

about? One of the characteristics of living matter is that its growth is directed to the perfection of the organism as one whole, not as a collection of independent particles. This is the action of the vital principle, which science can no longer afford to ignore.

Original Articles.

WHITE SWELLING OF THE KNEE:

REPORT OF RESULTS AFTER EXCISION OF THE KNEE IN 13 CASES DONE AT THE MASSACHUSETTS GENERAL HOSPITAL BY DIFFERENT OPERATORS.¹

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By white swelling of the knee is understood a chronic, inflammatory process of tubercular origin, which usually begins in the synovial membrane, or in one of the epiphyses adjacent to the joint, and which may be attended by extensive destruction and degeneration of tissue, and be followed by a reparative process, which is a more or less successful attempt at checking the disease.

A tubercular inflammation of the structures of the knee-joint begins most insidiously. The child, primarily well although never very robust, begins to favor the affected knee, showing a very slight limp, which is almost unnoticeable. Any sudden and unusual twist of the leg causes a twinge of pain. At first the lameness is intermittent: it appears for a few days, and then disappears for a time, only to reappear the more evidently. For several weeks nothing else is noticed, until upon more careful examination of the affected knee, a slight puffiness or swelling is found; the natural hollows about the joint are absent. A little pain is occasionally felt in this slightly swollen knee, independent of motion.

More careful examination will reveal tenderness to pressure over the head of the tibia, and at times over the condyle of the femur. This tenderness is most marked over the inner side of the knee. Tenderness, especially circumscribed tenderness, is more constant and, as an indication of osseous involvement, as Senn has suggested, is of more significance than was formerly supposed.

To bend the leg on the thigh completely will be found to be impossible. The knee is held fixed by muscular spasm. The tonicity of the muscles of the joint is of very great importance; muscular spasm — an involuntary fixation of the joint — always demands critical attention. The muscular spasm increases. At night while asleep, the child suddenly gives the characteristic sharp, high-pitched cry of osteitic pain due to muscular spasm. The ability to walk diminishes rapidly, and the child is often bedridden. Abscesses soon form, attended by higher fever, more pain and general disability. Sinuses, ulcers, cicatrices, contractures, follow one another in characteristic succession.

The knee, if considerably damaged and left to itself, and as a result of thickening of the ligaments, adhesions, and the adaptation of the hard and soft structures to the deformed position, gradually becomes more or less fixed in this flexed, everted, abducted and subluxated position. In certain cases, bony ankylosis may

occur, or the patient may succumb to a complicated, local or general, tuberculosis, septicemia or its sequelæ, or exhaustion. It is true that milder grades of the affection also occur which, under comparatively simple treatment, subside, leaving a more or less useful joint.

In the clinical picture of chronic knee-joint disease, the symptoms arrange themselves naturally in three groups: (1) those preceding deformity; (2) those associated with deformity; and (3) those attending abscess formation and permanently deformed positions.

The first group includes lameness, sensitiveness, muscular spasm, slight swelling, moderate sensitiveness to pressure about the joint, slight atrophy of thigh and calf muscles, increase of the surface temperature. These signs are apt to be overlooked, not because the doctor is necessarily incompetent to interpret them, but because he fails to make an examination. Every child who limps should be examined very carefully at once, for evidence of incipient trouble in the knee-joint, or in the other joints of the lower extremity. The ankle, hip and knee-joint limps are distinguishable.

The symptoms of the second stage are an increase of those of the first stage, and are due to poor nutrition and severe traumatism in the use of the leg. There is found to be more or less pain, night cries, lameness amounting to inability to walk. An acute inflammatory disturbance about the joint results, causing first, pain and tenderness, and finally formation of abscesses. The knee is much swelled; the skin is stretched, pale and shining, with enlarged superficial veins. A deformity is present which is more or less temporary.

In the third stage, however, the tibia is rotated outward and falls behind the normal plane with the thigh. Cicatrices form, in connection with the old sinuses. The limb is partially or completely ankylosed.

In a given case, the process may stop short at any point in the history here laid down.

The treatment of this disease, which has such a progressive, important set of symptoms, depends largely upon the period in the disease at which treatment is instituted.

The indications for treatment are local and general.

The general indication is to improve the nutrition of the patient by means of properly supplied fresh air, a nourishing diet, the relief of conflicting disorders.

The local indications are to provide conditions favorable to the process of repair at the site of the disease, to prevent or to correct deformity, to restore, as far as possible, the functions of the joint.

The local treatment may be classified into

The non-operative, or expectant;

The operative — erosion, excision, amputation.

There is an impression which seems to obtain in many quarters, that even with continuous rest, a tubercular joint never recovers, and that operative treatment itself, short of amputation, is of doubtful utility. It may be taken as an ascertained fact, that the great majority of tubercular joints will recover, if properly treated, with complete rest to the joint, and under good conditions of hygiene, sea-air and nourishing diet.

If, after the palliative and mechanical treatment which secures absolute rest to the functions of the joint — and this means not only rest from motion, but rest from every trauma — if, after this careful mechanical treatment, some permanent abatement of symptoms does not occur, as well as evident diminution in

¹ Read before the Warren Club, of Boston, Mass.

the girth of the joint, as shown by accurate, periodical measurement, operative interference is called for.

The length of time required in a trial of this palliative treatment should be decided by the condition of the case itself, but at least three months would seem to be sufficient for a fair trial. It is extremely important not to delay too long, for the operative procedures will be sorely handicapped, if attempted late in the course of the disease.

Dr. V. P. Gibney, of New York, has presented² a valuable commentary on the opinion of those who regard the protective mechanical treatment as of little value.

In his final results, in 300 cases of tubercular osteitis of the knee occurring among children treated on the expectant plan with some support and rest at intervals, according to the symptoms, 60 per cent. had motion. Under the fixation plan, with good apparatus, applied during a limited time, 76 per cent. had motion. Under the protective plan—that is, complete immobilization until all acute symptoms had subsided and convalescence could be safely predicted—95 per cent. had motion. In those cases treated by the protective method, it is found that abscesses are uncommon, motion is procured, relapses are not very frequent, deformity is slight, the limit of extension is great.

The protective method of treating osteitis of the knee, commonly known as white swelling, is an important means at our command for checking the disease and preserving a useful limb. In order to insure a satisfactory trial of the protective plan of treatment, the selection of apparatus for each individual case, the accuracy of adjustment, and the continuous and untiring watchfulness over the appliance, as well as its adaptation to the varying conditions of the leg, are all of the greatest importance.

Erasion of the Knee-Joint is the first important operative procedure to be instituted if the protective treatment fails. G. A. Wright, of Manchester, England,³ presents valuable statistics, which place this operation in its proper relation to other methods of treatment.

By erosion of the knee-joint is understood the removal of diseased synovial membrane and ligaments, and, if necessary, also, to a very slight extent, of bone and cartilage.

The advantages of this operation are:

There is no shortening.

There is no deformity, other than the cicatrix.

There is no arrest of the growth of the limb.

Free movement of the joint has resulted, although this is not always desirable.

The causes of failure of this operation are:

Incomplete removal of the disease.

Failure in maintaining asepsis.

Inability of the patient to repair the wound left by the operation.

Prolonged care is required to prevent flexion of the knee. The leg must be immobilized for some time—two or three years, or longer, if necessary.

Wright has reported 37 cases of erosion, which show some failures. In properly selected cases, it is safe to class erosion as an efficient surgical procedure.

Forcible Correction of the Deformity of Flexion.—In white swelling of the knee there is another operative procedure, which, under certain conditions, is of value. If the knee is flexed, and has remained so for

years, it was once thought, because of the shortening which necessarily must have occurred in the muscles, tendons and ligaments of the posterior side of the joint, that in order to correct the deformity, an excision was inevitable.

To-day, forcible straightening is practised successfully upon such flexed and semi-ankylosed knees. Dr. J. Goldthwaite, of Boston, has reported recent cases of his own and others after this operation. In one case reported, after deformity for about fifteen years, there is motion of about ninety degrees.

The operation of forcible straightening is performed by means of a piece of apparatus, purposely devised so that, without increasing the intra-articular pressure, the deformity may be corrected. Seven cases are reported, with good results in all.

Excision of the Knee.—Those cases should be excised which the expectant treatment, properly carried out, has failed to benefit, and in which erosion is contraindicated because of the extensiveness of the disease in the hard parts.

Amputation is necessary for those cases in which there exists disease too extensive for excision, and in which the general health is so poor as to demand immediate relief from the tremendous drain of prolonged suppuration.

Ninety-nine excisions of the knee were done at the Massachusetts General Hospital during the period of ten years prior to May, 1891. Thirteen of these cases have reported years after the operation. This group of operations is interesting, in that 10 of the 13 were fifteen years old and over, the oldest being thirty-one years of age. Two of the cases were aged thirteen and fourteen years respectively, and the age of one was not mentioned in the hospital record and was not obtained. These cases, therefore, represent a group of young adults.

The 13 cases in which the complete results are known, are here tabulated (see next page).

In most cases the excision was done for tuberculosis in the synovial membrane, which condition in almost every instance had extended to the bone. The disease had been of long duration—several years. There was present partial or complete ankylosis, at a larger or smaller angle of deformity in flexion. Subluxation of the head of the tibia backward, with more or less rotation of the foot outward, was increasingly present.

The operation of excision was done because of the persistence of local disease, because of the failure of the general health, because of the presence of discharging sinuses, and for the removal of deformity.

In a few instances an excision was done to avoid amputation, which seemed inevitable because of the tremendously disorganized condition of the knee-joint. In every case, a complete excision was done, the patella being removed, by a curved incision, transverse to the long axis of the leg, carried through the ligamentum patellæ. Drainage at each end of the incision was usually provided.

In a small number of cases the bone was partially immobilized by means of silver-wire sutures or steel nails, which were subsequently removed. In all cases the leg was immobilized externally from the toes to the hip by a plaster-of-Paris or posterior wire splint, at times including the hip, for a period of not less than four to six months.

By consulting the accompanying table, it will be seen that in each patient, a useful leg has resulted

² The American Journal of the Medical Sciences, October, 1893.

³ Annals of Surgery, December, 1889.

from the operation. In all instances but one, in which there is a little motion, union has been firm.

The limp is slight. The shortening in the cases which were measured has been from one-half to three inches.

With the exception of one case, which reported four months after the operation, the time which elapsed from the date of operation up to the time of observation has been from one to six years.

TABLE OF THIRTEEN CASES OF COMPLETE EXCISION OF THE KNEE-JOINT.*

No.	Age	Reasons for Operating	Result After	Union	Limp	Shortening
1	22	General health failing; deformity; swelling	4 yrs.	Complete	Slight	2½ in.
2	20	Ankylosis, with deformity.	3 yrs.	Complete	Slight	..
3	20	Ankylosis 6 years, with acute symptoms; amputation later, because all local disease was not removed at first operation.
4	13	Discharging sinuses 6 years, ankylosis at a right angle.	2 yrs.	Complete	Slight	..
5	15	Partial ankylosis; swelling; 4 years' duration; reasons for amputation not mentioned.
6	31	Swelling, flexed, partially ankylosed; duration 2 years.	2 yrs.	Complete	Slight	..
7	23	Bony ankylosis, after 7 years of disease, at a right angle; no acute symptoms.	1 yr.	Complete	Slight	1½ in.
8	29	A slow tuberculosis; swelling; weak leg; inability to walk much.	4 yrs.	Very slight motion	Slight	½ in.
9	14	No record of value.	6 yrs.	Complete	Slight	3 in.
10	16	Swelling, pain and flexion for 8 years.	6 yrs.	Complete	Slight	2½ in.
11	27	Trouble with knee for 13 years; flexed, tibia subluxated, lateral motion.	6 yrs.	Complete	Slight	2 in.
12	..	For ankylosis and deformity.	4 mos.	Complete	Slight	..
13	27	Swollen, enlarged, painful, deformed for 6 yrs.	4 yrs.	Complete	Slight	1 in.

* In all cases plaster-of-paris bandage from the groin to the toes; foot at right angle.

This report of excisions is of value because end results are recorded, and because it shows what serviceable legs remain after the removal of the knee-joint in young adults.

There are several questions of importance to be considered in connection with the operation of excision of the knee-joint:

The necessity of internal fixation.

The method of operating.

The external appliance to be used.

The length of time for maintaining immobility.

From a careful review of the experience of many operators, it seems that the accurate approximation of the tibia and femur secured by metallic sutures, offers the best internal fixation, better than that obtained by pins and other means.

The transverse incision through the ligamentum patellæ is most satisfactory, as it affords a more thorough exposure of all the joint surfaces than any of the other incisions suggested.

After the operation, a rigid external support is necessary. For a long time — at least a year or more — the unprotected leg should not be allowed to receive the weight of the body.

Immediately after the operation, a proper protection is provided only where both the hip- and ankle-joints are immobilized. This is best accomplished by a plaster-of-Paris roller bandage, extending from the tips of the toes upward and around the body at the hips.

The preservation of the patella is urged and discouraged by equally good authorities. The leg is stiff after operation; there is little use for the quadriceps, and its attachment to the patella, even if preserved, could be of little use. The bones are firmly united together. The patella therefore cannot help in retaining the bones in place. If there is any disease in the patella, complete removal of the bone is desirable, so that no portion of the disease may be left behind.

White swelling of the knee-joint is insidious in its onset, slow in its progress, and if untreated, is sure in its ultimate results. Its clinical course is varied. The indications for its treatment are constantly changing.

In many cases of white swelling of the knee-joint, there comes a time when just as careful judgment is needed to determine whether mechanical means alone shall be depended upon, or whether operative interference is needed to insure the best results, as is required of the surgeon in the care of cases of appendicitis, where he is called upon to decide for or against operation. The immediate danger from an error of judgment is less in the former than in the latter cases, but the nicety of the judgment demanded is equally great.

CASE I. D. B., aged twenty-two. A man of tuberculous appearance, losing flesh rapidly. Presents a right knee firmly fixed, swollen and covered with cicatrices, the remains of old sinuses.

Operation. — Complete excision. Patella removed; silver wire used.

Result, four years after operation. — Good general health; no pain at the seat of operation; complete bony union; a useful leg; slight lameness; shortening of two and one-quarter inches: the right thigh two inches smaller than the left; the right calf half an inch smaller than the left.

CASE II. J. C., aged twenty. A man of good general health. Presents a knee completely ankylosed, with deformity — that is, flexion, rotation of the tibia outward and subluxation backward. This ankylosis is said to have followed an axe-wound, which opened the knee joint several years previously.

Operation. — Complete excision. Patella removed.

Result, three years after operation. — A friend reports the man as being in excellent general health and able to work. He has no trouble whatever at the seat of operation. His leg is useful.

CASE III. C. W., aged twenty. This man had a chronic osteitis of the femur and tibia, in the neighborhood of the left knee-joint lasting six years. The knee was swollen and partially ankylosed.

Operation. — A complete excision. The patella was removed. One month after the excision, on account of a persistence of the local inflammatory processes, the thigh was amputated. The man recovered.

CASE IV. J. C., aged thirteen, a boy who had had for six years a chronic osteitis of the femur and of the head of the tibia, presented a knee firmly ankylosed at a right angle. There were sinuses on either side of the femur, communicating with the carious bone.

Operation. — A complete excision.

Result, two years after operation. — The general health excellent; no pain; a stiff leg; scarcely any lameness: leg useful.

CASE V. C. M., aged fifteen. For four years the patient has had increasing disability of the left knee-joint. The knee was much enlarged, the patella immovable, the contour of the joint obscured, and there was partial ankylosis.

Operation. — A complete excision. The patella was removed. Two months later the thigh was amputated. Two years after the excision and about a year after the amputation, the general health was excellent.

CASE VI. M. M., aged thirty-one, a woman who is said to have had rheumatic fever several years ago, presented a knee which was much swollen and fixed. The deformity had existed for about three months.

Operation. — A complete excision. The patella was removed. Steel nails were used in place of silver wire, but were removed early.

Result, two years after operation. — General health good; absence of pain; a useful leg; complete bony union; slight lameness.

CASE VII. M. Mc., aged twenty-three. A man with a tuberculous family history. He is said to have injured his knee seven years ago. The left knee is flexed to about a right angle; the tibia is subluxated. There is no heat or redness of the skin. The patella can be moved slightly.

Operation. — A V-shaped piece of bone, including the patella, the lower end of the femur and the upper end of the tibia, was removed.

Result, a little over one year after operation. — General health excellent; complete bony union; absence of pain; a useful leg; slight lameness; one and one-half inches shortening.

CASE VIII. K. K., aged twenty-nine. A woman in good general condition, presenting a slow, painless swelling in the left knee, incapacitating her for work. No evidence of any past abscess formation.

Operation. — A complete excision.

Result, four years after operation. — General health excellent; no pain; one and one-half inches shortening of the leg; very slight motion at the seat of resection; a slight lameness; a useful leg. The leg is protected at the seat of operation by a leather corset.

CASE IX. T. M., aged fourteen. A boy with a tuberculous knee.

Operation. — A complete excision. Silver wire used and subsequently removed.

Result, six years after operation. — General health excellent; absence of pain; complete bony union; very slight lameness; three inches shortening of the limb; a useful leg. There is a tendency to inversion of the foot on the excised side.

CASE X. S. H., aged sixteen years. For eight years has had a swelling of the knee accompanied by pain and stiffness. There is marked flexion of the knee.

Operation. — A complete excision.

Result, six years after operation. — Bony union; there is no pain; the leg is useful; slight lameness; two and three-quarters inches shortening of the excised leg.

CASE XI. I. H., aged twenty-seven years. A woman who has had trouble with her knee for thirteen years, that is, slight pain and swelling, and inability to use the knee with perfect freedom. The knee is flexed. There is much lateral mobility. The tibia is subluxated.

Operation. — A complete excision. Silver wire used.

Result, six years after operation. — Her general health is excellent. There is two inches shortening; complete bony union; no pain; a useful leg.

CASE XII. J. M. The left knee is swelled. The tibia, near the joint, measures one and one-half inches more in circumference than does the tibia of the right side. Ankylosis is very nearly complete at a little more than a right angle.

Operation. — Complete excision. Patella removed.

Result, four months after operation. — General health is excellent. Gained in weight immediately after the operation; no pain; a useful leg.

CASE XIII. M. G., aged twenty-seven. A woman who, for six years, has had a swelled, painful and stiff right knee. At the time of operation, there was a great enlargement of the right knee, much lateral motion, and inability to raise the foot from the floor.

Operation. — A complete excision. The patella was removed. During the following year, all the tuberculous tissue not having been removed, many curettings were done.

Result, four years and three months after the first operation. — Knee firmly ankylosed. General health is pretty good. Pain is absent; the leg is useful; very little lameness; one inch shortening of the right leg and one inch atrophy of the right thigh.

ICHTHYOL IN GYNECOLOGY.¹

BY MALCOLM STORER, M.D., OF BOSTON, MASS.

SUFFICIENT time has now elapsed since the introduction of this drug to form some judgment as to its value in the treatment of diseases of women. While many foreign writers have given us the results of their experience, so little has appeared in this country on the subject that I feel justified in laying it before you.

Much, apparently with justice, has been claimed for ichthyol in other departments of medicine; the question of its value in gynecology has been somewhat vexed, and it may be of interest to give a brief *résumé* of the results of some other observers, and see how closely they are borne out by personal experience.

The characteristics of the drug generally employed — the sulpho-ichthyolate of ammonium — probably are well known to you. Suffice it to say that it is obtained from a fossil fish deposit, and is a thick brown liquid, with a smoky and to some a highly offensive odor. It is soluble in water, in a mixture of alcohol and ether, in oils, glycerine and fats, and contains about 15 per cent. of sulphur, very intimately combined.² Discovered by Schrötter,³ it was introduced to the profession by Unna in 1883, and its success in certain inflammatory dermatological conditions soon brought it into great vogue. Unna's theory of its action was that by its reducing power it deprives the endothelium of the blood-vessels of oxygen, and so causes them to contract. While this view is vigorously combated, no better one has been proposed. (See Elliott.)⁴

Its use in gynecology was first suggested by Freund in 1890.⁵ He claimed surprisingly quick and complete cures in many cases of chronic parametritis, chronic

¹ Read before the Massachusetts Medical Society, June 13, 1894, and recommended for publication by the Society.

² Lurtigean: *Gaz. des Hôp.*, 1887, p. 165.

³ Schrötter: *Monatsschrift f. Prakt. Dermat.*, 1882.

⁴ New York Medical Record, 1887.

⁵ Freund: *Berl. klin. Woch.*, 1890, Nos. 11 and 49.