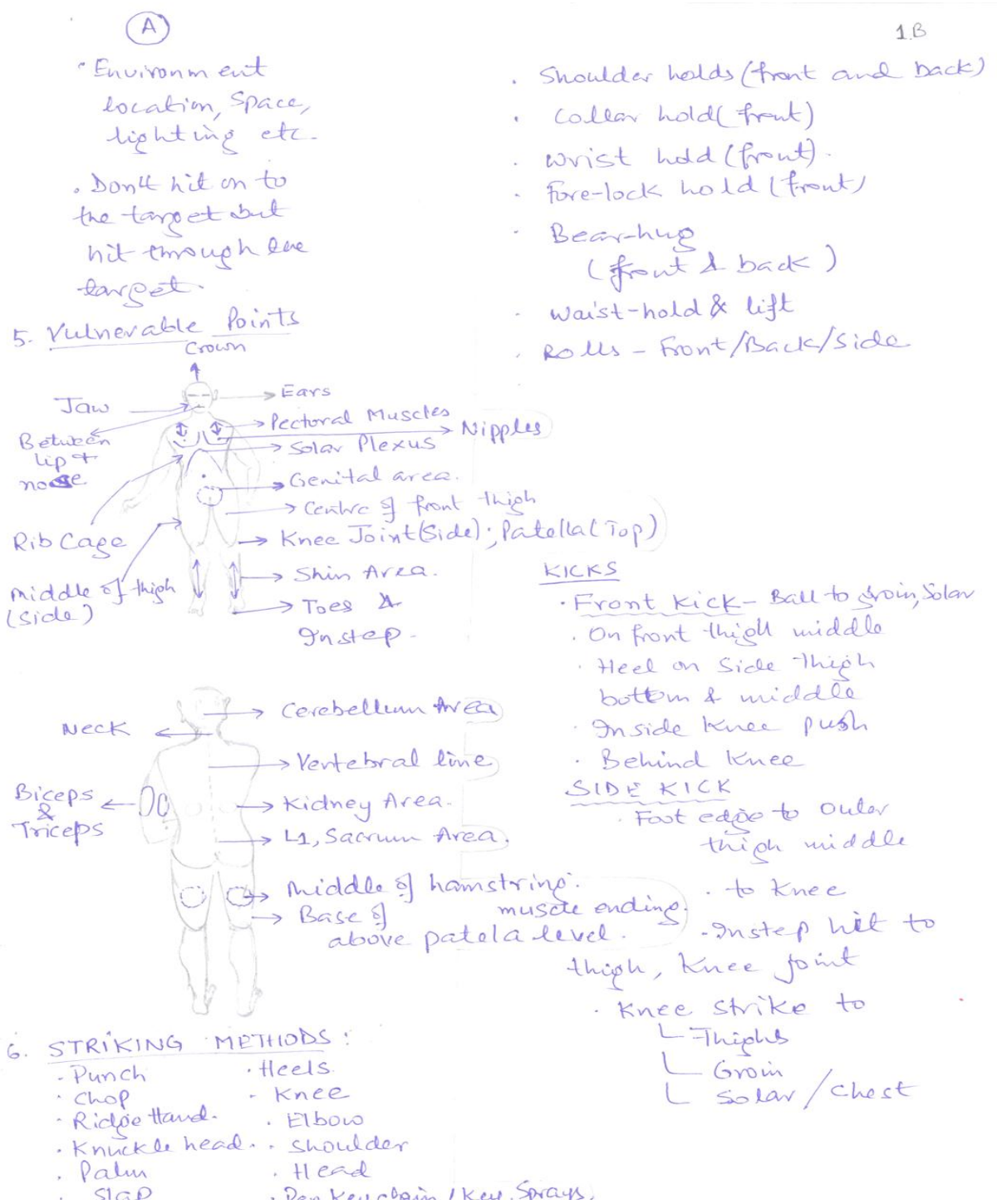
Jumping back or Horse Kick on bag

In the above kick chest should be high and up, bent elbows should be kept backwards to open the chest wide, front foot knee should be higher to black the stomach area and lower foot should guard the groin area. One should look at the target area over the shoulder from the same side of kicking leg.



Different blocks of Wing Tsun system of combat are being given below.

When engaged with opponent, one should follow the path of least resistance (just like water), meaning our attacks should slide over the opponents and not just meet his force head on with ours. While engaged one should focus on his neck and be able to see his/her whole body from head to toe. One should keep the opponent busy in defending the lightening hand work, that he/she should not be able to see the movement of one's feet below. Groin and face are the most important places to be guarded, as others can be strengthened with various conditionings. Groin to be saved with bent knees, jaw & face with the help of shoulders and hands. A rough sketch of present program is given below.



Drills: A few standard drills are being shown below for the practitioner. Hope they are clear and can be easily duplicated.

To make any attack strong use the followings :

Snap of the elbow and shoulder if hand attack, of knee and hip joint if kick attack.

Speed of the twitch muscles and strength of the other muscles.

Bring weight of the body behind the attack.

Attack on centre line principle.

Exhale while hitting. Breath and action should synchronize and end together.

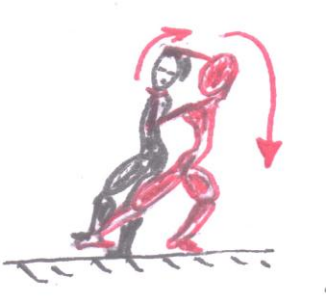
Last but most important, be 100% committed.

A.

Unsettling the tea pot (Temple strikes)

B.

Take the opponent on one's centre line and give repeated blows with palms on the temples or ears repeated and alternately with both hands.



Overturning the pitcher (forelock and chin)

Moving to one side of the opponent, holding the forelock with outer hand to pull it all the way back wards and overturning the chin with other hand. The opponent's whole weight will be shifted backwards in an awkward position. From here we can throw him back, giving a crushing elbow strike or forearm hit on his chest or Adam's apple.

C.

Let's Tango (Spinning)

Standing square to the opponent, in a brisk move stretch right arm over his right shoulder and catch hold of his hair on the left side of the skull and hold his right side of the forehead with left hand. Once his head is trapped thus, turn it in anti clockwise direction keeping his upper body at an angle of 60 degrees to the floor, making him fall on one's left hand side.

D.

Piercing the sky.

When in very close to the opponent, bringing either of the arm horizontal in front of the body, bring the other punch vertically up hitting the opponent under the chin.

E.

1

2

Oh no. (Pull and hit to topple, get pulled strike and topple)

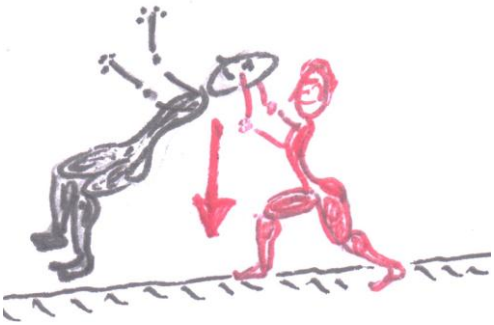
Holding the wrist of the opponent in front with same hand and holding his arm from above his elbow with other hand give him a sudden jerk and pull in a direction going out of our body to one side. When his whole weight is moving in that direction just release the outer hand and hit him with full force with forearm across the chest or Adam's apple in opposite direction. If connected and timed well, it will make the opponent fall on his back after turning in the air.

F.

Horse kicks back

This is pushing the opponent a little backwards, and jumping, spinning (clockwise or anti clockwise depending upon the stance) in air and kicking with the heel of the foot (right or left) in the rib cage area. One should keep ones chest up in opposite direction and look over shoulder (right or left), same as kicking foot to give maximum power to it.

G.



Humpty Dumpty falls (Backdrop)

Quickly move to the back side of the opponent and hold his head with both palms pull and turn his head backwards and bring it down in vertically downwards movement. Opponent will fall on his back to the floor.

H.

Dragon whips its tail.

Facing the opponent, and doing spinning kick (Charkashi) on his face with the ball of the foot. The lower foot should be pointed in the direction opposite to the opponent. This kick can be done with the hip joint keeping knee locked or we can add snap of the knee joint to into the kick when making contact with the opponent. Once learned, same can be done with jumping in the air.

I.

Monk opens the door

When in close engagement, open both arms of the opponent and push the opponent on solar plexus area in forward and little upward direction so as to left off the ground and make fall on the back backwards. If held from back, bring both the elbows into the rib cage of the opponent with speed and power to simulate a situation like monk closing the doors.

J. Scraaaatch: With foot scratch the shin of the opponent when in close quarter. With knuckle one can scratch the pectoral muscle of the opponent along with nipple.

K. Stand right hand forward in stance as per fig 1 below. Strike with left back hand on the temple, right hand full hand slap on the other temple of the opponent as per fig 3.

fig1 fig2 fig3 fig4 fig5

Bringing the right hand arm in horizontal position in front of the body to guard against any counter attack, give an upward punch on the chin from below with left hand. Then tilting towards left side,

deliver and inner edge hand strike on the side of the neck with force. Any of the above attacks if delivered with speed, power can be enough disconcerting as well as incapacitating for a while.

Hand-shake hold variations:

Scratching the wrist.	1
Knuckling the back-hand.	2
Back hand to knee.	3
Twisting the thumb. .	4
Single hand wrist hold, Double hand wrist hold.	5
Holding arm and strike on elbow from top/below.	6
Bear hug from back release variations.	7
Bear hug from front release variations	8
Choke holds.	9
Groin attacks.	10
Elbow joint, knee joint and toe crushing attacks.	11
Solar, Larynx, Groin, side of neck, jaw, temples, ears, eyes, pectorals, shins.	12
nose strikes, Delicate points/pressure points for attack, nut crack.	
Elbow points for pressing and hitting.	13

Conditioning:

1000 papers, thumb and fore finger, knuckle press, bottle rolling on shins,	14
Bamboo presses with forearms, ball of foot-side-heel conditioning.	

Note: Engagement is the last resort. If anything can be avoided by even little insult, accept,

If one has to undergo a little physical handling, no problem,

If by giving money, it can be avoided, do it,

If you can run away from that place, run,

But if all the above alternatives have been exhausted, be hundred percent committed.

Engage for minimum possible duration, as greater the duration of engagement, more will be the injuries. Always keep yourself on higher ground during engagement. Keep the opponent towards the crammed area, if a light source is there, keep it at your back. Remember, women are always mentally stronger than men, exploit this advantage. This ends a short course on self-defense for women.

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CHAPTER VI : PSYCHOLOGY

Before understanding the psychological perspective upon Wellness, we first need to have the knowledge of the basics of the psychology concepts. It is in this light that a little about the psychology is being discussed in the coming section.

Psychology was initially defined as study of soul

Psychology: *Psyches* (Soul) + *Logas* (Study)

As it grew as a field the study the definition of psychology also evolved as it is currently defined as:

Psychology *is the scientific study of the human thinking, feeling and behavior, embracing all aspects of conscious and unconscious experience as well as thought.*

It is an applied science which helps to understand the basic causes about human behaviour by undertaking scientific research about the mental functions involved in the individual and group behavior. The Subject matter of Psychology includes, brain functioning cognition, sensation, attention, perception, learning, intelligence, memory, motivation and emotion, personality, psychological aspects of health and wellness, abnormal behavior, work behaviour, stress, interpersonal relationship and social behaviour. Psychology is sometime called a **hub science** as its findings link us to various subjects like social sciences, natural sciences, medicine, humanities, and philosophy.

Health psychology is the study of **psychological** and behavioral processes in **health**, illness, and healthcare. It is concerned with understanding how **psychological**, behavioral, and cultural factors contribute to physical **health** and illness. **Psychological** factors can affect **health** directly.

The famous maxim of ***health is wealth*** is not only true for the individual but it is highly relevant to the modern day organizations. An organization is as healthy as its individual. For example, what is the biggest loss that has occurred to Apple Company? Obviously it is the early death of its founder, Steve Job. So the health of the employees is no more an individual affair, but is very important from organizational view-point also. In long term, healthy and happy employee can provide best services to the clients and that will result in happy clients which in turn will ensure the achievement of organizational goals and objectives.

In the recent years, the concept of health has become very holistic in nature. Health is not only the absence of disease but it also includes psychological, behavioral and spiritual wellness as a part of holistic health. The health of on individual is the product of complex interaction between biological factors (genetic predisposition) psychological factors (personality, thinking pattern), behavioral pattern (life style , eating habits, level of physical activity), work place factors (work- life balance, job stress) , social factors (quality of relationships, social support), cultural values (hygiene, health consciousness, life goals) and environmental factors (pollution, infrastructure, living conditions). The biological factors can predispose a person to certain diseases (cardiovascular, diabetes, cancer etc.) but its onset, degree and impact is highly dependent upon psychological, behavioral, occupational, social, cultural and environmental factors being faced by the person.

Researchers, linking health and life style, has found that people who eat regular meals, maintain a healthy weight, do not smoke, drink little alcohol, receive adequate sleep and exercise regularly are in better health and live longer. Scientists are also discovering associations between psychological and physiological processes. These include the influence of anxiety on the cardiovascular and immune systems and finding that the functioning of an immune system can be modified through training. There is also a growing awareness of the importance of sound communication skills during office visits.

Different Perspectives of Studying Human Behaviour in Psychology:

1. **Biological**
    a. **Basic Premise:** Emphasizes the biological determinants of human behaviour
    b. **Major Emphasis:** Nervous system, Neurons, Hormones and Glands,
    c. **Major Concepts:** Brain Functioning, Various Impacts of brain damages on behavior.

2. **Psychodynamic**
    a. **Main Proponents:** Sigmund Freud, Jung
    b. **Basic Premise of Human Behaviour:** Unconscious forces and unfulfilled desires, Libido and Aggression
    c. **Major Emphasis:** Early Child hood experiences, Family Relationships
    d. **Major Concepts:** Id-Ego-Super ego, Conscious, Sub Conscious and Unconscious mind, Defense Mechanism, Developmental stages.

3. **Behavioral**
    a. Main Proponents: Pavlov, BF Skinner, Watson.
    b. Basic Premise: Human behavior is shaped by the rewards and punishments that person gets from his surrounding environment.
    c. Major Emphasis: Rewards and Punishments, observational learning
    d. Major Concept: Conditioning, Schedules if Reinforcements, Learning
4. **Humanistic**
    a. Main Proponents: Abrham Maslow, Carl Roger
    b. Basic Premise: Human being can grow and reach their highest Potential
    c. Major Emphasis: Self-concept, Self direction, Choice, Self Actualization,
    d. Major Concepts: Motivation, Free will, Self-Actualization
5. **Cognitive**
    a. **Main Proponents:**
    b. **Basic Premise:** Focuses on information processing and thinking in human mind. Compares mind to a computer
    c. **Major Emphasis:** Attention, Perception, Memory, Thinking and Problem Solving
    d. **Major Concepts:** Evolution of gender roles and social roles

Wellness and Psychology

Now let us try to one of the perspective in details understand the most famous contribution of psychology in understanding human behaviour given by famous psychologist Sigmund Freud. It will help to know the concept of personality, conflicts, anxiety and stress in relation of wellness.

Basic Structure Of human Psyche (Personality), Sigmund Freud, Psychodynamic View:

	Id	**Ego**	**Superego**
Consist of	Instinctive and biological forces	Rationality and Societal influence	Moral and ethical values learned from parents and others
Basic Drives	Sex and Aggression	Smooth functioning and avoiding harm	Controlling Id basic impulses
Working Principal	Pleasure seeking and immediate gratification	Reality, Delayed gratification Society norms.	Morality, Values and Ethics.
Nature of Id	Selfish and wishful, does not care about the consequence of the behavior.	Rational and objective, try to avoid the negative consequences of behavior.	Unselfish, helping and caring for others.
Influenced by	Unconscious mind and internal World.	Conscious mind and external world.	Parenting, Socio-cultural factors.
Basic Function	Immediate need gratification and impulsive behaviour without thinking of the consequences.	Controlling Id Impulses, Satisfying the needs in socially approved ways, Maintaining a balance between Id and superego.	Controlling id by causing anxiety and guilt to ego (Person) if it behaves as per impulsive demands of Id.
When in control	Immediate Need Satisfaction	Balanced Personality	Feeling proud
When ignored	Repression and low energy	Conflicts with society	Anxiety and Guilt
Metaphor	Horse	Rider	Ideal Path
Example : if you are hungry and got no money	Get food by hook or crook: steal/ snatch	Work/Request/ Sell Something	Work only, never ever steal or snatch

Composition of Mind: Tip of the iceberg

Observable behaviour

Attitude, Feeling, Thinking, Values

Basic Desires and Impulses , Painful memories , Rejections, Separation, Failures, Guilt, Anxiety, Anger, Habits

Composition of Mind

	Conscious	**Subconscious**	**Unconscious**
Consist of	Selective Awareness at the present moment of the internal and external environment.	Awareness on recall or external stimulation.	Primitive forces and Repressed memories.
Mind Proportion	10%	30%	60%
Personality part	Ego	Ego and Superego	Mostly ID
Computer Metaphor	Key board (Input) and Display, Current application Running.	Installed Software's and applications	Default Settings, Hard disk, Hidden programs, Viruses.
Function	Dealing with reality in moment to moment basis.	Working memory for day to day functions	Store house of repressed and painful memories that our conscious mind cannot handle.
Influence on decision making	10%	20%	70%
Tools	Awareness	Self-analysis	Accessing Accepting and being aware.

Functioning of Human Psyche:

Some time in life because we lose control on own self (Ego) because of needs immediate gratification (Id) and do certain things that are not approved by our own self (Superego) and also by the Society can cause a lot of guilt and anxiety. **Defense Mechanism**: In order to save our self from anxiety our rational mind (Ego) gives various explanation or excuses for justifying what we have done to lower anxiety or guilt level.

Defense Mechanism	Description	Example
Denial	Refuse to accept any external painful event and blocking it out of our awareness.	1. Cancer Patients denying Cancer reports. 2. A wife denying the extramarital affair of husband 3. Drug addict refusing to accept that drugs are bad for health
Repression	To bury painful experiences, threatening thoughts and feelings in deep unconscious mind by ego. It is first forgetting and then forgetting what we forgot.	1. Forgetting childhood bad experience. 2. Hidden Aggression towards the near and dear ones.
Projection	Attributing one's own unacceptable thoughts, feeling and behaviour to others people.	1. I do not hate him, he hates me 2. She wore provocative dresses, I was her wish.
Displacement	Satisfying a need or impulse (aggression) with substitute	1. Someone hit or abused by stronger person will hit the weaker person 2. Disliking every member of group after a bad experience with one of the member of that group.
Rationalization	Distortion of facts to make the act less disturbing. Giving excuse for act.	1. Everybody does that. 2. This much is permissible. 3. You need to do this for survival. 4. Next time I will not do it.

Regression	Psychologically Going back to an earlier time when faced with stress in the present situation.	1. Excessive gaming when facing stressful situation. 2. Too much eating, sleeping or drinking when in stress as this behavior represents our early infancy days.

Features - Defense Mechanisms:

1. Saves person from anxiety and feeling of guilt.
2. People unconsciously use them and are generally unaware that they are using a defense mechanism.
3. No need to undergo painful behaviour change process, just give or create an explanation.
4. It hampers the self-growth of a person.
5. They are resistant to change and hard to overcome.

Failure of Defense Mechanisms:

When defense mechanism fails to protect ego from painful feeling of guilt and fear of getting caught and punished , anxiety, stress and depression may occurs.

Tip for Sound Psychological Wellness:

All though defense mechanism protects guilt and anxiety, but excessive use of them hampers your self-growth and adversely impact your psychological health. Following things to get rid of the defense mechanism to ensure self-growth:

1. **Self-Awareness**: Try to develop self-awareness by observing and analyzing your behaviour in stressful situation.
2. **Feedback**: You should also take feedback from others about your behavior.
3. **Identifying**: This will help you to become aware of the defense mechanism that you are using.
4. **Plan**: Make a actin plan to bring the requisite changes in behaviour that would help to nullifying the need to use a defense mechanism. For example, instead of giving last minute excuse for not completing a deadline driven project, start working on in from the beginning.
5. **Share:** Tell few reliable people about your awareness of defense mechanism (excuses and explanations) that you tend to use.
6. **Request:** Request them to make you aware/ stop you, when you are using that defense mechanism.

Harmful Thought patterns that leads to Anxiety, Stress and Depression

	Negative Thought	Alternative Thought
Negative Evaluation of Self	Past experience, Negative opinion by Others. Harsh evaluation of self against Social criteria, Comparison with others.	Develop Self-Acceptance. Achieve small goals to regain self confidence. Try distance yourself from over critical people. Stop being a Perfectionist.
Negative Evaluation of Others	Fault finding , Criticism ,Stereotype Prejudice and Bias.	Try to understand people better Develop Empathy and caring attitude.
Negative Evaluation of Situation	Pessimistic attitude, Worst is going to happen, It will never change.	Keep on trying and do not quit.
Should & must	Perfectionist attitude, Unrealistic demands on self and others, Giving big statements, I must please all.	Try to adapt yourself as per the situation.
Mind Reading of Others	Others are plotting against me Criticizing me Others do not respect or love me.	Talk to people, Stop assuming things.
Others can Read My Mind	They should know, Everybody knows that.	Tell people what you need Take help from people
Internal locus of control	Holding oneself responsible for every thing Craving for control on others.	Try to inculcate situational factors in end results.
External locus of Control	I cannot control any thing Luck is responsible for whatever happens.	Start accepting responsibility actions taken by you.

Tips of Deal with Anxiety and Stress

Level	What to do
Physical Level	**Healthy Eating:** No junk food, Eat on time
	Physical Activity: Walk, jog, Running, Sports, Exercise, Yoga.
	Limit Alcohol and Smoking
	Sleep Well: but No over sleeping
	Deep Breathing: Inhale and Exhale deeply
Mental level	**Do not sit Idle**: Find some work, if not for money atleast to be busy.
	Do not Trust your negative mind : In such condition mind blows everything out of proportion and paint everything in a dark picture.
	Mediation: It soothes one's mind.
	Do not discuss past: Talking to much about bad past events further worsen the situation.
Action Level	**Keep on doing Efforts:** let the worry be there, keep on working as sitting idle will increase it more.
	Set achievable goals: Achieving them will help your.
	Share: Share your feeling with trusted people and ask for their help.
	Mix with People: Do not sit alone most of the time. Go out and interact with people not matter what is mood is like.
	Reconnect with Family and Friends: It surely Helps.
	Learn the Triggers: learn about your anxiety triggers and avoid them as much as possible
	Time - out: Try to distance yourself from stressful environment for some time.
	Get professional help: Seek psychological counseling if everything else fail.

SMART :Together**E**veryone**A**chieves**M**ore**1+1 = ?**

Activity 1

Do you know a Team?

Objective of the Activity:

- Ice breaking to help the participants to know each other
- Setting the participation norms for the workshop
- Understanding the main characteristics of a team.

Method

Every participant has to do the share the following information:

- Name
- Department he belongs to, in the organization
- Name a team
- Reason why he calls those people a team.

Take away points from the activity:

Team: A **joint action** by a group of people with **complementary skills**, in which each person **subordinates** his or her **individual interests** and opinions to the **unity and efficiency** of the team.

Important characteristics of team:

- Conman Goal
- Agreed path to attain the goal
- Complementary skills
- Clear leadership
- Trust on each other
- Respect for each team member views
- Caring approach towards each group member

My initiative as a team member:

SN	My action Plan	Date of Completion	Success indicators

Activity 2

What keeps you together?

Instructions:

- Participants forms team based on there birthday months proximities.
- Based on the strengths of the each team member teams needs to decide a :
    1. Team name
    2. Team tag line
    3. Team song

Take away:

- Analyzing each member strength while forming a team
- Inviting ideas from everyone
- Choosing a name that appeals to all
- Inducing motivation
- Commitment towards goal

Action points:

- Make a list of total strengths of your team members
-
- Try to give mission names to all the goals set by organization for your team
- Try to put some motivational poster around your desk
- Decide some core values, which your team is going to abide by.

My initiative as a team member:

SN	My action Plan	Date of Completion	Success indicators

Activity 3

Less is more

Instructions:

- Participants are divided in two teams with equal members.
- Each group is given a area of 8 floor tiles
- Team has to use the minimum place while accommodating all the members of the team at least for 10 seconds.

Take away points:

- Minimum input maximum output (standing on 4 out of 8 Tiles)
- Supporting each other (Team members were holding each other)
- Planning (who will stand in the center, who will enter last0
- Obeying the norms
- Evolving effective feedback system (taking feedback from the Judge)
- Ability of deal effectively with work pressure for a longer duration.

Action points:

- Try to support your team members by giving them relevant information or share the secret of trade.
- Offer your support to teammates when they have got extra work.
- Try to use your resources very effectively to reduce input cost i.e. amount of stationery being used and other budgetary expenses.

My initiative as a team member:

SN	My action Plan	Date of Completion	Success indicators

Activity 4

Brick walk

Instructions

- Participants are divided in three teams
- A brick is given to each team member
- Team member has to cover a distance of 35 meters from the start line by using bricks to cover the distance
- They have to complete the task in minimum time
- Each time any group member touches ground 1 minute is added to the time as penalty

Take Away Points:

- Analysis of the task at hand. (who we have to place the Bricks)
- Analysis of the resources available to accomplish the task.
- Identifying team member's strength.
- Allocation of duties and responsibilities. (Who will stand where)
- Ensuring each member's participation to achieve the goal.
- Making sure that everybody has understood the instructions clearly.(penalty of one minute for a mistake)
- Dividing the task in small manageable goals.
- Keeping in view each team members limitation while setting deadlines. (first member should think how far he has to place the brick.)
- Encouraging and supporting each member of the group.
- Balancing speed and accuracy.
- Keeping eye on the competitors.

Action Points:

- ❖ Make a list of all the resources like man, machine, money and materiel that you can utilize effectively to achieve your team goal.
- ❖ Divide the responsibilities and duties by consensus.
- ❖ Try to give different duties or suggest some other ways of doing the job perfectly, if a team member is finding difficult of play his role in team.
- ❖ Set goals of intermediate difficulty level, keeping in view the limitations of the team member.

My initiative as a team member:

SN	My action Plan	Date of Completion	Success indicators

Activity 5

Passing the Ball

Instructions:

- Participants are divided in 3 equal groups
- Each group is given a soft ball
- Group members need to pass that ball to through ever member's hand in minimum possible time.

Take away points:

- Clear understanding to all the instructions.
- Getting ideas from each team member.
- Creatively thinking about the solution.
- Trying to better the team performance in each trial.

Action Points:

- ❖ Try to generate the maximum new ideas of doing a routine work in a more efficient way by inviting the team members for a group discussion. (how can we pass the ball in minimum time)
- ❖ Set a shorter and challenging dead line to complete team project. (take less and less time each time).
- ❖ Encourage each other to try innovative ways of completing the task at hand.

My initiative as a team member:

SN	My action Plan	Date of Completion	Success indicators

Activity 6

Crossing the line

Instructions:

- All participants stand on one side of the room.
- A crossing line is drawn at about 20 feet from them
- Trainer announce some statements, relating to day to day behaviors of participants in teams, i.e., *The people who rarely come late to office*
- The participant needs to walk over to the crossing line if any statements holds true about him

Important Points:

- Every body who plays this game agrees not to disclose any information to the other people who are not participating
- A person can choose not to cross the line, if he do not want to reveal a particular information about his behavior in team, even if it holds true for himself i.e. *People who has broken the trust of their team member*
- Complete silence is maintained during the activity

Take away points

- Self analysis.
- Courage to accept the fact that some time we do commit mistake.
- Understanding that feeling and emotions of team members.
- Not judging the person before knowing him.
- Sharing reduces pain.
- I am not alone.

Action Points:

- ❖ Try to develop relationship of care and concern rather than competition with team members.
- ❖ Try to understand the circumstances of the individual that might be playing a role in his team behavior.
- ❖ Offer your support and resources in the hour of need to your team member that might be personal or professional need.
- ❖ If you don not like someone, it simply means that you need to know him more.

My initiative as a team member:

Activity 7

Creating a Picture

Instructions

- Participants are divided in four equal groups.
- 4 picture are shown to each teams.
- Trainer give each team pieces of pictures to the each team.
- Team task is to make the picture again.
- Every team selects a team leader.
- Teams can negotiate with each other on the issue of exchanging the pieces of paper.

Take away:

- Choosing a area related to your core competencies (which picture parts we are having in maximum).
- Analyzing the gaps (which parts we need to complete the picture).
- Choosing a effective leader based on required skill set.
- Finding the resources to fill the gaps (which team has got the parts that we need).
- Analyzing the needs to the other team (with whom we can negotiate better).
- Negotiating with other teams on win- win basis (if all team works together we can complete the task quickly and with out conflicts.)

Action points:

- ❖ Make a list of the short coming in your current way of achieving the team goals.
- ❖ Make an action plan to fill those gaps.
- ❖ Try to find out the various ways your competitive teams are handling the same issue.

My initiative as a team member:

SN	My action Plan	Date of Completion	Success indicators

Suggestions to improve team Unity and performance:

- Try to remember the name of as many people in your organization as you can.
- Know about the important days of your team mates like, birthday, marriage anniversary. and wish them on these days. (If situation permits you can have a small get-together.
- Click a group photograph of your team and keep it at your desk.
- Make sure that every team member gets a fare chance to give his views.
- Divide team responsibilities as per the strengths of the team member.
- Praise every improvement in team members.
- Team should focus its energy to boost the confidence of members who are behaving well rather than just focusing on changing the behavior of negative people.
- Try to use WE word more than I.
- Respect every team member for the only fact that he is a human being.
- Do not indulge in office gossips.

THERE IS NO '**I**' IN THE WORD TEAM.

NOTES

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Chapter VII : Yoga

Literally 'yoga' means joining of two or more things together. Since the ideals of yoga are the highest, here it means joining of Atma (self) with Paramatma (Supreme). Thus it is a journey back to the roots, to the source of evolution or to the supreme. Like in our earthly lives, we work in our offices during daytime and return to our dwelling in the evening, same way we come from the source at birth, go through various evolutionary processes and again return to the source. This path of return is YOGA.

It has various classifications like **Hatha**, **Ashtang or Raj yog**, **Janana yoga**, **Vedic**, **Karma yoga**, **Laya yoga**, **Kriya yoga** etc. **Hatha yoga** is a method by which we build a disease free body for developing a peaceful mind. Unless, the medium is healthy, mind cannot be stable. Through various asan, mudra and pranayama, we make our body disease free, stable, youthful, a perfect carrier to carry an enlightened spirit. According to Hatha yoga, '*Shareeram Adyam Khalu Dharma sadhanam*', meaning that if body can be kept perfectly hale and hearty, the mind would be as a natural consequences, sound, concentrated and elevated. A hathayogi knows his body thoroughly, understands its constitution, functions and needs. According to him no human is bad as all are part of that Supreme. It is only due to some defective functioning of muscles, or nerves or glands, human nature gets distorted. Glands are nourished by blood and blood is formed from food we eat. Satvic food will create satvic qualities, rajsic will brings out rajsic propensities and tamsic food will reflect tamsic attributes. Hence a balanced diet is a must for healthy state of both body and mind. Our ancient rishis have aptly said, *Jaisa Ann, Vaisa mann*. As is the food, so shall be the mind.

The surface of water naturally breaks into ripples, sun gives sunlight unasked, the absolute energy starts in the boom of absolute consciousness. The absolute bliss, the pure consciousness, the great intelligence, the Purusha submitted to and entangled with its Shakti, the Prakriti, to create a play of many. Thus from ONENESS, came out DUALITY. Prakriti cannot remain without Purusha, hence when Purusha withdraws, Prakriti also withdraws. All the play of maya stops and vilaya takes place, complete annihilation and even then only ONE remains, which again is that great intelligence only. Hence, we can say that in all the different forms we see all around, the common factors is THAT alone. Thus there is only one supreme energy, which connects all of us into, one country, one continent, one planet one milky way, all the planetary system and whole of brahmand. This is aptly described in the concept of '*Vasudev Kutumbkam*'. All can live in peace

and harmony together, despite all the differences. There will be no greed, no wars, no calamity but perfect peace, pure joy will prevail.

According to **Raja yoga** mind is more subtle than our body and vital energy. If it can be controlled, then pran will be controlled. It stresses the need to control mind through a eight step process. This method was laid out by great saint Patanjali, who was considered to be an avatar of Shesha. It stresses the need of full suspension of mental activity. When all the thoughts and mental activity subsides, what ever is left behind is pure supreme truth, our true self. The eight steps are Yama, Niyam, Asan, Pranayam, Pratyahaar, Dharna , Dhyan and Samadhi. In the final stage of Samadhi, the meditator becomes one with the object of meditation. Duality vanishes and oneness prevails where there is eternal bliss. This is called Kaivalya.

Janana yoga is the method of sharpening the mental discrimination to come to the understanding that he alone is real and pervades everything.

Vedic yoga is symbolized by fire. Whatever is put inside fire, it becomes tat alone. Thus, when we put everything in to that super conscious, we also become that. If, we can surrender to that super divinity then we also be divine Thus surrendering of all the ego to parampurusha is the way of Vedics.

Karm yoga is the method of being engaged in self less duty. But how can one perform without dragging in one's ego. Thus it is possible only when we consider all to a part of our own self. Then alone real karma yoga takes place.

By the process of **laya yoga**, mind gets annihilated in to that reality through a different process. Kundlini yoga is a form of laya yoga. One moves through practice of various chakras, matrikas, different naads, lace of Shakti and to a state of Unmani.

Kriya yoga is the method of separating breath, pran and mind. Certain techniques are devised for understanding the subtle differences, experiencing them in ones own body, develop a higher understanding of it. This is totally practical method with least theory. It was first taught in this modern world by Mahavataar baba to Lahiri Mahashaya, on the peak of Dronagiri mountain, in the present Uttranchal.

Thus as we go through this chapter, we will have an insight into the details of Hatha yoga and Rajyoga practices with some knowledge of others systems too.

Before going in for yoga, one firmly believes that one should undertake various cleansing techniques as devised by our ancient yogis. Doing thus, further practices

become easier to perform and experience. Various cleansing procedures can be tabulated as follows:

A.SHODHAN:

Malakulasu nadishu Maruto naiv madhyagah,

Katham syat unmani bhav, karya sidhih katham bhavet. 4/2/HYP.

Till all the nadis are filled with impurities, pran can never flow in the Madhya nadi. Without achieving that, one can never generate Unmani bhav. Without it, how can one achieve the end result.

Shudhameti yada sarvam, Nadichakram malakulam,

*Tadaiv jayate yogi pran sangrhane akhshmah.*5/2/HYP.

Till all the impurities is removed from various nadis in body, a yogi can never be able to assimilate pran shakti inside.

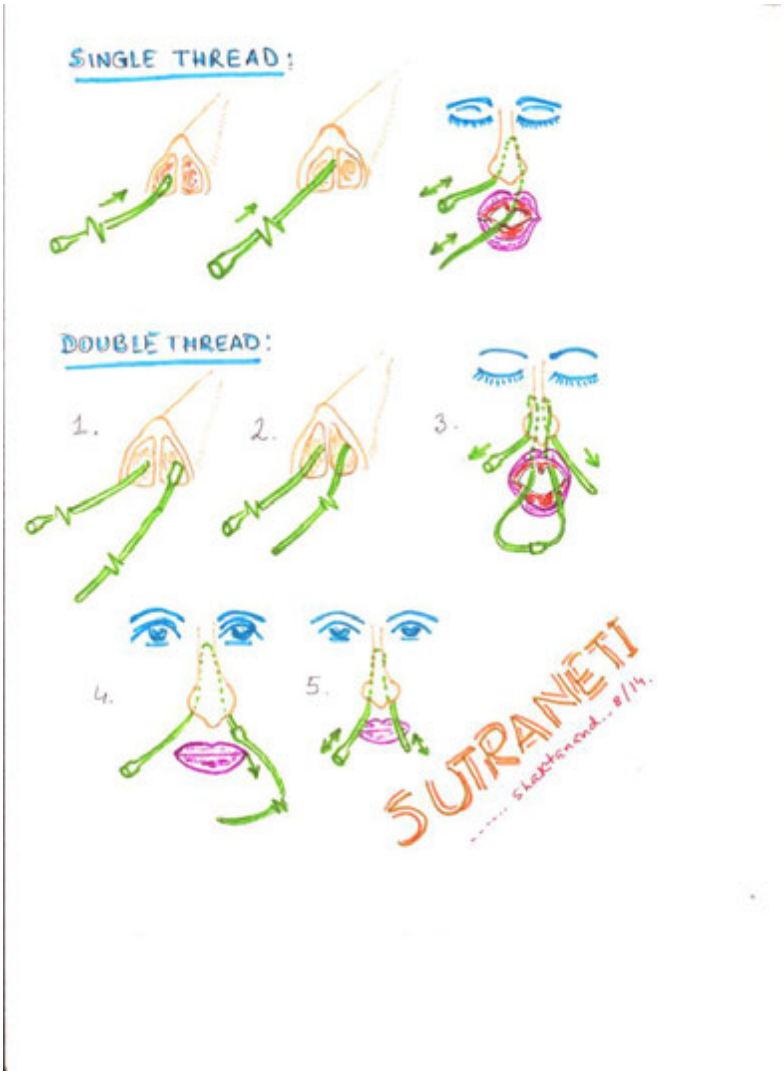
NETI: It comprises of two methods, Sutra neti (two sutras or threads are used in it, namely, rubber catheter and specially prepared cotton thread) and Jal neti.

Sutra Neti: Wash the thread, whether rubber or cotton and clean the nasal passages. If rubber thread, hold the close end front and open end in the rear. With thread held in thumb and forefinger at the opening of particular nasal passage, push it with the help of other hand in small steps slowly till it comes out in our throat without leaving the other end lest by accident it is swallowed in to our body. Insert thumb and forefinger in to the mouth and catch hold of the thread in throat. Without leaving the upper end at the entry point of nose, take this end also out of mouth. With the help of both the hands, start moving the thread up and down the nasal passage and throat cavity. It will cleanse both areas.

This entails increase in power of nerves in the area of eye brow centre, improves eye sight and hearing power. Many nasal problems are removed by it. First timers should try rubber catheter first and later on use cotton sutras as they are difficult to get these days in market and a little harder to practice.

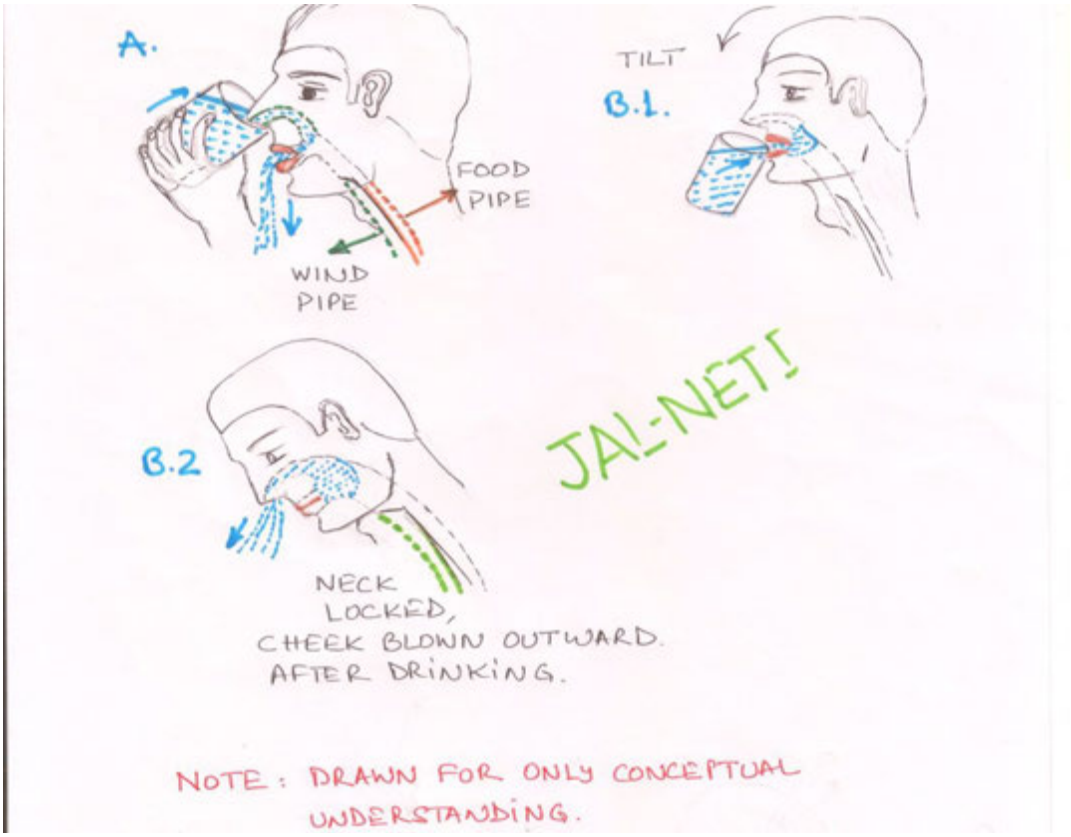
After learning this properly, take two rubber catheters. One of them should be inserted in one nasal passage head first, while other should be inserted in the

second nasal passage tail first. As told earlier, take ends of both out of our mouth. Then put the head of the one thread in the tail of the other catheter. Now, start pulling the nasal side catheter ends which will make the joined ends of catheter in mouth go back in to throat cavity. Slowly pull one side catheter out of the nasal passage. This way, we will get one catheter completely out of nasal passage. Dissociate its end from the end of other one and we will be left behind with one catheter only with its two ends hanging out of two nostrils. Holding these two ends, move them in and out, there by rubbing both nasal passages simultaneously.



Jal Neti**:** For this we need a special neti pot or one can improvise a bottle with tube fixed to it as shown below or we can use a glass directly to drink the liquid. Neti is performed in different stages with water at first, milk next and ghee in the third

stage. If one has mucous in nasal passage then warm water should be used or else normal water can be used. A little salt can also be added to it or else it will cause irritation in the nasal cavity. Drink water through nasal passage and spit it out through the mouth. It should not be swallowed. One glass is sufficient for cleansing. Closing one nostril, blow breath out through the open one forcefully so that no water is left in the nasal cavity. Do the same with the other nasal passage also. Thus, the whole of the nasal cavity has become clean. High blood pressure patients should use normal water. Salty water kills germs as well as reduces swelling inside the nasal passage.



Now fill up your mouth with water (by even inflating our cheeks to store maximum inside). Lowering our chin above sternum, closing the passage going in to throat, blow the mouth water out through nasal passages as an elephant does. This is called Gajkarni after elephants Sanskrit name of Gaja. Again blow the nasal passages clean.

Further, there are blood sinusoids located in the mucous membrane of our nose which warms up the air entering in our breath to body temperature. Further it is humidified so that it is not dry when it goes into the lungs or else it will make our

lung membrane dry where alveoli or air sacks will loose their flexibility which is essential to store air in them. Further the cavities in the bones of face trap dust particles also which are partially stopped by hair in our nasal passage also.

After this one can take normal temperature milk (not boiled), drink 50-100 gm through nose and do not spit it out but drink it fully. This helps in energizing the nerves of nose and eyebrow centre. It is said 100 gm of milk taken as above is equal to 1 kg of it taken through the mouth.

Further, one can take liquid desi ghee (clarified butter) and drink it through nose. These three methods complete the Neti procedure.

The last procedure under it is taking out mouth water from the holes in the eyes. A fluid is continuously produced in our eyes called Lachrymal glands. It passes through the naso-lachryml ducts in to the nose and keeps the nasal passage membrane moist. In 24 hours, about one liter of this fluid is secreted by the glands in our eyes. It is through this duct, a trained yogi forces the water kept in mouth out through the eyes. One must have seen such things being shown on discovery channel many times. It removes all kinds of problems of our eye, cleanses this duct. Capacity to force milk out through eyes is considered to be perfection of neti kriya.

Thus the whole of our nasal system becomes perfectly clean for any kind of pranayam practice.

Dhauti: Next kriya for cleansing is dhauti. It is used for cleansing our esophagus or food pipe and stomach. This also comprises of different methods.

Chatur angulam vistaaram, hast panchdashayatam,

Gurupad isht margena, siktam vastram shanaih graset,

punah pratya haret chaitat, uditam karma tata. 24/2/HYP.

Take a four finger, 15 hand length cotton cloth, which has been thoroughly dipped in water. Slowly as instructed by ones guru, one should take it in and pull it out.

First procedure is Vastra dhauti. A pure cotton cloth 4 fingers wide and 15 feet long is taken in rolled up form. It is immersed in water and thus thoroughly moistened. Then one of its ends is pushed in to throat with finger and then drinking water, one swallows it into food pipe. Like one eats food, same wave dhauti is gulped down without chewing. It goes up to our stomach. Then one can do nauli

kriya. After that it is to be taken out. The whole procedure must be learnt from an expert before doing independently. It cleanses the whole food pipe as well as stomach. The yogi from whom one learnt this procedure use to take 120 feet long dhauti cloth to demonstrate that it is not difficult to do, though he once shared that his guru uses only 2-3 feet length for quick cleansing. Sometimes during initial stages, while taking out the dhauti from food pipe, it gets a little struck in esophagus, our food pipe. One should not worry at that time, if it gets a little struck then DO NOT try to pull forcefully but drink some water as a small length is re-swallowed and then slowly pull it out.

Vaman Dahuti: Next method under dhauti is Vaman or vomit. Take warm water if one has mucous inside, else even normal water will also suffice. Drink four glasses of it and vomit it out. One may use ones fingers to assist in vomiting.

Generally, dhauti is of five types while Antar dhauti is of four kinds as below:

Antar Dhauti[1], Varisaar Dhaut[2], Dant dhauti[3], Hrid dhauti[4] and Mool shodhan[5].
Antar dhauti further divided in to *Vaatsaar[a], Vanhisaar[b], Vaarisaar[c] and Bahishkrit[d]*.

(1) Antar Dhauti:

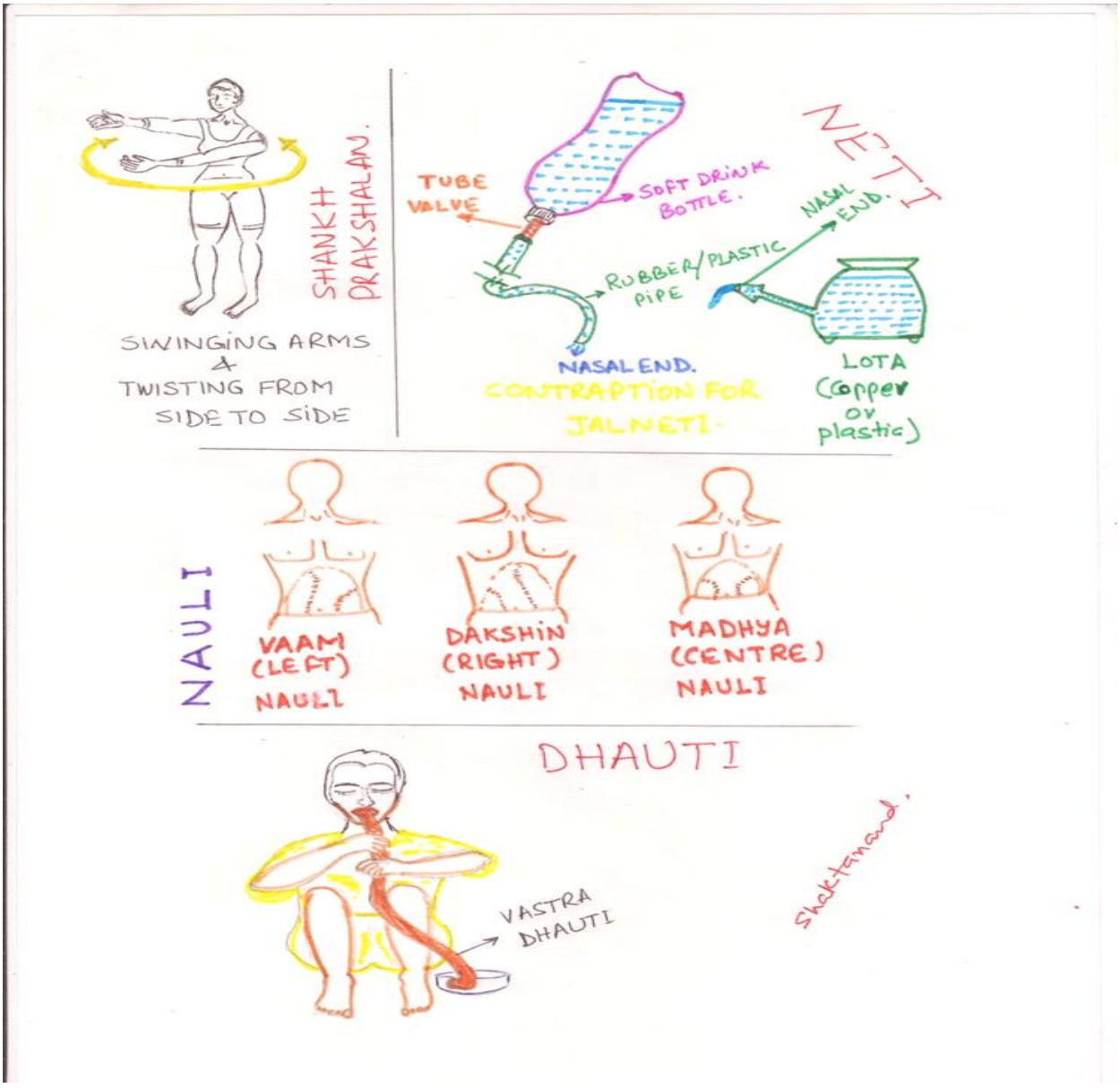
Vaatsaar[a]: As the name suggests, it involves air in it. It helps to cleans neck, esophagus(food pipe) and stomach. Sit in any dhyan asan and inhale air forcefully through mouth, which is kept in kaki mudra. Gulp it down the throat and hold for a few seconds in stomach and then breath it out through mouth. Repeat this process again and again. Digestive power is increased and its debility removed.

Varisaar[b]: It is also called 'Shankhprakshalan'. It is a kind of cleansing with water but followed in a specific manner as detailed below. After taking regular food, do not eat anything or drink any heavy liquid for 18 hours.

Take two utensils of water, one hot boiled and other normal tap water. Mix the two in a jug so that it is drinkable. Add salt into it as per taste.

Now drink 2-3 glass and move your arms along with waist from side to side while standing. This would entail the water in the stomach to move through various apertures in our body, thus cleansing them. Keep on drinking and thus moving. Whenever there is an urge to pass stool or urine, sit on the toilet seat and let it pass naturally. Do not try to force anything. A time will come in 1-2 rounds when as soon as we drink water, immediately we will have to pass it out. Thus keep repeating the process, till water coming out of body is completely clean. At

this juncture stop drinking water further and lay yourself down on your back for one hour without moving to any side. After that one can eat khechari made out of moong daal, 3 parts (without covering or dhuli) and rice, 1 part with desi ghee of cow. Nothing else should be eaten that day but this khechari. There is no restriction to amount eaten. Also try to remain in bed for the whole day and prefer not to perform any physical work. Next day onwards one can eat anything and do anything as per ones normal routine.



If one is a high blood pressure patient, then till BP is normal one is advised not to do this practice. Heart patients should not perform this.

For people suffering from diabetes, it is the best cure and it should be done as per the following schedule, under guidance;

Twice a month for first three months (6 times in three months); once a month for next three months (3 times in three months); once in two months for next three months(3 times in 6 months). Thus a total of 12 times one would do in one year. It is believed that by that time disease of diabetes will be removed from its roots. A normal person can do 3-4 times in a year to extract it benefits. It also removes the worms from stomach, bilious belching, effect of excessive pitt dosha and vaat dosha.

Vanhisaar[c]: This kriya as the name suggest has to do something with digestive fire. It is also called agnisaar. To perform one should sit down in padmasan or any asan which is possible keeping spine straight, breath in, and move one's stomach in and out. Do it in the sets of say 20 times each. As we get tired, muscles become stiffer and movement of the stomach becomes more and more slow and difficult. In such a state one can seek assistance of fingers to press the stomach in and relax by keeping hands on the waist and fingers on either side of the navel. People with gall bladder stones should refrain from it.

Alternately do it on exhaled breath also same number of times. One can do maximum of hundred times in a day depending upon ones capacity.

It increases our digestive fire and all the organs of the digestive system are massaged.

Bahishkrit Dhauti[d]: Practice on empty stomach. Breath in through mouth in Kaki mudra and take it in to stomach. Hold it there as per ones capacity and then exhale through mouth. Slowly one should increase practice of holding the air in stomach.

As per Gherand Samhita this process requires holding air in stomach for 1hr 30 minutes and then moving it out through anus.

Do abdominal breathing 8-10 times sitting in padmasan. Then exhale and suck stomach in as if touching our spine. Hold as long as possible and then inhale afresh. Again exhale complete and suck in stomach. One can repeat this process 3,5,7… times as per ones capacity. It invigorates all the parts of our digestive system and is very beneficial.

Dant Dhauti[2]: It involves cleansing of our teeth with help of datum of Keekar or Neem tree. After this one should cleanse the pallet with thumb and back of the tongue with first two fingers. Thus phlegm is removed and taste buds are cleaned. Mouth becomes fresh and taste is restored.

Hrid Dhauti[3]: Though its name is after heart but its cleansing takes place in the food pipe only. It is known to be of two types, Dand and vastra dhauti.

Mool Shodhan[4]: Also called Ganesh Kriya, it is cleaning of the anal aperture with middle finger. Thus cleansing the hole from inside and outside, massaging all the muscles in it. This keeps it in perfect condition and removes any onset of diseases like piles, worms, constipation, skin problem etc.

Jihvamool Dhauti: This procedure cleans our throat, strengthens our tongue, improves our voice and removes stuttering of speech. Tongue is used for speech as well as taste. For this procedure with the help of three fingers cleans the back side of tongue from above and underneath. Then with the help of fingers pull the tongue many times as if milking it.

Kapalrandhra Dhauti: To clean the kapal randhra, we use our thumb on pallet, both hard and soft part, properly. It removes the problems of forehead. Headaches are removed and poisonous secretions which turn in to ulcers at later stages are also ejected from body.

Kapalbhati : Some places it is also described in three ways as Vaam kram[1], Vyut kram[2] and Sheet krim[3]. As its name suggest it is cleansing of our forehead area. Vaam kram[1], it is a kind of forceful anulom viloma but starting from right nasal passage. Inhale with force from right nasal passage, exhale with force from left nasal passage; inhale with force from left nasal passage and exhale with force from

right nasal passage. This forms one cycle. Repeat it a number of times. Both passages of our nose should be open. It removes all kinds of waste from our nasal cavity as well as forehead.

Second Vyut kram[2] involves drinking water from mouth and expelling it out of nose. Thus phlegm is removed.

Sheet kram[3] involves sucking water through nose and expelling through mouth. It provides youthfulness, decrepitude never figures, phlegm is removed.

Basti kriya: It is also of types. One is called Jal basti and other is called Thal basti. For Jal basti sit in clean flowing water of a river or in a tub in utkat asan with water up to navel. Insert a pipe in anus. Thus water will rise inside the intestines. One can do nauli prakriya and then expel the water out of the system through anus. This will clean our colon of any kind of degenerating stools etc. Urinary disorders cured, digestive disorders cured and vaat dosha removed.

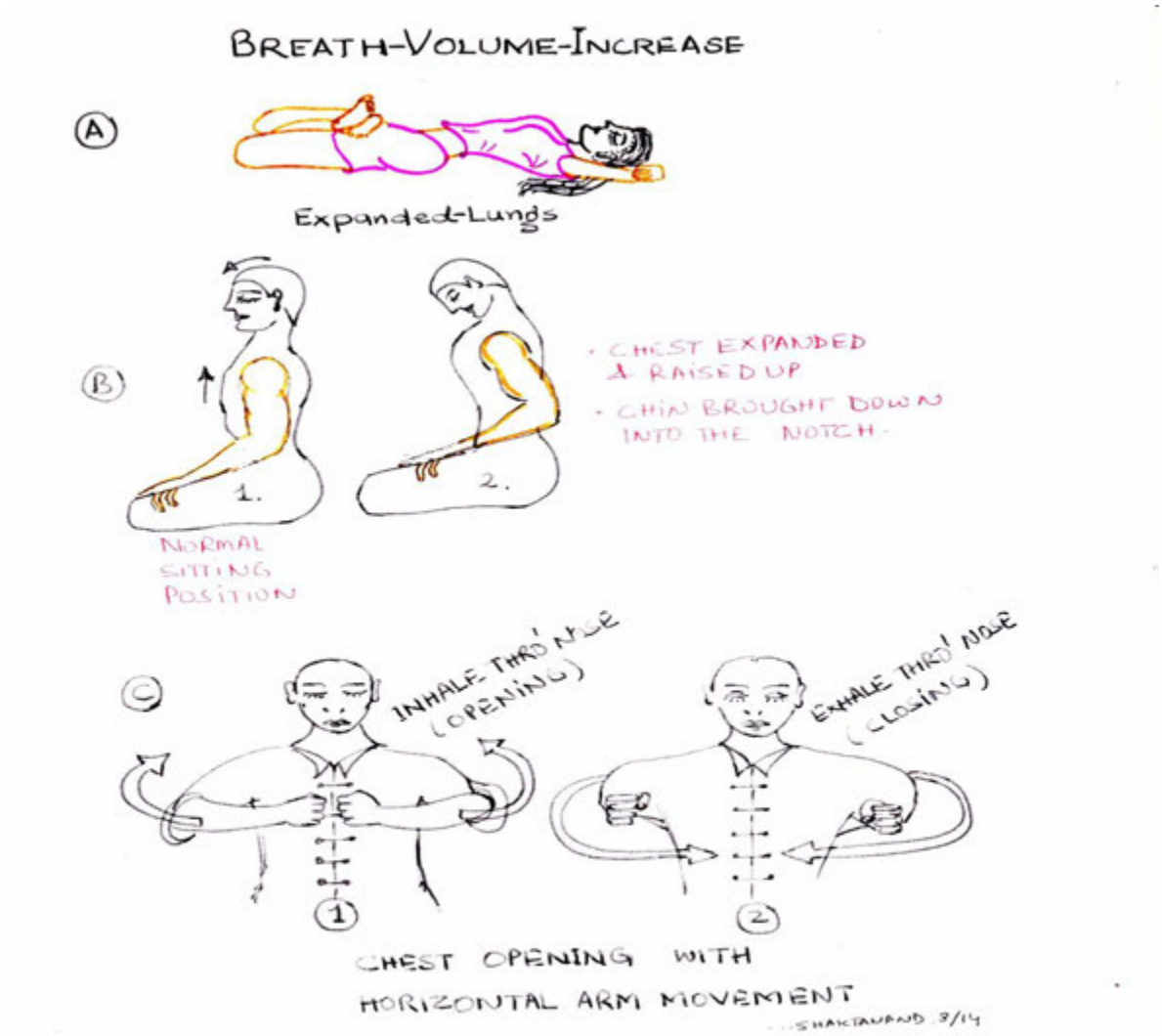
Thal basti involves positioning in paschimotanasan, performing nauli movement and then ashwani mudra. It removes constipation, increases digestive fire and reduces flatulence.

Nauli: This is also of two types, one is called Dakshin (right side) nauli and other is called Vam (left side) nauli. It cleanses our digestive system and massages all organs their and thus improves their working capacity. It is also used for awakening of kundlini, where it is rotated in particular manner for a longer duration of time.

Tratak: Take one to 1.5 inch diameter black circular paper. Stick it at level of one's eye while sitting in front of a wall at a distance of approximately two feet. Relax and watch your breath a few seconds. Then focus your gaze at the centre of this black circle without blinking till tears start flowing from your eyes. This practice may be done once only. Thus the eyes get cleansed, its power increases and the gaze becomes penetrative and focused. Though it is a Dhyan kriya, but can be used for cleansing also. One believes that it is to be used ultimately in Antrik Tratak.

Most of the cleansing techniques discussed here are yogic but many special kriyas for cleansing are mentioned in tantric texts also. We have not gone in to their detail here

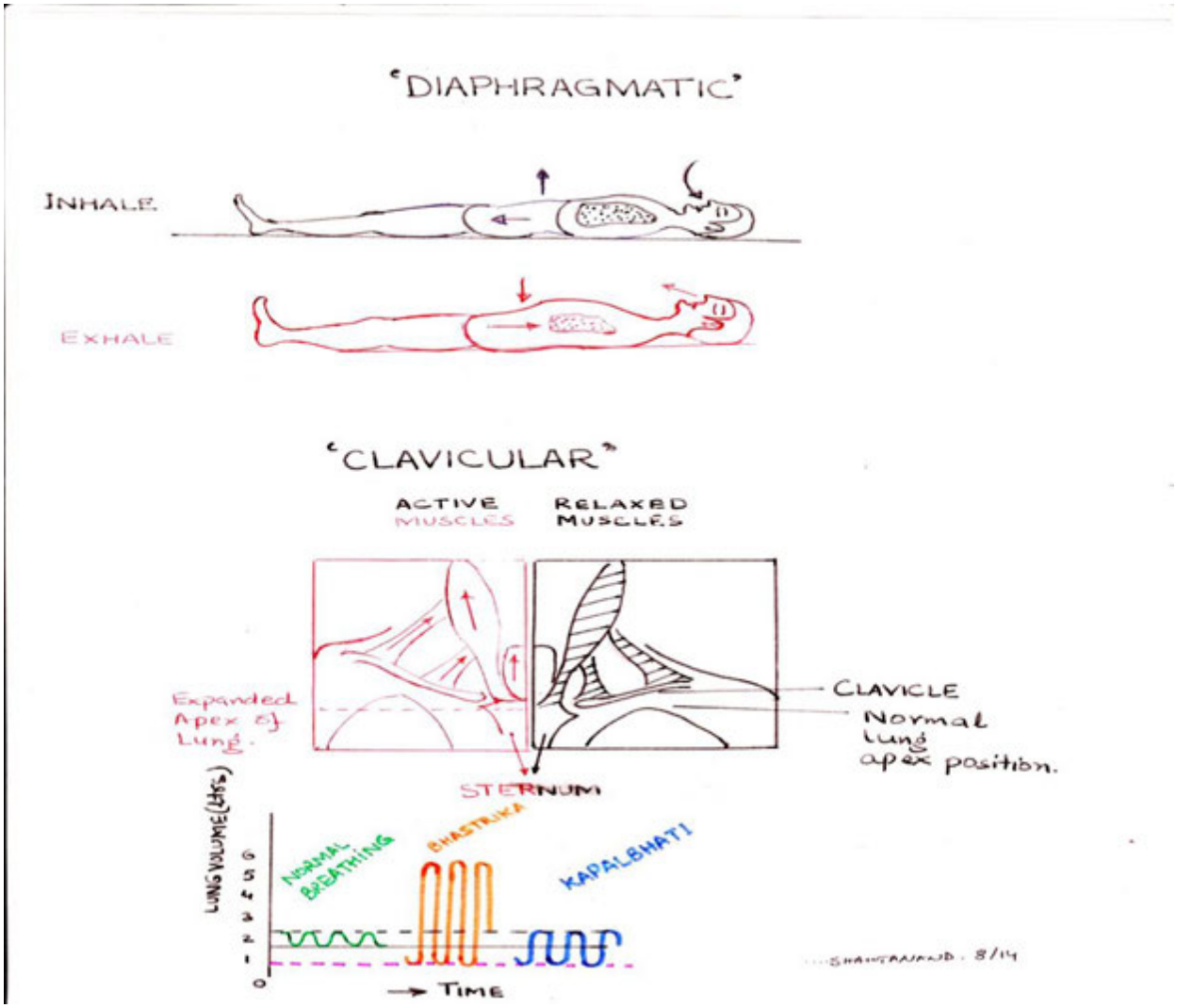
Before going in for yoga, one firmly believes that one should undertake various cleansing techniques as devised by our ancient yogis. Doing thus, further practices become easier to perform and experience. Various cleansing procedures can be tabulated as follows:



The second important thing necessary is deep breath capacity. The same shall be used for kumbhak during various mudras. Here we will analyze the capacity of air

in our lungs. The total air volume of lungs is 6 liters. Mostly people are shallow breathers. They utilize about 0.5 liters of volume during normal breathing. About 1.5 liters of air always remains inside our lungs and is called residual volume. Normal breathing is done in the range of 1.5 to 2.5 liters, meaning we use maximum of 3 liters capacity of our lungs i.e 50 %, while the remaining is unutilized. When d

oing kapal bhati, since it uses forced exhalation and natural inhalation, this range of breathing moves from 1-2.5 liters range. While in the case of Bhastrika pranayam where both inhalation and exhalation are forced, the breath moves in the range of 1-5.5 liters. This is clear from the graph depicted in the breathing pattern of Diaphragmatic and Clavicular breathing.



Another method to increase breathing capacity uses Ramping(already explained in post 'Yoga and Meditation' in yoga label), where inhalation and exhalation are done with steps. We increase the number of steps from say 4 times to 16 times

max. In the maximum stage, we will inhale a single breath in 16 steps and exhale it in 16 steps. Even flaring of nostrils while breathing, is said to increase the capacity by almost 10 %.

With the help of pranayam the mind becomes free of impurities and fit for meditation. The mind, controls our senses and breath, controls our mind. Our mind and breath have a secret connection, wherever either goes, the other follows. There is a continuous fight going on in this body between the breath and the mind. Most of the time the mind is the winner and hence an ordinary person moves from one birth to another as per his karmas, his desires. But a yogi spends his time to strengthen his pran every moment, so that at last when his time comes to leave his body, the mind follows the pran, and not otherwise, as the yogi exits his pran from the tenth door i.e Brahmrandhara at the top of the head.

Forward bending of spine give strength to it while reverse bending of spine give flexibility to it. Hence, a proper mix of two is essential for sitting in long duration meditation practices. Thus, a stable spine and still chitt (mind) are essential for sadhana.

Pranayam literally means 'elongation of the life force', a process by which our pranic capacity is increased. Pranayam practices have been categorized in various divisions. One is called Samvriti and Visan vritti,They are as follows;

Surya bhedi[1], Chandra bhedi[2], Ujjai[3], Kapalbhati[4], Bhastrika[5], Sheetali[6], Sheetkari[7], Kevali[8], Bhramari[9], Moorcha[10] and Plavini[11]. One is not going into the theoretical details of the above pranayam, which one can get from books, magazines and the Internet but, here I will be adding small and important details to make the practice more potent.

Suryabhedi[1]: Inhale with full force through right nostril while closing the left nasal passage. Internal retention is carried out with Jallandhar bandh. Hold the air as long as possible comfortably and then exhale through the left nasal passage. Repeat the same procedure. It raises kundlini and improves digestive power. It pacifies the nerves and due to forceful inhalation it cleanses the sinuses, removing various obstructions. This is good for people with low blood pressure, but it should not be done too vigorously by high BP patients.

Chandrabhedi[2]: It is opposite of Suryabhedi. Here inhalation is done through the left nasal instead and breath is exhaled through the right nasal passage. The left passage is connected to Ida nadi. It cools the system. It soothes the nerves but

should not be done in excess by people with low BP, and those who are too introvert. Also both of these pranayams are not to be performed on the same day.

Ujjai[3]: It is simply thorax breathing. Much has been written about it, for general details one can refer to these works. From a personal perspective, one should imagine a pillar of light energy rising through the anus and passing over the vertebral column and going up through the Brahmrandhra, or crown of the head. It is a personal interpretation. It helps raise our kundlini into Sahasrar. When in deep Dhyan, if one observes ones breath it will automatically be flowing like that. It brings about peace of mind, balances the two nadis and helps prana flow in Sushmana. It cures asthama and depression.

Kapalbhati[4]: It is a method of breathing in which the exhale is done forcefully and inhalation is done naturally with the help of the diaphragm. General description is available at many places which one can refer to. Here one would like to share that during this breathing, though, breath is going on through nose but one should amplify the feeling that it is flowing horizontally through a hole in between the eyebrows, where the nose and forehead meet. Also one should keep ones chin a little upwards for increasing this feeling. It makes our sensation at the space of ajna chakra stronger. In due course one is able to see light in ones forehead from where actual sadhana of a practitioner starts. There are great details from this point on but since it is not in the scope of the present subject one would not delve into that.

Another important point in its practice is its speed. One should do in the range of 60-80 per minute. If it is increased it will start changing into Bhastrika and if it is too slow it will not generate the desired effect. It can be experienced that if ones does around 1000x in a sitting, its effect on the fore head and mind will be self evident. Since breath is forced out, our throat has a tendency to dry up quickly, gulp down saliva or drink small quantity of water after few sets. So do it and experience. It generates introversion and should not be done longer by introverted personalities.

Bhastrika[5]: Here the breathing pattern is forced inhalation and forced exhalation both, unlike Kapalbhati where it is only forced exhalation. It provides great energy to our body and hence is good for people with low energy. But it should not be done strongly and over longer duration by people having high BP and heart ailments. They should just follow long and smooth inhalation and exhalation patterns, without jerks during breathing and unwanted stress to the system.

Sheetali[6]: As the name indicates, it cools our body. Breath is inhaled from the mouth through curled up tongue stretched out which moistens the incoming air striking our throat. Then, this breath is gulped down or swallowed. As it reaches our stomach, one feels coolness spreading there. Hold it for a few seconds with Jalandhar bandh and then exhale as in Ujjai. After odd number of cycles like 7,9,11… one should stop the practice and inhale deeply through both the nostrils and relax.

If one gets fever, immediately start this pranayam and fever will be cured without medicine. One has tried it in 102^0 centigrade fever and in just 15 minutes it was gone and did not recur. One suggests the readers to try it during fever and experience it firsthand.

Sheetkari[7]: The only difference from above is that we breath in through our open lips with teeth joined together. Many places it is explained that this one is for people with full set of teeth.

Both the above pranayams are cooling, soothing to ears, eyes and good for stomach ailments. Activate liver and spleen.

Bhramari[9]: It is pranayam to focus mind on sound. One inhales with Ujjai and closes eyes, ears, nose, lips etc. and makes sound like a bee and keeps one's mind focused there. It is advised to do it in a peaceful place. Thus night time is good for such practice. In my opinion, actually one should listen to antar naad instead of the sound produced physically. That meditative practice is best, which makes us fathom the depths of our inner Self than the outside world.

Kevali[8]: Kevali kumbhak is an advanced type of Pranayamic practice. As the name suggests, it is not only kumbhak or retention, but it should be understood as retention with very small inhalation. This can be explained with the help of simple example of putting a bucket full of water under slightly opened tap. Fresh water keeps trickling in and it changes the stale water as the bucket over flows. Kevali is also like that. We keep retaining most of the breath and only change 5-10 per cent of it at any time. As our control on breath will rise more and more, our duration of kevali will become more and more. Kevali will make our breath subtler and subtler and reduce its length more and more.

A person's breath in normal circumstances treads a distance of 12 fingers width from the nose. The goal of a yogi is to reduce it by 12 fingers and come just to the tip of his nose i.e. he should take breath from there and leave his exhalation also there. If a strand of cotton is kept at the nose tip, it should not move at all. A yogi

who has such subtle breath is called a Paramhamsa. Such a person will have all siddhis and nidhis at hand and will not be dependent upon nature for anything as he would transcend all the five elements.

Moorcha[10]: Inhale with Ujjai and hold breath internally as long as possible. By repeating this a number for times one will feel like fainting or swooning. This will slow down our mind and grant it peace.

Plavini[11]: It is concerned with floating on water. It is not taught much or explained in details. Due to its mentioned purpose, one amasses air in stomach and floats in water. A similar kind of floating is also done in Matsya asan. The more air we can retain inside, the better floating will be experienced. Though in the case of matsya asan one's body is angularly floating with nose and forehead above the water surface and the rest submerged. But if one has lots of air in the stomach like a pot, then I think the body must also be supported by inside air to come up towards the surface. In that position the body will become horizontal. A similar thing can be experienced while floating on the back. When asked the secret of it from a Himalyan yogi, it was said inhale maximum and then breathe like in Kevali. As science students, we will agree that more the air inside our body better will be floating.

Anulom Vilom[12]**:** 'Loma' means hair, 'Vi' means against order, while 'Anu' means in natural order. It can be done in two ways, i.e. Anulom pranayam and Vilom pranayam. Viloma pranayam is with ramping on both sides while anulom pranayam can be without ramping.
Anuloma pranayam reduces hypertension, high BP, cleanses nasal passages, sharpens inner awareness and quiets the mind.

Viloma pranayam is good for people suffering from low BP, soothes the brain.

There are different ways suggested by different teachers but one liked the interpretation of anuloma viloma as taught by Guru Dattatreya to his disciple Sanskriti in Jabal Darshan Upnishat on his question of how to keep ones nadis cleansed, which is as follows.

He surmised that first one should follow only those karmas as stated in the scriptures, leave all the hankering after desires and fruits of karma, follow the precepts of ashtang yoga and make one's mind still, be always truthful, perform service to learned people, always delve in the chintan of atma. Locate a good place on a mountain top, a river bank or near a bilv tree in forest where there is peace and no fear. Sit on an asan facing East or North keeping head, neck and body aligned. Close mouth and focus on the realm of moon in front of the nose tip and

visualize that in pranav bindu there the nectar of Paramatma is flowing and one is having His darshan there. Then inhale through the left nasal passage and fill up ones stomach. Hold it inside and visualize nectar of the moon spreading everywhere. Exhale through right nasal passage. In the middle of the stomach, visualize the realm of the Sun. Inhale through right nasal passage and see the appearance of the deity of the Sun. Join fire (Agni beej) 'R' with naad and bindu. Thus, chanting 'Ram' spread its energy throughout and exhale through left nasal passage. Repeat it 3,5,7,9….number of times.

Then one can add 16:64:32 ration in the poorak, kumbhak and rechak during this pranayam. In Poorak concentrate on 'A', in Kumbhak concentrate on 'U' and in Rechak concentrate on 'M'. It is said that one who does this for six months without fail, even an ignorant person generates knowledge; if one does it for one year, one would have Darhsan of Brahm. Thus, practicing daily, a yogi gets free from the bonds of this world to experience eternal freedom.

By doing this the nadis get cleansed. Various symptoms are there to gauge the cleansing of nadis. The first symptom is *lightness in body*; second symptom is *increase in digestive fire* and third is *hearing of antar naad*. Till these symptoms are experienced, keep doing practice. Such is the saying of Lord Dattatreya.

Then he explained the effects of pranayam as follows which are very interesting. According to him they should be done during both sandhyas, morning as well as evening.

By holding the breath at the nasal tip, pran comes under control,

By holding it inside naval, all diseases are removed,

By holding it in the big toe, lightness of body is achieved,

By drinking air through curled up tongue fatigue is removed, pitt is reduced and the body becomes disease free,

By attracting the air through the tongue as above, holding it in the neck slowly one should drink it. Thus all the diseases are removed.

By attracting air through Ida holding in the middle of eyebrows, one should visualize as if drinking nectar, all diseases are removed,

By attracting the air through both nasal passages and holding in the middle of navel, all ailments of stomach are removed,

By attracting through both the passages and holding it therein, all diseases of the eyes are removed,

By attracting through both the nasal passages and holding it in ears, all ear problems are removed,

Similarly, if held in the head, all problems pertaining to the head are removed. One should try them to experience firsthand.

C.BANDHAS:

After asan and pranayam, another important thing to be learned before starting mudras is bandhas. There are three bandhas explained in yogic scriptures, namely Jalandhar bandh, Udiyan bandh and Mool bandh. They are used in various combinations with pranayam and asans to practice mudras.

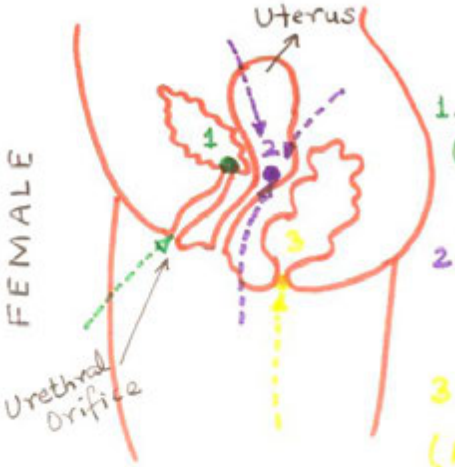
Jalandhar Bandh:

This is the first bandh and it involves the area of throat and thyroid. Normally, it is said, nectar (som rasa) which is continuously produced by our Sahasrar is consumed by the Sun energy in Manipur chakra. This bandha stops that flow of nectar from falling into the digestive fire and be wasted.

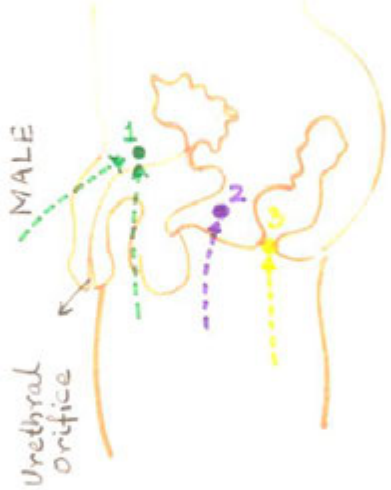
Sit in a Dhyan asan and raise the chest to meet descending chin. Chin rests in the notch of the neck between the two collar bones keeping back straight and body aligned.

Our body has two channels namely Ida and Pingla, which are cooling and heating nadis respectively. Cool energy coming from the lunar side is not allowed by the neck lock to fall into the stomach. Thus, this nectar is saved from being destroyed and hence life gets prolonged. It clears nasal passage, regulates flow of pran to heart. Also thyroid and parathyroid located in the neck are kept in good shape, alleviates the problem of hypo or hyper secretion of these glands. It relaxes the antah karan chatushtaya i.e Mind, intellect, chit and ego.

VARIOUS POSITIONS IN MALES & FEMALES



1. SAHJOLI MUDRA (Clitoris, vaginal walls & Urethra)
2. MOOLBANDH Cervix & Vaginal muscles.
3. ASHWINI MUDRA (Anal muscles/ sphincters)



1. VAJROLI MUDRA (Penis)
2. MOOLBANDH between Anus & Scortum, the perineal body.
3. ASHWANI MUDRA (Anal muscles/ sphincters)

Nasikagra gazing (Nosetip) activates MOOLADHAR

.... shaktanand. 9/14.

Udiyaan:

As the name suggests, it is associated with some kind of flying. In this bandh our pranic energy starts flying in to Sushmana. This bandh is applied on empty stomach and exhaled position. It can be done sitting and standing. But for learning and experiencing it in strong way one suggests it to be performed while standing.

Stand with feet 1-1.5 shoulder width apart. Raise chest and lower chin comfortably on to it. Bend forward keeping your hands on your thighs. Inhale fully through nose and then exhale fully. Suck in your stomach as if touching it with your spine. Slowly without removing the neck and stomach lock, come up into standing position with hands on the frontal side of pelvic. Take leverage from the hands to make the stomach lock more acute. Hold as long as possible and then remove stomach lock, bend down again, remove your chin lock and inhale slowly to prepare for next cycle. Stomach is sucked in from both above and below the navel. With the help of this, one experiences Unmani.

With Udiyaan bandh both Ida and Pingla get balanced, cause Sushamana to open and pran flies into the Sushumana. Those who practice it regularly, keep young. It massages the digestive organs. When diaphragm is lifted, heart muscles are lightly massaged. It removes toxins from digestive system and increases the gastric fire. If this bandh is properly applied, it generates the other two bandhas automatically also. Through experience one will know it.

Moolbandh:

This bandh is in the region between anus and scortum in men and at the end of cervix on the mouth of Uterus in women, as shown in the sketch above. This area is contracted and lifted up while sitting in Padmasan or in Sidhasan, when the heel is also pressing it. The lower abdomen gets sucked in towards the spine. Apan vayu which normally flows downwards (operates in the area between navel and anus), it is made to go up and meet pran. It helps us to gain control over secretions which flow downwards, i.e. seminal flow, urination and defecation. It should not be misused. It is seen that while sitting in an asan if we fix our gaze at the nose tip or even contract our pupils just a fraction Moolbandh is experienced. All learned readers might already know this and if not then can try to experience.

Pranapanau Naadbindu moolbandha chaiktaam,

gatwa yogasya sam sidhi yachato na atra sanshayah,

Apan pranyorekyam kshayo mootr purishayah,

Yuva bhawati vridhoapi satatam mool bandhanat,

Apane Urdhvge jate samprapate vanhimandlam,

Tadanal shikha deergha jayate vayu naahata. 64-66/3 /HYP.

With help of moolbandh a yogi joins downwards flowing pan with pran and bindu and thus grant sidhi to the yogi, there is no doubt about it. By joining of Pran and Apan and reduction in urine even an old person becomes young. When apan moves up and joins the realm of fire there, digestive fire gets stronger.

It is said that once we learn these three bandhas, we are at the cross roads, either we can go back in to the world to enjoy bhog or we can take the path of self-realization.

Many different combinations to practice the above bandhas are available in various texts but we have discussed only the basics of it from a practical point of view. Lots of scientific research work has been done by stalwarts like Sh.BKS Iyenger, Paramhamsa Sivananda ji and Paramhamsa Satyananda Saraswati ji. Paramhamsa Vishudhananda ji took it to still greater heights with his Chatwari kriya and all the things he use to do. The Sadhna paksh of his lineage has been dealt with in detail in the writings of his great disciple Gopinath Kaviraj ji. Sant Gyaneshwar ji's interpretations are also good to read and meditate on. Great detailed work on pranic energy has also been done by Swami Yogeshwaranand ji of Yog Niketan, Rishikesh.

One is of the view that without understanding the theoretical part and philosophical part, the complete benefits of the technical part will not be experienced. Understanding of the fundaments is essential for serious sadhaks. People can just follow the technical part alone to receive some benefits on the physical level. For details, one can refer to the works by the above mentioned gurus, which are easily available in print as well as on the internet. But it is comprehendible only to a sadhak, who experiences and does not just read it. These jewels are spread in various Upnishads, Purans, Patanjal yoga sutras, Hatha yoga pradeepika, Goraksh samhita and many Tantrik texts to name a few. Those interested in deep study, may read the originals and with the help of able guides experience them too.

D .<u>Mudras</u>:

As per Hatha Yoga Pradeepika,

Updesham hi mudranam, yo date sampradayeekam,

Sa aiv Shri Guruh Swami, Sakshaat Ishwar aiv sah,

Tasya Vakyoparo bhutwa, Mudrabhyase samahitah,

Animadi gunaih saardham, labhate kaalvanchanam.129-30/3/HYP

A guru who gives instructions on this subject in the lineage of nath yogis is Ishwar (in human form). By practicing as per his instructions, a disciple can achieve great sidhis(powers) and transcend death also.

Raj yogam bina prithvi, Raj yogam bina Nisha,

Raj yogam bina Mudra, Vichitrapi na shobhyate.(126/3/HYP.)

Stopping the flow of chit vritti and joining it with atma represents the path of Raj yoga. Without knowing it, one cannot know Earth, night and special mudras.

As earth is dug up with machines to find precious stones in it, in the same way with the help of mudras we move in various parts of our body to excavate various jewels. Use of mudras is helpful in removing the anxiety of mind, stillness in body & mind both is also achieved. In all, there are three bandhas and 22 mudras. Three bandhas are essential to be known beforehand, prior to diving into practice of mudras. Relaxation of both body and mind are also essential for experiencing various mudras, though we are not dealing with the subject of relaxation here. One understands that whosoever will practice these things will surely know how to relax first. Mudras destroy various diseases like cough, asthama, spleen enlargement, leprosy etc. twenty kind of different diseases are removed by it. It is said that one who practices mudras regularly has nothing to fear of. No disease can ever visit that body.

Mudras affecting various glands in our body: If different glands function improperly than our body will become a plying field of various diseases. Mudras are more subtle than asan and pranayam. They are generally divided into two basic

forms; first is **Hasta mudras** and second is **Yogic mudras**. Hast mudras have been explored in great length as is clear from various poojan hast mudras. Details of such mudras are abundant in tantric shastras and here we are not at present dealing in them as that itself will become too big a subject that our attention on yoga mudras will get distracted. Further, yogic mudras can also be divided under two heads, first those which effect Glands, second those which affect our Pran.

***HAST(HAND) MUDRAS*:**

Hand is an important part of the body not only from the movement part of it but from many angles too. Astrologers can read the lines on palm to predict future, one can read the shape and lines to gauge the personality and so on. Just by one glimpse of it one can read major lines and mounts on the hands and even roughly know material and spiritual state of particular person. Thus we can say, it is an important part to size up the owner of it.

Still a more subtle part has been used in the Ayurveda, where a hand is used to control various elements in our body. While Swar Shastra controls elements in our body with the help of swara in conjunction with mudras to reap various benefits. Anyway, Swar Shastra is not the point of discussion here. Right now, we are concerned with the topic of hast mudra. An exhaustive kind of work has already been done by our ancient seers. Tantra and Vedic poojan methods deal in scores of mudraas for appeasing the deities, many mudras are used in our traditional dance forms too.

In general, our hand has five fingers, which represent five elements. These are depicted in the sketch below. Whichever is touched with the thumb, that very element starts increasing in our body, while whichever is pressed down by thumb starts reducing in our body. Our body is based on three humors, namely Vaat, Pitt and Kaph. Pitt and Kaph, these two humors are closely connected. If anyone decreases, other increases automatically and vice versa is also true. Mudras for controlling these three humors have also been shown below.

HAND-FORMS

NOTE:-
Reduction of KAPH will increase PITT &
Reduction of PITT will increase KAPH.
Hence combination can be generated to enhance effect of any.

VAAT KARAK

NOTE
MUDRA holding time 15 to 45 minutes maximum in 24 hrs.

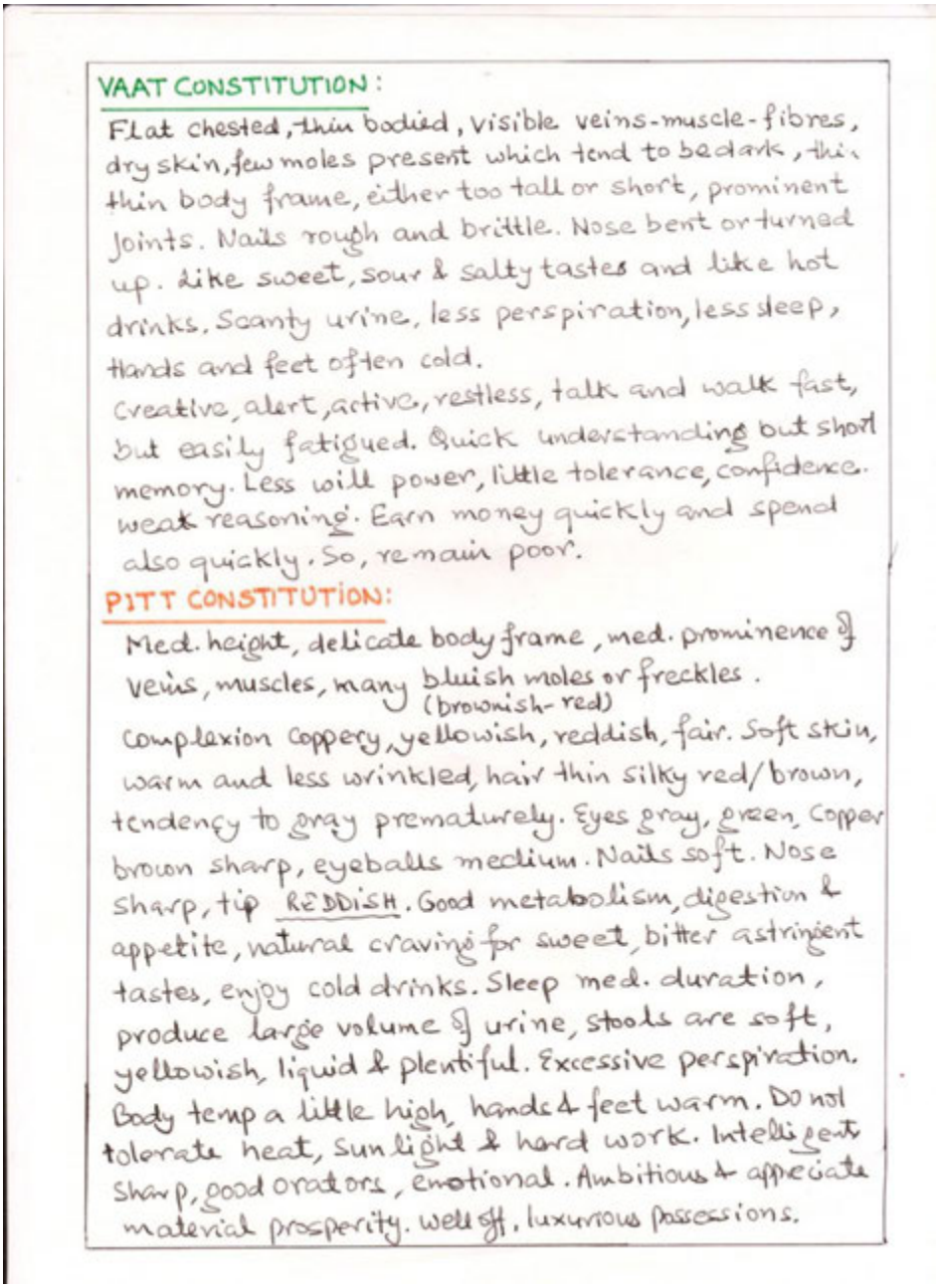
KAPH KARAK

Mrit Sanjivni Mudra
or
Hrid Mudra

NOTE
for details refer "HEALTH AT YOUR FINGER TIPS" by Dr. D. Gala.

PITT KARAK

An extra Mrit Sanjivani mudra has been shown also known as Hridh mudra. This is said to be very helpful mudra during heart attack. If one is not having immediate medicine at hand then one should resort to this mudra as it will help the patient in distress.



VAAT CONSTITUTION :

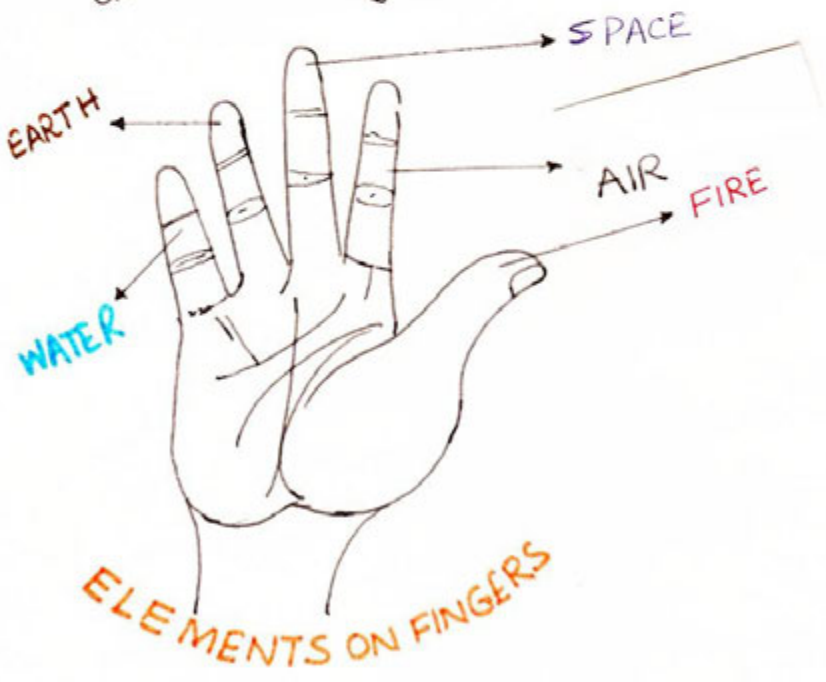
Flat chested, thin bodied, visible veins-muscle-fibres, dry skin, few moles present which tend to be dark, thin thin body frame, either too tall or short, prominent joints. Nails rough and brittle. Nose bent or turned up. Like sweet, sour & salty tastes and like hot drinks. Scanty urine, less perspiration, less sleep, hands and feet often cold.
Creative, alert, active, restless, talk and walk fast, but easily fatigued. Quick understanding but short memory. Less will power, little tolerance, confidence. weak reasoning. Earn money quickly and spend also quickly. So, remain poor.

PITT CONSTITUTION:

Med. height, delicate body frame, med. prominence of veins, muscles, many bluish moles or freckles. (brownish-red)
Complexion coppery, yellowish, reddish, fair. Soft skin, warm and less wrinkled, hair thin silky red/brown, tendency to gray prematurely. Eyes gray, green, Copper brown sharp, eyeballs medium. Nails soft. Nose sharp, tip REDDISH. Good metabolism, digestion & appetite, natural craving for sweet, bitter astringent tastes, enjoy cold drinks. Sleep med. duration, produce large volume of urine, stools are soft, yellowish, liquid & plentiful. Excessive perspiration. Body temp a little high, hands & feet warm. Do not tolerate heat, sunlight & hard work. Intelligent sharp, good orators, emotional. Ambitious & appreciate material prosperity. well off, luxurious possessions.

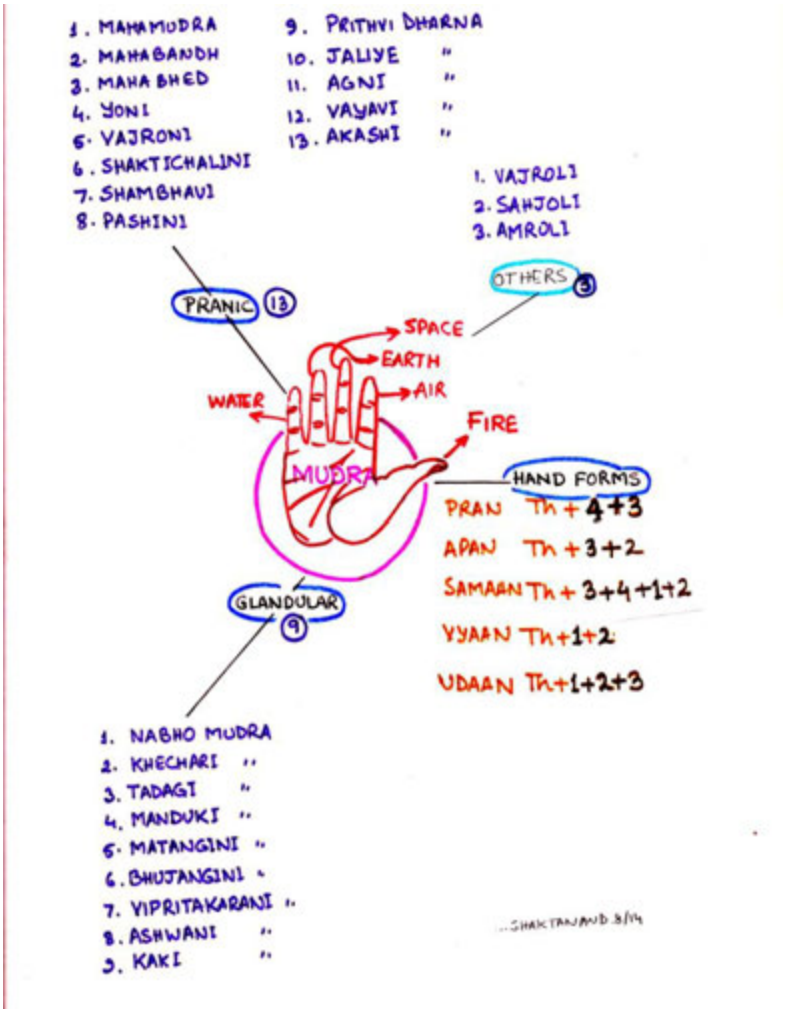
KAPH CONSTITUTION:

Well developed bodies, carry excess weight, broad and extended chests, thick skin, veins etc. not seen, prominent bones, soft-lustrous-oily skin, hair thick dark, wavy, soft, eyes dense, black-or-blue, white of eyes generally too white, large and attractive. Digestive fn. slow, slow-n-less eater, like pungent, bitter-astringent foods, stools soft-evacuation slow, sound-prolonged sleep, good stamina, happy and peaceful. Tolerant, calm, forgiving, loving, exhibit traits of greed, attachment, envy, slow comprehension and understanding, but once understood very good memory (long time.) wealthy, earn money and hold onto it.



People belonging to these humors exhibit specific traits as detailed above. But it is very difficult to find a person of only one single humor. Most of us are a mix of them. But for the information of learned readers, those traits have been shown above. For further details in it, one can refer to very handy book 'Health at your finger tips' by Dr. Dhiren Gala. One found it to be interesting, informative and practical.

YOGIC MUDRAS: These have been divided into three heads of Gandular, Pranic and Others. Third classification has been created since some were not mentioned in the first two categories by a particular scripture and hence to give maximum information to the readers one has included them too.



MUDRA CHART

Glandular Mudras:

1. Nabho Mudra:

Sit in any comfortable dhyan asan. Close ones eyes, upturn ones tongue and touch its tip to the soft pallet. Slowly, start rotating the tip slowly over it as if massaging that area. Try to taste the nectar there which is coming from above. It has secretion of the Pituitary gland, located in the middle of our brain and which is king of all the endocrine glands in our bodies. It is responsible for masculinity (spermatozoa stimulates tissues in testes to elaborate testosterones) in males and femininity in females (crafian folliele in female ovary). If this secretion is less, it results in dwarfism.

2. Khechari Mudra:

In this, tongue is taken further back and up towards the nasal passage. For this, one has to have a longer tongue which can draw up to that space. Yogis devised methods to elongate tongue. First practice, involves use of Sendha salt. Put some on ones tongue and with forefinger and middle finger start as if milking it. A regular practice of it will entail elongation of it. In other more serious approach, yogis use to cut frenulum below the tongue over a period of time, thereby allowing the tongue to roll back more and more. Thus they could raise it up in to the kapal kuhar and taste the secretions coming from Pituitary gland. Hatha yoga pradipika eulogizes this mudra so much that one feels that it is beyond the capacity of any langage to praise it. A few of such slokas are being shared here.

Chitam Charti Khe Yasmad Jhivah Charti Khe Gatah,

Tenaisha Khechari Naam Mudra Sidhair Nirupita. 41/3.HYP

Mudra with the help of which Chit starts to fly in the sky between eyebrows and tongue also starts moving there is called Khechari.

Na rogo maranam tandra na nidra na kshudha trisha,

na cha moorcham bhavetasya yo mudram veti khechareem,

Pidyate na sa rogen, lipyate na cha karmana,

badhyate na sa kalen, yo mudram veti khechareem. 39-40/3/HYP.

One who knows Khechari, disease, death, sleep and unconsciousness do not occur. That yogi is powerful enough to win over death. Whatever action he performs, he is not bound by its fruit. That is why even death can't do anything to him. We can say that he gets *iccha mritu*, death as he desires.

Khecharya Mudritam yen, Vivram Lambik urdhawtah,

Na tasya ksharte binduh, kaminya shaleshi tasya cha,

Chalito api Yada Binduh, Samprapto yoni mandala,

Vrajatya urdhava hritah, nibadho yoni mudraya,

Urdhwa Jivah sthiro bhutwa, sompanam karoti yah,

masardhen na sandeho, mrityum jayati yog vit. 42-44/3/HYP.

By its practice, a yogi, whose tongue reaches talu randhra and drinks the nectar there, his semen is never lost. Even if it falls to the yoni mandal, with the effect of yoni mudra it is re attracted to its source.

Nityamsomakala poornam Shariram yasya yoginaam,

Takshkenapi dranshtasya visham tasya na sarpati,

Indhnani yatha vnahih tail varti cha deepakah,

tatha somkala poornam, dehi deham na munchati. 45-46/3/HYP.

One whose body is filled with nectar even if the deadliest of snakes bites that person, he is not affected at all. As fire does not leave the material on which it is thriving, like a lamp never leaves its wick in the same way a yogi who is filled with nectar never leaves his body.

3. Tadagi Mudra:

The literal meaning of tadag is 'pond'. Thus in this mudra, we exhale and suck in our stomach as if we are joining it with our vertebral column. It affects our Pancreas which is 6-8 inches long, almost one inch thick and weighs around 3oz. It secretes insulin, which is essential for sugar metabolism in our bodies,.omr else it will cause diabetes.

4. Manduki Mudra:

Manduk means 'frog'. One can see a frog moving its tongue with great speed to catch small insects from the air. It quickly moves its tongue in and out of mouth. One is also supposed to move ones tongue like that quickly. It will stretch our tongue, all the veins, arteries and nerves attached to it along with muscles. Thus salivary glands and taste buds will function better. I think it affects our thyroid area also. One retains perpetual youth and the hair, do not turn grey easily.

5. Matangani Mudra:

It is a mudra which is learnt from elephants. Elephant can draw in and spray out water through its tongue very easily. Here also we try to copy and elephant. First take a glass of warm water with little salt in it, dip ones nose in to it and inhale it through both the nasal passages. After taking in from nose spit out through mouth. One can do this with one glass of water. After this reverse the process i.e now drink through mouth, instead of taking it down through food pipe, bring it out from nose as an elephant does. This is called Gajkarni, where 'Gaj' means elephant in the Hindi language.

6. Bhujangani Mudra:

Bhujang means a snake. This mudra replicates a snake and hence its name. It cleanses our blood, increases our digestive power and alleviates rheumatism. Where throat and nose meet, adenoids are located. Sometime they get enlarged due to cold etc and close the passage thereby making breathing difficult. They are kept in perfect condition by this mudra. Also on either side of palate and throat in the arches lie tonsils. They are also kept in good condition. Cure arthritis and

rheumatism. Ailments of stomach, dyspepsia and gall bladder ailments also cured through it.

7. Vipritakarani Mudra:

In this mudra navel is kept above the palate and hence called Vipreetakarani. For performing this mudra one should like down on the floor with face up. Raise torso up so that legs are pointing straight upwards. Support back with hands keeping thumbs inwards and fingers outwards. Unlike Sarvangasan, where shoulders to heels and toe tips are vertical and in one line, in this mudra, body from shoulders to hips are at 60-70 degrees angular to floor level, while legs are vertical. Thus moon in the palate gets down, while sun in the navel is brought above. Thus moon does not fall into the Sun and deplete its power. (When we are sitting or standing palate being above loses it's nectar in to Sun of navel and hence cools down its fire.) Sun gets stronger and stronger. Whatever is eaten is digested easily. But one should not fast or eat less during this practice as it will cause harm to our body.

Alp-haro yada bhaved, Agnir dahati tatkshanat,

Adhah Shirashch urdhav padah, Kshanam Syat prathame dine,

Kshanat ch kinchid adhikam, abhyaset ch dine dine,

Valitam palitam chaiv, shanmasordhave na drishyet.

Yag matram tu yo nityam, Abhyasetas tu kaaljit. 82/3/HYP.

If one eats less food during practice of this mudra then increased digestive fire will burn up the body. First day practice should be for a small time and one should increase the timing slowly every day. Thus in six months all diseases will be removed and one would become powerful. If this practice is maintained for 3 hrs in a day then one can overcome even death.

It removes problems due to imbalance of Vaat dosha. It affects Pituitary gland, kidneys, testes and gonads.

8. Ashwani Mudra:

This mudra copies a horse. If we see a horse from the back side we will observe that it keeps moving its anus in and out. Yogis felt that such a movement helps one to raise ones energy up. Thus they also practiced to move anus in and out by contracting and expanding it. This helped raise the kundlini through Sushmana up towards Brahmrandhra. While sitting in any of the dhyan asans, one doing this mudra can easily feel energy rising through the Sushumana and hitting our Brahmrandhara. It gives strength to our intestines, Colon which turns liquid content of small intestines in to solid by absorbing the liquids and discharging the solid feces out of anal opening. It is said 7.5 to 10% water liquid is absorbed by it. If it is not strong, we will lose liquid in our stools. It cures dysentery or atisaar.

9. Kaki Mudra:

Kaki means a 'crow', which is seldom seen to be ill. Here, lips are puckered up as if whistling and air is sucked in with great force through them. The air should hit throat inside. It is gulped down in to our stomach though esophagus, food pipe and held there for a few seconds and again exhaled out of mouth. When air goes in stomach it cleanses it and it becomes stronger. It generates Gastrin*, when it moves with blood, makes our mind strong and body disease free.

*Gastrin is a hormone produced by the lining of the stomach and released in to blood by nerve impulses that are initiated by tasting food or by its presence in stomach. It stimulates secretions of Pepsin, a protein splitting enzyme, Hydrochloric acid and stimulates contraction of stomach walls.

Salivary glands located at the rear and sides of the tongue produce Saliva which help breakdown of starches in to Dextrin and Maltose, dissolves solid food and makes it ready for further action in the intestines. It also lubricates the mouth and helps to move the food down the Esophagus, the food pipe.

Pranic Mudras: Apart from above 13 other mudras have been mentioned in the yogic shastras and they are connected with our pran vayu.

1. Maha Mudra: Extend right leg in front with toe pointing up and fold left leg so that its sole is touching the inner right thigh, inhale through nose, hold your right

toe with both hands. Close your anus and perform jalandhar bandh (neck lock) simultaneously keeping your back straight. Perform breath retention as long as one's capacity and then removing jalandhar bandh slowly exhale through nose. Repeat the process without extra breaths in between i.e one should develop the capacity to perform it with each breath and thus repeat as many number of times as one has fixed in sadhana.

Chandrange Tu Sambhyasya, Suryange punah Abhyaset,

Yavatalla bhavet sankhya, tato mudram visarjayet.

First practice on the left breath and then on the right breath. Thus practice kumbhak pranayama on both. Till it is done with equal numbers, do not leave the mudra position.

Na hi patha apathyam va, rasah sarvai api neerasah,

Api bhuktam Visham ghoram, Piyushamapi Jiryati. 16/3/H.Y.P.

There is no good or bad path for a yogi who practices this mudra. Whatever tasteless things he eats he can nullify negative reactions, even if he eats poisoned food it turns like nectar..

2. Mahabandh Mudra: This is performed in sidhasana with heel pressing the mooldhar space or in utanpad asan with right leg stretched front while one is sitting on the heel of folded left leg underneath s shown in the sketch. One uses khechari, ujjai while inhaling,with mool bandh and shambhavi mudra. It should be performed four times in 24 hours for a period of 2 ghadi i.e 48 minutes. It is also recommended to be performed three times in one sitting as one's guru always stressed on quality than quantity. At some places they have recommended it for 12 times in one sitting for advanced students.

3. Mahabhed Mudra: After Mahabandh comes the state of Mahabhed. As the name suggests it is a great piercing technique. It pierces the chakras and moves the pran in sushmana. As the earlier one, this also can be done in two different asans, Sidhasan or Utthanpaad asan. With heel of the left foot on the mooladhar and perform khechari and exhale complete. Bend head forward and raise breath with ujjai from frontal passage to vishudhi. Raising one's head raise the energy to bindu in shikha. Then descend it through sushmana back to mooladhar. On reaching mooladhar in the position of bahiya kumbhak apply jalandhar bandh, moolbandh

and udiyan bandh all together with the nose tip gaze. Hold the breath, as long as convenient. Run the consciousness from *nose* tip to *udiyan* and to *moolbandh* in bahiya kumbhak. Remove nose tip gaze, moolbandh, udiyan bandh and jalandhar bandh. Relax your body and be ready for next cycle. One may do three cycles of it. It focuses the mind, awakens kundrlini and grants spiritual knowledge.

It cures diabetes, leprosy, increases digestive fire, makes the pran fly up in to Sushmana and makes the Kundalini to wake up.

As per Hath Yoga Pradipika, its explained as per following sloka.

Mahabandh sthito yogi, kritva Poorakamekdhoh,

Vayunaam Gatim avartaya Nibhritam Kantham mudraya

samhast Yugo bhumau, sfichau sam tadyet shanaih,

Putdwayam atikramya vayu

Som Surya Agni sambandho Jayate Cha Mritaya vai,

Mrita avastha samutpanna, tato vayum virechayet,

Mahabhedo Ayam abhyasaan, mahasidhi pradayaka,

Valoplitvepaghnah, Sevyate Sadhak uttamah. 26-29/3/ HYP.

After holding the position of mahabandh, a yogi should focus his mind and do poorak. Putting both hand on the floor, he should lift his hips a little up, with left heal in mooladhar place, should make it hit the floor again and again. Doing this, life force leaves Ida and Pingla and enters Sushumana. Then through these three nadis, representing Moon, Sun and Fire grants nectar to the practitioner. As a state of death approaches, exhale. This practice gives great sidhis. Many diseases are removed by it and great practitioners do it regularly.

4. Yoni Mudra: Sit in sidhasan, inhale through nose. Perform moolbandh, jalandhar and udiyan bandh. Let the pranic energy fly in to Sushmana. Raise it chakra wise experiencing the light there and in the end make it meet the Shiva in Sahasrar for ultimate union. Experience the bliss coming out of this union and taste this nectar.

Consider oneself as Shakti, joining with purusha, full of bliss, realize Aham Brahm Asmi. Contemplate deity within ones heart.

5. Vajroni Mudra: Taking support of a wall stand upside down on hands. It increases outer life force, makes our body extremely strong. It guards our semen and provides celibacy. It increases the power of all the nerves in our body.

6. Shaktichalini Mudra: As the name suggest, it deals with movement of pranic energy in our body. Though various pranas are all the time moving in our body but the movement one is suggesting under the force of our will power. We should be able to move the pranas along different channels as per our desire. This simply is not only a cause but also effect of various sadhanas done by a practitioner.

Many do it in vajra asan. Sitting in asan one is supposed to contract and relax the penile muscles. One can do it in sets of 15 to 20, three to five times. But one finds the above practice much more powerful, subtle and rewarding. Apart from this, if one gets accomplished in it, self-healing, outside body healing and par kaya parvesh are all advanced states of this kriya.

7. Shambhavi Mudra: It helps to pacify our vrittis, focus our Chitt, snares our budhi (intellect). After doing Shanmukhi mudra, concentrate on the center area between the eyebrows, find bindu there. Fix mind on that bindu. Bring Atma there and experience the perpetual bliss of this state and enter Samadhi.

It is said depending upon the amount of power available in a chakra, the number of petals are formed. Thus according to it, if petals are four the total power available will be less than in a chakra where petals are sixteen. Raise the power of kundlini through the chakras into Ajna chakra.

Here we are dealing with only a small practice for elemental dharans (concentration) for all the readers.

8. Prithvi Dharana Mudra: It is one of the five elements of creation in the cosmos. Whatever gross is seen around us is because of manifestation of prithvi tattwa. It is represented by a yellow square. Its attributes are stability, mental concentration,

smell, while the chakra connected with it is mooladhar. Generally, it is visualized between knees and ankles. It represents Bhu loka.

Fix a yellow square paper at eye level around two feet away. Concentrate on it. Take it inside the eyebrow centre and start focusing on the attributes listed earlier. Keep on visualizing yourself as earth, heavy and stable, source of all smells, power of attraction, dryness, which can imbibe all elements, which is all giving like a mother, capacity to cover, hardness and capacity to pardon.

9. Jaliya Dharna Mudra: During the process of creation water was the first gross kind of element which came in to form as Space, Air and Fire were still subtle to it. All kinds of liquids come under it. It is represented by crescent moon and extends from knees to navel in our body. Physiologically seeing one would agree to it as most of the organs dealing in liquids fall under excretory system and procreation system located here.

Make a half crescent moon sticker which is silver or grayish in colour and fix as explained above and meditate on it. Or else we can sit on a river bank and meditate on the water flow, its attributes like life giving element, representing liquids of the cosmos, capability to flow, take form of any container, a cleaning agent etc. Extend your consciousness to such an extent that one feels like water element and fill up the whole universe. One should feel its attributes of subtleness, flow ability, attraction, power behind it, whiteness, coolness, purity, light emitting capability etc.

10. Agni Dharana Mudra: Its represented by red triangle. It has inherent quality of heat and fire.. Whatever is offered to it becomes fire. It is the heat of Sun, it's the power behind our eyes, it's the power behind our digestion. The main chakra for this is Manipura in the navel area. As earlier, concentrate on its yantra take it inside your eyebrow centre and bring it to Manipura. Meditate on various aspects of this element there. Feel the fire of Manipura expanding and engulfing our whole body. See yourself converting into small-small particles of fire and expand yourself to fill up the whole cosmos with it. You are that element of the cosmos and have capacity to do whatever that element can do. Inside us it is digestive fire. One can also meditate on a flame to extend ones visualization.

11. Vayavi Dharana Mudra: It is represented by a hexagon and is given grey colour. As earlier fix the yantra, do tratak on it, take it in between the brows and then transfer it to Anahat chakra space. Concentrate on various qualities of air

element, its lightness, capacity to flow, invisibility, capacity to carry anything, power behind it, its capacity to cleansing and drying up. Imagine yourself turning into air element and experience all these attributes. It increases pranic power. It cures problems of liver and spleen.

12. Akashiya Dharana Mudra: It is the subtle element in cosmos and is represented by a circle. In its crudest form it is black in colour, which is the colour of antriksh. All the creation starts taking form in darkness. It pervades everything and can enter into anything. Without its presence nothing can exist as to exist one needs space whether gross or subtle. Use hexagonal yantra for meditating on it or one can concentrate on cloudless sky. Focus more and more on its attributes and turning yourself into it experience them one by one. It increases power of heart. Lungs also get strong energy from it.

13. Pashini Mudra: Lying down face up. Raise legs straight up and carry them over the head and put them on floor, as in halasan (plough pose). Fold knees, so that head is between both knees. Then lock feet behind neck, one may bring ones arms out through the legs and kept around the hips. Dhyan is to be performed on mooladhar. It gives strength and nourishment.

OTHER MUDRAS: Vajroli and Amroli mudras can be put under this heading.

Vajroli Mudra:

It is said one who is a practitioner of this mudra can do anything as per his wish, general rules do not apply to him. Two most difficult things for a Vajroli practitioner is milk and a woman who is under control, means a practitioner should desist them. Whether man or a woman, one should slowly practice contraction and expansion to stop the flow of seminal fluid downwards.

Prepare a 14 finger long glass needle which is only that much thick that it can enter our urinary tract. Insert it one finger on the first day. Slowly increase its insertion length till one reaches twelve fingers. One should not perform this without presence of an adept else one can rupture inner membrane. After this one should prepare a silver pipe with one end curved upwards, to be inserted in to the urinary canal and blow slowly air through it and thus cleanse the passage.

Secondly, one should practice stopping the urination just when it is going to come out of body. Thus one can have better control over those muscles.

After this yogi starts to attract water through his urinary organ. When adept in this, he replaces it with milk. After that oil is used. Finally specially prepared mercury is used. It is said when one is able to hold 250 gm mercury inside for a period of three hours without letting it to fall out, Vajroli mudra becomes sidh. One has seen a yogi sucking oil through his urinary organ and then later excreting it out. Such a yogi will have full control over his seminal flow and become urdhavretas. He becomes knower of past, present and future. It is said he gets sidhi to roam in space. Even if the bindu starts flowing downwards, keep trying to move it upwards. Downward movement of bindu (seminal fluid) is death and upward movement is life. A woman should also practice in the same way.

Bindu is controlled by our Chit. If kaam bhav rises in our chit then bindu will get destabilized and have tendency to flow downwards. But if our Chitt is still nothing can happen to our bindu.

Sahjoli:

Sahjolish amrolirvajrolya bhed ektah,

Jale su bhasm nikshipya dagdh gomaya sambhavam,

Vajroli maithunat urdhava stri pursoh swa anglepanam,

Aseenayoh Sukhe naiv mukt vyaparayoh kshanat,

Sahjoliriyam prokta Shrasuya yogibhih sada,

Ayam shubhkaro yogo bhog yukto api muktidah,

Ayam yogah punyavataam dheeranaam tattva darshinaam,

Nirmatsaranaam sidhyet na tu matsar shaleenaam. 92-95/3/HYP.

Both these mudras are extensions of Vajroli only. One should prepare bhasm of cow dung. When sitting in joined position, the couple should rub bhasm on to their heads, shoulders, hearts, navel, arms, stomach etc with great faith. This yoga becomes sidh only for yogis who are without any dwesha, a knower of tattva and has great courage .

As naad rises above heart it turns into Bindu. When raj and bindu join outside, children are produced but when they are joined inside, then one is called a Yogi. A woman who by contracting her yoni raises the raj up and guards it is called a yogini. Her raj is not destroyed at all. When her naad also rises up it turns into bindu. She gets the power to know past, present, future and achieves Khechari sidhi. This yog is propitious even for enjoying the bhogas of this world.

Amroli:

Leaving aside the earlier flow which carries more Pitt tattva and later flow which is without anything should be left and one should only use middle flow. According to it one should drink Shivambu through nasal passage and should practice Vajroli through maithun without letting the bindu to fall. Middle flow means chandramrit. It is also mixed with cow dung and applied on head, neck, shoulders, heart and arms. It helps increase the power of eyes. It is devised by practitioners of Kapalik lineage.

Plavini Mudra: Plava means swimming in Sanskrit. One was surprised to know that this word has same meaning in Polish language also. In this a yogi gulps in air and fills up his stomach fully with it and then he can float on water. In HYP it has been explained as Plavini kumbhak.

Antah Pravtit udar, marut aporitodrah,

Pyasyagadheapi sukhat, aplavte padm patra vat. (HYP)

One who fills up his stomach with air that sadhak can float even in deep waters like leaf of a lotus plant.

In general **mudras** give the following benefits:

Makes our mind still and focused,

Makes pran and apan balanced,

Makes kundlini rise upwards,

Cleanses various nadis,

Opens the door of Brahmrandhara, 10th door,

Helps to attain Samadhi,

Secretions of Thyroid, Pancreas, Spleen, Liver, Kidneys, Gonads etc. are stabilized.

The six karmas of **Hatha yoga** bring about the following effects:

Asan bring forth *firmness*,

Mudra brings about *stability*,

Pratyahaara brings about *Dheerta (courage)*,

Pranayam brings about *lightness* in our body,

Dhyan brings about Pratyakshata or *makes visibility of form*,

Samadhi brings about disconnection from everything or *complete detachment*. This is just the first state of Samadhi...the merging awareness of the Self...

Many different mudras are there in Kriya yoga, which are extremely powerful and have not been discussed here. Hope all the readers will like the article in same way as one enjoyed it while writing.

Note:

Should the learned readers find any shortcomings in this article series, do please overlook & forgive one. Please inform and one will try to correct them with humility.

SUKSHAM VYAYAM:

A few suksham vyayams are being given here in connection with the disease and wellness and program. Should the reader like to check more such exercises, they may refer to 'Yogic Suksham Vyayam, by Dhirender Brahmchari, Dhirender Yog Prakashan, New Delhi.

Vishudhi Chakra Shudhi: Put four fingers at the point of depression below the adams apple in line with clavicles, as per fig 1. Rest chin over it. Now remove the fingers without moving the chin or altering the neck position. Keeping gaze normal, forward looking, stand as per fig 3 with feet close to each other and body straight and relaxed.

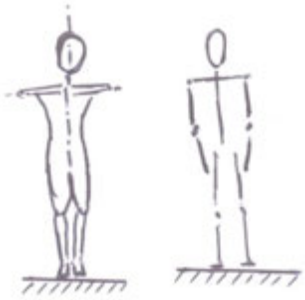


fig 1 fig 2 fig 3

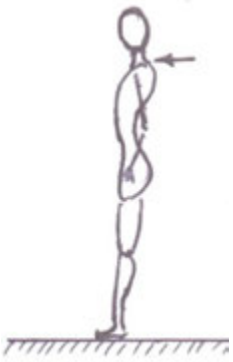
Keeping the body in this position start breathing in and out forcefully through nose. Do 25-30 times. Relax and perform 3 sets.
IT removes the effect of Vaat, Pit, Cough, fat etc. accumulated in the area. It cures stuttering of the speech, gives good shape to the neck region and is very beneficial for the singers. The whole exercise gives great power to the vocal system.

Budhi and Dhriti Shakt Vikasak: Stand with feet together, body straight and relaxed and hands on outer side of the thighs. Overturn chin as far back as possible. Keeping the gaze in front, mental focus on shikha, start inhaling and exhaling forcefully through both the nasal passages. Perform 15 x 3 sets.

fig 1

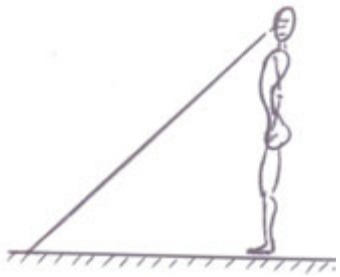
Below the place of shikha(tuft of hair kept by Brahmins on their head), is the place of realm of budhi. As per yogic literature, a nerve keeps on rotating continuously in this area providing knowledge to all the senses and organs. Because of cough movement of this nerve is restricted, which is the main cause of forgetfulness, low power of brain, non-clarity, By performing this kriya, all the cough is removed from the nerves and provide one with shinning intellect, greater memory, positive thinking.

Medha Shakti Vikasak: Stand straight as per figure shown below. Closing eyes, rest the chin in the depression below the Adam's apple. Focus mind on the hard point just below the neck.



Start inhaling and exhaling forcefully through nose with great sound of breath flaring the nostrils. It removes any cough accumulated in the region of medha Shakti(memory) and increases attractive power, pran travels into Sushumana. One starts experiencing great love.

Increasing the memory power: Stand with feet together, keeping the neck straight, bring the gaze down on to the floor as convenient. Fix dhyan on the crown of the head and start inhaling and exhaling forcefully through nasal passages. It removes all the elements from the space between forehead and shikha, which are responsible



for tiredness of brain due to longer working, gives strength to the brain to work for longer duration with clarity and provides greater memory power. It is very good for students, who are supposed to read and understand a lot during their education period.

Netra Shakti Vikasak: Standing straight as above, turning the chin upwards, throw head as far back as possible and comfortable. Now focus gaze on the middle of eye brow centre. Lock the gaze there without blinking. When tears are about to come into the eyes, close the eyes. After a few seconds again open the eyes and repeat the same procedure. Do it for 5-7 minutes regularly. It removes all the problems of the eye and provides great power of eyes like a hawk.

Karn Shakti Vikasak: Stand straight with feet together. Closing eyes, ears, nose, inhale through kaki mudra. Expand the cheeks filling breath inside and close mouth also as we do in shanmukhi mudra. Perform Jalandhar band by resting chin in to the space below the adams apple. Hold this position of antrik kumbhak as long as comfortable, then slowly bring the chin up exhaling through nose opening both the eyes.

Breath with Kaki mudra

It removes all the diseases of ears. Improves hearing power. Open sushumana path and hence helps in hearing of antrik naad.

For increasing focus, Balance:Walk on a straight line for a distance of 50 steps front and 50 steps back. Make sure to walk in perfect straight line only. It focuses

the mind, gives a great sense of balance (after some time one can walk on rope even) and makes our heart filled with happiness.

Hridgati, for increasing stamina: Stand straight with feet a little apart. Make fist and bend both elbows, so that forearms are parallel to the ground.
Step 1: Now inhale forcefully through both the nasal passages and while extending one fisted arm front so that elbow is opened only 90-95 % percent only so as not to jerk the elbow joint. Make sure both, the movement of fist and breath are synchronized. Arm moves like piston of an engine forcefully. In the second movement, bring the forward punch back and backward punch front simultaneously exhaling. Thus keep on inhaling and exhaling and simulating piston movement with arms. Do it for 3-5 minutes. Learn it properly.
Step 2: Now we will add simple jogging movement into it. When we inhale and punch front, opposite leg knee should be folded. When other punch is brought forward, opposite knee is folded, thus alternating punching will be done with opposite knee folding jogs. Hit heels on to the hips while jogging.
Both step 1 and 2 be performed simultaneously with forceful breathing and muscular power of arms. One should increase time till one reaches about 15 minutes without stop.
It is a special exercise. By joint it for 5-10 minutes regularly one can attain stamina to run 15-20 kms without any problem. Body becomes strong, well developed, lungs get very strong, one doesn't tire easily, chest becomes wider, face becomes shiny, all extra fat is removed. It is very good for athletes etc.

Jumping: Stand with feet one shoulder width apart and arms hanging by the sides. Make a full circular backward roll of both the arms inhaling through nose as shown in the figure 1 below. Jump up as in fig 2, bending the knees and the elbows simultaneously. While landing back on the floor as in fig 3, snap the arms front by extending the elbows. This completes one cycle. Repeat it 10-15 times and perform 3 such sets.


fig 1


fig 2


fig 3

This is good for calf muscles, thighs, strong feet and raising kundlini Shakti. It also helps in alleviating the problem of dwarfism.

Increasing the power of stomach: Stand straight with feet close together. Put hands on the waist with thumbs pointing towards the navel and fingers towards the vertebral column at the back. Bend from waist forward through an angle of 30 degrees as in fig 1. Inhale forcefully thorough nose by extending the stomach forward so that diaphragm is used to expand the lungs. While exhaling suck the stomach in. Continue this synchronized movement for 25 times and perform 3 sets.

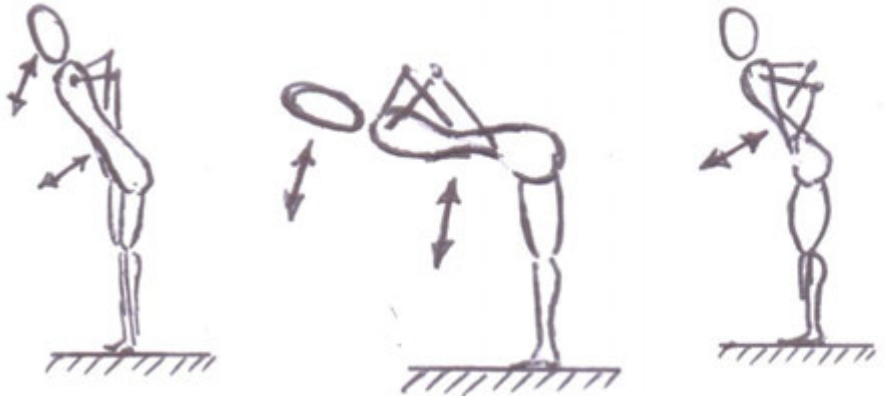


fig 1 fig 2 fig 3

Stand straight with hands on the waist as earlier. Inhale deep and exhale bending forward through 90 degrees as per fig 2. In the bent position, one is totally exhaled. Thus holding the breath out, quickly move the stomach in and out. A maximum of 100 times in 24 hours can be done. One may do it in one go or in small sets as convenient.

Position of hands and body is same as in figure 2. But in figure 3, one breathes in and out through nose forcefully with movement of stomach along with it. On inhalation, stomach is extended while on exhalation it I sucked inside.

Stand straight, looking on to the floor at a comfortable distance. Inhale through nose extending the stomach and exhale, sucking the stomach in. Repeat it as shown

fig 1 fig 2

in the figure below for 25 times. May repeat 3 sets.

Nauli Kriya: Apart from all the above, Nauli kriya, which is a typical hatha yoga kriya should be performed. After learning vam and dakshin nauli, one should be ale to rotate it. Once that has been practiced, on empty stomach, put a folded muslin cloth on the navel and wrap a cloth over it. Now move the nauli, 3.5 circle clockwise and 3.5 circles anti clockwise. For serious practice do it for 30-45 minutes. For normal practice perform a set of 07 clockwise and anticlockwise movements. Like that do 3-5 sets depending upon capacity and time. It increases the power of digestion and one is able to digest anything.

Developing Waist power: Stand straight as in fig 1 with hands at the back on either side of vertebral column. Inhale through nose and exhaling bend backwards as far as possible (fig 2) and hold position for a few seconds. Return back to position 1 and inhale. Repeat 5-7 times.

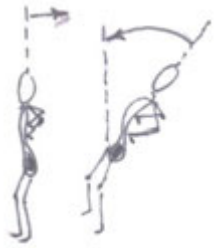


fig 1 & 2

fig 3

fig 4

Now Keeping feet one to one and half shoulder width apart as in fig 1, inhale through nose, exhaling bend forward bringing chest close to thighs and head towards the knees as in fig 3, keeping legs straight. Come back to position as per fig 1 again and inhale.

From fig 1 bend forward exhaling to fig 3 and inhaling to fig 4 (backwards). Repeat it continuously 5-7 times.

From standing position inhaling go backwards as in fig 5 and bend all the way forward exhaling through nose so that head touches ground as in fig 6.


fig 5 fig 6

Stand as in fig 7 with warms straight by the sides. Inhale and go into position as per figure 8, exhaling come to position as per fig 9 keeping arms straight.

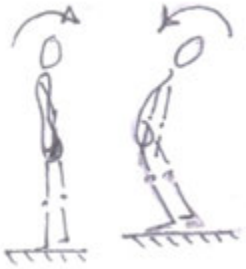



fig 7 fig 8 fig 9

Repeat 5-7 times.

Stand straight inhaled and extend arms sidewise as in figure 10. Exhaling bend from waist towards left and NOT from shoulders and try too brings left hand as closer to pelvic as possible. Inhaling return to fig 10 and bend in opposite direction towards right as shown in fig 11.


fig 10 fig 11

Repeat movements on both sides 5-7 times.

Stand about 1 to 1.5 shoulder width apart as shown in fig12. Raise arms upwards inhaling. Exhale and bend forward from left towards right in a circle, continue bending backwards, moving from right to left, inhaling complete one circle. This way, make one circle clockwise and one circle anti clockwise. Perform 5-7 such sets.

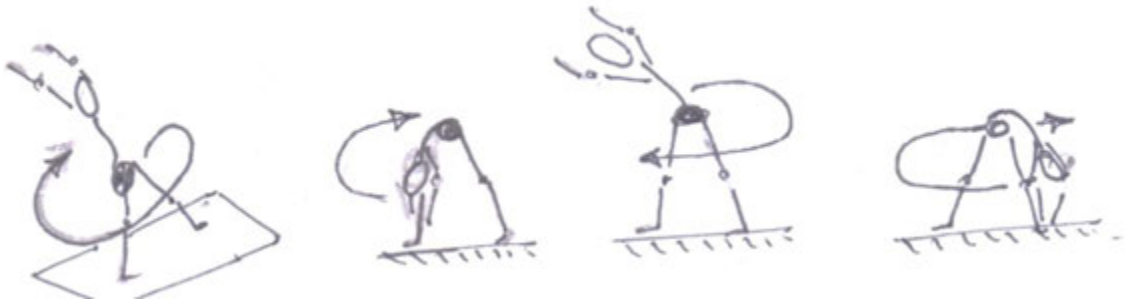


fig 12 fig 13 fig 14 fig 15

fig 12 to 15 depicts one clockwise circle. Repeat same on the other side i.e anti clockwise too.

Elbow power generation: Stand with feet one to one and a half shoulder width apart. Arms are resting by the sides, body posture is straight and relaxed. Make fists with thumbs inside. With quick movement, bring the forearms up (fig 2), keeping the upper arms and elbows locked in their same place as in fig 1. This movement should be done with full power and speed. Repeat it in sets of 15, three times.

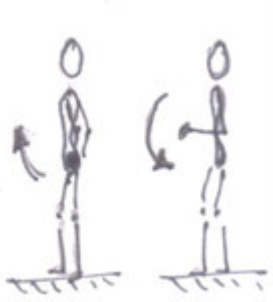


fig 1 fig 2

This ends some of the Suhsham Vyayam exercises given in the chapter on yoga. One has given various physical aspects of yog in quite details though they may not be essential for general wellness trainers. But still if someone is interested, they can benefit from the details.

****

Format – I Wellness Program: Healthy Body- Healthy Mind- Healthy Spirit

Please fill or bold the relevant columns

Personal information	
Name	
Phone Number	
email id / Facebook id	
Organization	
Address	
Bodily Measurements	
Height (cm)	
Weight (kg)	
Waist (inches)	
Body fat	
Blood Pressure	
Bodily functions	
Basic Metabolic Rate	
Body Mass Index	
Daily Calorie Intake	
Stamina	Low/ Medium/ High
Stretch and Flexibility	Low / Medium / High
Medical History	
Any Health issue	
Pain in specific area	
Major surgeries recently	
Allergies	
Past Work-out Details	
Type	Walk/ jogging/ running/ swimming/ sports/ cycling/ gym/yoga/……
Duration of session	
Intensity	Low / High / Medium
Frequency per Week	Daily / twice/ thrice / five day/ six day
Goals	
Physical level	Weight loss / Flexibility/Shape/ Disease relief
Psychological level	Relaxation **/** Positivity/ Self Control
Spiritual level	Meditation **/** Happiness**/** Feeling connected
Relationship Level	Family/ Friends/ Office
Any other goal	

Body Parameter Calculations:

Basic Metabolism Rate

Men: 88.362+(13.397 x Wt in kgs)+(4.799 x Ht in cms)-(5.677 x Age in yrs)

Women: 447.593+(9.47 x Wt in kgs)+(3.098 x Ht in cms)-(4.33 x Age in yrs)

1. Sedantary life style (No exercise at all) = 1.2 X Basic Metabolism Rate
2. Moderately Active life style (1-3 days per week) = 1.375 X Basic Metabolism Rate
3. Active Life style/Sports (3-5 days/week) = 1.55 X Basic Metabolism Rate
4. Very Active Life style/ Heavy exercise(6-7 days/week) = 1.725 X Basic Metabolism Rate
5. Very Hard/ Professional sporty/ Physical = 1.9 X Basic Metabolism Rate

(6-7 days a week and twice a day)

Basic Metabolism Index(for weight checking)

BMI = (Weight in pounds/Ht in inches ^{2})

Very severely underweight 16-18.4; Severely under weight;15-15.9; Normal 16-18.4; Over weight 25-29.9; Obese Category I 30-34.9; Obese Category II 35-39.9; Obese Category III ≥ 40.

FAT CONTENT

Adult Body fat % age: (1.2 x BMI) + (0.23 x Age in yrs) – (10.8 x Gender) – 5.4

Child Body Fat % age = (1.51 x BMI) + (0.70 x Age in yrs) – (3.6 x Gender)+ 1.4

Gender: Male = 1, Female = 0.

Range	Men (%)	Women (%)
Essential	10-12	2-4
Athletic	14-20	6-13
Fitness	21-24	14-17
Acceptable	25-31	18-25
Obese	≥ 32	≥ 26

Note:

For Six pack reduce fat % age to 8-11 for men and 15-17 for women.
For looking good reduce fat % age to less than 18 incase of men and 20-23% in case of women.

Waist /Hip ratio : Obese Men-≥ 0.90; Women ≥ 0.85 ; Normal Men < 0.9; Women < 0.8

Body Water Content

Total Body Water (TBW) = Weight x C,
C=0.6 for adults and non elderly
C=0.5 for adult elderly males, malnourished males and females.
C=0.45 for adult elderly or malnourished females.
Water deficit is calculated through sodium level in the body as per following formula:-

TBWD = TBW x [1-(Na)t/(Na)m] where (Na)t is target sodium concentration while (Na)m is measured value in the body. Deficit may be through insensible losses, profuse sweating, diarrhoea, Urination, less intake.

Format II Exercise Zone Indication:-

Beats per minute Age	100 %	90 % Vo2 max.	80% Anaer. Hardcore training.	70 % Aerobx Cardio Endurance training	60 % Wt.cntl Fitness and fat burning	50 %, Modrt activity, Maintenance /Warm up
20 yrs	*200*	*80*	*160*	*140*	*120*	*100*
25 yrs	*195*	*76*	*156*	*137*	*117*	*98*
30 yrs	*190*	*71*	*152*	*133*	*114*	*95*
35 yrs	*185*	*67*	*148*	*130*	*111*	*93*
40 yrs	*180*	*62*	*144*	*126*	*108*	*90*
45 yrs	*175*	*58*	*140*	*123*	*105*	*88*
50 yrs	*170*	*53*	*136*	*119*	*102*	*85*
55 yrs	*165*	*49*	*132*	*116*	*99*	*83*
65 yrs	*160*	*40*	*126*	*109*	*93*	*78*
70 yrs	*155*	*35*	*124*	*105*	*90*	*75*

General tables for information on various constituents of Indian foods.

Protein Allowance 1gm/ kg of body weight (general people)

1.2 to 1.7 gm/kg body weight for athletes.

Fat requirement Essential fat in body 10% of body weight.

20-35% daily energy requirement from fats.

10% from Monounsaturated; 10% from poly unsaturated; 10 % from saturated.

Minerals

Iron (dietary requirements	Rice	Wheat and rice	Wheat or millets
As per the levels of absorption)	5%	3%	2%

Calcium : Phosphorus 1:5 for adults, 1:1 for infants

Trace elements (Desirable daily intake)

Chromium	65 micro gram per day
Copper	2.2 micro gram per day
Manganese	5.5 mg per day
Zinc	15.5 mg per day

Molybdenum 500 micro gram per day.

Vitamins

Vitamin Retinol for adults 600 micro gram;

Beta carotene 2400 micro gram

1 microgram of Beta carotene = 0.25 microgram of Retinol.

If both present in diet then calculation can be as follows,

Retinol content = microgram Retinol + microgram B.cart. x 0.25

Retinol content = Vit A IU x 0.3 + B.cart. IU x 0.15

Thiamine, Riboflavin and Nicotinic acid: The daily allowance is related to energy intake.

Basic allowance per 1000 kcal is Thiamine 0.5 mg, Riboflavin 0.6 mg, Nicotinic acid 0.6 milligram Niacin equivalent.

Niacin allowance takes into consideration the contribution of Tryptophan. 60 mg of tryptophan yields 1 mg of niacin.

Niacin Equivalent = Niacin content + Tryptophan content/60 (mg)

Folic acid: Its allowance in the form of free folate.

RDA of folate normally is 100 micro gram while in pregnancy 300 microgram.

Also represented in body weight equation as 3 micro gram per kg body weight.

Vitamin B_{12} 1 microgram per day. Received from animal foods only.

Vitamin C 20 – 25 mg/day

Vitamin D No recommendation given, 15 minutes of sun-light is good enough.

Vitmain E 0.8 mg per gram of polyunsaturated fatty acids is suggested.

Carbohydrates 5-7 ml/kg of body weight of FLUIDS for optimal performance.

Ref: Appendix 1, page 96-97, Nutritive values of Indian foods, ICMR, India.

Format – III Athletes requirement:

Nutrients	Energy	Carbohydrates	Proteins	Fats
Foods				
Fluids				

Note:

For optimal performance 5-7 ml/kg weight of fluid is necessary.

An athlete who trains minimum one hour per day would require 435 kcal extra per day.

Calculation is 31.2 kcal x body weight.

Format – IV Food Nutrient Calculation Chart:

Diet	Food /Amount	Diet	Energy	Protein	Carb	Fat
1.						
2.						
3.						
4.						
5.						
6.						

In the above text we have talked of different life styles as **Sedentary, Moderate and Active**. So we must have some idea about these classifications. By **sedentary** we mean those people who perform only light physical activity which is typical day to day life. **Moderate** category people are those, who apart from their normal life as per sedentary standards, also spend energy equivalent to 1.5 to 3 miles walk every day at a speed of 3-4 miles per hour. **Active** life style indicates that the person involved apart from his sedentary work also walks more than 3 miles at 3-4 miles per hour. Thus it means, their walking is more than one hours per day, say 1.5 hours.

Format – V HEALTH IDEA FROM NATAL CHART:

1. As per Rashi:

A = Jupiter, Moon, Venus, Sun and Mars.

B = Rahu, Ketu, Saturn and Mercury.

Rashi	Planet	Rashi	Planet
Maish (Brain)		Tula (Kidneys)	
Vrishabh (Neck)		Vrishchik (Urinary disorders)	
Mithun (Lugs & Breath)		Dhanu (Blood vessels)	
Kark (Digestive fire)		Makar (Joints)	
Simha (Heart)		Kumbh (Blood and Blood flow)	
Kanya (Lower stomach & intestines)		Meen (Kaph)	

Note: Planets under A in any particular rashi will represent strong specific system; while planets mentioned under B under particular rashi will represent weak specific system.

2. As per Nakshatra:

From the Nakshatra, find out the particular akshar, specific tree and aushadhi of the person as per following table.

Format : VI

LIFE STYLE CHART

Name _____ Sex _____ Age _____

Energy	Sedentary	Moderate	Active	Very Active
Energy/day (M) (K cal) (W)				
Proteins				
Carbohydrates Sugar Starch Fibre				
Vitamin Beta Carotine Retinol B12 Vitamin C Vitamin D				
Fats				
Minerals Calcium Iron Potassium Sodium Iodine Zinc & Copper				

Note :

Sedentary : Only light physical activities associated with typical day to day life.

Moderate : Equivalent to walking 1.5 to 3 miles per day at 3-4 miles per hour speed, in addition to the above sedentary activities.

Active : More than 3 miles per day at 3 – 4 miles per hour speed, in addition to the above sedentary activities.

Format VII : Elemental Inference

S.No.	Element	ALPHABETS									
1.	Air	अ	आ	ए	क	च	ट	त	प	य	श
2.	Fire	इ	ई	ऐ	ख	छ	ठ	थ	फ	र	क्ष
3.	Earth	उ	ऊ	ओ	ग	ज	ड	द	ब	ल	ळ
4.	Water	ऋ	ॠ	औ	घ	झ	ढ	ध	भ	व	ष
5.	Space	ऌ	ॡ	अं	ङ	ञ	ण	न	म	स	ह

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The Wellness Program can be broadly classified in three levels. Level I will refer to 15 minutes, Level II will refer to 30 minutes and Level III will refer to 45 minutes Program. Each level can further be subdivided into 3 classes per week- three month system and 5 class per week-two month system as tabulated below:

LEVEL I Program schedule

Level	Prog.	Week I	Week II	Week III	Week IV
15 minutes Level I	**3 months (3 classes per week)**	**1 + 1+ 1 AFTER EVERY 8TH**	**1 + 1+ 1 CLASS IS SPECIAL**	**1 + 1+ S SESSION 'S'**	**1 + 1+ 1**
	2 mnth (5 classes per week)	**1+1+1+1+1 AFTER EVERY 9H**	**1+1+1+1+S CLASS IS SPECIAL**	**1+1+1+1+1 SESSION 'S'**	**1+1+1+1+S**

LEVEL II Program schedule

Level	Prog.	Week I	Week II	Week III	Week IV
30 minutes	3 month 3 classes per week	1 + 1+ 1 AFTER EVERY 8TH	1 + 1+ 1 CLASS IS SPECIAL	1 + 1+ S SESSION 'S'	1 + 1+ 1
Level II	2 month 5 classes per week	1+1+1+1+1 AFTER EVERY 9TH	1+1+1+1+S CLASS IS SPECIAL	1+1+1+1+1 SESSION 'S'	1+1+1+1+S

LEVEL III Program schedule

Level	Prog.	Week I	Week II	Week III	Week IV
45 minutes	3 month 3 classes per week	1 + 1+ 1 AFTER EVERY 8TH	1 + 1+ 1 CLASS IS SPECIAL	1 + 1+ S SESSION 'S'	1 + 1+ 1
Level III	2 month 5 classes per week	1+1+1+1+1 AFTER EVERY 9TH	1+1+1+1+S CLASS IS SPECIAL	1+1+1+1+1 SESSION 'S'	1+1+1+1+S

NOTE:

Thus every level will have four kinds of special **'S'**classes:

S_1= Session of Psychological training

S_2= Session on Physiology

S_3= Session on Diet and Nutrition

S_4= Session on Yoga, meditation and self defense.

. Every level will also have different modules in it, which will be progressively shared with the clients after gauging the improvement of previous schedule.

. Periodic testing will also be carried out to calculate the Wellness quotient of an individual and thereby the whole organization to gauge its improvement.
. Testing charges will be extra on per person basis and it will include pathological, psychological, and physiological testing methods.
. From time to time outstation outdoor activities may also be planned, which will be intimated in advance. For such activities registration in advance will be required.
. If clients desires, we can also provide trainers to accompany them for their annual meet where ever, and impart pre discussed participative practices for up-gradation of employees.
. We will also be running Wellness certification programs. Our endeavor will be to produce highly skilled professionals, who will become a greater asset to any corporate and society at large.
. We BELIEVE in discipline. Hence, if ever our trainer is late for the session by even one minute, THAT day session will be free for the client and not charged.

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NOTES

Chapter VIII Bibliography

S.No.	Book	Publisher
1.	Yogic Therapy	Swami Devanand Saraswati, Shivananda math and Yogashram Sangh, Baranagar, Kolkotta-90.
2.	Matrika Shakti Vilas	Paravidya Prakashan, 3019, sector 27D, Chandigarh-160019. India.
3.	Yogic Suksham Vyayam	Dhirender Brhamchari, Dhirender Yoga Prakashan, Friend's Colony, New Delhi.
4.	Asan, Pranayam, Mudra Bandh.	Bihar School of Yoga.
5.	Various RDI Charts	Nutritive Values of Indian foods, ICMR, New Delhi

In face of the micro and macro stresses of the modern turbulent world, the concept of fitness has changed to WELLNESS. Thus a trainer must have sound knowledge of Physiology, Psychology, Physical exercise regimen, Yoga, Diet and nutrition and self-defense to cater to the ever-demanding needs of the clients, be it an individual or a corporate. Hence the need for trainers' manual became imminent.

....Shaktanand

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