EXPERIENCES OF RESECTION OF THE HIP-JOINT.

Presented to the Section of Surgery at the Annual Meeting of the British Medical Association in Worcester, August 1882.

By GEORGE COWELL, F.R.C.S.,

Senior Surgeon to the Westminster Hospital, and to the Victoria Hospital for Children.

MUCH has been written and said during the last few years about the treatment of joint-disease without excision; and, as a result, some discredit has been thrown, both intentionally and unintentionally, on that operation. In company with many other surgeons, I am confident that the excision of diseased joints is a proceeding which has preserved many lives and limbs in the past, and has very largely sustained its reputation as a measure of conservative surgery. If the excision of joints be destined ever to find its place in a museum of the surgical barbarities of the nineteenth century, it will not be because it is a proceeding unsuitable for the treatment of a certain class of cases under fairly appreciated conditions; but it will be because surgeons possess a better knowledge of the pathology of joint-disease, a fuller power of diagnosing its varieties and early stages; because there is a wider recognition by the people of the necessity of seeking surgical advice at the earliest possible moment; and, finally, because the progress of sanitary science will afford equal facilities for the hygienic and the mechanical treatment of all classes of the community. Our discussion to-day is a step in the direction of improving our knowledge in some of these respects; and it will be a happy day when we are able to cure the disease before the joint has been damaged to an extent in which excision or ankylosis, amputation or death, are the only possible terminations. I am very far from saying that the operation of the excision or resection of joints has not been misapplied. I believe that it has been performed when other modes of treatment might have sufficed; that it has been undertaken when local disease had advanced too far, or when other conditions existed in the patient which rendered such a proceeding unsuitable; and, further, that the method of performance and the subsequent treatment have not always been well calculated to ensure success. But this is only equivalent to saying that we are not all or always endowed with an equal amount of wisdom and judgment. Our very difficulties and failures have, however, had the advantage of stimulating a more extended study of the pathology, diagnosis, and treatment of joint-disease, and of suggesting our interesting discussion of to-day. But I venture to remind you that, whilst we are endeavouring to improve our knowledge in these respects, and learning to restrict the operation of resection of diseased joints, we must avoid running into the opposite error of failing to recognise its immense value in proper cases. For my own part, I desire to record my earnest protest against any sweeping general condemnation of it.

Thus far, I have spoken generally; but it must also be remembered that it is altogether impossible to form any adequate judgment or to formulate any expression of opinion on the general subject of excision which shall be of general application. The conditions of its application to different joints vary so widely, that each operation must be considered on its own merits; and I think that our knowledge of the subject will advance more steadily if we confine our attention to each joint separately.

I believe that there is no joint-disease which can be more satisfactorily treated in its early stages than ordinary hip-disease (*morbus coxae*). But, for a successful result, three conditions are essential: 1, early and correct diagnosis; 2, proper hygienic surroundings; 3, the possession and intelligent use of the necessary surgical appliances. It

because these three conditions are fulfilled, that excision of the hip is rarely required amongst our private patients. It is precisely because one or more of these conditions have been wanting in many of our hospital patients, that disease has advanced beyond the curable stage, and that excision is often required. As surgeon to a children's hospital as well as to a large general hospital, I have had to deal, during the last dozen years, with a large number of cases of *morbus coxae*; and, out of 246 cases of all stages of the disease, I have performed 65 excisions, whilst 181 cases were treated in other ways. Of the latter, I have no exact record of the number of deaths; but they were numerous, chiefly from suppuration in connection with pelvic caries and necrosis. Of the excisions I have an exact record; of these, 39 were boys and 26 girls.

Number.	Ages.	Deaths.	Per Cent.
3	18 and upwards	3	100
20	12 and under	2	10
34	6 " 12	2	5.88
8	3 " 6	0	0
65		7	10.77

The deaths were from tubercular meningitis, phthisis, or the more immediate results of prolonged suppuration. Three of the other cases subsequently required amputation, and recovered. The rest recovered with more or less useful limbs. Many of the elder children had discharging sinuses for more than twelve months, and a few for several years; but, even in them, the shortening and deformity were less, and the limbs more useful, than in the cures by ankylosis. The best cases were amongst the younger patients, many of whom recovered most perfectly, with only the line of cicatrix and one inch to one inch and a half of shortening to show that excision had been performed, the firm ligamentous union permitting complete flexion and a fair amount of rotation, and the wasting of the muscles entirely disappearing with their restored use.

The conclusions that I have formed on the subject are these.

1. Resection should be restricted to cases where there is distinct grating in the joint, accompanied by either pain or profuse suppuration, or failure of health.
2. It should be performed without loss of time, as soon as these conditions are recognised.
3. It is inadmissible in patients over eighteen years of age. All three of my older patients died with more or less prolonged suppuration, and without the slightest attempt at repair. I have never seen an adult patient recover from excision of the hip.
4. The younger the patient (my youngest patient was three and a half) the more satisfactory the result, and the more rapid the repair.

I now perform the operation antiseptically, and always remove the great trochanter with the head of the bone. By not postponing the operation, the acetabular mischief is usually slight. Both ends of the wound are closed with two silver sutures, a tube being inserted so as to keep the centre of the wound, opposite the acetabulum, open. I prefer Bryant's splint, and fix the limb operated upon about one inch shorter than the other. This extension is a matter of great importance, as I am convinced that the muscular contraction forcing the shaft of the femur against some part of the acetabulum is a frequent source of subsequent failure, and of undeserved discredit of the operation. In the last few cases, when possible, I have placed the children for the first few weeks in the prone position (face downwards), so as to avoid soaking the bandages with urine. I have tried this plan for too short a time to express any positive opinion with regard to it; but it answers its purpose exceedingly well, and is marvellously tolerated by the little patients.

NOTES ON THE TREATMENT OF ABSCESS IN BONE.

Read in the Section of Surgery at the Annual Meeting of the British Medical Association in Worcester, August 1882.

By HENRY MORRIS, M.A., F.R.C.S.,

Surgeon to, and Lecturer on Surgery at, the Middlesex Hospital.

IN 1787, John Hunter, after stating that abscess in bone may find its way to the surface, added, "the crown of the trephine is often necessary in order to get at the seat of abscess."* It would thus appear that trephining or drilling for circumscribed abscess in bone was practised by the great master of surgery more than a century ago. It is, however, only since the publication of Sir Benjamin Brodie's paper in the *Medico-Chirurgical Transactions* (1832), just fifty years ago, that the operation has become the almost universally approved treatment of this affection.

It is indeed the only proper treatment; and probably the differences of opinion respecting it now-a-days, are confined to the rarity or frequency of the cases which require it, and to the degree of risk attending it. Possibly there are still surgeons who consider, as the late Professor Syme did, that the disease is a very rare one in surgical practice, and that the operation is attended with grave danger.† The following six cases, which have occurred in my practice during the last two and half years, point, however, to an opposite conclusion; and seem to indicate that abscess in bone occurs more frequently than is generally supposed; whilst, as regards the consequences of the operation, my personal experience, up to this period, has led me to think that good alone results therefrom in properly recognised cases.

CASE I. *Chronic Abscess and Central Necrosis in the Outer Condyle of the Humerus.*—Sigismund H., aged 44, a courier, was admitted on November 17th, 1879. Twenty-five years ago he contracted syphilis.

* Manuscript lectures of J. Hunter, quoted by Mr. Bryant in his *Practice of Surgery*, vol. ii, p. 509.
† Syme's *Principles of Surgery*, 1848 and 1863.

For nine years he had suffered from facial rheumatism and facial neuralgia. About ten months ago he had suffered pain in the right shoulder, and pain and stiffness in the right elbow. The pain in the elbow he described as being "like a pressure of several hundredweight upon the bone." The lower end of the humerus had been enlarged for four months, and for five months he had been unable to straighten his forearm. No treatment had given him any relief.

On admission, there was enlargement of the condylar end of the humerus, especially of the outer condyle; and pressure at one spot on the outer condyle excited pain. He complained of always suffering, but of having frequent paroxysms of great pain, which he described as taking the course of the musculo-spiral nerve to the shoulder.

I proposed to trephine the bone at the tender spot, but this he refused until December 1st, when he returned, requesting that the operation should be done. The periosteum, which was greatly thickened, was peeled aside, and the outer condyle pierced with a small drill without result; but, on enlarging the opening thus made with a gouge, a small sequestrum was exposed, surrounded by a few drops of pus. The cavity was large enough to admit the end of the finger; its walls were hard and smooth, but the bone between the cavity and the joint was somewhat softer than natural.

From this time the pain ceased, and on December 20th, he left the hospital before the wound had healed, being able to extend his forearm beyond an angle of 120°. After four or five weeks more the wound closed, and he has remained well since.

I saw him on June 25th, 1882, when he described himself as "never better in his life," and he could use his arm quite well; flexion, pronation, and supination were perfect, and extension could be carried to the extent of 148°.

CASE II. Abscess in the Upper End of the Shaft of the Tibia: Fibrous Ankylosis, with Displacement of the Knee.—Francis R., aged 35, a man of good physique, but having the aspect of much suffering, was admitted in July 1881. He was deeply pitted with small-pox; had never had syphilis. Seventeen years before admission, he struck his right knee against the rung of a ladder, and this injury led to stiffening of the knee and swelling of the bone below the joint. For five or six years, an open wound existed over the upper third of the tibia; then it closed, to break out again and again. At length, it finally healed; but, throughout the whole of the time since the accident, he had suffered pain, sometimes worse than at others, in the tibia. During the last six weeks, walking had greatly aggravated the pain.

On admission, the right knee was fixed, and the tibia displaced slightly backwards and outwards. The right tibia was much thickened in the upper part of its shaft. The skin over the enlarged bone was natural, except for a supple thin cicatrix. There was tenderness on firm pressure over all the thickened part of the bone, and even slight pressure on one spot gave rise to pain. Of late, the pain in the bone had been continuous, allowing him no sleep by night and no rest by day. Many remedies had been tried and failed. I believed there was an abscess in the tibia; and therefore, on August 5th, cut down upon it, and drilled the bone deeply in two places without evacuating pus. The periosteum was much thickened, and the bone was tough and dense. Relief was immediate and complete, and continued for two months; but on October 28th, 1881, about one month after discharge, he returned to the hospital, suffering all the old pains as severely as ever. On November 2nd, I therefore made another incision down to the bone, cutting along the cicatrix of the former wound. There was no difficulty in detecting the places where the drill had been previously introduced; they were filled with soft and ossifying granulations. Along one of these, a gouge was worked; and, when it had been pushed a little further into the bone than the drill had gone, about three drachms of foetid pus escaped. A steady recovery followed; on December 20th, the wound had quite closed; and, on January 3rd, 1882, he left the hospital quite well, though his knee was, of course, still stiff. I last saw him on March 1st, 1882, in perfect health; and I should have heard from him had his leg not remained sound and painless.

CASE III. Central Necrosis and Abscess in Lower End of Tibia.—Ferdinand L., aged 8, injured his left leg by slipping his foot between some railings. A week afterwards, the bone was swollen just above the ankle, and painful enough to keep him awake at night. After four months' treatment without benefit, he was admitted in January 1882, with uniform expansion of the lower end of the diaphysis, slight redness and heat of the skin over the swelling, and some tenderness on pressure. The fibula was unaffected, and the movements of the ankle were painless and free. He suffered little or no pain after admission; but, in about three weeks, the soft parts became very red, cedematous, and tender; so that, on February 24th, I made an incision over the front of the tibia, and peeled back the periosteum, which was a good deal thickened, and partially detached from the bone. Pus at

once oozed through a small aperture in the expanded bone; and, on enlarging this, between two and three drachms of fluid pus, some inspissated pus, and a small piece of necrosed bone, were removed. The cavity was lined by a smooth vascular membrane, which was scraped away. There was but little hemorrhage. He made an excellent recovery; and, in the beginning of May, he left the hospital wearing a temporary steel support for the leg. He has continued well since.

CASE IV. Central Necrosis of Right Fibula: Chronic Abscess in Lower End of Left Femur, giving rise to Suppuration around the Knee.—Joseph B., a fairly healthy looking lad was admitted first on October 19th, 1880, when six years old. His family history was good, but he had some slightly enlarged glands in the neck.

About Christmas 1879 he complained of pain in the right ankle, which became more and more severe, and extended up the leg. Considerable swelling followed in the upper and outer part of the right leg. He limped in walking. Three months before admission, a small piece of bone came away through an opening which had formed over the right fibula. Three weeks before admission, after a fall on his knees, he felt pain in the lower part of his left thigh, and a little swelling formed above the left knee.

On admission, there was a sinus over the upper third of the shaft of the right fibula leading to necrosed bone, and a day or two after admission a long slender central sequestrum was removed from the fibula. The wound healed rapidly.

On November 27th, between two and three ounces of serous fluid were removed from the swelling over the left femur. It was clearly bursal, and the bursa did not refill. After the removal of the fluid, the lower end of the shaft of the femur was felt to be much expanded. On February 4th the boy was discharged quite well, except that the lower end of the femur was painlessly enlarged.

For eleven months he remained well, but on the 10th of January, 1882, he was re-admitted with extensive suppuration around the lower end of the left femur, and in the popliteal space. All the parts about the left knee were exceedingly tender, and any movement of the knee made the child scream. The joint itself was not, however, affected. On the following day two incisions were made, one above the inner condyle of the femur, and the other at the lower part of the popliteal space, and several ounces of matter were let out. The lower end of the femur could now be felt greatly enlarged. After this, the temperature, which had been 102°, fell to 98.2°, and did not rise above 99° till January 21st; then it rose again, and was frequently as high as 101.6°. The pulse was rapid, the appetite declined, and pain and tenderness about the lower end of the femur and over the knee became very acute. These symptoms, supervening upon a long standing enlargement of the femur, led me to the opinion that a chronic abscess or central necrosis in the lower part of the femoral diaphysis was the cause of all the mischief. Accordingly, on February 2nd, I made an incision down upon the front of the femur—which was rough as well as expanded—and then peeled off the thickened periosteum with the rest of the soft tissues. A very small opening leading into the interior of the bone was thus exposed, and enlarged by means of a gouge. After going through a considerable thickness of dense, tough, but not very hard bone, an abscess-cavity, as large as a walnut, was laid open, and about half an ounce of laudable pus escaped. More pus was mopped out with pieces of absorbent wool, and the walls of the cavity were well scraped. The patient made a good recovery, lost all pain from the day of the operation, and was discharged well and with a movable knee on May 9th, 1882. There was one inch and a quarter of lengthening of the left limb, due solely to increase in the growth of the femur. The boy remains quite well up to the present time.

CASE V. Abscess in the Lower End of the Tibia.—On February 28th, 1882, Arthur F., aged 10, an active and well grown boy, was brought to me on account of a circumscribed swelling of the left tibia, about one inch above the ankle-joint. It came on after jumping from a height, between two and three months before I saw him. The swelling was slowly but steadily increasing. Pain—which for a long time had not been great, and had only been felt at all after walking or standing a good deal—had latterly occurred in paroxysms severe enough to cause him to cry, and keep him awake at night. The attacks of pain sometimes continued many hours, and would then pass off for a week or more. There was tenderness on pressure over the whole of the inner surface of the swelling, but more acute at one spot than elsewhere. I recommended the use of the trephine at the most tender point, and, on March 7th, I removed an egg-spoonful of cheesy-looking semifluid pus from the interior of the lower part of the shaft. After the operation there was no return of the old pain. Within three weeks, he was well enough to return home; and I saw him, perfectly recovered, on July 13th.

CASE VI. *Central Necrosis of Astragalus*.—Frances S., aged 12, a delicate looking girl, was admitted on December 18th, 1881. Twelve months before admission, swelling appeared on the outer side of the ankle. Pain, most severe at night, preceded the swelling by some months. Gradually the whole ankle-joint became soft and swollen, like an ordinary white swelling of the ankle. Tenderness on pressure was most marked over the lower end of the fibula. A plaster-of-Paris splint was worn till March 21st, 1882, when she returned to the hospital, feeling no better. In less than a month after removing the plaster-of-Paris, and whilst the limb was still kept fixed, the ankle-joint showed undoubted signs of suppuration; the temperature rose, and rigors set in. On April 17th, an incision was therefore made in front of the inner, and another behind and below the outer malleolus. On introducing the finger into the outer wound, I felt a small movable fragment of rough bone close to the articular facet for the outer malleolus. This was lodged in a cavity in the astragalus which was large enough, after the removal of the fragment, to receive the tip of the finger, and was limited by perfectly smooth and uniformly hard walls. The joint was washed out with a solution of tincture of iodine, the wounds covered with terebene and oil on lint, and the limb immovably fixed on a splint. Subsequently, the terebene was changed for iodoform, which was dusted over the weak exuberant granulations which had formed. The limb was still kept immovably fixed. No pain has been suffered since the operation; the joint has resumed almost its natural shape, and the wounds are all but cicatrised. I look forward to the patient recovering with a slightly movable joint.

REMARKS.—The operation which was performed in these cases was not, strictly speaking, trephining. In two of them, after dividing the periosteum by a linear incision, and peeling it off for a certain distance, pus was seen to ooze up through a small opening in the bone; and the abscess-cavity was opened up by applying the gouge to this spot.

In three other cases, after dividing and peeling off the periosteum in the same way, a drill was first introduced, and then the drill-hole was enlarged with the gouge. It is not always sufficient to use a drill under the impression that, if a cavity be reached, pus will escape from it along the side of the drill, or through the hole made by it, after its removal; for, as Case I shows, a little pus with a fragment of necrosed bone may occupy a cavity, but not declare itself by welling up; or the pus may be only semifluid, and too thick to flow, as in Case V. Under either of these conditions, the use of the gouge is needed to expose the abscess.

After emptying it of its contents, the walls of the cavity were in each case well scraped, or rubbed with dry lint, or a fragment of sponge; it was then washed out with iodine solution; and absorbent cotton-wool, or lint soaked in terebene and oil (1 part to 6), was introduced.

In all the cases the limb was immovably fixed in splints; and the subsequent treatment consisted in irrigating the cavity with iodine solution (tincture of iodine, four drachms to the pint of warm water) daily, or every second or third day, according to the amount of discharge; and the application of the terebene and oil on lint.

The situation of the abscess in Case I was on the epiphyseal portion of the humerus, though all the epiphyses had years before become consolidated with the rest of the bone. In the next four cases, one or the other extremity of the diaphysis of a long bone was the seat of disease, though in only one of them was the neighbouring epiphysis consolidated with the shaft. In Case VI, the abscess-cavity was in an irregular, not a long bone. Though this is unusual, it is by no means unique. I have seen the os calcis similarly affected; Mr. Annandale has reported a case in which the lower jaw was the seat of a chronic circumscribed abscess; and most surgeons have seen the mastoid bone similarly affected from extension of disease from the middle or external ear.

In the case in which the epiphyseal end of the humerus was affected, the elbow had become contracted, and the bone between the abscess and the articulating surface was softening down. In all probability, the elbow joint itself would soon have been disorganised. In three cases in which the ends of the diaphyses were affected, the joints were not involved; but in two of them (Cases III and IV) the abscesses, after remaining chronic for some months, took on a more acute form, and led to inflammation of the surrounding soft tissues. In Case IV it produced extensive suppuration in them, and fistulæ were beginning to form; whilst, in Case III, diffused abscess in the leg would certainly have occurred had the disease not been cut short by operation.

It is interesting to note that in both these cases (Cases III and IV) little or no pain was suffered for a time prior to the soft parts being affected. This was probably owing to the breaking down, in the course of the disease, of the solid inflammatory products which had

for a time limited the abscess. These products, by filling the natural spaces of bone, cause considerable intra-osseous pressure, and excite the severe, dull, and continuous pain which is an usual symptom of chronic abscess in bone.

In Case VI, in which the astragalus was the seat of the disease, the ankle-joint became early involved, and thus in great part, if not entirely, the symptoms of circumscribed bone-abscess, or central necrosis, were marked; at any rate, the cause of the suppuration of the ankle-joint was not suspected until actually ascertained. It no doubt was an exceptional case, for the great majority of chronic bone-abscesses are in the long bones. But even in them more is seen, in hospital practice, of cases where the abscess has been overlooked or neglected, and has gone on to extensive disorganisation of the bone which it involves, or of the joint in nearest proximity to it, than of cases in which the abscess, still circumscribed within narrow limits, is the only cause of suffering.

To avoid the very serious sequelæ of this affection, as well as to give relief to the distressing pain which it occasions, the diagnosis of bone-abscess and central necrosis is a matter of great importance. I make no distinction between the cases in which pus alone, and pus with a small sequestrum, is contained in the cavity, because there is an identity in the processes resulting in the formation of such sequestra, and in those producing small sloughs of connective tissue in the acute circumscribed inflammations of soft parts.

The diagnosis, it must be confessed, is often very difficult: chronic periostitis, chronic osteitis, and cysts and solid tumours of bone, need to be distinguished from abscess in bone. Periosteal thickenings more commonly affect the middle parts of the shafts of long bones, and are generally amenable to local medicinal treatment; whereas chronic abscess in bone generally attacks the ends of the diaphyses or the epiphyses, and is not in the least benefited by remedies.

Cysts in bone will be rightly treated by being laid open in the same way as a chronic abscess; and chronic osteitis, of the form which gives rise to severe continuous or neuralgic pain (the *ostéite à forme névralgique* of the French), will be relieved or cured by the use of the trephine; whilst the solid tumours require amputation or excision.

Thus, though an accurate diagnosis is admittedly difficult, if not impossible, in some cases, the possibility of falling into error, in spite of careful deliberation, should not discourage us from making an exploratory operation in doubtful cases of disease of bone.

Indeed, I would venture to say that, if we made it a rule to trephine or drill in all cases of chronic enlargement of bone attended with continuous or paroxysmal pain, and which rest and remedies have failed to cure, we should have the satisfaction of saving life itself in some instances, and of restoring to ease and usefulness the limb in very many others.

ON BORO-GLYCERIDE IN OPERATIVE SURGERY.

By RICHARD BARWELL, F.R.C.S.,
Senior Surgeon, Charing Cross Hospital.

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THERE can be no doubt that the dressing of operation-wounds, by some material, and in some method, that shall prevent fermentation or putrefaction of their secretion, greatly promotes their safety, and is almost a prophylactic against those secondary constitutional effects which we know by the names pyæmia, septicæmia, etc. But there is great doubt as to whether the particular method introduced by Mr. Lister is the best means of obtaining the object in view. It certainly is a very inconvenient one; and, although in hospital practice we may easily, and in the practice of a town, where distances are small, may with some difficulty provide or transport all the cumbersome paraphernalia required, the method can hardly be carried out in the rural practice of a wide district, especially if operation be needed on a sudden emergency. In military surgery, during war time, it is simply an impossibility.

Time will not allow me to discuss here the probable uselessness of the spray directed upon the wound. Certain is it that the pulverised stream and the eddies it produces cause more atmospheric dust to fall on the bare surface than would otherwise be the case. If we give full credence to the germ-theory, and believe that germination of certain parts of this dust is the direct cause of putrefaction, it must, nevertheless, be acknowledged that, however rapid the reproduction may be, it yet occupies an appreciable time. Therefore if, no spray being used, the wound is immediately washed with the germicide, whatever it may