ON THE MECHANICAL TREATMENT OF CHRONIC INFLAMMATION OF THE JOINTS OF THE LOWER EXTREMITIES

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649239955

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Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

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Trieste

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JOINTS OF THE LOWER EXTREMITIES,

WITH A

DESCRIPTION OF SOME NEW APPARATUS

FOR PRODUCING

EXTENSION AT THE KNEE AND ANKLE-JOINTS.

BY

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EXTRACTED FROM THE
TRANSACTIONS OF THE AMERICAN MEDICAL ASSOCIATION.

PHILADELPHIA:
COLLINS, PRINTER, 705 JAYNE STREET.
1865.

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ON THE MECHANICAL TREATMENT OF CHRONIC INFLAMMATION OF THE JOINTS OF THE LOWER EXTREMITY, WITH A DESCRIPTION OF SOME NEW APPARATUS FOR PRODUCING EXTENSION AT THE KNEE AND ANKLE-JOINTS.

The causes, pathology, and symptoms of the various diseases of the joints have been so accurately described by Brodie, Barwell, Guerin, Bouvier, and others, as well as in the numerous monographs upon the subject, that it would be superfluous to repeat their description. The fact, also, that chronic inflammation of any joint produces reflex contractions, causing deformity and severer pain, by increasing pressure on the diseased surfaces, thus making extension and counter-extension a necessary part of the treatment, has been so fully proved by myself and others who have written on this topic, and is now so generally admitted, that no further comments are necessary.

It is, in addition, acknowledged that the confinement, formerly necessary to produce the requisite extension and counter-extension, was so injurious to the general health of the patient, that the advantages were sometimes overbalanced, and exercise in the open air became a necessity in order to save life, even at the expense of a deformed limb. Moreover, the immense advantage given to patients with disease of the hip-joint, since the introduction of mechanical appliances, which allow exercise without discontinuing the extension, is so evident, that no one at all conversant with the disease and its proper treatment, will attempt to deny it.

The object of the present paper is, therefore, to show the practical utility of this very principle of treatment to the diseases of the knee and ankle-joints, even when they have extended to suppuration and caries; and to illustrate it by the narration of some cases which have come under my personal observation.

Before proceeding, however, with a description of the apparatuses

for the knee- and ankle-joints, it may not be inappropriate briefly to refer to the improvements made in the apparatus for the treatment of hip-disease, since the publication of my report to the American Medical Association, in 1860.

In the first and second stages of the disease—when the limb is apparently longer, and the knee and thigh both flexed—extension is kept up at night by a weight and pulley fixed to the foot of the bed, which is elevated some inches, in order to make the body a counter-extending force, and thus avoid the necessity of a perineal band. The weight is fastened to the foot either by a buckskin boot, laced snugly around the ankle, or by strips of adhesive plaster placed on either side of the leg, carefully secured by a well-adjusted roller, with pieces of webbing sewed to their lower ends, which can be folded under the stocking during the day. If the thigh is very much flexed, another pulley is placed over the first, at such a height as to allow the force to be applied from above the knee, nearly on a line with the distorted thigh: this pulley is lowered by degrees as the patient can bear it, until the limb is brought to a straight line with the body, or as nearly so as may be, when the new force can be dispensed with, and the weight applied to the foot alone. In the daytime, or while the patient exercises, the extension is continued in this stage of the disease by means of an extension splint applied to the thigh only, and which allows free motion at the knee-joint.

The instrument consists of a flange of very firm sheet-iron, three or four inches long, and one or two inches wide (according to the size of the patient), slightly curved, and which, when cushioned, fits directly under the crest of the ilium. At each extremity is a buckle to secure the perineal band, made in the centre, of buckskin stuffed with hair, and with ends of elastic webbing to attach to the buckles. On the outer side of the flange is a ball and socket or universal joint, to receive the head of the splint, which runs down the thigh to within three or four inches of the extremity of the femur, and is capable of being made longer or shorter by a cog-wheel worked with a key. Near its lower extremity is attached a branch, which, curving over the thigh, extends as far down as the main splint, and both terminate in broad ends with a roller over which the webbing attached to the adhesive plaster plays, and is secured to the splint by means of buckles near each lower extremity. (Fig. 1.)

To apply the splint, very strong adhesive plaster is required, or else two or three thicknesses of the ordinary plaster, cut in a fan

Fig. 1.

Sayre's splint for extension in morbus coxarius in the first and second stages.

shape (Fig. 2), and long enough to reach, on the inner side of the thigh, from the perineum to within three or four inches of the con-

Fig. 2.

dyle of the femur, and on the outer, from the trochanter major, to a point directly opposite the end of the inner plaster. These plasters are secured by a well-adjusted roller, and after pressing them well with the warm hand, to obtain a firm adhesion, the instrument is laid over the thigh, and the webbing, which is attached to the plaster, firmly fastened over the rollers to the buckles on the lower extremities of the instrument;—the perineal band is then buckled on, and the instrument is extended, with the key, to just such degree as is required to make the patient comfortable, and then locked by the slide.

This instrument should be worn as a guard for some months

after the patient is entirely well, as I have seen many cases return from very slight causes, after being perfectly well for a long time. In order to prevent the limb from swelling below the bandage, it is necessary to support the circulation either by an elastic stocking, or by a roller and a knee cap.

These instruments are made with great perfection by Messrs. Otto & Reynders, Tieman, or Wade & Ford, of this city.

In the third stage of the disease, when the limb has become shorter and the patient can, therefore, walk with the stiffened knee without difficulty—which cannot be done in the first and second stages, without a very awkward circumduction—the same principle can be much better applied by using the instrument first described by Dr. Andrews, of Chicago. It consists of a crutch in the perineum, with a wide flange curving around the gluteo-femoral fold, a ball and socket on its under surface opposite the tuberosity of the ischium, a rod running from it, to the heel, capable of being elongated at pleasure, and terminating at its lower extremity in two branches—the lower extremities of which are rounded or knobbed, to fit into iron cups or sockets which are well secured into the heel of a nicely-fitting laced boot; a thick buckskin tongue lies over the instep, before it is laced, for protection when the extension is applied. The boot being neatly laced without wrinkles, the forked prongs are inserted behind the heel into the sockets, and the crutch then slipped into the perineum. The instrument can then be extended by the cog-wheel and key, until the patient can bear pressure without pain. Its great advantage is, that force can be applied without girdling the limb with a roller, as must be done when adhesive plaster is used, which is a very great desideratum.

Fig. 3.

I have used this instrument in many cases where the limb was shorter than the other, with very great advantage, and can therefore recommend it highly. Those I have used were made by Messrs. Otto & Reynders, 58 Chatham Street, after the annexed pattern, which, I presume, is so much like Dr.

Andrews' splint, that I think he is entitled to the credit of making the suggestion. (See Fig. 3.)

Of course, the mere application of mechanical force to overcome one of the effects of disease, viz., muscular contraction, is not intended to supplant or prevent the adoption of the well-established principles of treatment, but merely as auxiliary thereto; but as the object of this paper is simply to explain the construction and application of mechanical force, it is not deemed necessary to enter further into the general principles of treatment, and we shall, therefore, proceed to the narration of some few cases where this principle has been applied satisfactorily to diseases of the knee- and ankle-joints.

REPORT OF SOME CASES OF CHRONIC DISEASE OF THE KNEE AND ANKLE-JOINTS, AND THEIR TREATMENT BY MECHANICAL APPLIANCES.

CASE I. *Thomas B. Clark, Fourth Street. Strumous synovitis of knee-joint; suppuration; luxation; anchylosis; operation; recovery.*

This patient had scarlatina when two years old, following which he had inflammation of the left knee-joint of the strumous variety, commonly called white swelling. After about eighteen months, contraction of the muscles took place to such a degree as to cause subluxation of the tibia backwards into the posterior inter-condyloid notch. Eight or nine fistulous openings around the outer part of the knee led to carious bone and into the joint. Drs. R. K. Hoffman and R. S. Kissam had examined him, and pronounced amputation the only means of cure.

I was called to see him in the spring of 1853, in consultation with Dr. Batchelder, who advised compression by means of sponge, and gradual extension: this was faithfully persisted in for some months, but with no appreciable improvement in the position of the limb. The sinuses on the outer side of the knee were then laid freely open —connecting with the joint—giving exit to a large amount of pus, and some carious bone which seemed to come from the *external* condyle of the femur and the patella only. The joint was freely injected with warm water, and the wound kept open by tents of oakum saturated with Peruvian balsam. Small pieces of bone continued to exfoliate for some months, when the wounds gradually cicatrized, and the parts became perfectly healthy; but with no improvement in the position of the limb. All the constitutional symptoms improved from the time the joint was freely opened; his appetite increased, and his sleep was tranquil without narcotics.