Electrical Treatment.—In chronic and subacute cases electric light or radiant heat treatment should be given daily or on alternate days, and this should be immediately followed by ionization with iodine ions, a 2 per cent. solution of lithium iodide being placed on the lint of the kathode. In cases where much pain is present ionization with salicylic acid ions is of value. Diathermy is of value in relief of pain.

Massage, etc.—When there are no signs of active inflammation and the infective cause has been removed, massage and movements of the joints are indicated. Where the joint movements are much limited in such cases breaking down of adhesions under an anaesthetic or suitable surgical measures may be adopted.

Diet.—In pyrexial cases the diet should be mainly liquid. It must be borne in mind that most cases of non-specific infective arthritis require a diet of high nutritive value, and attention should be directed towards giving a dietary rich in vitamins. Milk, cream, eggs, the unheated juice of fresh lemons or oranges, fresh fruits and vegetables, fish, chicken, and meat, may be given according to the digestive capacity of the patient. If tolerated, milk fermented with lactic acid bacilli is of value in controlling intestinal fermentation. Cod-liver oil and malt, or one of the many substitutes for this now on the market, may also be given with advantage.

In cases of fibrositis of aponeuroses and tendons local electric light and massage gives the best results; diathermy and ionization are sometimes beneficial. In perineuritis, such as sciatica and brachial neuritis, frequent application of electric light gives the best results. Ionization is sometimes of value, and if there is much pain salicylate ions should be used instead of iodine. Iodine may be given internally, and aspirin, phenacetin, or pyramidon for relief of pain. The local application of a mixture of equal parts of chloral, menthol, and camphor on gauze covered by oil silk is very helpful. Complete rest during the acute stage is necessary. In bursitis and teno-synovitis local treatment by electric light and ionization is indicated. In chronic villous synovitis where the above measures fail, the opening of the joint surgically and removal of the villous outgrowths has given good results.

PROGNOSIS.

Where a case of early arthritis is subjected to investigation and treatment on the above lines a complete cure can be effected. In cases of long standing the inflammatory changes are often progressive in nature and removal of the primary cause may do little good because the infective process is being carried on by a secondary intestinal infection. In such cases everything possible should be done to remove both the primary and secondary causes of infection, and when the signs of active inflammation in the joints have ceased measures should be taken to improve the mobility of the joints and muscular tone by massage and movements.

COCCYGEAL FISTULAE.

BY

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[With Special Plate.]

THERE is a type of fistula in the anal region which for years was a source of difficulty to surgeons, and still causes much embarrassment unless its nature is recognized. Fistulae of this type cannot be made to heal by the ordinary operative procedure, and failure to make them close is common.

They are always situated over the tip of the coccyx, or very close to it, and behind the anus. There is no internal opening, but frequently there are several external openings. The external openings are small, and discharge a thin serous fluid, or sometimes ordinary pus. The parts around are tender and often inflamed, and the condition causes the patient considerable discomfort when sitting, as the tender area is just at the point where most pressure occurs in the ordinary sitting position. The following case well illustrates the type:

A gentleman, aged 45, as the result, he thought, of a slight blow on the posterior part of the perineum, developed a painful abscess behind the anus. This abscess was opened and scraped

by his medical adviser, but refused to heal. Another operation was then performed and the fistula laid freely open into the rectum, although no actual track could be found opening in this direction. After many weeks lying up and a further unsuccessful operation the fistula was still unhealed, and he was brought to see me. I recognized the nature of the condition and completely excised the fistulous area, after which healing took place without further trouble.

It is quite common to find, as in this case, that several previous operations have been performed without success.

Several years ago the late Mr. Goodall described a number of cases of fistulae over the coccyx, which were difficult to heal, but he did not recognize their nature.

The true nature of these fistulae over the coccyx was recognized by Sir John Bland-Sutton, and his book on *Tumours* contains (fourth edition, p. 436) a description of them. They are congenital—remnants of the faulty coalescence of the cutaneous covering of the back during early embryonic life. They are an exaggeration of the "post-anal dimple" often seen in this situation, and are in reality sequestration dermoids due to skin being shut off from the external surface. The fistulous tracks are lined with skin, and it is for this reason that they will not heal when laid open. In one case, on laying open such a fistula, I found a lock of hair nearly an inch long growing from the walls. It is a curious fact that they may exist for many years without causing any trouble.

The microphotographs accompanying this article show the appearances in cross section of the fistulous track after excision; it can clearly be seen that they are lined with epithelium. Often, of course, considerable modification has occurred in their structure from secondary inflammatory changes, but it will be always possible to demonstrate the presence of epithelial cells in the lining membrane of some part of the fistula. There is often a considerable deposit of fibrous tissue around the fistulae, even when no operation has previously been performed. When, as is usual, one or more operations have been performed, a very complicated condition may be found, but the situation of the external opening near the tip of the coccyx will generally make it possible to surmise the nature of the condition. Often the condition is not noticed until, as the result of some slight injury, a small abscess forms and the parts become painful. Treatment consists in completely cutting out the fistulous tracks. An incision should be made around the external openings and deepened until healthy fat is exposed; then the whole area is cut out down to the coccyx, care being taken to watch for any signs of side tracks, which are often present. The dissection will as a rule go down to the coccyx, and a fairly large wound will result. This is best left to granulate, and will soon fill in with healthy tissue. It is not necessary to excise the coccyx unless a fistulous track is discovered passing up in front of it, when, of course, the track must be followed to its termination.

These congenital coccygeal fistulae are closely related to the dermoid cysts sometimes found behind the rectum, but whereas the fistulae lie superficial to the coccyx, the dermoids are usually on the front or upper surface of the coccyx and between it and the rectum.

These congenital fistulae seldom cause serious trouble, and except as the result of surgical interference never open into the rectum. The chief point of interest about them is that owing to their being lined with skin they will not heal unless completely cut out.

ACUTE OSTEOMYELITIS OF THE LONG BONES IN CHILDREN.*

BY

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[With Special Plate.]

ONE cannot work in a children's hospital without being struck by the fact that there is always going on a certain waste of valuable human life, or at least of future efficiency and wage-earning capacity. This occurs in cases in which, through some delay in diagnosis or some unfortunate choice as to a method of treatment, there is lost

* A paper read before the Aberdeen Medico-Chirurgical Society.

the opportunity of saving a life or of putting a child in a fair way to become a useful citizen. The reasons for this are of course the suddenness with which acute disease begins in early life, the rapid course it so often runs, and the great variation of symptoms in any particular disease. These factors make diagnosis difficult for the practitioner, and the surgeon is too often presented with a case in which the indications as to the best possible line of treatment are none too clear. These observations apply, I think, most particularly to acute appendicitis, to empyemata of the thorax, and to acute (septic) osteomyelitis of the long bones. In the former two a great advance has been made in the last ten years, but I cannot help thinking that in the last neither as regards immediate recovery nor as to late functional capacity has there been a very great improvement in results as compared with the state of affairs when this was the subject of discussion at a previous meeting of this society (about ten years ago).

Although in a few cases the general infection is so severe, and the local response about the infected bone so slight, that diagnosis is practically impossible, usually there are some local signs which should lead us to suspect what is going on. While I fully appreciate the difficulties of diagnosis, it seems to me, from what I have seen of those cases as they come into hospital, and from a study of their histories, that there are two classes of cases in which undue delay in arriving at a diagnosis occurs:

(1) Cases in which a child has been ill for several days without any apparent cause, and a systematic examination of the ends of the long bones has not been made. This point has been constantly emphasized by Dr. Rose in all his teaching.¹

(2) Cases in which, during an acute illness, an abscess has rapidly formed over the front of the tibia. A small incision has been made, and pus allowed to escape. The true nature of the condition has evidently not been realized, and home treatment continued until one or more of the other bones have been infected. These cases rarely recover.

On the other hand, whatever perfection we may arrive at in rapidity of diagnosis, the fact that the local disturbance may be accompanied or preceded by a severe septicaemia means that the initial mortality must always be fairly high until we can find some more prompt and efficient means of serum therapy than we are at present equipped with.

In cases that recover after operation there is always a great possibility of the functions of affected limbs being permanently impaired. This may be due to:

- (a) Direct extension of infection to periarticular tissues or to the joints themselves.
- (b) Infection of joints through the blood stream.
- (c) Permanent loss of bone substance through destruction of tissues capable of forming new bone.
- (d) Irregular growth, owing to interference with epiphyseal ends.
- (e) Ineffective after-treatment where the whole thickness of the bone has been removed.
- (f) Loss of muscle function from sepsis and from disuse.

The treatment of acute osteomyelitis must vary in some degree according to the type of case which we have to deal with.

While any attempt at classification must be faulty and subject to criticism, I feel, none the less, that if any attempt is to be made to indicate lines of treatment, this must be based on a consideration of the types of case, for in this way only can we hope, on the one hand, to avoid unnecessarily mutilating operations, and on the other, to apply sufficiently radical treatment when it is required. I think we may take it as a generally accepted fact that the process begins at the end of the shaft near to the epiphyseal junction. The only apparent contradiction to this is that one sometimes meets with a fairly acute form commencing high up in the shaft of the femur, but here the focus will be found to be close to an epiphyseal junction—namely, that of the small trochanter.

We may take it also that the so-called "subperiosteal abscess" described in the textbooks is in actual practice very rare, and that an abscess under the periosteum is almost invariably proved to have its origin in an underlying focus of infection in the bone itself.

Keeping these two points in view, and feeling the need of something to justify not advocating the same treatment in every case, I venture to submit the following rough classification into three types, and to discuss the treatment of each.

Type 1.

A case presents signs suggestive of localized mischief at the end of a long bone. The history is a comparatively long one, and the general infection is manifestly not at all severe. Incision reveals the presence of a localized collection of pus under the periosteum, which is separated from the bone only over the abscess area. Here removal of the bone denuded of periosteum will allow for drainage of the medulla, which should not be curetted out, and will—provided that all the denuded bone has been removed and given appropriate after-treatment—usually ensure a good result.

Type 2.

A short history, say twenty-four hours or less, of symptoms of severe general infection with strictly localized but very severe tenderness on pressure at one spot at the end of the shaft. On incision pus is not seen, but the periosteum has begun to separate, or is very easily separated, over the small area where tenderness was made out. When the bone is opened, which it should be freely, a little pus may be detected, but sometimes pus cannot be seen. If cultures be taken from the medulla, a vigorous growth of a staphylococcus, or a streptococcus, will result. In such a case, if treatment has been given at a sufficiently early point in the course of the disease, convalescence will be rapid and the final result good.

Type 3.

The most common type of osteomyelitis seen in hospital practice is that in which there is considerable denudation of periosteum. In some cases the bone will be free of periosteum in almost the whole length of one aspect; in others the stripping seems to have run round the shaft. In the most advanced stage the shaft is completely denuded of periosteum. This variety is only too familiar to us all, and it is the type most commonly met with in which disease of average severity has established itself in the shaft of a long bone.

The usual textbook teaching as to the treatment of those cases may be summed up as follows:

That a good-sized piece of bone should be chiselled out, and that this will amply provide for drainage of infected material, and will give the patient a good chance of recovery. More bone may be removed later if necessary; even the whole shaft may be resected, but if this is to be done it should not be undertaken for some time after, say about two months, in order to give time for new bone to form.

I submit that from the point of view of immediate recovery, and also looking to the possibility of obtaining the best functional result in the future, this treatment has not proved to be satisfactory, and I believe that the correct treatment is to resect (superiosteally) the whole thickness of the shaft, not necessarily the whole length, but always the whole diameter of the part over which the periosteum does not exhibit a normal degree of attachment to the underlying bone—an operation previously described and strongly advocated to this society by Sir Henry Gray.²

While one has no hesitation in applying it to the humerus and to the femur in suitable cases, fortunately the bone for which this operation is most frequently demanded is the tibia, where, owing to the splinting afforded by the fibula and to the distribution of the muscle attachments, the conditions for operation, after-treatment, and for good end-results are ideal.

The arguments put forward against this apparently too drastic operation are:

(1) That it is not necessary, as if chiselling be freely done it is quite sufficient. This theoretically is true, but the practical difficulty is that it is very difficult to judge when one has chiselled away all the bad bone, and if any is left there is always risk of the infection spreading locally or to other bones. From what I have seen of this operation in the type of case under consideration, the results are not at all good, and a certain number of cases have ended by amputation.

(2) That resection is more difficult and dangerous than chiselling, and that the mortality from it is very high. In the past five years I have resected completely ten tibiae, with two deaths, and six partially, with two deaths. I do not think, when one considers the nature of the disease, that one can look for a much lower mortality than this.

(3) That the bone will not regrow. I do not think that in children one need have any fear of this. I have seen only one case in which growth failed, and one in which it was exceptionally slow. Usually the bone regrows in from three to six months. The bone seems to grow from the epiphyseal ends, and abundantly from the bone-forming cells adherent to the under-surface of the periosteum. A study of skiagrams taken at various stages of regrowth and examination of the limb itself shows this beyond dispute. This is apparently in contradiction to the experiments of Gallie and Robertson,³ but their work as

regards this point is based mainly on animal experiments and on clinical observation made on adults. Great stress has always been laid on the value of inflammation as a stimulant to the activities of the bone-forming cells which get separated up with the periosteum. The finding I am tempted to deduce from my own cases is that while inflammation does, as pointed out by McEwan and others, promote the re-formation of bone in this way, where the sepsis has been very severe, or where pus under the periosteum has been kept too long under tension, the subperiosteal osteogenic cells get completely destroyed—giving a possible explanation for the occasional case of failure of growth that occurs. Also that if a septic bone shaft be allowed to remain *in situ*, it may sometimes, by keeping up sepsis, act as a deterrent rather than as a stimulant to regrowth of healthy bone, and that therefore, after it has become septic, the quicker it is removed the better. If in any rare case bone growth should fail, one can always get over the difficulty by grafting bone from the other tibia, as I demonstrated by a case shown here recently.

(4) The last argument advanced against resection is that the limb is difficult to manage after, and that the functional results are poor. The after-treatment is certainly difficult, but it can be satisfactorily done, and the results can be judged from the cases shown. On the other hand, when incomplete operation has been done, and sinuses have continued to discharge for long periods, necessitating frequent secondary operations and prolonged hospital treatment, the results as regards the adjacent joints are notoriously bad.

In performing complete removal of the shaft of the tibia the end of the shaft which shows signs of least infection should be divided by a Gigli saw, or by a broad sharp chisel. The bone then can be usually lifted out, as the other end, at which the infection has commenced, is free, or is easily separated from the epiphysis. The periosteal bed is then cleaned up with a little peroxide of hydrogen or eusol, and is packed with gauze strips, which are kept in position by two or three temporary skin sutures. The operation can be performed very speedily. Secondary suture of the periosteum and of the skin is performed in three or four days, and Carrel-Dakin treatment commenced by tubes placed within the periosteum. The Carrel-Dakin tubes can be removed in a few days. The limb is immobilized and extended on a Thomas knee-splint.

Early active movement of the muscles is of the utmost importance in stimulating bone growth, and in helping to form a limb which is straight and free from deformity. The Thomas splint is to be laid aside whenever the shaft of the bone can be felt to have attained to any appreciable degree of firmness. For the lower limb a calliper splint will be used, and walking begun at the earliest possible time. Massage and faradism are of value in keeping up the tone of muscles, but active movement is most useful.

Although these remarks are, strictly speaking, applicable only to osteomyelitis in children, I would like to raise the question as to whether, taking into account the present position of bone transplantation, we might with advantage be less timid in our treatment of adult cases, as I think by so doing we might save more lives and get better results than we have done in the past.

Generally speaking, cultures from the medulla of the bone and a blood culture should be made in every case. An autogenous vaccine may be of value in after-treatment, and it is always of advantage to know if there is an active septicaemia present. Vaccines and serums, though of value as adjuncts to operative treatment, do not seem likely to be able to replace it unless in extremely mild cases.

The value of transfusion of blood from individuals who have been previously vaccinated with the particular organism concerned has been proved to be of value in certain septic cases,⁴ but its use here as a routine treatment in acute cases presents obvious difficulties.

It seems, therefore, that the question of treatment hinges, at present, mainly on the type of operation to be performed, and I hope that by stating my own views, even at the risk of being considered too dogmatic, I may provoke some discussion and derive some help therefrom.

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A CASE OF IDIOPATHIC MUSCULAR DYSTROPHY.

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(From the Ministry of Pensions Hospital, Beckett Park, Leeds.)

[With Special Plate.]

A MAN, aged 24, was admitted to this hospital in January, 1921, his invaliding disability being recorded as synovitis of the left knee.

His history was as follows. He enlisted early during the war, and served for some time at home. As far as he can remember he was perfectly well and of category A 1 until Easter, 1916. About this time he was accidentally kicked on the left knee by a horse. The injured part became swollen and painful, and he was resting at his billet and doing no duty for six weeks. He was not admitted to hospital. In about two months he was better and had very little trouble, except that he noticed his knee give way very occasionally when walking, and rather more often when the limb was under less deliberate control, as in running or in making sudden movements. He was put on fatigue work until he went to France in August, 1917, where he continued in a labour corps. Early in 1918 he fell in the street owing to his left knee giving way, and he dates his downward progress from this.

He was demobilized in February, 1919, and his attributable disability was recorded as synovitis of the left knee joint.

Shortly after returning to civil life he noticed wasting of the left thigh, and had pain in the back and in the left hip region. Tuberculosis of the left hip-joint was suspected, but x-ray examination proved negative. Shortly afterwards the right thigh muscles began to waste, and he found that walking became increasingly difficult. Going upstairs became a great task, and he has often been carried up by members of his family. Up to the time of admission to this hospital he had noticed nothing else wrong. Difficulty in walking, with wasting of the thighs and pain in the back, were his complaints. His general health he regarded as good.

Examination.

The patient is a rather thin, pale youth, who walks with the aid of a stick. His gait is clumsy, wide-based, and waddling, with throwing out of the feet, and there is a noticeable lordosis even when he is fully dressed. Stripped he presents a typical picture of muscular dystrophy. The left knee-joint shows no signs of synovitis now and differs in no way from its fellow.

There is much wasting of both thighs. The atrophy, although he has not noticed it himself, has obviously extended to the buttocks and lower part of the trunk. The face, arms, hands, and the legs below the knees appear normal. There is profound wasting of both quadriceps, both sets of adductors, the psoas groups, the abdominal oblique muscles on both sides, and to a lesser extent of the hamstrings, glutei, and latissimus dorsi muscles, the serrati and the rhomboids. Both quadriceps on contraction show two or three ball-shaped relative swellings at intervals in the middles of the muscles. They are not strong enough to extend the legs at the knees. The tensor fasciae femoris on each side is hypertrophied and is used in a compensatory manner in extending the legs and in maintaining an erect posture. In raising the trunk at right angles to the lower limbs the recti abdominis apparently play a principal part, but he is obliged to call in the assistance of his arms. There is some relative hypertrophy, no doubt partly compensatory, of the spinati. He rises from the supine position in the typical "leg climbing" manner. X-ray examination of the hip-joints and spine shows no bony changes. The affected muscles show no fibrillary tremors; their electrical responses are diminished to both faradism and galvanism, but there is no reaction of degeneration and no myasthenic reaction.

The reflexes are normal except where profound atrophy of the muscles concerned prevents their elicitation. There is no dissociation of sensation—tactile, bone, joint, muscle, and temperature senses being unaltered. The other functions of the central nervous system also present no abnormality.

At a meeting on April 13th of the Hospital Conference of New York City, representing forty of the leading hospitals, it was resolved to call the attention of Congress to the injustice that would be caused to charitable institutions by an increase in the tariff on surgical instruments, as proposed in a bill presented to Congress.

A. MITCHELL: ACUTE OSTEOMYELITIS OF THE LONG BONES IN CHILDREN.

From a case in which subperiosteal resection of the tibia was performed on November 30th, 1919.

FIG. 1.—Showing the amount of regeneration that has taken place at three months after operation.

FIG. 2.—Showing amount of regeneration at four months after operation.

FIG. 3.—Photograph of the leg seven months after operation. The tibia is firm and strong and the range of movement in the knee and ankle joints is almost equal to normal.

H. S. CARTER AND W. FLEMING: IDIOPATHIC MUSCULAR DYSTROPHY.

FIG. 1.—Showing the marked lordosis in the erect posture, and the flattening of the chest.

FIG. 2.—Showing the atrophy of the thighs, the enlarged tensor fasciae femoris muscles, the early "taille de guêpe," and the flattening of the chest.

FIG. 3.—Showing the enlargement of the spinati and the atrophy of the rhomboids and lower muscles.