

WILCOX, (R.W.)

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of hip disease.



THE MECHANICAL TREATMENT OF HIP DISEASE.* By REYNOLD W. WILCOX, A. M., M. D., Clinical Assistant at the Post-Graduate School of Medicine, Physician to the North-Eastern Dispensary, New York City.

Among the mechanical appliances used in treating hip disease we may find almost any idea expressed in apparatus. The principle that rest is essential in joint disease is as old as the art of healing, but it is the manner of obtaining this rest that has rendered the solutions of the problem so varied. The modern mechanical treatment falls under three divisions;

1. Extension with more or less fixation,
2. Extension with no especial provision for fixation,
3. Fixation more or less complete.

With the first class, extension with more or less fixation is attained with the weight and pulley. At once there comes up the question whether or not we can relieve the mutual pressure upon the articular surfaces. At the outset we are met by two objections:

1. The weight and pulley usually, if not generally, are attached to the leg by adhesive plaster so that the pull is upon the skin and not upon the bones, except indirectly. The elasticity of the skin, then, certainly prevents the weight from putting its whole energy upon the joint. Again, the skin being freely moveable in some places, at others, notably the line at Poupart's ligament, we find it firmly attached, so, this point of attachment being above the joint the weight again fails of exerting its whole energy. However it must be borne in mind that some pull is obtained from the condyles of the femur.

2. The weight extension is usually applied in a line parallel to the long axis of the body and not in the line of the neck of the femur, this being another mechanical loss. In limited femoral or acetabular disease it is perfectly possible that the seat of the disease might be directly in the line of the extension, especially if there be slight adduction, and this may be the explanation of those cases in which extension is followed by an increase of pain. Does extension distract the articular surfaces? In an adult cadaver an extending force of one hundred pounds failed to separate two pins, one placed above the acetabulum in the ilium and the

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other pin driven into the neck of the femur. On section of all the muscles and tendons, it was found that the head of the femur was held by a firm fibrous band or rather ring. In the fœtus this ring is said to be not so well developed. In a child, by experiment, it was found that when the pins were similarly placed, they could not be separated, the same result as before. As the extending force used was far beyond the ordinary weight that is used for extension, it would appear that we do not get distraction in healthy joints, although it can not be denied that after long continued extension and in chronic disease the above mentioned collar may become softened and slight distraction may be produced. On the other hand so long as the joint is unruptured the atmospheric pressure, a no insignificant force, tends to act in the contrary direction, so then, in those cases where extension has been followed by relief of pain we must look in some other direction than distraction for an explanation. If, as is possible, increased intra-articular pressure will assist in the destruction of the joint certainly then, if distraction were obtained, our efforts would be far from conservative, for the extension ought to elongate the capsule, thus diminishing the capacity of the cavity, thus increasing the intra-articular pressure. On the contrary, we have extension diminishing of the intra-articular pressure, first because it stretches the ligaments and secondly because we have increased absorption of the contents of the joint from the primary increased pressure. As to what extension does, some things can be definitely stated.

1. It may overcome deformity when not due to true ankylosis.
2. It overcomes muscular spasms.
3. It tends to allow the muscles to atrophy.
4. It facilitates repair by giving the general condition an opportunity to improve.

But, unfortunately, it only slightly fixes the joint, as one can readily demonstrate for himself if he will go through the wards of an orthopædic hospital at night, when he will find the patients in almost every conceivable position. This method of treatment is simply confinement in bed plus a little more slight fixation of the joint. Patients will usually improve under this treatment for a time but it soon becomes irksome and ceases to be beneficial.

Extension with no attempts at fixation has held an important place in the literature of the last few years. At the outset it

should be borne in mind that any apparatus to be of any service whatsoever, should extend below the knee; various forms of apparatus have been devised but they all are practically the same in effect, the perineum being one point and some device for extension being used, some portion of the leg being the other point for the attachment of the apparatus. Since we have no third point in the line we ought to get motion at the hip joint. Among the advantages of this method is freedom from confinement in bed and to the house, this advantage can hardly be over estimated. Again, the direction of the pull can be changed to meet the varied positions of the leg and so in the end perfect parallelism of the legs can be attained. Further, all jarring through the foot is prevented but not through the trochanter, and the apparatus can be applied to patients of any age. On the other hand, some drawbacks suggest themselves, supposing the extension to be adjusted, the flexion of the leg upon the body changes the relation of the two bearing points to each other, this change as experiments show may be either in loosening or tightening the strap, depending upon the individual conformation and degree of nutrition. Further, any one who has adjusted a perineal strap will remember the bitter complaints that are made when the strap is tightened with any degree of efficiency. As without doubt this method will relieve pain in some cases, it has been said that it accomplishes this by rupture of the capsule. Considering the early excision to which so many joints treated in this way have come, this certainly in some cases may be the correct explanation. Without doubt, motion with friction is detrimental to a diseased joint and it is also true that motion with extension and without friction is a mechanical absurdity. Further, when the patients walk, the side bar bends and the perineal strap stretches, the effect of both of which is to reduce the extending force but on the other hand the weight of the leg goes to counteract this loss. Last of all comes a very important point, any one watching a patient as he walks with this apparatus and a high shoe on the sound side, can hardly fail to notice that with each step on the diseased side the whole pelvis rotates about a point near the greater trochanter of the other side. In other words, it appears that the muscles have fixed the joint in spite of all efforts of the surgeon to the contrary.

A second division of this method is the so called physiological one, namely, the high shoe on the well foot, the only other apparatus being crutches. Here again we get all the advantages of out-door exercise but the plan is only applicable to older children and must needs be under constant supervision.

Although rest in the treatment of joint disease has been the keynote to all treatment, yet it remained for the past few years to see it emphasized in the sentence "enforced, uninterrupted and prolonged rest." If motion is the work of the joint then certainly rest should be represented by fixation. As fixation is the chief end in view in this method of treatment, a few modes of attaining this result will be alluded to. Gutta percha splints, fixed bandages fail to meet the indications. Lateral fixation, as for fractures of the femur, if carefully adjusted, does very well but it has many objections on the score of adaptability. Posterior fixation by wire breeches extending below the knee are too cumbersome. Posterior fixation, as obtained by well covered bands of iron nearly encompassing the chest, mid-thigh and middle leg, connected at right angle by a straight posterior bar of iron, seems to meet all the indications. This apparatus is cheap, light, easily moulded and requires but little supervision. This apparatus is that invented and used with such brilliant success by Mr. Thomas, of Liverpool.

What, then, can fixation accomplish? It certainly reduces friction to a minimum or altogether abolishes it, thus preventing destruction in the joint and relieving pain. If the child is old enough to walk upon a high shoe on the sound side and crutches, we get extension as in the physiological method. With this apparatus we can obtain out door exercise, freedom from confinement, and if recovery takes place it is usually without lumbar deformity. The bugbear of this plan of treatment was the old idea that we would obtain ankylosis after long continued fixation. It has been stated, and so far as I know correctly, that with *perfect* fixation ankylosis never takes place unless there be profound disorganization, and in that case even ankylosis would not be an unfortunate result. In the majority of cases the stiffness after the removal of the apparatus will disappear with the continued use of the limb.

Abscesses in any situation need not, of themselves, prevent the application of this apparatus, as it can be applied to the sound side and the other limb bandaged with it. The great drawback to the employment of the posterior fixation splint has been the fact that the principle has not been carefully studied and simple as is the apparatus, its very simplicity is misleading. In general, surgeons have only partially studied the apparatus and finding themselves failing, have set out to modify the apparatus under other principles. Believing, as it seems just to conclude, that many of the failures have been due to an imperfect application and careless manufacture of the instrument, with increased care the principle of fixation will be as fully recognized as a necessity in diseases of the lower extremities as it has been, for many years past, in the joints of the upper extremities.

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