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BY

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ENEBUSKE

GYMNASTICS IN HEART DISEASES.[1]

BY DR. CLAËS J. ENEBUSKE.

THE term "gymnastics" has not acquired a generally accepted definition in the English language, so far as I have been able to learn. A reasonably clear presentation of the subject, the discussion of which, by your courteous invitation, I shall have the honor to open here to-night, depends in no small degree upon an agreement at the outset of the actual meaning of the term gymnastics, inasmuch as it must be one of the fundamental technical terms in my paper. Therefore, I solicit your generous patience with a few general introductory remarks about gymnastics from my present standpoint, before I pass over to my particular subject.

For my present purpose, I wish to define gymnastics from its theoretical aspect as, the attempt to understand the activity of the human body, which expresses itself in its movements and postures, as far as it can be understood by the aid of present biological knowledge, and especially the attempt to understand, as far as possible, their effects upon the body. The results, gathered from these attempts, form the contents of the "theory of gymnastics," if that term may be spoken at present.

I wish to define gymnastics from its practical aspect as, the attempts to utilize the theoretical knowledge of the movements and postures in such a way, that they may become means to serve the purpose of ameliorating the body.

It is, therefore, the definition of the postures and movements, with regard to form and degree of activity for the said purpose, which determines them as gymnastic in contradistinction to others.

[1] Read, by invitation, before the Boston Society for Medical Improvement, February 24, 1896.

Moreover, the selection of such defined postures and movements and combining them in such a way that they together shall yield the best possible results in the desired direction, that is, combining them to what is called in the gymnasium a "gymnastic day's order,"[2] and in the "gymnastic clinic,"[2] a "gymnastic prescription,"[2] is what constitutes a gymnastic lesson or a gymnastic treatment in contradistinction to other forms of physical exercises.

Finally, the substitution at proper time of a given gymnastic day's order or gymnastic prescription by another of modified composition, so as to meet the change in condition of the individual engaged in the gymnastic lessons or receiving the gymnastic treatment, causing a rational progression of the postures and movements to take place parallel with the change in the condition of the individual, is what constitutes a course in rational gymnastics or in gymnastic treatment in contradistinction to other courses of exercises.

I said that the amelioration of the body is the purpose. The amelioration may be understood as the amelioration of the healthy individual, so that he may actualize in his body the most of his possible physical beauty, strength and efficiency. Gymnastics for this purpose have been called "pedagogical gymnastics," and, through the pedagogical profession, they serve, in the first place, the schools and higher educational institutions. The gymnastic pedagogy, by its near relation to the subject of school hygiene, is related to the physician's interest. On the other hand, the amelioration of the body may be understood as the amelioration of the diseased body, that is, the postures and movements may be defined to serve the purpose of alleviation and cure of disease. Gymnastics for this purpose, as far as they actually adapt themselves for this purpose, serve medicine and demand a place in materia medica. They have been called "medical gymnastics," and by

[2] Translations of Swedish terms.

the inner order of the things they have the same relation to the business of the medical profession as the pedagogical gymnastics have to the business of the pedagogical profession.

The postures and movements needed for the purpose of pedagogical gymnastics have generally a different character, are more active than those generally needed for medical purposes, which sometimes are entirely passive. However, in the preparatory training under pedagogical gymnastics of weaker, yet healthy individuals, postures and movements are often needed, which resemble or are identically the same as those used in medical gymnastics. On the other hand, in the treatment of patients by medical gymnastics, particularly in the after-treatment, postures and movements of the same character as those used in pedagogical gymnastics are often employed. The boundary-line between pedagogical and medical gymnastics cannot be clearly drawn by stating that such or such movements and postures are pedagogical gymnastics and such others are medical gymnastics. The movements and postures are common, belonging to both branches. The distinction lies in the purpose to which they are adapted. They are pedagogical gymnastics when they serve education and are administered by persons qualified to serve education; they are medical gymnastics when they serve medicine and are administered by persons qualified to serve medicine.

The title of my paper, "Gymnastics in Heart Diseases," may perhaps at first impress with an accent of novelty. I feel confident, however, that if, by your courtesy, gentlemen, the definitions of the terms gymnastics and medical gymnastics, which I have suggested, are adopted by you during the discussion of my subject to-night, a few words only may suffice at the outset to divest the title of my paper of all trace of novelty. When, ages ago, a physician advised a sufferer from heart disease to go to bed and by the re-

clining posture the embarrassment of his insufficient heart-action abated, a gymnastic remedy was successfully employed. When you advise your heart patient to go to bed, or to sit up, or stand up, or begin to walk, to walk about more, to begin to walk downstairs and upstairs and so forth, you deal with gymnastic measures from the standpoint of my definition. In recent text-books on medical practice the discussion of the therapy of heart diseases contains in due place also the advice to take regulated exercises, a suggestion again of a gymnastic remedy.

This traditional and recognized essential part of the therapy of heart diseases contains, although in a comparatively vague and incomplete form, an outline and suggestion of the essentials of the gymnastic therapy of heart diseases. The reclining posture, the half-reclining, the sitting, the standing postures, a little walking, more of walking, walking up stairs, walking up hills and mountains, and other regulated exercises: these are somewhat defined postures and movements, and in the order I have mentioned them they represent an approximate progressive scale of exercises. They are, therefore, gymnastic from the standpoint of my definition of gymnastics. They are defined with reference to desired effects. When, for instance, the reclining posture is advised, it is not only because the patient is unable to stand or walk, but because the reclining posture brings the mechanism of his circulation to act under modified conditions, which make his insufficiency less felt and favor recuperation. The posture exercises a remedial influence. When again, sitting and standing and walking are advised, these exercises are not only marks of improvement gained under preceding conditions, but they help to adapt the mechanism of the circulation to their own more active conditions; they are therefore means of a remedial training. The same may be said of the other exercises mentioned.

However, the postures and movements mentioned are not so exactly defined gymnastic remedies as can be given. By rough comparison, they may be said to stand in a similar relation to the exactly defined gymnastic movements and postures, as the crude drugs, such as roots, barks, etc., stand to the active principal substances, alkaloids, glycosides, etc., which by chemical processes may be eliminated from them. The progression they represent is not an even, continuous, successive progression, but a progression by discontinuities, the members of the series distanced from each other by considerable intervals. Finally, they do not contain any suggestion of the idea of a gymnastic day's order or a prescription of a number of exercises, which combined give better result than one form of exercise alone.

If, however, we elaborate further the principles, spoken or unspoken, but surely involved in the employment of the postures and movements which I have enumerated and which are prescribed by all physicians in dealing with heart diseases, if we elaborate them so far in details as present knowledge and experience admits of, — we will reach practical conclusions that shall resemble the distinct method of gymnastic treatment which will be presented in the further development of my subject.

As the title of my paper implies, it is not my purpose to discuss the therapy of heart diseases *in toto.* What the therapy of heart diseases in general teaches, stands or falls with or without the gymnastic treatment of them. It is only one of the remedies at disposal which claims its own place among the rest. It is a fact, that in comparatively recent times, or since the first half of this century, perhaps from the early thirties, attempts have been made to understand and bring to practical applicability the effects of gymnastic movements and postures upon heart diseases. The result has been, that at present three distinct methods

are elaborated and described and practised. In chronological order mentioned, they are:

(1) The manual gymnastic method, originated by the Swedish gymnasiarch Ling, further elaborated by his followers, and during the last thirty or forty years by an increasing number of physicians in Sweden.

(2) The so-called medico-mechanic method, elaborated by Dr. Zander in Sweden.

(3) The mountain-climbing or terrain cure, elaborated by the German professor Dr. Oertel.

Of these methods the two first mentioned are most distinctly gymnastic, consisting of formally defined postures and movements. Oertel's is less formal in the movements employed, inasmuch as they consist in walking up hills, but in them certain physiological principles are employed, which are also employed in the two first mentioned, more distinctly gymnastic methods. Oertel's method is described in his "Therapie der Kreislaufs-Störungen," the description easily accessible. Zander's method is based upon the same principles as the manual gymnastic method, but elaborated differently in the technique inasmuch as mechanical machines, run by steam or electricity, give the postures and movements to the patient. The technique of this method cannot be well demonstrated without the machines; the theory is described, if the theory of the manual method is described.

The manual gymnastic method is the oldest, embraces the principles of all the methods, has the widest scope of applicability, and is continually being fuller elaborated by physicians in Sweden who hold official positions under the Swedish government as well as by private practitioners of medicine. The term "gymnastic physician" sounds as natural in the Swedish language as the title "orthopedic surgeon" in English. By this is meant men who have studied gymnastics in connection with medicine, have taken medical examination and are licensed by the Royal

Medical Council in Stockholm as practitioners of medicine and surgery.

The manual gymnastic method can be demonstrated without elaborate accessories. I consider, therefore, I can best serve the opportunity of this occasion by a condensed description of this method and a demonstration of its technique.

Some of the principal workers and writers upon this subject may be mentioned. They are Dr. Sätherberg, former head-physician of the Orthopedic Institute in Stockholm; Dr. Jäderholm, former Professor of State-Medicine in the Royal Carolina Institute of Medicine and Surgery in Stockholm, also former head-physician of the Orthopedic Institute in Stockholm; Dr. Hartelius, former, and Dr. Murray, present Professor of Medical Gymnastics in the Royal Central Institute of Gymnastics in Stockholm; Dr. Rossander, former Professor of Surgery in the Royal Carolina Institute of Medicine and Surgery; Dr. Zander and Dr. Wide, both docents of Medical Gymnastics in the Royal Carolina Institute of Medicine and Surgery (Dr. Wide is also head-physician of the Orthopedic Institute in Stockholm, and Zander, head-physician of the Medico-mechanic Institute in Stockholm); Dr. Levin and Dr. Wallgren, Assistant Professors in Medical Gymnastics; Dr. Levertin, docent at the Royal Carolina Institute of Medicine and Surgery, etc.

I became first interested in the subject some ten years ago, when during the second year of my medical course in the Medical School of the Royal University in Lund, Sweden, I received instruction in medical and pedagogical gymnastics. During last year I have returned to the study of the subject. In preparing my *résumé* for this occasion I have consulted the following writers:

Robert Murray, M.D.: The physiological basis of the gymnastic treatment of organic heart diseases (Swed.).
T. J. Hartelius, M.D.: Manual of medical gymnastics (Swed.).

A. Wide, M.D.: Gymnastics in the diseases of the organs of circulation (Swed.).
Astley Levin, M.D.: Contribution to the knowledge of the influence of medico-gymnastic movements upon the rhythm of the pulse in organic heart diseases (Swed.).
Frans Lindblom, M.D.: Gymnastics in heart diseases (Swed.).
M. J. Oertel, M.D.: Therapie der Kreislaufs-Störungen.
Herman Nebel, M.D.: Bewegungs-kuren mittelst Schwedischer Heilgymnastik und Massage.

When last spring I received the invitation from the President of the Boston Society for Medical Improvement to read a paper before the Society on some subject bearing upon gymnastic therapy, I decided to obtain further information upon the subject of gymnastics in heart diseases. At the summer clinic in Lysekil, in Sweden, I found Professor Murray and Dr. Wide, and through their courtesy I received their further information. Disclaiming originality on my part in connection with this subject, I feel confident that my *résumé* will be a correct, although necessarily condensed, representation of the method such as at present is understood and practised in Sweden.

The heart-diseases treated by gymnastics in Sweden are: valvular disease, fatty heart, weak heart (from nutritive disturbances), uncomplicated hypertrophy. Only in the uncomplicated juvenile hypertrophy, if that term is accepted clinically, cure can be obtained. In the other diseases, the result is alleviation of all the symptoms, making the patient more useful and comfortable, with prospective retardation of fatal development.

According to statistics just received from Stockholm, during the 27 years from 1865 to 1892, there were treated at the medical clinic of the Royal Central Institute of Gymnastics 1,209 cases, and at the Orthopedic Institute in Stockholm, 994 cases of heart diseases. Dr. Wide, the present head-physician at the Orthopedic Institute in Stockholm, states that he has about 100 cases of heart diseases a year under gymnastic treatment. The greatest number of these cases

are mitral insufficiency with symptoms of failing compensation in various degrees. Inasmuch as the indications for treatment in the main are the same for the different heart diseases, mitral insufficiency may be chosen to exemplify the application of the gymnastic method. The indications are:

(1) To increase the force of the systolic stroke of the heart.

(2) To relieve the venous hyperemia of the abdominal organs.

(3) To relieve the venous hyperemia of the lungs.

(4) To relieve the hydropic exudations.

The gymnastic treatment strives to meet these indications by (1) bringing in more effective operation the auxiliary forces of circulation, and by, on the other hand, (2) stimulating the heart to more forceful contraction.

The auxiliary forces of circulation are brought in more effective operation by

(*A*) Manipulations, passive and active movements which push the venous blood from the peripheric parts towards the venæ cavæ. Such are:

(*a*) Massage of the extremities in centripetal direction.

(*b*) Abdominal massage.

(*c*) Certain passive movements (circumductions, flexion and extension).

(*d*) Certain active movements, with resistance.

(*B*) Movements which increase the negative pressure within the thorax and thereby produce increased aspiration to the auricles. Such are the respiratory movements (deep inhalations).

The stimulating action upon the heart contraction is produced

(*A*) By the increased inflow of blood, caused by the movements mentioned, particularly as the inflow now consists of blood, better oxygenated, because of the respiratory movements.

(*B*) By manipulations upon the chest, which act as cardiac stimuli.

The larger inflow of blood gives a larger volume of blood for the ventricles to contract upon, gradually raising the arterial, diminishing the venous pressure. As the pressure difference between the aorta and the right auricle increases, the condition for the nutrition of the heart-muscle by the coronary circulation improves.

The increased pressure difference between the aorta and the right auricle promotes the relief of venous stasis and hydropic exudations.

Localized effect upon the venous congestion within the abdomen is added by the abdominal massage and certain passive and active movements involving that region, such as circumduction of trunk, alternate twisting of trunk.

Localized effect upon the chronic hyperemia of the lungs is added by the respiratory movements.

Localized effect upon the hydropic exudations is added by massage upon the region involved.

This is the physiology of the method, reduced to brief terms.

FURTHER EXPLANATION OF THE MOVEMENTS EMPLOYED.

(1) *Massage upon the Extremities*, consisting of gentle kneading of the muscles and stroking of the limbs in centripetal direction under moderate pressure. By this the contents of the veins and lymphatics are aided to empty themselves in the direction of the venæ cavæ, while the negative pressure, momentarily produced behind the stroke, causes an increased inflow into the corresponding capillaries from the arterial side, thus adding a force to the circulation and locally promoting the absorption of edema.

(2) *Abdominal Massage.* — By successive compression of the contents of the abdominal cavity, the ven-

ous and lymph currents are aided onward in the direction of vena cava inferior with a corresponding increase of arterial inflow in the part, thus adding a force to the circulation. It is suggested also, that the mechanical pressure produced may exercise a stimulating influence upon the innervation of the vessel walls and the intestinal walls. Also is the suggestion presented, that mechanically a reflex stimulus from the splanchnic area upon the vagus may possibly be produced, inasmuch as a stronger pulse of slower rate is observed directly after the abdominal massage, when administered according to the rules of the art, as applied upon the case. This suggestion is, of course, not presented as an established theory.

(3) *Circumductions of the Joints* that admit of this form of motion, namely:

Circumduction of hands.
Circumduction of arms (that is, shoulder-joint).
Circumduction of feet.
Circumduction of thigh (that is, hip-joint).
Circumduction of head.
Circumduction of trunk and
Circular twisting of trunk.

The effect of the circumductions is explained by referring to the fact, established by direct physiological experimentation, that the capacity of the veins, where they pass over the joints is increased when they are lengthened by the extended attitude of the joints, correspondingly diminished when they recoil with the change to flexion. In the circumduction of the joints, therefore, increase and diminution of the capacity of the veins adjoining the moving joint, alternates, as the extended and flexed positions of the joint succeed each other. For each time the veins are thus lengthened, blood is aspired into the vein from its peripheric tributaries, which in its order influences the flow from the arterial side through related capillaries. In the soon following recoil of the veins they empty themselves in centripetal direction.

Particularly effective are the circumduction of the shoulder- and hip-joints, as by them a strong aspiration is produced in large veins. An additional explanation is offered with reference to these joints. The femoral vein, having received the greater number of the veins of the lower extremity as tributaries, in passing over Scarpa's triangle on its way to the external iliac is, as known from anatomy, enclosed, together with the femoral artery, in a strong fibrous sheath, derived in part from a process of fascia lata; the anterior part of the wall of the vein is thereby in this region attached to the fascia and follows the movements of the fascia. In the successive alternation of contraction and relaxation of the muscles surrounding Scarpa's triangle, the fascia is elevated and depressed alternately and the vein dilated and compressed. Experiments by Loven and Ludwig are quoted in support of these explanations. Similar reasoning may be made regarding the circumduction of the shoulder-joint. Although it is admitted, that the theoretical explanation may be open to criticism, the effect of the movements upon the circulation, for which they are administered, is actually obtained.

Circumduction of the head is similarly related to the veins of the neck and head. Given with due precautions, according to the rules of the art, it is credited with a certain effect against congestion of the head.

Circumduction of trunk and circular twisting of the trunk act chiefly upon the vena cava inferior. They are credited with an effect to relieve venous stasis of the abdominal vessels.

(4) *Respiratory Exercises*, consisting essentially of deep inspirations, administered as passive movements. Two objects are in view: (1) more complete oxygenation of the blood, (2) aspiration of the blood to the auricles. Their employment for the latter purpose is based upon the physiological fact, that the negative pressure within the thorax increases with deep inspira-

tion, thereby causing the blood to be aspired to the auricles from the venæ pulmonales and cavæ. They influence particularly the pulmonary circulation, but also the systemic. The diaphragm, by its contraction, dilates the vena cava inferior at the place where the central tendon is attached to the wall of the vein on its passing through the tendon. At the same time the descending diaphragm compresses the abdominal organs and drives the venous blood from these organs into the vena cava inferior. The aspiration produced within the vena cava superior acts not alone upon the veins in the upper part of the body, but also upon the ductus thoracicus and the lymphatic circulation at large. The respiratory movements most used are:

a. Lifting of chest.
b. Spanning of chest.
c. Certain arm movements.

(5) *Certain Passive Movements*, found by experience to have a calming influence upon an irritable heart. Explanation of their action not attempted. Those are:

a. Vibratory lifting of the chest.
b. Vibratory manipulation of the back.
c. Nerve-pressure of the back.

(6) *Local Manipulation of the Precordial Region.*

a. Hacking.
b. Slapping.
c. Vibratory pressure.
d. Stroking.

These manipulations have a traditional reputation among gymnastic physicians in Sweden, although no satisfactory physiological explanation of their effect can be given. It is found by experience, that these manipulations, administered according to the rules of the art, with gentle, delicate touch over the precordial region, act calming and strengthening upon the heart when the beat is weak, rapid and irregular. The effect, clinically observed, is that of a cardiac stimulus, and suggesting a possible reflex stimulus from cuta-

neous nerves upon the inhibitory nerve of the heart. It has been suggested, that the physiological experiment by Goltz, in which, by slapping the surface of the abdomen of a frog, cardiac inhibitory effects are exhibited, may be regarded as a possible analogous phenomenon. However defective the physiological interpretation of these manipulations may be, among those who have most experience in the matter there is a general agreement about the effect of the manipulation. I have had occasion to ascertain in cases of mitral regurgitation with symptoms of insufficiency in milder degree, that I was able to reduce the rate of the pulse with from five to twelve beats by this manipulation continued during five to seven minutes. The effect is most marked, when the pulse-rate is high, 110 or more.

(7) *Certain Active Movements* are administered in the progression of the treatment.

The experience is, that violent, vigorous, rapid, long-continued and frequently repeated exercises, particularly of the upper extremities involving the muscles of the thorax, have a deleterious influence upon the heart. On the other hand, experience has also taught, that milder, active movements of the lower extremity, carried out in slow rhythm, also respiratory exercises, have a calming influence upon the heart.

In the after-treatment of heart diseases several milder active movements are given in reclining or sitting posture, such as

Flexion and extension of the hands.
Flexion and extension of the feet.
Flexion and extension of the knee.
Flexion and extension of the elbow.
Flexion and extension of the hip.
Rotation of the hip.
Abduction and adduction of the hip.
Pronation and supination of the forearm.

They are given with a view of obtaining a livelier operation of the auxiliary forces of circulation, with-

out causing an active exertion of the body, that excites the heart action beyond a certain moderate degree.

From what I have said so far follows, that the movements administered by the gymnastic physician in heart diseases are, so to say, movements of the blood and breath of the patient. The criterion of a correctly chosen and successfully administered movement is not that it accords perfectly with the outer, mechanical definition of the movements, though that is indirectly important and helpful. No, the criterion is that the movement actually influences the heart in such a way as is aimed at. It is necessary, therefore, in the beginning of the treatment of a delicate case to examine the pulse before and after each movement until the physician gets the pulse of the patient, so to speak, in his grip with aid of the movements; thereafter the observation may be made less often.

A detailed, formal, verbal description of the technique of the administration of the movements and postures mentioned would be tiring to listen to and not convey an adequate idea of the work. I prefer, therefore, on this occasion, to demonstrate practically some of the technicalities. (Demonstration by model was here given.)

In the treatment of a given case, several movements are chosen, which respond to the indications present. These are combined to a prescription of movements, which are administered with intervals of rest, so that a day's treatment extends over half an hour to an hour. The treatment is repeated once every day until improvement is well established, when the treatment is repeated less often, and carefully chosen mild, active movements taken by the patient on intervening days.

As an exemplification I present four successive prescriptions of movements, given in a case of a woman, age twenty-three, with symptoms of mitral re-

gurgitation in milder degree consequent upon acute rheumatism. She had been under treatment for rheumatism during the last two years, with periods of recovery intervening. During the last half-year she had been treated for endocarditic symptoms. Had recovered; was dismissed by her attending physician; had come to Boston with a view of increasing her strength by exercises; wanted to join a gymnasium class.

When she came to me, requesting my advice regarding her gymnastic exercises, she had just discontinued the use of digitalis and strychnia. She was still suffering more or less from a sense of precordial oppression, occasional severe shooting pain in the region of the heart, headache, diarrhea, occasional vomiting, and, on slight exertion, fatigue and dyspnea. On examination she exhibited pulse 128, small, low tension, regular; heart impulse in the nipple-line, fifth interspace, extending down towards sixth; mitral systolic murmur at apex, extending to the left of the nipple-line, lost in the axilla; percussion negative or a possible increase of dulness to left. She was advised not to take any class gymnastics at present, but was offered such a course of gymnastic treatment as is indicated by the following four prescriptions, which were given during the next following three months:

Prescription No. 1. Begun November 1, 1895; changed November 18th:

1. Wing-sitting, lifting of chest.
2. Half-lying, circumduction of feet.
3. Half-lying, massage of abdomen.
4. High-ride-sitting, circumduction of trunk.
5. Half-lying, circumduction of hip.
6. Half-lying, manipulation of precordium (slapping, percussion, vibratory pressure and stroking).
7. Same as 1.
8. Opposite-standing, hacking of back.
9. Same as 1.

The above movements are all passive.

Prescription No. 2. Begun November 18th; changed December 16th:

1. Wing-sitting, lifting of chest.
2. Half-lying, circumduction of feet.
3. Half-lying, massage of abdomen.
4. Same as 1.
5. Half-lying, circumduction of hips.
6. Half-lying, manipulation of precordium.
7. Same as 5.
8. Same as 4.
9. Opposite standing, hacking of back.
10. Same as 1.

The above movements are all passive.

Prescription No. 3. Begun December 16th; changed January 9, 1896:

1. Wing-sitting, lifting of chest.
2. Half-lying, circumduction of feet.
3. Half-lying, flexion and extension of feet (with resistance).
4. Half-lying, massage of abdomen.
5. Half-lying, flexion and extension of knees (with resistance).
6. Half-lying, flexion and extension of elbow, wrist and fingers (with resistance).
7. Half-lying, circumduction of thigh.
8. Half-lying, manipulation of precordium.
9. Same as 1.
10. Opposite standing, hacking of back.
11. Same as 1.

The movements, No. 3, 5 and 6, of this prescription, are active, with resistance, taken in restful position, the active work localized upon the muscles of the leg, the thigh, the upper arm, and the forearm, in the order mentioned; all the other movements are passive.

Prescription No. 4. Begun January 9th; discontinued January 31st.

1. Cross-sitting, circumduction of arms.
2. High-opposite-standing, flexion and extension of feet (with resistance).
3. Wing-prone-stride-sitting, raising of trunk (with resistance).
4. Opposite half-hook, standing, downward pressing of knee (with resistance).
5. Half-hook, half-lying, extension of leg (with resistance).
6. Half-lying, flexion and extension of elbow, wrist and fingers (with resistance).

7. Half-lying, massage of abdomen.
8. Half-lying, manipulation of precordium.
9. Half-lying, circumduction of thigh.
10. Wing-sitting, lifting of chest.
11. Opposite standing, hacking of back.
12. Same as 10.

The movements, Nos. 2, 3, 4, 5, 6, of this prescription are active, with resistance taken in restful position, the active work localized upon the extensor muscles of the hip-joint and erector muscles of the spine in No. 3, upon the iliacus psoas and abdominal muscles in No. 4, and upon the extensor groups of the hip-joint acting together with quadriceps extensor cruris in Nos. 5, besides Nos. 2 and 6 giving the same localization as introduced in the next preceding prescription.

After the first two weeks of treatment all the subjective symptoms were relieved, expressed by the patient in these words: "I breathe easy, feel flexible, not heavy as before; my palpitation and pain in the chest have ceased to trouble me."

When, six weeks after the beginning of the treatment no subjective symptoms had returned, the mild active movements were introduced, which are indicated in Prescription No. 3. The effect being favorable, after three weeks more a greater amount of active work was introduced, as indicated by Prescription No. 4, the localization in this prescription, involving all the larger groups of sceletal muscles, except those attached to the thorax. In administering these active movements, I graded the resistance, rhythm and frequency of repetition so as not to allow the pulse-rate after the movement to reach 100; and during the latter half of the prescription I administered the mildest degree of resistance, or entirely passive movements, with the aim in view that at the end of every day's treatment the pulse-rate should be reduced to below 80, or as near that as possible.

TABLE SHOWING THE PULSE-RATE IN THE CASE REFERRED TO, BOTH BEFORE AND AFTER THE EXERCISES.

	Before.	After.		Before.	After.		Before.	After.
Nov. 1,	120	96	Nov. 27,	84	72	Dec. 19,	86	72
4,	124	88	29,	84	72	20,	90	84
5,	90	84	30,	84	78	30,	92	82
6,	104	90	Dec. 2,	96	84	31,	86	80
7,	108	90	3,	88	84	Jan. 6,	88	72
8,	100	84	4,	88	76	7,	92	72
10,	96	80	5,	84	84	8,	82	72
18,	88	74	6,	88	88	9,	78	72
19,	98	96	12,	88	76	10,	98	76
20,	88	88	13,	88	76	13,	82	78
21,	78	78	14,	88	80	14,	90	78
22,	88	74	16,	88	76	15,	80	80
23,	94	80	17,	80	72	16,	88	88
25,	84	76	18,	80	72	20,	88	80
26,	94	84						

My plan was to continue with a fifth prescription, containing localization upon the pectoral muscles and serratus magnus, and thereafter somewhat more complicated movements, involving simultaneous localization upon a greater number of groups of muscles.

At the end of the three months there was no change in the objective signs, observed at the first examination.

The theory of the gymnastic therapy in heart diseases which I have presented is open to criticism, and does not claim to satisfy the classical rule "Totum et rotundum ab omnibus partibus." Whatever may be the strength or deficiency of the theory, all who have the most experience with the method advocate it as a rational method, supported by very satisfactory results — relief from symptoms, increased strength, usefulness and comfort.

Different views are held regarding the range of applicability of the method. Some physicians in Sweden begin to administer mild, passive movements of the extremities, gentle massage of the extremities and mild respiratory movements when the patient is bedridden by severe symptoms of broken compensation. Others give gymnastic treatment as after-treatment,

when rest in bed, digitalis and other agencies have done their work. The ultimate end of the treatment is to establish the compensatory hypertrophy, to train the patient to such degree of activity as is consistent with the safety of the heart and to keep him informed of the limits of exertion, which he must not go beyond.

My own experience at present is limited to some cases of mitral incompetency with symptoms in milder degree. I succeeded invariably by the gymnastic movements to reduce the heart-rate, if it was high before the beginning of the movements, the pulse exhibiting at the end of the movements appreciable increase in strength. The highest reduction of the pulse-rate, which I have obtained, within an hour, has been by 38 beats, in an instance where the rate was 120 at the beginning and 82 at the end of the day's exercises. On an average the reduction has been by 10 to 15 beats after an hour's gymnastics, more if the pulse-rate was high, less, the nearer it was to the individual pulse norm. It is my hope that larger casuistic material in the near future will enable me to give some contribution to the demonstration of the value and scope of gymnastics in heart-diseases.