

Judson (A. B.) *al*

A Contribution to the Treatment of White  
Swelling of the Knee.

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Read before the American Orthopedic Association, St. Louis, Mo.,  
September, 1893.

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BY A. B. JUDSON, M.D.

ORTHOPEDIC SURGEON TO THE OUT-PATIENT DEPARTMENT OF THE NEW  
YORK HOSPITAL.

*Presented by the author*

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## A CONTRIBUTION TO THE TREATMENT OF WHITE SWELLING OF THE KNEE.

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White swelling of the knee belongs to a class of diseases which it is difficult to believe are not constitutional, and yet which are so modified in their progress and results by the influence of mechanical environment that, beyond the regulation of the diet, the administration of roborants and the observance of the laws of hygiene, the only treatment necessary is that which is carried on by mechanical appliances. Not that treatment of this kind can abruptly arrest the disease and remove the traces which it almost always leaves in the structures which have been affected. It will be a happy day when the advance of our science puts us in possession of the power to cut short this morbid action, and secure ultimate symmetry and normal ability.

Until that day we may well give our best attention to methods of placing the affected member and the system in the best position to promote and take advantage of the inevitable rally of the defensive and reconstructive sources of nature. For restoration to health and more or less complete function are certain to occur, except in most unfortunate exceptional circumstances.

Speaking of hip disease Brodie exclaimed: "Why should the disease be dangerous? The hip-joint is not a vital organ!"<sup>1</sup> And this is not the less true of white swelling of the knee. And in the case of children, among whom our patients are chiefly found, we have especial reason to expect, amid the countless

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<sup>1</sup> Clinical Lectures on Surgery, Philadelphia Edition, 1846, pp. 279, 280.

transformations attending growth and development, an early occurrence of the favorable reaction in which the disintegrating process ceases and repair of the damaged structures, so far as may be looked for, sets in.

As in the treatment of articular osteitis elsewhere, we seek to arrest the functions of the joint, which, in the present instance are two-fold; motion and weight bearing. We are early taught that the function of a joint is to give motion to the otherwise rigid skeleton, and it is only later, when we are perplexed with the treatment of diseased joints in the lower extremities, that we are impressed by the observation that one of the important functions of the bones which go to make up the joints of the lower extremity, is the duty of sustaining the weight of the body, or a large part of it, in standing, and of enduring the violent blows that are inflicted in rapid succession by the weight of the body in locomotion. Therefore, it follows that, as the function of the knee is two-fold, our efforts to arrest function must also be two-fold. We must 1, arrest motion, or fix the joint and we must, 2, relieve the joint of the duty of bearing weight. I prefer to do these two things, in the joint in question by two separate instruments, one of which, the fixative brace, is to be worn constantly, while the other, the protective splint, or ischiatic crutch, is used when the patient is up, and removed during the hours of sleep.

1. And first of fixation of the knee: it is one of the very simplest problems in mechanical surgery, made so by the presence in the limb of a bony lever above and one below a joint (ginglymoid); which practically has no motion except in flexion and extension. How widely different from the problem of fixing the hip-joint which, a ball and socket, has flexion, extension, abduction, adduction and rotation, and practically no leverage at all above the joint. The fixative splint for the knee is simply a lever, making pressure from before backward at the place of

motion, and counter-pressure from behind forwards at two points; one remote from the joint, at the upper part of the femur, and the other, also remote from the joint, at the lower part of the tibia. A bar of soft steel of suitable length is applied to the posterior surface of the limb. To it are attached four cross-pieces each cross-piece being riveted at the middle of its length, and curved so as to half encircle the limb. The upper and lower transverse pieces are applied to the limb with the intervention of pads, while the middle pieces do not necessarily touch the surface of the limb at all, but have at each end a buckle in which pieces of webbing are tightened over the limb in front; one piece of webbing crossing the lower part of the thigh and the other the upper part of the leg. If the apparatus is applied to a limb with the knee fully extended and the webbing straps tightly buckled, flexion of the knee is prevented and, as there is practically no lateral motion, this brace is an efficient means of fixing the knee, not immobilizing it, for immobilization, or the equivalent of bony ankylosis, is impossible by apparatus applied with the intervention of the vulnerable skin and the elastic and mobile subcutaneous tissues.

When the knee is fully extended, this fixative splint arrests motion, but when used in case of deformity it is a convenient and efficient means of bringing the flexed knee into extension. At the beginning the splint is to be applied with the upright bent to simulate the flexion of the knee, or to be a little straighter than the knee, and the straps are to be buckled more or less tightly, according to the tolerance of pressure, until after a few days of intermitting and gradually increasing pressure the flexion of the limb corresponds with the flexion of the splint. With care and judgment the upright of the splint is then to be still further straightened and the pressure re-applied by tightening the straps and buckles as before. In an ordinary case, coming under treatment in the

acute stage, this manner of correcting the deformity is easy, certain and painless, and we have the added satisfaction, while thus reducing the flexion, of arresting motion in the knee at the same time.

It seems paradoxical to say that we, at one and the same time, prevent motion and effect a change from flexion to complete extension. This calls to mind the peculiar condition of an inflamed joint, a condition in which the muscles in reflex contraction hold the joint motionless, and yet not so rigidly motionless but that it may be moved by a force gentle, continuous, painless and harmless. In the hip-joint advantage is taken of this peculiar kind of immobilization, which is better called fixation, to correct the bad position of the limb, without mechanical force, by inducing the patient to adopt habitual attitudes and motions, chiefly the habit of walking in natural rhythm, in which a normal position of the limb gives the patient more convenience in locomotion than a deformed position. With the mechanical advantages found in the knee, however, we can change the position of the joint, regardless of the patient's habits or convenience, by directly applying force through the leverage of the fixative splint.

In this affection, as in all others producing deformity and disability through osteitis, the best ultimate result is to be sought incidentally while our principal efforts are directed to the promotion of recovery by the arrest of function. Fortunately, in white swelling of the knee the means of arresting motion, or fixing the joint, are identical with those with which the final good position of the limb is secured.

2. In the second place, we must relieve the affected joint from bearing weight in standing and walking, a problem very easy of solution by the use of a pair of crutches and a high sole on the well foot. But axillary crutches, though sometimes necessary, may in almost all cases occurring in orthopedic practice, be laid aside in favor of the perineal or ischiatic

crutch. This, in its simplest form, consists of a steel upright, ending below in a foot-piece, shod with leather, and above in a horizontal semi-circular pelvic band, covered with leather, or better with hard rubber, carrying a padded strap for the reception of the os innominatum. The same apparatus is used in the treatment of hip disease in certain stages, except that in white swelling of the knee the rigid knee-piece is discarded. It is useful in order to prevent motion at the knee, which is harmful in hip disease, because it is inevitably accompanied by motion at the hip. It is useless in the disease now under consideration because arrest of motion at the knee is secured by the fixative splint already described. The ischiatic crutch is provided with a shoulder strap by which the weight of the apparatus is transferred to the opposite shoulder in walking and with the ordinary knee strap of webbing and the leather ankle strap. The upright should be adjustable in length to accommodate the growth of the patient or, if there are many patients, uprights of different lengths may be kept in readiness. Like any other crutch it is laid aside at night.





