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MEDICAL GYMNASTICS.

BY

NILS POSSE, M. G. D.

Of GYMNASTIC CENTRAL INSTITUTE,

STOCKHOLM, SWEDEN.

BOSTON:

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DEPARTMENT OF HYGIENE
WELLESLEY COLLEGE
WELLESLEY, MASSACHUSETTS

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History of Physical Education
and Dance

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INTRODUCTION.

THESE pages are not intended to be a medical treatise for professional study, but they are written for the purpose of conveying to the public at large a general idea of what is commonly known as "the Swedish Movement Cure and Massage."

A Circular being of necessity limited in space, this pamphlet is naturally nothing but an outline, from which many important things have been left out, and a selection made of such facts as would seem of the most interest to the ordinary reader.

Many persons think that "Movement Cure" is the same as "Lifting Cure"; that Medical Gymnastics are some sort of athletics or identical with the gymnastics taught in the common gymnasiums; again others consider Massage, "shampooing," and the "rubbing" received in a Turkish bath as being all of a kind. If this pamphlet be in some degree a means of dispersing the misconception prevailing on this subject, it will have fulfilled its purpose.

NILS POSSE.

293 Columbus Avenue, Boston, Mass.,

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"THE MIND IS STIMULATED BY MOVEMENTS OF THE BODY."—*Pliny.*

MEDICAL GYMNASTICS

Is a system of exercises and manipulations, based on anatomical and physiological principles, used for the restoration and preservation of health. Though the name "medical gymnastics" is the one adopted by medical men the world over, other names have been used, such as "medicina gymnastica," "therapeutic manipulation," "movement cure," "kinesipathy" (from the Greek *kinesis*, movement), not to mention their synonyms in all the different languages. The

HISTORY

of this mode of treatment commences with the history of Man, who, before he knew how to employ Nature in his service, understood by instinct to use manipulations for certain bodily ailments, as is still customary among wild tribes; and even the most ancient peoples had methods of treating disease by mechanical means.

At least 3000 years B. C., the Chinese had a thorough system of gymnastics, represented on ancient pictures as being used for evidently remedial purposes; and in manuscripts from those days they maintain that gymnastic exercise stimulates the bodily fluids to an even motion, which is the condition of health. This motion being greatly influenced by the position of the body — facilitated in the lying, impeded in the upright — it could be much modified by it, and from this reason the Chinese attached much importance to the bodily positions in the cure of diseases.

The Egyptians, though far advanced in agriculture, industry, etc., never developed gymnastics into any system, and this was also the case with the Hindoos and the Persians, the priests being the only ones who practiced it, using some of the simplest manipulations for certain diseases.

It was first among the Greeks that gymnastics became more generally used as a curative means; Plato and other philosophers have left evidence of how exercise was daily used to maintain health and strength; Galenos, the celebrated physician (Second Century, A. D.), showed the difference between exercise generally and gymnastic movements, among which latter he counted rubbings, kneadings, frictions, etc. Greek physicians not only prescribed manipulations and movements of the body for remedial purposes, but they also had great skill in applying them.

The Romans imitated the Greek gymnastics, and used them as a hygienic means to a greater extent than any other people before them, and medical gymnastics were a part of the bath in the great Roman bathing houses. Asclepiades (100 B. C.) prescribed gymnastic treatment for many diseases, and Celsus, who lived 130 years later, knew of no better means to counteract the effeminate luxuriousness that threatened to ruin the Romans physically.

During the Middle Ages, it seems that manipulations were used among the people, although gymnastics were forgotten as a therapeutic system.

But during the Sixteenth and Seventeenth Centuries, physicians and physiologists again commenced to emphasize the remedial value of gymnastics; Mercurialis and Sydenham, considered them from a hygienic point of view; Fuller, Tissot, etc., insisted upon their being adopted as a medicine; but it was not until the beginning of this century that medical gymnastics commenced to attain the systematic perfection into which they are daily being more and more developed. The present system, invented in the beginning of this century by the celebrated Swede, P. H. Ling, is a collection, on a philosophical plan, of old-time fragments and truths, and is a rational system entirely different from gymnastics both of ancient and of modern times. Based on entirely anatomo-physiological principles, Ling's system may be divided into two parts (the transition from one into the other being very difficult to make distinctly): *pedagogic* gymnastics, used to develop and maintain the harmony between body and mind in health; *medical* gymnastics, used for the restoration of the harmony, disturbed by disease.

Ling's pedagogic gymnastics, the best means of physical education, and at the same time a preventive of many diseases, are prac-

tised in all the schools of Scandinavia, in the English boarding-schools, on the Continent, and, in fact, wherever physical culture is treated in a more scientific and rational way.

Ling and his followers (Branting, Georgii, etc.) developed the medical part of the system to such perfection, that but little remains to add to give it accuracy — if accuracy be ever obtained in the treatment of diseases — and as it is now practiced all over the world, it goes hand in hand with medicine and is applied with success to widely differing forms of disease. There are two methods of applying the treatment; by hand or by machine, the latter being a substitute for the former, so as to save the strength or time of the operator, or so as to give long continued movements (vibrations, etc.), with the required accuracy. The manual method is naturally more perfect, as a machine could never exceed the human hand in skill or variety of motion, although it may outdo the latter in endurance.

To be successful in the practice of this system, it is necessary to have a thorough knowledge not only of anatomy and physiology, but also of the effects which movements produce upon the bodily and physiological condition of man; in the

MEDICO-GYMNASTIC COLLEGES,

these effects are the subject of a special study, Kinesiology, or the science of movements, which is to the Medico-Gymnastic Doctor what materia medica is to the M. D. The druggist may make up the medicine, but only the M. D. is expected to prescribe it; so the "manipulator" may apply the movements, while only the M. G. D. is to be relied on for a safe prescription, *as no definite ends, but mostly ill results are obtained through haphazard applications.* To become a skillful M. G. D. requires almost as much study as it does to practise medicine, and realizing this, Ling founded a school for the training of gymnastic instructors and gymnastic doctors, which school, the Gymnastic Central Institute in Stockholm, Sweden, was founded in 1813, and is now supported by the Swedish government. The object of this school is "to perfect and maintain gymnastics in the whole of their theoretical and practical comprehension. It is intended partly to *educate gymnastic instructors* and *medico-gymnastic doctors*, partly to communicate

practical instruction in all parts of gymnastics, as also to treat such invalids for whom gymnastics are considered beneficial." It has three departments, the military, the pedagogic, and the medical. The latter gives to students instruction in Anatomy, Physiology, Pathology, Hygiene, Kinesiology, and in the theory and practice of Medical Gymnastics, and it has a clinic for the treatment of invalids by the exclusive means of movements. None but the graduates of this Institute or other recognized medical colleges are permitted to practise the gymnastic cure in Sweden. Institutes like this one are to be found in other European cities (Berlin, St. Petersburg, etc.), the one in Stockholm, however, being more complete as a college than the others.

As every bodily exercise is a movement from one position to another, it is necessary to understand the gymnastic interpretation of the words

MOVEMENT AND POSITION

before going into the technical details of either.

"*Every exercise of which the direction and duration are determined is a gymnastic movement*," according to Ling. To stretch a limb, or to make frictions along a muscle, nerve or vessel, in a direction and manner, and with a force and velocity all previously determined, and for a distinct purpose, are instances of gymnastic movements. The limits of a movement are determined by the laws of gravitation and by the sphere of the activity of the muscles; if a movement is not in conformity with the laws of the organism, it not only loses its value, but it may also prove to be injurious, hence the anatomical structure and the physiological functions of the body, as related to motion, should be familiar to those who apply or superintend gymnastics.

A gymnastic position is the position of the body at the beginning, duration, or end of a movement, and must be as correct as the movement itself if proper results are to be obtained. A movement is rendered exact, when the commencing position, the terminating position, the line of motion and rhythm of action are clearly and severally determined.

To give a detailed description of the different positions would occupy too much space. It may therefore suffice to say, that the principal positions are five: standing, kneeling, sitting, lying and

hanging, each one having numerous variations, depending upon the position of the limbs relative to the body, such as "stretch-standing," "stride-kneeling," "long-sitting," "reclining," "heave-hanging," etc., etc.

The position is varied according to the desired effect of the movement; it is complicated or simplified according to the strength of the patient, or so as to bring a greater or less number of muscles into action, that is, so as to isolate certain muscles while others are in action; it is varied in conformity with the laws of gravitation, counterpoise, etc., etc.

Gymnastic movements are *active* when performed through the patient's own exertion, and *passive* when applied by an outside power (an assistant or a machine); if the active movement is performed under resistance or with the help of an assistant, it is called *duplicated.* Movements are also classed according to the action performed (flexion, extension, twisting, swinging, rotation, vibration, kneading, etc.); according to apparatus; according to the symmetrical form of the body (one-sided, two-sided); according to time (rapid, slow, etc.); but for the terminology and description of the movements, the classification according to the action performed is the one generally used, and among the most common names thus obtained, are: Flexion and extension, separation and closing, twisting, pulling, raising, heaving, rotation, swinging, lifting, compression, hacking, slapping, percussion, rubbing, friction, vibration, kneading, etc., some of the latter being comprised in the well known word MASSAGE (Greek *mássō*, I knead or handle; Arabic, *mass*, to press softly).

Without dwelling at length on the many technicalities, a few movements may here be described, so as to show

HOW MEDICAL GYMNASTICS ARE APPLIED.

Neck-flexion backwards under resistance: The patient, standing upright, arms horizontally extended forward and grasping a fixed bar (or other support), so as to make a steady equilibrium, bends his head forward as far as he can; the assistant now places his hand flat on the back of the patient's head and makes a slight resistance, while the patient stretches his head upward and backward; this is repeated eight or ten times. This movement has

the effect of leading the blood away from the head, besides strengthening the extensors of the neck. When the head is bent, the large veins, that partake of the flexion, *fold* on account of their soft walls; this stops the flow of the blood *from* the head, whereas the blood flows freely *to* the head through the corresponding arteries, which merely *curve*, as their stiff walls prevent them from folding; the amount of blood thus increases in the head, so that, when the neck is again straightened, the blood flows with increased power away from the head. Besides its other effects, this move ment evidently is valuable in the treatment of congestive headaches, etc. Similar movements can be given to any part of the body with corresponding results.

Stride-kneeling, trunk-twisting under resistance: The patient is kneeling, the knees half a yard apart, and the heels together; the hands (thumbs backward, fingers forward) rest with a firm grip on the hips, so as to isolate these from the motion, which is confined to the trunk alone; the patient now twists himself to the right, and the operator standing behind, with one knee supporting the patient's back, places his right hand on the front, and his left hand on the back of the latter's corresponding shoulders, and makes a moderate resistance, while the patient twists to the left by an exertion of the abdominal muscles. The operator changes the position of his hands, and the movement is repeated to the right, and to each side alternately five or six times. This movement, which may be done in several different positions, and also taken active, affects the vertebræ, the spinal cord and surrounding vessels and nerves. Everything that is twisted becomes contracted in one or more directions, so also here; the spinal column prevents any shortening effects, and the ribs keep the chest expanded; thus all contraction is confined to the abdomen, which is compressed by its oblique and transverse muscles, and its contents are forced upwards towards the chest. This movement, which is thus a mode of inwardly lifting, has a great influence on the respiratory, circulatory and digestive organs, and is of great value in the treatment of pelvic and abdominal diseases.

Ride-sitting, passive trunk-rotation: The patient sits astride a chair (usually made especially for this purpose) with his hands fixed on the hips as above, and the operator takes hold of the patient's shoulders, and gives to his trunk a rotary motion, first

to one side, then to the other. This movement affects the smaller and larger vessels and nerves in the chest and abdomen, and has a soothing, sleep-inspiring effect on the patient. Corresponding active or passive movements can be done in several different positions, according to the effect desired.

By rotary motion, the blood vessels are alternately lengthened and shortened, which causes a pump-like action of the blood in the direction of the heart, naturally producing good circulation.

Stretch-lying, arm-flexion and extension under resistance: The patient is lying flat on his back (on a high couch) with his arms stretched upward in the same direction as the body. The manipulator, standing behind, takes hold of the patient's hands and makes a moderate resistance, while the patient bends and stretches his arms. This movement, which can also be taken active and in many different positions, strengthens and limbers the arms, and by expanding the chest, it is useful in the development of the respiratory organs.

Hanging, legs-separation and closing under resistance: The patient, hanging by the hands on a horizontal bar, separates his downward stretched legs under resistance from the operator, and resists while the latter closes the legs together; when the movement has been repeated in this way a few times, it is changed so that the operator separates the patient's legs while the latter resists, and resists while the patient again closes them. Besides strengthening the adductors and abductors of the legs, this movement affects the contents of the lower part of the abdomen by leading the blood away from that region, and thus it is useful in the treatment of pelvic disorders generally.

People generally have an idea that all "rubbing" is *massage*, whereas the latter name is given to a group of passive movements: friction, kneading, percussion, vibration, etc., each one being a distinctive procedure, determined as to its form as much as any other gymnastic movement, and applied, as the latter, for the purpose of inducing determinate effects upon the organism. What has above been said about "movements," equally refers to "massage," as the two names in fact are as good as synonyms; and the question may arise whether it would not be as well to drop all other names, such as "Movement Cure," "Medical Gymnastics,"

etc., and let the word "Massage" embrace all forms of manual and mechanical therapeutics.

As the details of the manipulations are beyond the scope of this treatise, those who seek further knowledge are referred to more extensive works on the subject (such as Dr. Douglas Graham's, Dr. Geo. H. Taylor's, etc.), and the remaining pages will instead be devoted to a brief résumé of the

Physiological Effects of Medical Gymnastics.

Force is the manifestation of life in the body; it expresses itself in *motion* or *action;* a constant chemical action is going on in the lungs by oxydation of the hydro-carbons, in the ultimate atoms by the metamorphosis of tissues; growth is an unceasing motion, as is also the circulation of the blood and other bodily fluids; the rhythmical motion of respiration is a muscular action, and so are all voluntary movements of the different parts of the body.

The supply of force in the body is, however, only limited; when supply and need are equivalent, health prevails, but when the expenditure exceeds the supply, fatigue and disease result. To cure the latter is to restore harmony in the body or to lead the force already present away from parts where it can be spared, into channels where it is more needed; it is *to impart motion.*

It is a well known fact that an unused muscle diminishes in size and power, whereas the *muscles that are exercised grow large and strong;* this shows that muscular activity increases the reproduction of tissue or the exchange of waste for vital matter. The increased heat we feel during bodily exertions is a good indicator of this chemical action. The scientists have also proved, that while a muscle contracts, the absorption of oxygen and exhalation of carbonic acid in it are about double to what they are when the muscle is at rest.

When a muscle contracts, it causes an increased pressure in the blood-vessels that penetrate it; the contents of the veins, the waste products, are more rapidly carried away and fresh blood more speedily supplied through the arteries, and a similar action is at the same time taking place in the other fluids. Provided the bodily fluids contain vital constituents, by its activity the muscle

thus maintains and increases its own vitality, and for that reason it is easy to understand why exercise is a means of physical development.

But exercise also has a great influence on the *quality of the blood*, inasmuch as an increased circulation calls for a speedier renewal of the waste matter, a greater supply from without of force-creating ingredients — fresh air and food. When absorbed in the blood, these vitalizing properties are however as readily given up as they are received, in order that the healthy condition of the blood should be maintained, for if the constituents, meant for other purposes (such as to form muscular tissue, etc.), were retained in the blood, the quality of the latter would degenerate, and thus there prevails in the organism a constant production and exchange of waste for vital matter.

Every muscular effort is involuntarily preceded by an increased inhalation, which phenomenon is explained by the fact that in every muscular contraction, arterial blood, rich in oxygen, must necessarily be present, so as to allow the chemical changes to take place; exercise thus also *induces respiration*. The air inhaled expands the lungs, presses the diaphragm down and as a consequence of that, compresses the contents of the abdomen, the walls of which rise; the parts resume their former position, by which motion the air is again expelled; the diaphragm and the air above it thus act like a pump, causing a constant oscillation of the abdominal and pelvic contents, increasing the action of their involuntary muscles. From its extent, we can see that the respiratory motion must have great influence on the digestive organs, and adding this to the fact that respiration brings the oxygen into the blood, we can understand why it is desirable to have a large breathing capacity, and why extensive lungs in a broad chest indicate health.

As respiration furnishes oxygen, so digestion provides the system with its other constituents; it is necessary not only to eat good, substantial food, but the latter must also be properly digested in order to be nourishing. *Good digestion is insured by strong outside muscles of the stomach*, and movements that affect these have effect also on the involuntary muscles of the bowels, the peristaltic motion of which is stimulated by contractions of the abdominal walls.

That exercise increases the *absorption* is evident from the fact that bodily exertions create appetite: there is an increased demand for vitalizing material to make good the waste caused by muscular action. As it promotes the circulation in the capillaries, exercise also stimulates the *secretions*, and that it equally influences the *excretions* is indicated by the perspiration and the increased activity of the kidneys and bowels experienced after muscular efforts.

Science teaches that the inactive *nerve* grows weaker and degenerates, until perhaps it entirely loses its sensibility or ceases to convey the impulse of the will to the muscle. The truth that exercise beneficially affects the nerves, we see confirmed in every-day life: those who do a great deal of bodily work, the laborers, seldom suffer from those nervous diseases, which are so common among business men and persons who lead a sedentary life. But as voluntary motion means activity of the will and nerves as much as of the muscles, so, for persons whose muscles are weak and nerves morbidly sensitive and over-developed, *active* exercise means over-effort of the nerves rather than of the muscles, and is consequently injurious to the former. Here the exercise should be *passive*, because in imparted motion the brain and nerves are at rest, and the muscles, which then are the only active parts, receive all the nutritive results.

Fresh, nutritious blood, freely circulating through the brain, preserves the latter's power of action, which, on the contrary, is weakened when the blood is poor in quality or quantity; in persons suffering from Anæmia, Chlorosis, etc., the intellect grows feeble in proportion as the disease progresses. The mental power is stronger in health than in disease, and is evidently depending on a good circulation; but as exercise improves not only the latter, but also the quality of the blood, it may, though indirectly, have a beneficial effect on the mental power and activity. That bodily exercise also tends to improve the moral forces is proved by its soothing effect on mentally depressed persons, its power to inspire confidence, courage and resolution in the irresolute, order and precision in the disorderly, and chastity in the impure.

These various effects of exercise explain its value, and also indicate the method of applying

Medical Gymnastics for Different Forms of Disease.

In diseases that spread all over the system (constitutional diseases), the abnormal condition is caused by a generally disturbed nutrition; in Anæmia and Chlorosis, which are characterized by headache, backache, shortness of breath, palpitation of the heart, cold hands and feet, abnormal appetite, costiveness, etc., the treatment has for its purpose to improve the quality of the blood and increase its vitality; the movements should be stimulating and strengthening and generally directed so as to improve the respiration, the circulation and the digestion. As weakness is the principal symptom of these diseases, the movements must here be passive, such as passive rotations of the limbs, general massage, etc., whereas in Plethora, the reverse condition or too rich blood, strong, active and resistive movements, that afford increased muscular activity, are indicated. The treatment which has for its object in the former case to improve the nutrition, in the latter to increase the absorption, has in both good results, provided the dietetic conditions are favorable.

Among diseases where medical gymnastics have proved very beneficial, are Heart Complaints of different kinds. Here the heart is unable to do its work, its functions are impeded by various causes, such as enlargement of the ventricles or of the muscles of the heart, fatty degeneration of the latter, valvular deficiency, etc., and the distribution of blood consequently becomes irregular. The aim of the treatment should here be to ease the action of the heart by giving mechanical aid to the circulation in peripheric parts, and this is attained by passive rotations of the arms and legs and mild active movements of the latter, vibratory movement of the trunk, percussion in the region of the heart, passive respiratory movements, etc. Medical gymnastics, when properly applied, not only give temporary relief in these diseases, but a permanent cure may in a great many cases be performed — a result seldom attained by medicine.

It is a proved fact, that if applied in time, medical gymnastics may cure Consumption by improving the general nutrition, and developing the respiratory organs, but this is generally very slow work; it requires not only months, but years of constant treatment. Much more rapid is the effect of mechanical therapeutics

as a cure of ASTHMA and EMPHYSEMA; the movements should here tend to prevent and diminish the accumulation of carbonic acid in the blood by increasing the circulation and facilitating the respiratory act; proper attention must also be given to the digestive organs, as the production of wind in the stomach and bowels presses the diaphragm upward and thus aggravates the symptoms of the disease.

In some cases of Throat Diseases, catarrh, paralysis of the vocal cords, etc., vibratory motion of the larynx may effect a cure.

For disorders of the digestive organs, movements are a valuable remedy. In DYSPEPSIA, stimulation of the nerves of the stomach increases the secretion of the digestive juices; massage on the abdomen facilitates the dissolution of the food and increases the peristaltic motion of the bowels, which is also promoted by movements that induce deep respiration; the excretions are promoted by resistive twistings of the trunk. The latter movements are of great importance in the treatment of CONSTIPATION, which disease often is nothing but a lack of general muscular tone, or weakness of the muscles that perform the expulsory act; powerful frictions along the colon in the direction of the rectum give prompt, sometimes immediate, relief from this trouble; they are a mechanical means of forcing an adverse nature to do its work. In DIARRHŒA, the peristaltic motion of the bowels is abnormally increased and the mucous membranes of the intestines over-supplied with blood; the former can be diminished by vibrations, applied transversely on the abdomen, the latter by movements that lead the blood away from the abdomen. Percussion with the outer edge of the hand in the region of the liver often gives speedy relief to bilious diarrhœa, and is also a valuable movement in the treatment of HYPERÆMIA of the LIVER and similar disorders.

In PELVIC DISEASES no remedy equals massage; displacements of the uterus can be permanently cured by suitable movements — such as restore the activity of the supporting muscles, viz. resistive twistings of the trunk, respiratory movements, or, generally speaking, movements that cause internal lifting. Passive twistings of the trunk in rapid rhythm are known to relieve painful or suppressed menstruation. Leucorrhœa and chronic cystitis are rapidly cured by deep pressure motion applied in the region of the bladder (immediately over the pubic crest) and percussion

with slightly clinched fist on the sacral region; this latter movement causes a vibratory motion of the pelvic viscera, which lessens their excretory functions.

In all these diseases the treatment should not be merely local; it must of course also embrace the whole organism, so that good general health may be secured.

Neurasthenia, Neuralgia, Paralysis, and other nervous diseases are treated by medical gymnastics with remarkably good results. In the first mentioned disease, general massage is oftentimes a sure remedy where other kinds of treatment have failed; it has a restful, soothing effect on the nerves and improves the general nutrition. In neuralgia, powerful local masage and pressure motion on the afflicted nerve afford speedy relief, and similar results are obtained in various forms of cramp and paralysis. For the latter, vibratory motion is very effective; if the disease has its seat in spinal centres (paraplegia) excellent results are obtained by percussion on the soles of the feet, and generally this form of paralysis can be completely cured by medical gymnastics. If cerebral centres are affected (hemiplegia) there is very little hope of a cure, although the disease may be benefited by massage, inasmuch as this treatment will delay renewed attacks and partly restore the muscular power of the afflicted parts. In all nervous diseases, massage of the back is an important factor, as it relieves congestion in cerebral vessels. Massage of the head is often alone a cure for insomnia, and is as such universally used by professional "masseurs."

In Rheumatism, muscular or articular, massage becomes remedial through its power to promote the resorption of the inflammatory products, and to relieve the stasis. Besides local massage, movements should be given so as to secure a good general circulation of the blood. Though the chronic forms of the disease take long continued patient work, acute attacks can be rapidly overcome if attended to in time, and with sufficient energy; sometimes treatment should be applied as often as two or three times a day. The same may be said of accidental injuries, such as Sprains, Synovitis, etc., the only modern cure for which is massage and nothing else. In deformities of the spine, limbs, chest, etc., the value of medical gymnastics is indicated by their ability to incite local nutritive activity.

Although medical gymnastics are a valuable remedy for a great many diseases besides the above mentioned, they do not pretend to be a "cure-all," but as a therapeutic agent they claim to be worthy of a place beside medicine. It is, however, only when applied with skill and directed and controlled by intelligence that this mode of treatment becomes truly remedial.

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