Restoring Healthy Muscles to Infantile Paralysis Cripples

Girls Exercising with Paddles to Cure Spinal Curvature from Infantile Paralysis. In Combination with These Movements There are Deep Breathing Exercises for Every One. This Carries a Larger Volume of Oxygen into the Lungs and Improves the Blood.

Exercising Before a Mirror for the Cure of Infantile Paralysis Deformities. By Concentrating the Gaze and Mental Attention Upon the Defective Part While Exercising It, Blood Is Drawn to It and Nerve-Control Restored.

Medical Science's Best Exercises and Devices for Keeping Victims of the Cruel Scourge from Becoming Life-Long Cripples

Pushing the Squares. An Exercise to Restore the Nerve Force and Muscular Action to the Paralyzed Left Leg of a Child.

WE know that there is no certain cure for infantile paralysis, and that in a large proportion of cases it leaves the little victims crippled.

A great problem, therefore, in connection with this disease, which is causing such cruel ravages among New York children, is, What can be done to improve the resulting paralysis?

Most remarkable results in curing recent and long standing cases of paralysis have been obtained by Dr. Henry W. Frauenthal, physician-in-chief of the New York Hospital for Deformities and Joint Diseases. They are described in a very interesting new work by Dr. Frauenthal and Dr. Jacolyn Van Vliet Manning, the epidemiologist of infantile paralysis.

Among the methods of treatment described are therapeutic exercises performed before a mirror, massage, passive motion and various applications of the electric current.

By these exercises a withered muscle not functionally destroyed may be restored to function, and uninjured muscles are directed to restore the injured ones. The electric current appears among other effects to cause a contraction of the blood vessels, which then relieves the pressure within the spinal column which is the cause of the paralysis and pain.

Most novel and interesting are the exercises performed before a mirror. These are in a sense a form of mind cure, since they depend in part on drawing blood and nutrition to the part thought about and looked at in the mirror.

It has been proved that mental concentration has a stimulating effect on growth, whether in intellectual development through the study of higher mathematics or in muscular development accomplished by simply gazing at the reflection of a particular muscle or muscle-group in a mirror. The nerve-control and nerve efficiency displayed by the Oriental dancer can be developed by any person, in any voluntary set of muscles, if a proper effort is made for the development of sufficient nerve force and nerve control.

The concentration of the mind on the muscular effort carries blood to the controlling nerve centres, producing growth and development in the conducting nerve trunk to its most distant filaments. Thus the limb crippled by infantile paralysis receives a new blood supply and its withered muscles are brought back to activity.

A fact that led up to this method of treatment was the demonstration by Professor Anderson, of Yale, that when a person, placed on a body balance, concentrates his mind on one extremity of his body, the balance tips in the direction of this limb, showing that a flow of blood to that part has been secured.

It has been observed in post-mortem examinations of the human brain that when motion of an extremity has been frequently practised by mental concentration the convolutions of the brain presiding over this motor area are increased. The securing of ample nourishment and the absence of undue fatigue being secured, the stimulus transmitted from the brain to the extremities of the body depends on the calibration of the conducting nerves, as the diameter of copper wire regulates the volume of electric current.

After an attack of infantile paralysis these normal conditions of nourishment are not found in the nerve trunks. The anterior roots in the affected parts are decreased in size. The motor function has been seriously impaired and there is a condition of excessive excitability which produces undue fatigue. In addition, some nerve filaments have suffered degeneration and atrophy. The use of the mirror, then, in infantile paralysis has the effect of producing:

1. Muscular contractions to prevent atrophy and promote regeneration.

2. Drawing blood as nourishment to secure repair and growth of impaired nerve trunks. This also fills up muscles and restores growth of cartilage and bone.

Treatment is given before a large, well-lighted mirror, so that the patient may see all parts of his body clearly. No clothing is worn which would hamper movement or obscure the view. The feet, particularly, must be untrammelled, in order that they may have the freedom of movement which they so seldom enjoy under ordinary conditions.

In corrections of the trunk, particularly lateral curvatures, which are so frequent, the compound mirror is used and is so arranged that the patient can easily observe the movement of the spinal and other muscles of the back.

The mirror must extend to the floor, because in all foot-work and most of the leg-work, and also in the stretching and rising to cure lateral curvature, the child's vision would be obscured by a mirror hung above the floor line.

Individual treatment is desirable, and in this way Drs. Frauenthal and Manning have obtained the best results. However, in institutions, children over three receive instruction in groups of six or more. Such daily classes are held at the New York Hospital for Deformities and Joint Diseases.

When the child observes the desired muscular action taking place in the mirror and realizes that his effort is bearing fruit after a few days of work, it is surprising the excellent effort he will put forth. In the beginning light massage or tapping of the muscle will aid its action. The inspector must make clear to the patient the muscles to be brought into use. The patient must make the contraction slowly to produce the greatest effect. When the contractile force is not sufficient to move the limb the instructor aids in the desired motion, at the same time compelling the patient to make all mental effort towards its attainment. As the muscle becomes stronger the needed assistance is lessened. The muscle is allowed to take up more of the work, run the whole of the exercise and receives the maximum amount of work possible in its weakened condition. The exercise must always stop short of the fatigue point, for fatigue will produce neurasthenia.

The muscles most frequently involved in infantile paralysis are those of the hips. Placing the child on a chair in a comfortable position before the mirror, the instructor brings the foot up to a right angle with the leg; he then urges the child to aid in bringing up the small toes at the side of the foot through an arc of about thirty degrees. If the child cannot do this alone, the instructor places one hand on the knee to keep the leg in position and the other under the foot; this greatly aids the child's effort to make the desired contraction.

This is repeated several times, but never to the fatigue point. Each set of muscles is contracted in a similar manner. If the motion cannot be brought about, the mental effort must still be made and will be helpful in the end. Forty-three patients have been enabled to walk by this method who have been incapable of doing so during a period of from nine months to four years.

In many cases the doctors have to handle paralyzed muscles on one side of the spine and unopposed overcontracted healthy muscles on the opposite side. Securing a permanent result is dependent on the success in equalizing the muscle force.

The alarming increase in the respiration rate during the acute stage of infantile paralysis shows that practically every case suffers from some involvement of the respiration centre. The fatal cases are usually terminated by paralysis of the respiratory tract. Every case affecting the upper part of the body presents some atrophy of the muscles of the ribs. The majority of these paralytic children, whether left with injuries of the upper or lower extremities, show a very poor chest expansion, which looks like an inheritance from a tuberculous ancestor, but is simply a result of the disease.

To overcome this serious defect, as well as to provide oxygenation for all the body tissues, breathing exercises are made a constant accompaniment of the treatment. The best results come from treatment instituted as early as possible, as the original paralysis tends to become worse if neglected. The doctors have, however, obtained complete restoration of function as late as eight months after the acute stage in cases referred to as hopeless and marked by complete loss of function.

Mechanical apparatus has been devised for the use of the paralytic with muscles atrophied from the waist down to help him to walk. In numerous cases of paralysis it has been found that the iliopsoas muscle, which raises the thigh, is wholly unaffected, though connected muscles have been paralyzed and may be utilized in walking, when the flaccid limbs are stiffened and supported by apparatus. The doctors state that any type of apparatus that is bandaged to the limb or is attached with straps and buckles is detrimental to the paralyzed muscles. They are liable to cause muscle atrophy.

Another prevailing evil is the encasing of paralyzed muscles in plaster of paris or starch bandages, thus adding confinement to the already damaged musculature, when every effort should be made to retain the tone of the muscle until it again comes under the control of the will and renews its functions. More damage can be done with this type of apparatus than can be regained by these muscles in a year's treatment.

No appliance should be used that is not removed daily to permit treatment by physical therapy. The pressure of bedclothes on the paralytic foot and ankle, for instance, may be obviated by the use of a light, aluminum splint, applied to the heel and sole of the foot and projecting an inch or two beyond the great toe.

Spiral steel springs and india rubber bands have been utilized with great ingenuity to replace hopelessly paralyzed muscles. Thus an artificial thigh muscle has been arranged by two strips of stout gartering which cross the knee obliquely and are attached to the leg splints right and left above the knee and below it.

The experts emphasize the importance of beginning mechanical treatment as soon as possible and not waiting until the paralytic condition has become fixed or undergone a retrograde change. A week after the subsidence of fever is given as a good time to begin treatment. Light electric treatment may even be given before the pain of the acute stage has passed.

Electricity gives an initiative to new growth and inhibits destructive tissue change. It may be employed in the form of high frequency current, static machine, X-ray, the galvanic and faradic currents.

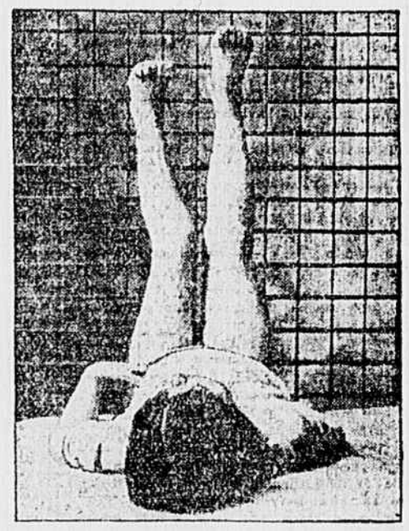
Two days' treatment with the high frequency current along the spine cured an old case of paralysis of both legs.

An unfamiliar employment of the current is to drive strychnine directly into the muscles and nerve-endings. Strychnine is the best tonic for weakness of these parts.

Electric stimulation also has the effect of increasing the calibre of a nerve weakened by the paralysis, thereby increasing the transmission energy. In this kind of treatment the object aimed at is "stimulation of the ganglionic neuron through its peripheral branch."

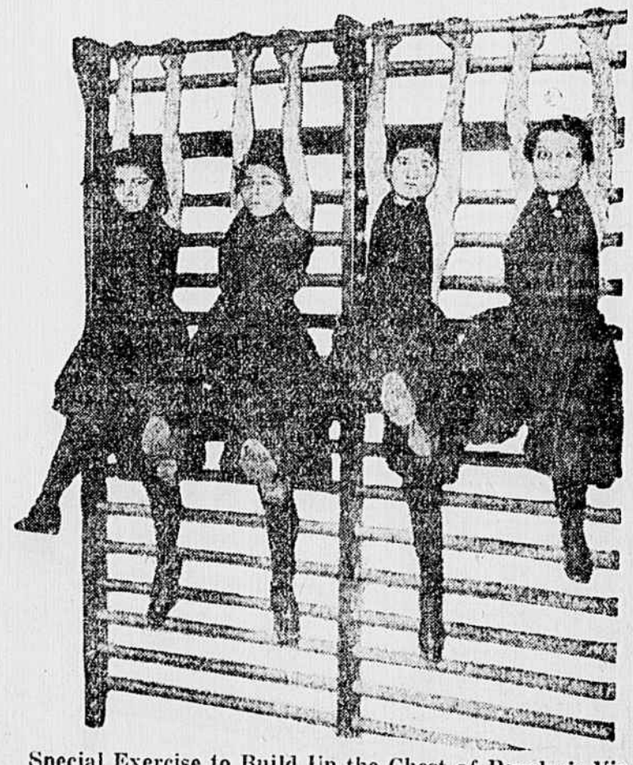
Many cripples who had been pronounced hopeless by physicians and condemned to lose the use of both limbs have been cured by electricity, massage and mirror exercises. One cure is mentioned of a person who had been crippled for fifteen years.

Massage should begin the moment the acute inflammatory symptoms have disappeared and be kept up even though no visible improvement is made. The improvement may come suddenly.



Treating a Paralyzed Baby's Leg with Light Rays.

Girls Exercising on Tables for Spinal Curvature and Paralysis of the Extremities. These Exercises Correct Their Deformities While Benefiting the Heart and Lungs.



Special Exercise to Build Up the Chest of Paralysis Victims, Which Is Almost Always Withered Even in Slight Cases.