to assume such attitude as it will while the spine is flat, and a line joining the anterior superior spines of the ilia is at right angles to a line passing from the center of the sternum to the symphysis pubis. Now, make slight traction on the diseased limb, in the direction which it assumes while the trunk retains the position I have just mentioned, and make the traction just sufficiently strong to give ease and comfort, the leg being placed meantime on an inclined plane to give it support. If you have fastened the patient securely in bed, and applied traction as I have indicated, you will make him comfortable and can gradually change the direction of this traction little by little, day by day, until both legs are flat in the bed and parallel, without tilting of the pelvis or arching of the lumbar spine. If you find that traction in the line of the deformity does not give the patient absolute comfort, pass a bandage around the thigh, and make a slight lateral traction outwards. In some cases this will give ease to the joint which the longitudinal traction fails to give, but is not necessary in all cases. When the legs are parallel apply your hip splint, and not before, the object being to again allow the patient to take outdoor exercise while the inflamed joint is kept at rest, but if you find that the patient begins to have pains in his joint when you allow him to get up on his splint, or splint and crutches, it shows that you have not applied the splint in such a manner as to protect the joint from the traumatism of locomotion, and if you can not succeed in so adjusting it that the child can go in the open air without increase of tenderness in its joint and without being disturbed by cries at night, put it back in bed, and have it trundled out in the air in a baby carriage until you are capable of so applying the splint as to protect the inflamed joint and, at the same time, leave the rest of the body free for locomotion.

In passing to the knee I would draw attention to the fact that the knee is *not* simply a hinge-joint, and that efforts to straighten a knee which has taken on the characteristic deformity of chronic tubercular inflammation of the knee-joint, by simply pulling on the leg are apt to increase the pain, because the front of the knee-joint is strongly compressed by force applied in this manner. There is always a sliding backward of the head of the tibia upon the condyles of the femur in cases of chronic knee-joint disease, and to counteract this posterior displacement of the tibia, pressure must be exerted on the head of the tibia from behind forward, at the same time that traction is made in the long axis of the shaft of the tibia, if we wish to relieve the spasm of the joint, and correct the deformity of the knee. The tight ham-string muscles, brought into fierce spasms as they are by irritation within the joint, form a fulcrum, and when the knee is straightened as if it were a simple hinge the joint surfaces are pressed together with a lever of enormous strength acting upon these firm ham-string muscles as a fulcrum, which increased with articular pressure results in pain and damage to the joint. On the contrary, by applying traction for the purpose of reducing the deformity along the line of the articular surface of the condyles of the femur, the deformity is corrected gradually, almost imperceptibly, and the joint can then be put up in a splint which embodies the same principles of treatment—traction in the long axis of the tibia, and pressure from behind forward against the head of the tibia, while at the same time the patient is prevented

from bearing weight upon the inflamed joint, and able to get the benefits of fresh air and outdoor life during the months or years of treatment which will be necessary before the joint is well.

Your chairman has warned me that ten minutes is to be the limit of our papers, so all that I can hope to do is to draw your attention to the principles of treatment and leave the practical application of them to some future occasion.

THE CONSERVATIVE TREATMENT OF TUBERCULAR JOINT DISEASE,

OR, MORE EXPLICITLY, THE PURELY CONSERVATIVE TREATMENT OF TUBERCULOSIS OF THE JOINT STRUCTURES.

Read in the Section on Surgery and Anatomy at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5-8, 1894.

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For the purpose of the present paper it does not especially concern us which or how many of the different tissues which together constitute a joint are affected, and I shall not attempt to discuss methods of treatment based on anatomic differentiation of the location of the lesion. It may, however, be stated that in the great majority of cases the initial lesion, so far as the joint is concerned, is in the bone; but in the purely conservative treatment the management of these cases differs hardly any from that of those which are primarily synovial.

Underlying the treatment of all forms of chronic tuberculosis, of whatever tissue or wherever situated, is the gospel of rest and food. This is founded upon the fact, learned in the first place by experience, and confirmed later by the results of biologic investigations, that there is in living tissues an inherent antagonism to all forms of infection, and that this antagonism is best exerted by tissues that are not functioning and are at the same time well nourished. In the infection of no tissue has this been better shown than in the infection of bone. This is due, in part, to the very chronic course these cases follow, which permits careful and extended study of them, and in part to their large number—for tuberculosis of the joints or bones constitutes more than 80 per cent. of all cases of tuberculosis in patients under 17 years of age; and I have calculated on reliable data that in San Francisco, for instance one child out of every 286 of the child population has tuberculosis.

Work, for a bone, is resistance to pressure and strain,—pressure being produced by the weight of carried structures, and strain caused by the use of the bone as a lever. As bone is a living tissue, work must physiologically be followed by a loss of energy and the need of rest. Rest for a sound bone necessitates that it shall be subjected to neither pressure nor strain beyond that which properly exists between the different parts of the skeleton with the individual quiet. Perfect rest for a diseased bone contemplates that it shall be subjected to absolutely no pressure or strain, whether that be developed in the doing of work, or be the natural result of its position in the skeleton. Practically, it is impossible to wholly eliminate the latter factor, and the aim of treatment on conservative lines is to secure, in the first place, the complete cessation of active work and

then to lessen, as much as possible, the physiologic and unavoidable pressure between bones so that a rest of therapeutic value may be had. During the period of this rest careful attention is given to the general health of the patient, and every effort is made to secure a gain in body weight. This is a brief statement of the principles of conservative treatment.

There are two major plans, in accordance with one of which these principles are applied: One aims to secure rest by fixation alone of the joint, claiming that with fixation is absence of inter-osseous friction and of pressure. This is considered to be true, no matter what may be the relative position of the bones, but the plan arranges first for the gradual correction of any faulty position and then fixation in the proper position. So long as a pathologic process is present the fixation must be maintained, and never must the joint be released until the reparative process is complete. In this method no account is taken of pressure developed by the muscular spasm which is the most common and prominent accompaniment of joint lesions.

The other plan endeavors to secure rest by traction below and counter-traction above the diseased joint, thus addressing itself primarily to the spasmodically counteracted muscles, by antagonizing their spasm, relieving the pressure on the bone and consequently the cause of the spasm itself; the rest from the spasm and the spasm-pressure removes the tendency to early deformity, and the immobilization is then an easy matter,—for in a diseased joint there is no tendency to ordinary motion, but rather the avoidance of it. In regard to arranging for the gradual correction of any faulty position and to the continuance of treatment until the disease has ceased and repair is accomplished, this second plan does not differ from the first.

Of these two distinct methods of attaining the same end, the latter apparently complies more nearly with the requirements of the proposition.

Under conservative treatment, cases of joint disease follow one of three courses: Either they entirely and wholly recover, with a joint so little damaged that its function is in no ways impaired, and its disability must be looked for to be found; or they recover after a certain amount of permanent damage has been inflicted, are functionally more or less incompetent, and their disability is evident; or they do not recover but go on for long periods of time, their condition constantly bad or going from bad to worse; they can perform no function; their disability is complete.

In its results, then, tuberculosis of the joint structures differs in no particular from tubercular or other forms of not necessarily fatal infection of any other part of the organism. That is, the conservative treatment is a method of treatment but it is not a means of cure.

It is important, for its proper use, to know in what cases it will succeed and in what cases fail.

At the Twenty-third Congress of the German Chirurgical Society held in Berlin on April 18 of this year Bruns, of Tübingen, reported 600 cases of tuberculosis of the hip joint; of these but 200 were available for statistical use. They covered a long period of years, had been treated by various methods all conservative, as by revulsives, vesications, cauterizations, immobilization, traction and iodoform. On

their results he declared himself, with very slight qualification, in favor of conservative treatment. He summed up practically, as follows:

1. Of all cases, 48 per cent. begin in the first ten years of life, 37 per cent. in the second ten years, and but 6 per cent. in the third ten years.

2. In 66 per cent of all cases there is suppuration, abscess and fistula.

3. Recovery is attained by conservative methods in 55 per cent. of all cases, and in an average time of four years.

4. Death occurs usually of a visceral tuberculosis, or amyloid degeneration, or sepsis, in 40 per cent. of all cases, and in an average time of three years.

5. Prognosis depends chiefly, in each particular case, on the presence or absence of suppuration—of non-suppurative cases 77 per cent. recover; of suppurative cases 42 per cent. only.

6. Prognosis in general depends on the age of the patient when attacked. In the first ten years of life the recoveries are 65 per cent; in the second ten years, 56 per cent.; in the second twenty years of life, 28 per cent. only. No case recovers which is over 40 years old when attacked. Suppurative cases are especially serious in patients over 20 years.

7. Most of the recovered cases die later of tuberculosis of other organs. Of those who recover in the first ten years of life, 6 per cent. die later of tuberculosis of the lungs; in the second ten years, 9 per cent.; of those who have passed 20 years, 7 per cent.

The functional results, in spite of atrophy, shortening, ankylosis, and vicious position he considered good. In all cases motion was limited. Ankylosis was a frequent result of suppuration. In every case the limb was in a vicious position of flexion, and usually adduction, rarely abduction—the flexion sometimes being 90 per cent. Flexion, rather than shortening, was the cause of the functional disability. The shortening was due to three factors. Atrophy of disuse, absorption of the femoral head, and extension of the acetabulum in an upward and backward direction due to absorption of bone. Without giving any statistics of resection cases he claims that their results, in view of life and limb, are no better than these. His qualification to his advocacy of conservatism was his desire to await modern methods of wound treatment in resection cases. At the same time, Schede, of Hamburg, Helferich of Griefswald, Gussenbauer, of Prague, and von Bergmann, of Berlin, advocated conservatism as against operation.

There are several points in these statistics which would bear careful discussion, but I must not, in my allotted time, attempt more than a brief mention of one or two. His total percentage of deaths, 40 per cent. is a higher mortality than is usually credited this particular form of joint tuberculosis; but this is explainable, partly, on the fact that many of his cases occurred in the time before systematic treatment by traction and immobilization was instituted. The mortality of the suppurative cases, 58 per cent., is of the whole report the part that most holds attention. According to it the chances of a given case's dying are more than doubled by the occurrence of abscess. There can be no doubt in this world but that it is proper to persevere in conservative treatment in cases where there is no abscess for the ultimate chances of recovery with a useful limb are good. But if abscess comes it is a symptom that the organism is not able to absorb and eliminate the

detritus of the infected tissue—tissue that is potentially or actually dead and must be removed; the disease is gaining on the patient; conservative treatment is not conserving. At this point of any particular case what sign or symptom will tell us the patient's chances; whether he will, after being more or less ill, ultimately recover or whether he will die. We know he has forty-two chances of recovering to fifty-eight of dying, but what is this particular patient going to do? How long should conservative treatment be persevered in under these circumstances? That is, how long should the patient be left to the surgical efforts of the staphylococcus to rid him of his diseased bone when the original infection, the bacillus of tuberculosis, may be extending its operations on the bone *pari passu*, or migrating to and attacking other organs?

These statistics are the latest I know of that cover any considerable number of cases. They have been compiled under strict stipulations as to what cases were proper ones to be included. In spite of the consensus of opinions in favor of conservatism, I can not see but that the statistics themselves force us to ask these questions, questions which Bruns himself suggested when he stated that he waited to know the results of later methods of wound treatment before finally committing himself. It is not my duty, in the present instance, to attempt to formulate the answer.

CONSERVATISM IN THE TREATMENT OF TUBERCULAR JOINT DISEASE.

Read in the Section on Surgery and Anatomy, at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5-8, 1894.

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The days of conservatism, to judge from a perusal of our medical journals, seem almost to have passed; for no sooner does a student gain the magical cognomen of M.D. than he seeks fields and pastures new where he may acquire local if not world-wide fame. He seeks this, not in the direction of honest, hard, painstaking clinical work but only too often sees his chance in some major operation, requiring not alone judgment in its planning but experience in perceiving its necessity. Too often in his endeavors to count his majors by the tens or hundreds he loses sight of the main object of his art, which is to save nature's organs intact as far as is compatible with health and life, and errs in his enthusiasm wilfully if not criminally in producing mutilations that cause older and more conservative surgeons to shudder in dismay. Thus it is that our journals are flooded with records of hip-joint amputations, heroic operations on the spine and such like, to the exclusion of records, which happily are being collected, where the limb still remains as a monument of the patient efforts of some obstinately conscientious practitioner, who, following nature's dictates and methods succeeds in saving life and limb in spite of the sneers and innuendoes of his fellow practitioners. However, it is possible for us in our admiration of conservatism to let the pendulum swing too far and to lose sight of the fact that mutilation is not naturally the antithesis of conservatism, but, that between the two there lies a field where bold, active surgical

measures may be of paramount benefit to the patient and absolutely indicated in the various stages of the disease. It is this boundary line between conservatism and active treatment of a tubercular joint that I wish to discuss in some detail, and to make as far as possible a clear distinction between cases that require operation and those which will be decidedly the better for absolute unhindered rest.

There are so many considerations that enter into a calculation of this nature and which influence one's opinion in coming to a just conclusion that it is impossible to lay down definite rules which will hold in every case. Diathesis, present health, social condition particularly the power to gratify certain requirements, such as climate, food, apparatus, etc., influence so materially the conduct of cases, that each patient must be judged on his or her own special condition and environments.

Given a patient in the first stages of hip-disease, a patient whose social condition is such that every luxury can be obtained, that change of climate, fresh air, conveyances, the best of food cooked in the best way, are all procurable; a patient whose common sense or the moral control of whose friends would help in carrying out instructions as to rest in bed, the use of apparatus and the like, I should have little hesitation in giving a very favorable prognosis. In the great majority of such cases cure would follow and, with care in after treatment, the cure would be permanent.

On the other hand, a case of this sort denied all care, all necessities and all luxuries, and, especially denied intelligent supervision and nursing would sooner or later progress from bad to worse and would end, as most of these unfortunate cases do end, in total destruction of the joint and perhaps in death from exhaustion. This is the course with only too many patients seen in our crowded cities; everything is ordered but nothing procured, with disaster as the result. In the face of this, can one wonder at the surgeons in crowded manufacturing centers advocating and carrying out excisions at the very earliest period, even before the joint cavity is involved, under the perfectly legitimate idea that it will only be a question of a short time before the process will go on apace and destroy the articulation?

These advocates of early excision undoubtedly go too far in their views, and often a joint which could be saved with the limited means at their disposal is sacrificed ruthlessly as a holocaust on the altar of their faith. I have among my collection of hip joints one which was removed by one of my old teachers which shows two caseous foci close to the epiphysal line, the joint otherwise being healthy. Knowing as I do both the operator and the squalid surroundings of most of his patients, I am fully prepared to accept this specimen as an evidence of skilled diagnosis and appropriate treatment. However, I think that if the social conditions had been otherwise that it is just in such cases, viz., those where the disease commences primarily in bone that conservative treatment will show the most brilliant results.

Diagnosis is everything and an error committed in the early stages may result in a disaster to the patient. It has been my luck to see cases of commencing hip disease in children diagnosed as intracapsular fracture of the femur and subjected to rough passive movements under chloroform. Most of these