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## PHYSICAL TRAINING THROUGH CORRESPONDENCE.

### IS IT POSSIBLE TO GROW TALL?

Yes! but there is a limit in age, at which the skeletal bones, specially the long bones, stop their lengthwise growth. To understand this, a touch of Osteology (Science relating to the structure and growth of bones) is necessary.

Bone is a combination of organic and inorganic substances in ratio of about one to two; organic substances: chiefly consisting of fat and collagen forming a total 31%; and mineral salts; Calcium phosphate 58%, Calcium carbonate 7½%, Calcium fluoride 1½%, Magnesium phosphate 1¼% and Sodium chloride a little more than ½%.

The toughness and elasticity of bone depends, therefore, on its organic constituents, while its hardness is due to the mineral matter.

If the development of a long bone is traced through successive stages from the cartilagenous condition in which it is preformed, one notices that it begins to ossify in the shaft. This ossific-centre is known as "diaphysis". As yet the ends of the shaft are cartilagenous. These centres which are independent of the "diaphysis" and appear much later at variable periods, are termed "epiphysis". A complete fusion of these two occurs at variable periods in the life of each individual.

And within these epiphysial cartilages, calcification of the cartilage takes place centrally, just as in the diaphysis.

The two parts of the bone—viz., the diaphysis and the epiphysis—are thus separated by a layer of joining cartilage.

This is as yet uncalcified but is extremely active in growth owing to the invasion of blood vessels and cells from a vascular zone which surrounds the soft ends and also the growth of the epiphyses towards the shaft. As long as this layer of cartilage persists, extension and growth in length is possible. Growth takes place more actively and is continued for a longer time at the end of the bone where the epiphyses are the last to unite. Later, however, this layer of cartilage becomes calcified, and the true bony growth occurs within it, thus leading to a complete union between the shaft and epiphyses. When this has taken place all further growth ceases in length.

The height of a person depends entirely on the length of (long bones) especially that of Femur (thigh bone) and the tibia and the fibula (bones in the lower leg). This fusion usually occurs in youth, at an age when the skeletal bones, especially the shaft bones have attained their maximum development. This age is anywhere between 16 and 21 years. A few physiologists put it at between 18 and 19.

Can there be any truth therefore, in advertisements which offer exercises to increase height, with a guarantee of three to six inches development in height for every adult? And, what about the pills and liquid extracts which most probably contain pituitary (a particular gland inside the skull which is responsible for certain disturbances in the growth of bones) extracts? What effect can they have when the cartilaginous portion in the shaft bones have become calcified? This exploitation by the quacks must persist as long as the public are ignorant of the principles of human physiology and anatomy.

Almost all of us desire to grow tall. Unfortunately this desire in us shows itself when we have passed the age of growing tall.

More than one's own desire, this ambition to grow tall, is mostly a qualification needed for some government job, etc. Hundreds have approached me for just a couple of inches round their chest, or for an inch more in height, because they want to join the army, the police, or a job where personality and physical fitness counts as a paramount necessity.

Going back to the question: Is it possible to grow tall? It is obvious that after a certain age it is not possible and this age is anywhere between 19 and 22 for men, and 15 to 18 for women.

A person's stature depends entirely upon the growth of the long bones. The maximum growth of these bones depends on the health and vigour of boyhood days unvisited by any virulent diseases. Nutritious diet is of paramount importance during the growing period of the boy or girl. Fresh air, sunshine and exercise play no less a part.

We often notice people of poor growth born of parents who themselves are tall and well-built; likewise tall and well-built people are born of parents who are of moderate physique. To a large extent growth depends on the care, the upbringing, and the diet, the parents bestow on their children during the early growing periods. The mother must be healthy and strong during the foetal life of the child. She must have enough milk in her to suckle her infant. Children who had no chance to these two, are unlucky, and, what is more: having no innate vitality, they lack resistance and are prone to every childhood disease. Such diseases not only stunt the physical growth of the children but stem their mental growth as well.

Yet, stature may entirely depend upon the genes and chromosomes transferred by parents to children. Even if this be true, much can yet be done to improve health and stature, if care, nutritious and balanced diet, and proper physical training are given to children during the early period of growth.

Let us now divide the height of a person into two equal halves, fixing the pubis-bone (the root portion of the penis in man, and clitoris in woman) as the centre.

If a man's height is equal from this centre towards the two ends of his body I would say his legs are symmetrical for his height. It is easy for any person to find out in which part of the body, viz.—the legs or torso—he is short by applying this simple test. Invariably the short person is short in the legs, and nothing can be done to lengthen the leg bones; because the shaft-bones cease their growth by 20 or 21 and even earlier in a few cases. Rarely is one short in the torso,

unless there be some born deformity, Rickets or injury to the spine. If such defects are absent there may be a chance to stretch out the torso, say, an inch or two utmost, provided ossification has not yet begun in Lumbar-sacral region of the spine. This stretching is done by a regular course of spinal exercises followed systematically for at least two months. These exercises cannot make each vertebra grow big and long, but will stretch out the intervertebral-spaces, making the cartilagenous discs therein more thick. Even each one of these gains a thirtieth of an inch, it will add one inch to the full length of the spine. Now it is necessary to give you an outline of the anatomy of the vertebral column.

The anatomy of the spine:—The back bone or the vertebral column consists of twenty-six separate bones. The last two, though consisting of several individual bones in early childhood, fuse together in adult age and form only two bones known as the "Sacrum" and the "Coccyx". The seven bones at the top in the spine situated in the back of the neck are named the "Cervical Vertebrae" (Cervix=neck). The next twelve bones that follow them are known as the "Dorsal Vertebrae" from which the ribs of the chest take their origin. The next five bones situated in the small of the back are called the "Lumbar Vertebrae". The last two are known as the "Sacrum" and the "Coccyx" respectively.

The bones are ranged one below the other in a continuous chain and each fits exactly with the one immediately above it, as well as with the one immediately below it. Each of them has the "Articular process" (the partially moveable joint). Between each vertebra there is a soft pad of fibro-cartilage disc, to protect it from colliding with its immediate neighbour. The object of the exercises of this lesson is to stretch out these interligamental spaces, and allow these fibro-cartilage discs to grow thicker, by diminishing pressure around them. This can be accomplished only if the carriage of the body is corrected; if one uses his muscles to keep his body straight, instead of throwing the entire weight of the body on the bones.

It is not possible to grow taller by an inch, unless you learn to hold yourself straight. If you are round-shouldered, flat-chested, and weak in the back, you can never hope to

grow tall. The first thing therefore to do, is to correct the carriage of the body.

The correct carriage of the body:- The muscles of the body are designed to hold the body erect. This should not be forgotten at any period of one's life. Holding the body straight keeps the muscles of the back and spine strong and supple; and this in its turn keeps the back from warping. A person who habitually "gives" at the waist, is weak. A warped body has neither shape nor strength. A straight-back denotes strength and health.

All the muscles of the body must be used in supporting the body. This does not imply much labour. What begins as a conscious effort, ends as habit, and the habit itself is exhilarating. A proper development of the muscles of the abdomen and the waist makes it easier for the person to sit straight; for, every gain in the strength and development of a system of muscles builds up a power of involuntary action. So bear these things in mind always:

1. Hold your spine straight.
2. Lift your chest up.
3. Hold your abdomen in.
4. Keep all the muscles in a semi-tensed condition.

Relieve undue pressure against the abdominal-viscera. Straightness is the "SIGN OF YOUTH". Cultivate this straightness and you will prolong and intensify your youth. Bodily erectness depends upon maintaining the straightness of the spine. If you drift into careless habits of sitting, standing or walking, your body's weight is thrown on the bones of the spine. This imposes a continuous pressure upon the intervertebral-cartilagenous-cushions and upon each individual vertebra. This interferes with the natural growth of the torso; and the weakness of the spinal muscles warps the spine and stunts the growth.

All this explanation was necessary to prove that the first thing for you to do, is to relieve the pressure on the vertebral bones, by holding your spine always erect, with the help of the muscles of your torso. No increase in your height by even a fraction of an inch is possible if this instruction be ignored. All the exercises I am setting for you and many

more like them will not be of use if you do not start right now the habit of keeping your spine erect.

Why is it easier to grow broad than to grow tall? The answer is simple; there are no thick muscles to develop under the scalp nor under the heels. One can fill out easily by making the skeletal muscles thick and by broadening out the thorax. You may ask a question, "How can one broaden out his thorax (rib-box) as easily as one can develop his muscles? And if one could do that, why should he not increase his height too, since the thorax also is built of bones (ribs)?" The question is quite relevant and here is my answer:-

The ends of the ribs joining the sternum (Breast-bone) are made of cartilagenous tissues which expand and contract with each intake and outthrow of breath. A continued operation of this movement tends to make the cartilagenous ends of each rib expand step by step till the period of ossification starts.

The student who is keen on adding an inch or two to his height should take plenty of milk and eggs. He should use less salt, for, this common salt (Sodium-chloride) and other mineral salts, harden the periosteum (outer membranous layer of the bones) and make the bones more brittle. He should live amidst natural surroundings; among tall trees and lofty mountains, and take full advantage of the air, water, and sunshine. He should wrestle, swim, and climb trees. He should choose tall persons for his companions, and spend most of his time in their company. He should imagine himself to be as tall as these companions. He should hold his head up and chest high, and not be affected in his walk, manners or bearing.

EXERCISES:-For the stretching of the spine, there are no better exercises than the Yoga asanas, specially those of the spinal group. Important among these are, Bhujangasan, Sala-bhasan, Dhanurasan, Paschimottanasan, Halasan.

#### EXERCISE 1.

PASCHIMOTTANASAN:- Study Fig. 1. Lie on your back, with the legs straight and together and arms stretched straight above the head. Rise up slowly to sitting position (exhaling deeply), bend your trunk well forward and reach for the toes. Hold on to that position for as long as you can, breathing normally, and trying to reach further and further. In a

week or two you must be able to catch the toes with your palms and place the forehead on the knees and hold on to that position for a couple of minutes.

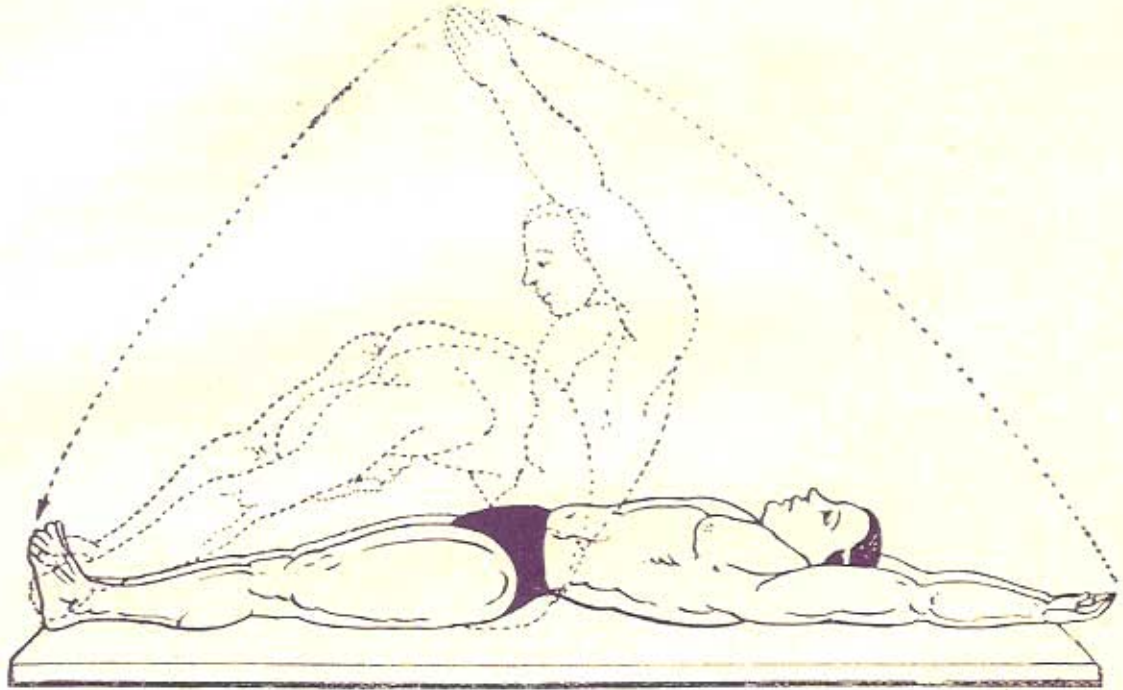
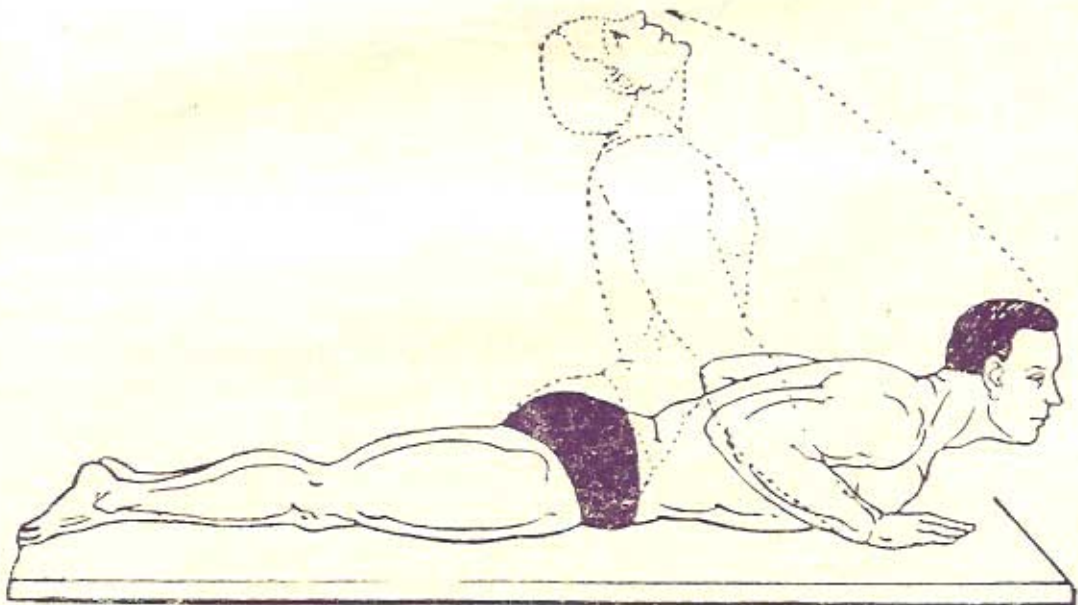


Fig. 1



Fsg. 2

EXERCISE 2.

THE BHUJANGASAN OR THE COBRA POSE:- Study Fig. 2. Lie on the stomach, legs together and toes pointed. Place the palms immediately beneath the shoulders and go into the position indicated by the dotted line and maintain that position as long as you can, breathing normally all the time.

Take care not to lift the hips off the ground, or to throw the weight of your body on the supporting arms. This posture is maintained by the powerful contraction of the muscle of the back; especially the "Erector-spinae" muscles. The arms only serve to maintain the balance. The head must be thrown as far back as possible.

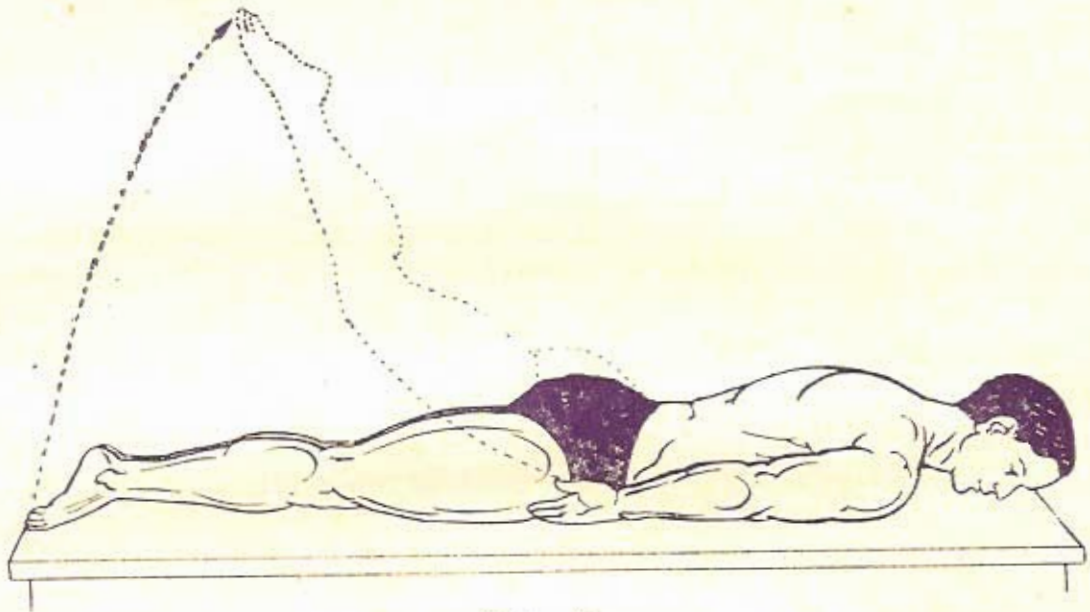


Fig. 3

EXERCISE 3.

THE SALABHASAN:- Study Fig. 3. Lie prone—feet together and toes pointed—arms full length close to the sides of the body—palms turned upwards. Raise both legs together as high as possible with the knees rigid and straight. Exert enough pressure against the ground from the wrist-joints, the shoulders and the chin, to help you maintain the posture. Hold on for as long a period as you can, breathing normally.



EXERCISE 4.

THE DHANURASAN:- Study Fig. 4. Lie prone—flex the knees and grasp both ankles with your palms—go into the position indicated in the dotted line. Maintain the highest position

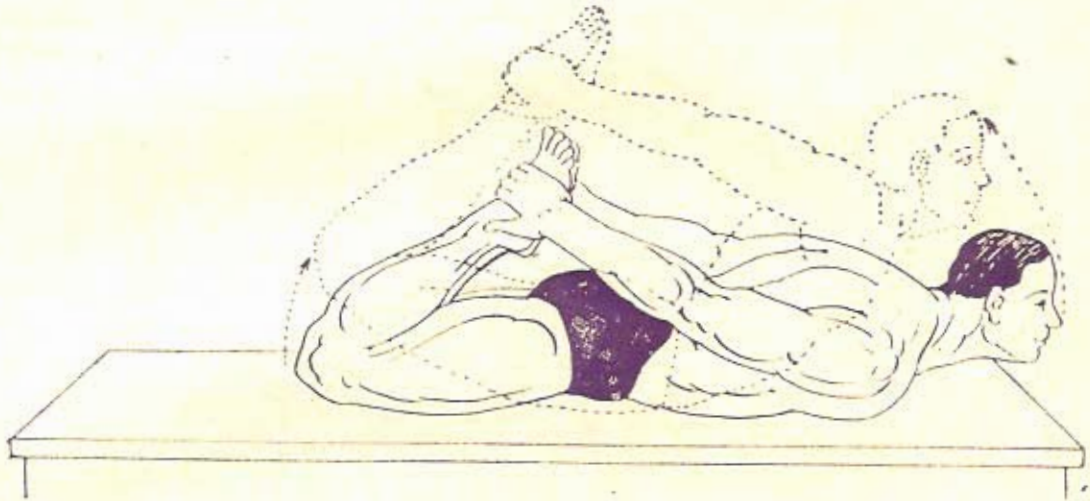


Fig. 4

you can by vigorously straightening the legs and raising the chest, and throwing the head back. Hold on as long as you can breathing normally.

EXERCISE 5.

THE HALASAN:- Lie on your back, legs together and straight. Stretch your arms straight above head. Now, raise the legs off the ground until they are at right angles to the body and then take them further up above your head and reach the floor above head with the toes. Hold on in that position for a minute or two breathing normally all the time. You must gradually try to take the toes further and further up above the head.

HERE ARE A FEW ADVANCED EXERCISES.

EXERCISE 6.

Study Fig. 5. Procure a stool. Take up the position as shown in the illustration, securing your feet well under an almirah or some heavy object. Go into the position shown in dotted line, deeply inhaling. Your hands should reach the ground and your head should be taken as near to the floor as possible. Pause for a few seconds. Start exhaling and slowly rise up to sitting position, by flexing the abdominal muscles.

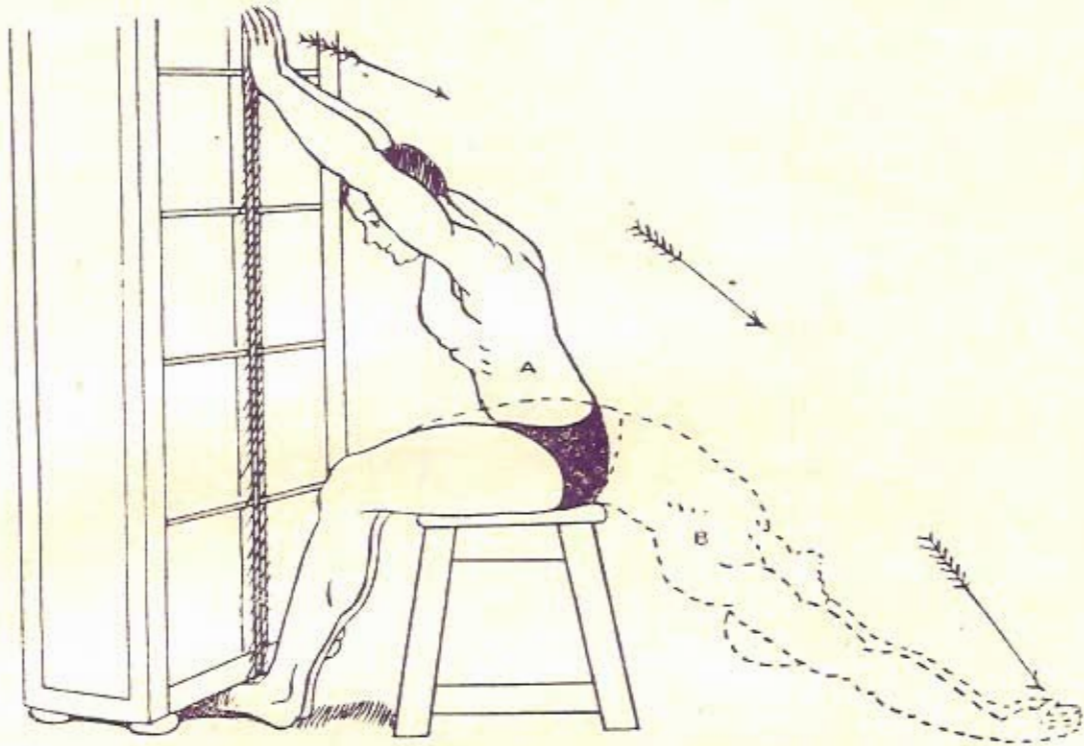


Fig. 5

strongly. Besides being a good spine-stretcher it is an excellent abdominal exercise too. Repeat the exercise 8 to 10 times. Every time you bend back try to take your head further and further down towards the ground.

#### EXERCISE 7.

Study Fig. 6. stand on a stool, as shown in the illustration firmly gripping the under ridge of the stool. Straighten your knees vigorously as indicated in the dotted line position. While doing so, bend your head down between the shoulders. Breathing should be normal and repeat the exercise 10 to 15 times, maintaining the finished position each time at least from 3 to 5 seconds. As you get used to this exercise, screw up tightly a strip of wood across the two legs of the stool lower than the level of the under ridge. When even this becomes easy, fix the plank further down and start again.

#### EXERCISE 8.

Study Fig. 7. Draw a thick straight line 6 ft. long on the wall perpendicular to the floor and mark it in inches and feet.

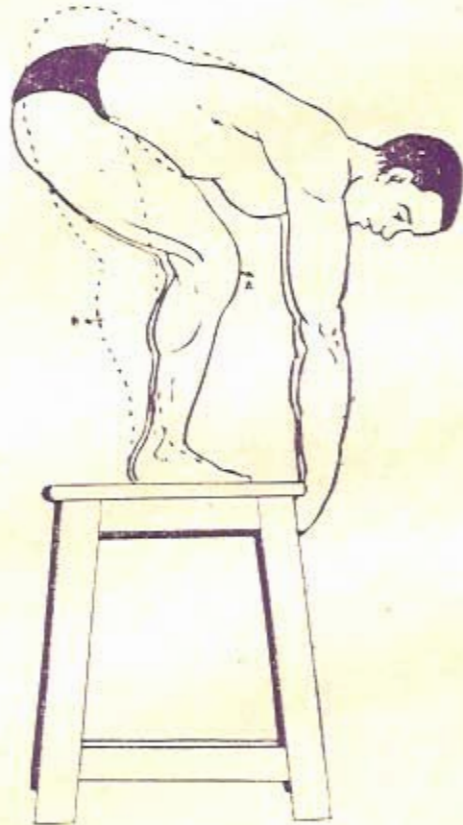


Fig. 6

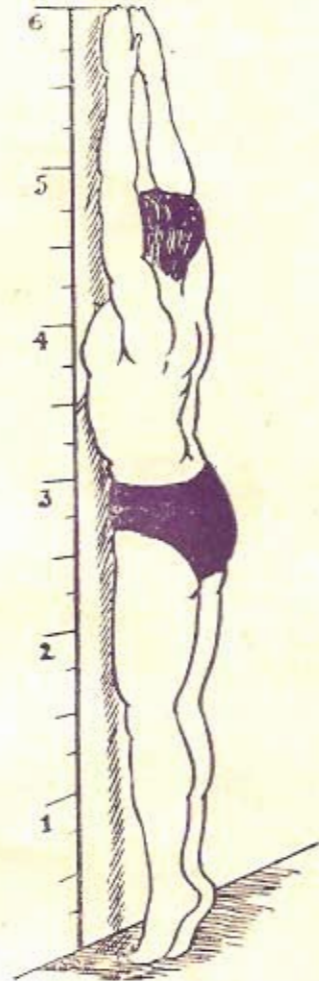


Fig. 7

Stand with your chest against the wall and reach up with your palms the highest point you can on the wall, standing tip-toe. Mark this point red and with each repetition try to reach up to this red point and beyond. This red point must move up day after day. Breathing must be normal. Six to eight repetitions will do.

#### EXERCISE 9.

Study Fig. 8. Stand some two feet away from the wall and bend sideways exactly as in the illustration, and touch the wall with the tips of your fingers, exhaling deeply as you bend sideways. As the exercise becomes easy, stand further

away from the wall and perform 8 to 10 repetitions on your left side and on your right side again. Inhale deeply as you straighten up and exhale well as you bend sideways. Maintain feet together and the head well between the shoulders throughout the exercise. Mark the distance between the edge of your feet and the wall, and as you persist in your practice, this distance must gradually increase.

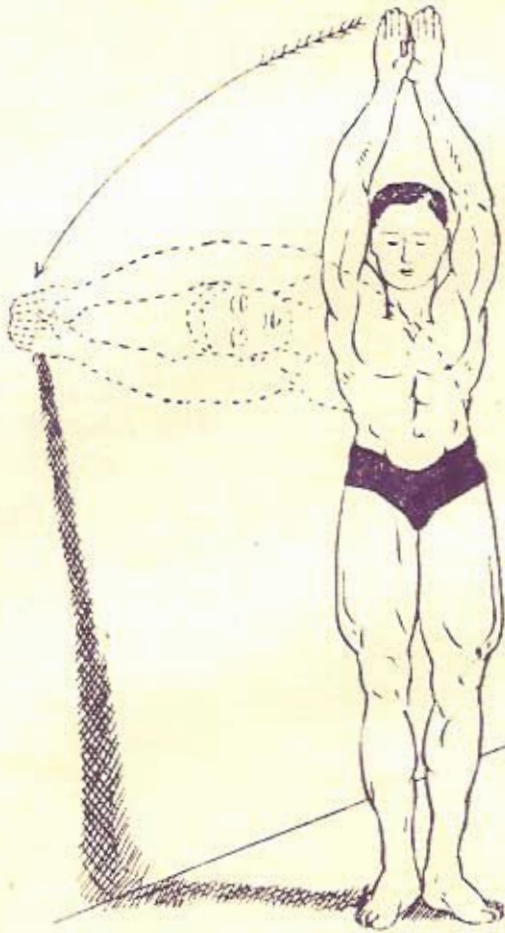


Fig. 8

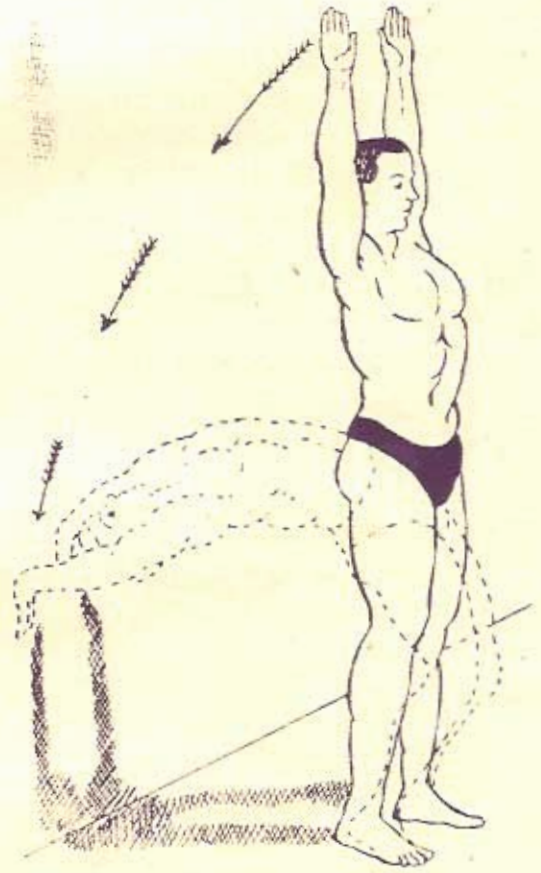


Fig. 9

#### EXERCISE 10.

Study Fig. 9. This is a strenuous, even dangerous, exercise. You had better let it alone, unless you have confidence enough; but, when you start on it be moderate at the beginning and increase your efforts as you gain more and more confidence.

You must guard against sprains, and against slipping.

Stand 2½ to 3 feet away from the wall with your back towards it. Bend backwards and place your palms flat against the wall and slowly bend further back by slipping the palms downwards slowly and one after another, till you cannot bend any more. Now start retracing your palms back again and come back to starting position. Breathing should be normal. Repeat 3 to 4 times. Do not do this exercise standing on a carpet or on a smooth floor.

These exercises are better done in the morning. Some do them before going to bed. One must not expect results to show up in a week or in a fortnight. A regular practice of one or two months yields good results. The two months are not wasted, if at the end you perceive that you have not grown even ¼ an inch taller. Honest work does not go unrewarded. If it has not made you tall, it has improved your health, and the carriage of your body. If after this effort of two months your height has not improved, there is nothing in the world that can make you tall—not exercise—nor pills nor drug. You are destined to remain what you are. Do not let advertisements tempt you.

Except the last the other exercises in this lesson are good reducing exercises. They take inches off hips and waist.

Height, most often is a gift from the mother's side. If you are not yet married, try and select a tall lady for your life's partner, so that at least your children may possess good stature.