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THE
THERAPEUTIC VALUE
OF
MOTION.

BY
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NEW YORK.

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Resident Physician and Director.

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THE

Therapeutic Value of Motion.

BY G. H. PATCHEN, M.D., NEW YORK.

(FROM *THE MEDICAL ADVANCE*, FEBRUARY, 1884.)

So much has been written about the value of *rest* in the treatment of many forms of disease that its therapeutic importance is generally understood and appreciated. But the fact that *motion*, in an active or passive form, possesses an equal if not greater therapeutic value, is scarcely comprehended by a large majority of the profession, and even if comprehended, the principles governing the details of its application are so little understood as to render it of very little, if any, practical value.

It seems difficult to account for this lack of definite knowledge when we consider that many years ago, Ling the celebrated Swedish physician, devised a complete system of therapeutics consisting only of active and passive movements based upon a most thorough and perfect knowledge of physiological and anatomical laws.

Ling's methods have been in operation for more than forty years with the most satisfactory results, frequently curing forms of disease that drugs alone were not able to overcome. They are especially adapted for the treatment of a large class of chronic diseases for which, by the use of drugs alone, there often seems to be so little help.

Rest and motion are, in reality, only relative terms. Absolute rest of the *entire* body is almost a practical impossibility, and, were

it possible, it would in a short time prove a dangerous remedy. Motion, in some form or degree, is an absolute necessity to the perfection of those physiological and chemical changes upon which health depends.

Rest causes stagnation of vital processes and diminished vigor of general vital function, and, while it may be necessary, temporarily, for the repair of an injured part, or on account of a highly inflamed condition of certain organs, the restoration thus brought about is always at the expense of the general vitality.

In the presentation of cases for treatment it is often an important question to decide whether motion or rest should be employed.

As a general rule it may be safely stated that rest should be made use of in the treatment of all acute conditions of disease, where the normal activities are in excess, while motion, in some definite form or degree, should be employed in all chronic conditions of disease, where the normal activities are deficient. But the line separating these distinct principles can not be too rigidly drawn. There are many conditions, both in acute and chronic forms of disease, where rest of a part can be most judiciously combined with motion of other portions of the body.

From a remedial standpoint there are various kinds of motion, each producing distinct effects; but they all may be considered under two general heads or classes—active and passive.

Active motion comprehends all movements that originate in the will of the patient and are executed by the patient himself without assistance. This definition would, of course, include all kinds of voluntary exercise, even that pertaining to labor. But it is not our purpose to consider the merits of general exercise as a remedial measure (although without doubt it has many), as its effects are not definite or specific enough to enable them to be successfully employed for therapeutic purposes.

Active movements promote nutrition and increase the strength and endurance of the muscles brought into use, and the afflux of arterial blood towards them. Thus by judicious use of them the nutrition and consequent functional activities of any portion of the body where muscle exists can be increased. Another, no less important result of the proper employment of active move-

ments, is the *derivative* effect that can be induced by directing the afflux of blood from any part to a group of muscles more or less remote. Thus a congestive headache can be relieved by making use of such movements as will direct a flow of blood to the feet and legs.

Chronic cases of congestive headache that are caused by constipation and torpor of the digestive organs, can be cured by the use of such movements as will cause a flow of blood to the abdominal region, and, at the same time, strengthen the digestive functions and increase the peristaltic action of the intestinal tract.

Passive motion comprises all movements by which the whole, or any designated portion, of the body is moved by some external source of power and independently of the will of the person operated upon. There are many varieties of passive motion, each having more or less distinct effects. Massage, which includes several distinct forms, such as rubbing, clapping, knocking, pulling, stretching, etc., is, perhaps, the most familiar. Vibratory motion is another valuable form. Its special province and effects will be considered further on.

Passive movements promote secretion and excretion. Continued pressure upon a part (which, perhaps, might be called a paradoxical form of passive motion) as every one knows, will cause absorption or wasting away of the part to which it is applied. "It is a fact, confirmed by the experience of many years with the movement cure, that all passive movements, as pressure, vibration, stroking, etc., done either by the hand or with instruments, increase the absorption of the diseased organic parts, which may be vascular glands, or other natural parts of the body."

The fact that motion, in some form or degree, is absolutely essential to the perfection of all the various vital processes that are necessary for the maintenance of life and health, is too little appreciated. But a studious investigation of what is constantly taking place within the body, will make it very plain and demonstrate its importance. We shall find that, at least, three distinct forms of motion contribute to the proper action of all the various physiological changes. First we notice the motion that accompanies all the chemico-vital changes incident to nutrition. This includes all those complex phenomena associated with the digestion and assimilation

of food, the oxidation of the blood, and the reduction of waste matters to their simplest forms in order to insure their speedy exit from the body. Vital chemistry, in its physical aspects, does not differ from any other, and motion to some extent—at least a change of form and place—is necessary to all chemical changes whether occurring outside or inside of the body.

The next form is that of involuntary muscular action. This motion is widely distributed and subserves a most useful purpose. To this class belong all of the rhythmic movements of the various organs and regions of the body, such as those of the chest, heart, arteries, diaphragm, abdominal muscles, alimentary canal, etc. These movements are associated with organs and regions that maintain and control the most important vital functions. By a most beneficent and wise arrangement, their action is, to a very great degree, independent of the will or of voluntary control and is in constant operation. They assist to a great extent the movements of the first class, and, although limited in degree, yet, by means of their continuous action, their aggregate effect is considerable.

Movements of the third class are derived from the action of the voluntary muscles. This includes every variety of muscular exertion and is very comprehensive in its results. While, undoubtedly, life might be indefinitely prolonged by the combined effects produced by the first and second classes of motion, it is very certain, that, unaided, they are not sufficient to maintain life and health in their most vigorous perfection. No matter how strong the constitution, it soon becomes enfeebled unless frequently reinforced and invigorated by voluntary exercise. Again, in this relation there is a very important physiological fact very little understood, which is, that *muscular action* is the *natural counterpoise* to *nervous action*, and, for this purpose alone, it should be in daily use. Foster calls the muscles, "The master tissues of the body," and truer words were never spoken. From this fact the observing physician can derive therapeutic hints of inestimable value.

Voluntary muscular exercise contributes, in many ways, to the perfection of physiological processes. It directly accelerates the circulation and oxidation of the blood; increases the functional activities of the liver and intestinal canal; promotes the absorption of ingested fluids; hardens muscle and increases its growth and

strength; promotes the nutrition of all portions of the body; overcomes the action of gravitation which would cause stagnation of the blood and other fluids and consequent congestion and inflammation in various organs and, in many other ways, shows itself to be an indispensable factor in the problem of life and health.

This hasty review of physiological processes, enables us to see to what extent vital phenomena depend upon mechanical agencies and how readily they may be affected by them.

If, as is undoubtedly the case, disease is nothing more or less than modified vitality occasioned by some imperfect or diminished action of the mechanical part of vital activities, is it not reasonable to infer that it can be removed and health re-established by such mechanical processes as will restore the deficient physiological action in those parts in which it is lacking?

The inference is both logical and practicable and embodies the fundamental principles of the movement cure. Movements, in some of the forms previously mentioned, can be so applied as to affect any organ or portion of the body, increasing vital action where it is deficient and decreasing it where it is in excess, thus restoring that harmonious equilibrium of the different organs upon which health depends. When the patient possesses a considerable degree of strength, the single or active movements may be used. When the debility is great and nervous action excessive, the passive and passive-active or duplicated movements are most effective. Duplicated movements are those made by the patient with assistance. They are of two kinds. In one the power to make the movement is partially supplied by the operator. In the other the movement is made entirely by the patient, but the *quality, amount* and *duration* of the movement is entirely under the control of the operator. Duplicated movements are the most important, in a therapeutic sense, of all others. "They may be confined mainly to any particular anatomical division or physiological function, to the nerve, to the muscles, or may influence all together. They are adapted to the most feeble invalid or to the strongest persons, and need never produce effects beyond the requirements of the invalid or the intention of the operator."

There is one form of passive motion of great value in the treatment of many of the severer forms of chronic disease, which seems to be but little known by the profession, but I am sure it will grow

in favor as a thereapeutic measure, when its virtues are better understood. I refer to mechanical massage or vibratory motion already spoken off. Its nearest analogue is manual massage, but it is much more important and effective, producing results that the latter can never hope to obtain.

Its proper administration requires the use of mechanical, rather than manual power, because, in order to secure the best results, the vibrations must be given with a rapidity that would exhaust the strength of the most willing hands. Motion at the rate of 1,000 or 1,500 vibrations per minute, continued for five or ten minutes at one application, is necessary in many cases.

Many machines have at different times been devised for this purpose, but undoubtedly the most ingenious and successful are those invented by Dr. Geo. H. Taylor of New York. For convenience of application and effectiveness of purpose, they leave little, if anything, to be desired. They can be applied to any part of the body, their application causes no pain and they are capable of giving vibrations at any desired rate of speed.

In a therapeutic sense, vibratory motion means a great deal and has a wide range of application.

When a disease becomes chronic, it is because the vital powers are so enfeebled that they are no longer able to maintain, to a sufficient degree, some of the three forms of activities that we have found necessary to health, and there is, consequently, stagnation or obstruction, somewhere, that needs to be removed. If the chemico-vital processes are, from any cause, insufficient, the obstruction will be the result of improper oxidation, or imperfect reduction of waste matter, and an important vital part may, in this way, become affected. If the motions of the second or third class become deficient, there will occur inactivity or congestion of different organs, which will result in serious disease. In either case there will be a deficient heat, deficient respiration, and sluggish capillary circulation.

As we have shown these conditions to be greatly influenced and controlled by movements subject to mechanical laws, it follows, in accordance with the law of the correlation forces, that vibratory motion may become a sovereign remedy for any and all states which these conditions may induce.

What are some of the effects of mechanical massage? If we subject a portion of the body, say the leg, to its action for a time, what is the result? The entire mass is in a state of rapid motion, say at the rate of 1,000 vibrations per minute. The first effect experienced will be a sensation of heat. The sensation is real. The foot and entire limb become warmer; the skin is red and itching. There is evidently more blood there than before, and it is in a more active state of circulation. The limb feels much as it does after a brisk race except there is no feeling of exhaustion or fatigue, because no demand has been made upon the nerves or will-power for support of voluntary exertion of any kind. Where does the heat come from? From several sources. In accordance with the law of the correlation of forces just mentioned, a part of the motion to which the limb has been subjected has been transformed into heat and a considerable degree of heat has been also developed by the friction of the fluid and semi-solids of the leg against each other. Although unaware of it, by any immediate sensible effect, other important changes, in addition to the production of heat, have been effected. A portion of the motion has been transformed into chemical energy, and all the chemico-vital activities have been stimulated and quickened. The oxygen, held in solution by the blood, comes into more vigorous and immediate contact with oxidizable material and a more perfect oxidation and elimination of waste material is the result.

That oxidation and elimination of waste material is increased by the action of mechanical massage, is proved in several ways. First and mainly by the appearance of eliminated matter. The urine soon becomes greatly increased in quantity, and is of clearer color; there is more urea and less uric acid; the skin becomes softer and more moist, showing increased elimination of insensible perspiration. The tongue becomes less coated, and the sallow complexion assumes a more natural color, all of which effects are ample evidence of more perfect reduction and elimination of obstructing material. Absorption is increased; swellings and even scrofulous enlargements become less, and gradually disappear; rheumatism vanishes; pains and inflammations of parts contiguous to the point of application, are lessened and healthful action gradually restored. The capillary circulation is accelerated. The

frequency of the pulse is often lessened from five to fifteen beats per minute for some time after a treatment, showing less obstruction in the circulation. The nutrition of the muscles is promoted and conversely nervous activities are soothed and diminished. The appetite is increased and the sleep becomes more prolonged and tranquil. There is soon noticed an exalted feeling of strength and vigor, and, in almost every way, there appear signs of improvement, which, with proper management, will continue until health is fully restored. There are other very important effects to be derived from the proper use of vibratory motion in the form of mechanical massage, such as its power to cure many kinds of deformities, paralysis, neuralgia and other nervous affections, but a consideration of these subjects must be left to some future occasion. The object of the paper is to show the possibilities of motion, in its various forms, as a therapeutic agent, and to encourage study and investigation of its merits and methods. It will amply repay investigation. Did space permit, cases illustrating the different effects and methods of application could be furnished in abundance. In order to use motion, as a therapeutic agent, with the greatest success, its effects and best methods of application must be most thoroughly understood. This requires a great amount of study and experiment. But happily this arduous task has been so greatly lightened by such eminent and enthusiastic explorers in this line of medical thought and practice, that we shall do well enough to accept as true the results of their experience, and endeavor to properly apply them to cases in hand.

Like other powerful remedies, its misuse will be followed by harmful results. Until individual experience with it, in a variety of cases, has either confirmed or corrected theoretical knowledge of its application, it should be cautiously used and the effect of each administration closely observed. Properly administered it cannot fail to do good.

THE CIRCLE OF MOTIONS IN THE LIVING BODY.

LIFE and health are maintained through the mutual interdependence of various kinds of *Motions*, for which the system furnishes the arena. An understanding of these relations is an important aid to the seeker after health. Attention is here called to the chief points concerning these motions.

Motion of Respiration.—Rythmic motions of the walls of the chest, bringing oxygen (of the air) in contact with blood passing through the lungs. Also an aid to the circulation.

Motion of the Abdominal Walls.—Synchronous with respiration ; promotive of the functions of organs in the abdominal cavity.

Motion of Heart and Arteries.—Pump-like, urging blood toward the tissues and extremities.

Motion of Blood in Capillaries.—Supplying material support for action and renewal of tissues.

Motion of Contents of Veins.—Return currents, urged forward by muscular action, especially the walls of the chest and abdomen.

Motion of Stomach and Bowels.—Peristaltic, or worm-like, forcing onward digesting materials, exposing them to different successive solvents, and aiding absorption of digested matters.

Motion of Cilia.—Urging secretions of glands and mucous surfaces forward toward outlets.

Motion of Osmosis.—The transmission of fluids through membranes and cell-walls, for vital growth and repair ; the return of products of vital waste to excretory organs. A large portion of the contents of the body is always passing through this change.

Motion of Diffusion.—By which oxygen, carbonic acid, and watery vapor, and other gaseous matters, are interchanged between the system and atmosphere.

Motion of Organic Growth and Repair.—The arrangement, under control of vitality, of materials derived from food, into specific vital forms, endowed with vital functions, capable of

self-perpetuation. These are the vital organs, instruments of power, as muscles, nerves, bones, glands, membranes, fibres, etc.

Motion of Chemical Action.—This is possible only through contact of matters having chemical affinity—contact secured by antecedent motion. The whole series of progressive changes of matter from ingestion of food and absorption of oxygen to the exclusion of the same as waste products, is included in this category.

Purpose of these Motions.—Manifestly the development of power, muscular and nervous, for interior and exterior uses.

Muscular Motion, under the direction of the Will.—The expenditure of power completes the physiological circle of motion; it is absolutely necessary for the maintenance, to an effective, that is, healthful degree of the several kinds of motion which engage in the vital circle. Such expenditure reacts directly upon and secures the motions described.

Motions in Chronic Ailments.—The diminution of available power is indicative of diminution of one or more of the preliminary motions necessary for its development. Suffering indicates action, but action in wrong channels; in other words, relative disproportion in those which form the circle of activities. Local affections are ultimate results of defective or disproportionate action. The control of these actions or motions is the first and last object of the physician.

Transmitted Motion.—It is known that motion received, like muscular action, promotes each and all in the series. Hence its entire relavency, when ordinary motions are insufficient, *as is always the case in Chronic Diseases*. Thus are secured purely physiological effects, as relates to nutrition, with a minimum of expenditure. These effects, under the conditions, become remedial or medical.

All remedies imply motion. No better confirmation of the principles stated is needed than is derived from ordinary practice; for all remedies, of whatever school or nature, depend for their efficacy on their influence in promoting or modifying the above motions.

In fact, there is little else for medicines or treatment to do but to call out in different parts of the vital system, in different ways, those motions from lack of which the system suffers.

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