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243
SUBCUTANEOUS OSTEOTOMY

IN

YOUNG CHILDREN.

BY

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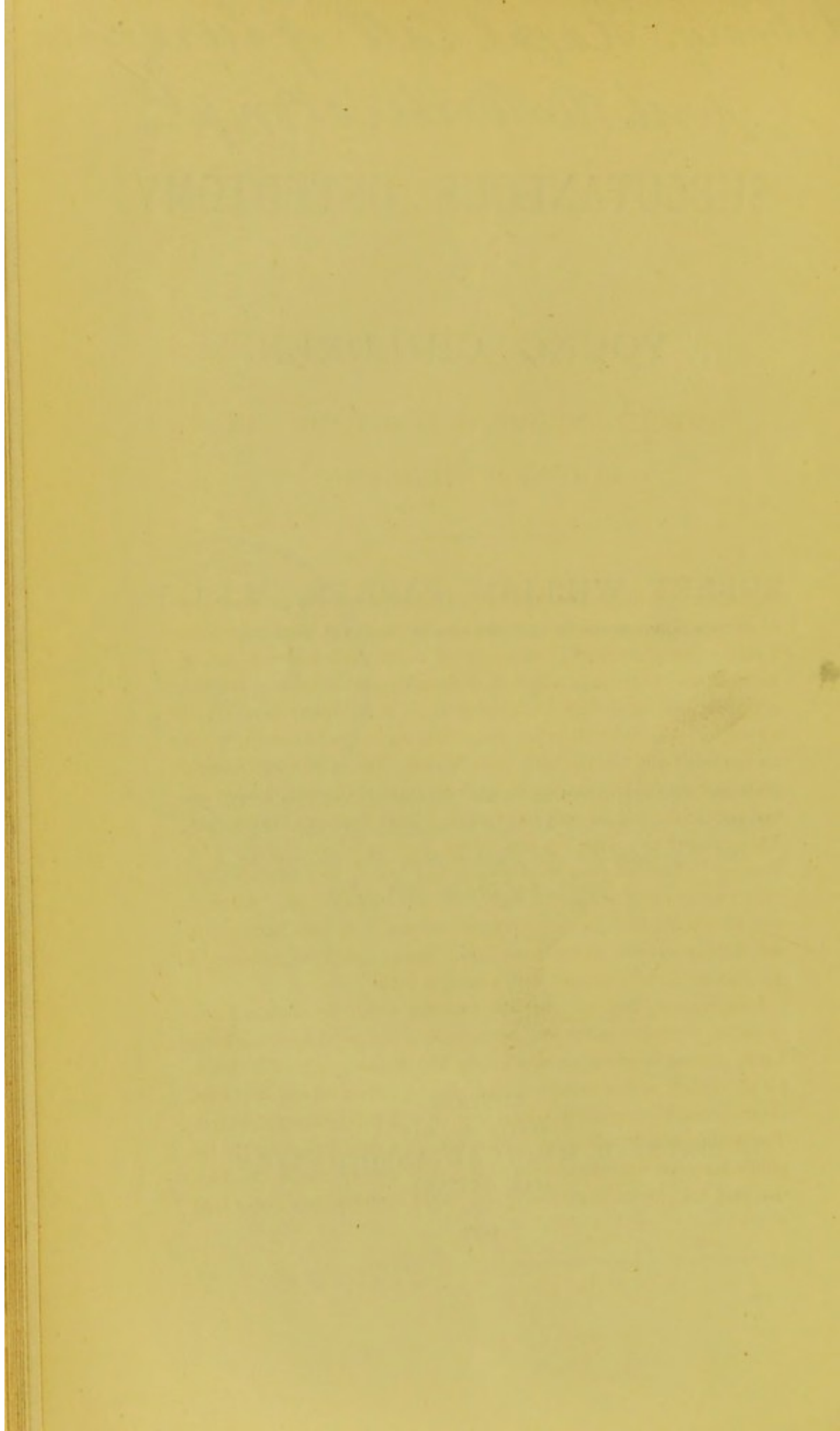


*Being an Address delivered in the Section of Surgery at the Annual
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SUBCUTANEOUS OSTEOTOMY IN YOUNG CHILDREN.

ALTHOUGH the hospital has afforded me abundant material for osteotomy in different kinds of deformity of the long bones of the lower extremity, I shall nevertheless chiefly confine myself in this paper to the subject of knock-knee. Osteotomy is now so thoroughly established as a surgical operation, that an apology for undertaking it is no longer needful; of all surgical operations, there are few, conferring so great a benefit, which are burdened with less mortality than this one. Out of fifty osteotomies, performed on children varying in age from three to thirteen, I have not had one death; and in only one case has there been any suppuration. This occurred in a little boy aged about four, on whom I operated for bow-legs. The left tibia was chiseled, and healed very satisfactorily; after two or three weeks the right one was operated on. All went well for a time; then some erysipelatoid oedema of the soft parts set in, and the boy was very ill for some days. Under treatment, however, I am glad to add he recovered with a straight limb.

I ought to say that, knowing the tendency which the slighter forms of rickety curvature of the long bones have to disappear spontaneously, I only proceed to osteotomy after having had the cases under observation for about three or four months, during which cod-liver oil and steel wine are tried, and also the use of splints kept on with India-rubber bandages. The facility with which these rubber bandages are applied by the lay public is a great recommendation; but a still greater one is the fact, that they not only never get loose, but, on the contrary, they rather tend

to become tighter; thus they keep up a constant traction. If anything be likely to overcome deformity, it is constant pressure and traction such as this. The splint, which should be hollowed out somewhat and well padded, is placed on the inside of the leg; it need not reach beyond the foot, and then it will not interfere with walking. For I hold it very desirable that the patients should be out and about, rather than shut up in unhealthy rooms, fresh air being very essential for rickety children. In slight cases, much may be accomplished by this means, *if time and some little trouble be given to the case.*

I will now speak of genu valgum. It seems to me that we may divide the cases into two chief classes: the complicated and the simple. By the complicated, I mean where, in addition to a certain amount of genu valgum, there are rickety curvatures of the long bones, by which the former deformity is aggravated. By the simple genu valgum, I mean cases in which there is no other deformity, no curvatures either of tibia or of femur. The treatment must of course vary with the nature of the deformity. Speaking generally, it may be said that, the less a genu valgum is complicated, the more certain it is to be overcome by the condyle operation. In the complicated cases, very much may be effected by straight splints and the India-rubber bandages, or by the use of various orthopædic instruments. Even in these cases, however, if there be any obvious overgrowth of the internal condyle, I should recommend an operation; for it allows of so much immediate improvement in the position of the leg, that the remaining deformity of the femur or of the tibia can be the more easily treated. It is true, too, that a considerable degree of simple knock-knee may be overcome without any operation whatever, if the patient can provide himself with suitable instruments and have the almost daily supervision of his surgeon for a long period. But among the poor children who attend the out-patient departments of our hospitals there is a double difficulty to be met: they are too poor to provide themselves with instruments, and they cannot have the surgical supervision without which the best instrument is almost useless. Thus hitherto there has not been any available remedy for this class of persons for a deformity which is by no means uncommon, and we have been under the disagreeable necessity of sending away the severer cases without relief.

It has long been known that a hypertrophic lengthening of the internal condyle of the femur is the most frequent pathological condition which leads to the production of simple genu valgum. Many other conditions

have been assigned. I have myself seen cases in which I could not demonstrate overgrowth in the condyle; in two cases now under care, I believe it is due to overgrowth of the internal tuberosity of the tibia; and I have several times seen how curvatures of the long bones may simulate this deformity. Nevertheless, the broad fact remains, that in a large majority of cases, this undue lengthening of the internal condyle is the cause of the deformity. I am the more disposed to regard this as the real source of the disease, because, in highly marked cases even, after the condyle has been loosened, the deformity can always be overcome.

We owe an especial acknowledgment to Dr. A. Ogston of Aberdeen for having first applied this knowledge to the purposes of surgery; for although other operations had from time to time been proposed and undertaken, none were comparable to Ogston's at the time when it was first published. In recording this, we must not forget to mention the obligation we owe to Listerism; without such a protection no surgeon would have ventured thus deliberately to open the largest joint in the body. In the next place, I think that great praise is due to Mr. Reeves for having improved on Ogston, by suggesting a subcutaneous osteotomy; and further, one which may frequently be done without even entering the joint.

Personally, I have not adopted Ogston's operation; I have not even done it once. Reeves' modification seems to me a less serious operation, and just as effective. Since its introduction, therefore, I have given up all other operations for uncomplicated genu valgum. In children, I believe it can be performed without entering the joint, for the layer of encrusting cartilage, together with its synovial lining, would stretch rather than crack sharply off, as was probably the case in adults. Fortunately for my patients, I have had no opportunity of putting this opinion to the test of the *post mortem* room; but the clinical experience of upwards of twenty-five cases seems to bear me out. Among these cases I have now and then had some effusion into the joint—about three or four times in all. On one occasion, in dividing the condyle, which was very soft, I felt the chisel move too freely, and I anticipated what really occurred—effusion into the joint. Though well marked, it was not very severe, and it quickly yielded to an India-rubber bandage and an ice-bag.

I now generally use the carbolic spray at all these operations, and apply a small Lister's dressing to the wound.

The operation is performed thus. An incision is made with a small scalpel down to the condyle. It should be made about its centre from before backwards; this will correspond to the axis of the femur, and will be about midway between the tendon of the adductor magnus and the inner margin of the patella. The chisel is then introduced, and the condyle is gradually separated. It is well to avoid entering the condyle too far in any one given place; the attempt should rather be made to chisel it equally in each direction by making the handle of the chisel describe the arc of a circle while the mallet is being gently used. If the chisel be sharp, a mallet will not be necessary when operating on young children. After the condyle has been freely loosened, *redressement forcé* is practised until the deformity is corrected. A little over-correction even is desirable. Then plaster-of-Paris bandages are applied from the toes upwards, and the limb is held in position until the plaster is hard. An ice-bag is kept applied for three or four days. There is not much pain subsequently, and rarely any constitutional disturbance whatever. After an interval of from four to eight days, the plaster bandages may be removed, and also the Lister dressing. It will generally be found that the limbs can be *voluntarily flexed to about two-thirds of their extent immediately afterwards*. The amount of stiffness varies with the length of time which has elapsed since the operation. If the joint have not been entered, there will scarcely be stiffness at all. But under any circumstances, I would dissuade from any movements but those of which the patient is voluntarily capable. I should not propose to allow the patient to walk about so soon as this, as it is impossible for the process of union and repair to have been completed thus early. In some of my earlier cases, I waited for three weeks, in others for a fortnight, before commencing movements. I have gradually reduced the time, as experience has shown it to be possible. *Voluntary movements* are always to be preferred, and should be practised every day.

Since experience shows that genu valgum (*vide* Holmes's *Surgery: its Principles and Practice*, 1st edit., p. 481) does not in any way tend to spontaneous cure, I have in well marked cases not hesitated to operate on children even as young as three years. I have been led on to this by the remarkably little effect which the operation seems to exercise upon them, and by the feeling that it is therefore better to relieve them early in life of a deformity which materially interferes with their own comfort, as well as with that of their families. A child with well

marked genu valgum requires very much more care and nursing than another one whose legs are straight and strong. It is the additional labour and responsibility involved in the care of a weakly child which often constitute, for a poor family, the proverbial "last straw which breaks the camel's back". I think, therefore, it is preferable to operate early in suitable cases, seeing how harmlessly it can be done, rather than to wait for two or three years, simply because our patient happens to be a young child.

There is also another argument in favour of an early operation in children when the knee-deformity is at all pronounced. It is, that a genu valgum cannot last long without giving rise to a kind of spurious talipes valgus, which then materially complicates the case. In consequence of the obliquity of the leg, the weight of the body falls largely on the inner part of the ankle-joint, as may be seen in Figs. 1 and 3, especially in the right foot. This unusual and too localised pressure on rickety joints little by little causes the ligaments to yield, and a talipes valgus results, more or less complete in proportion as the knee-deformity has lasted a longer or shorter period.

For the purposes of illustration, I append very brief notes of some of my cases.*

CASE I.—William B., aged 6, a healthy-looking child, had a well-marked double genu valgum, which was said to be getting worse. Reeves's operation was performed on June 28th, 1878, on the left leg, being my first operation. A straight splint was then applied, and an ice-bag over the knee. On August 2nd, the right leg was operated on in a similar manner, and the same after-treatment was adopted. A pressure-sore quickly formed on the outer side of the leg, over the bony prominence of the head of the fibula, which gave us some trouble, inasmuch as it interfered with the wearing of the splint. I may say that this operation, viewed in the light of my later ones, was only partially successful. The boy continued to wear straight splints, and subsequently an India-rubber bandage, for some months; and when I last saw him, a few weeks ago, his legs were sound and nearly straight.

I am not ashamed to own that I felt somewhat nervous in deliberately chiseling so nearly into the healthy knee-joint; this accounted for my not loosening the internal condyle of the femur sufficiently to allow the

* Photographs of the cases, before and after operation, were shewn. The accompanying figures were copied from the photographs, being selected as typical cases.

leg to come quite straight; the operator, therefore, rather than the operation must be blamed for the but partial success. I ought also to refer to the plan of after-treatment, which is answerable for something in this case; since this time, and in consequence of the trouble from pressure-sores in this case, I have relinquished the use of splints, and now only use plaster-of-Paris bandages. The leg having been forcibly straightened, plaster bandages are applied; the leg must be held in the required position until they are hard and dry.

CASE II.—H. O. D., aged $5\frac{1}{2}$, was admitted on October 1st, 1878. He was a rickety child, with curvature of the femora and of the tibiae, and also with double genu valgum, especially marked on the right side. It is stated in the case-book (by Mr. H. R. Hutton) that "the thighs being put together with the patellæ forwards and the internal condyles touching, there is a distance of eight inches between the malleoli". Reeves's operation was done on October 8th on the right knee. Plaster-of-Paris bandages were used. There was no rise of temperature. The first dressings were removed on the eighth day; it was found that the boy could semiflex the joint without any pain. The left knee was then operated on in a similar manner, and the dressings were again removed on the eighth day. From this time, all appliances were left off. He was exhibited at the Clinical Society on November 8th. Figs. 1 and 2

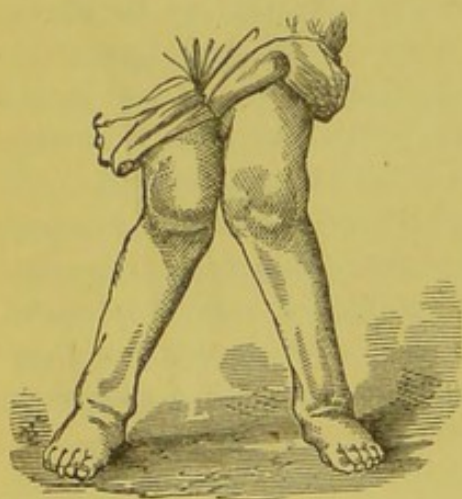


Fig. 1.

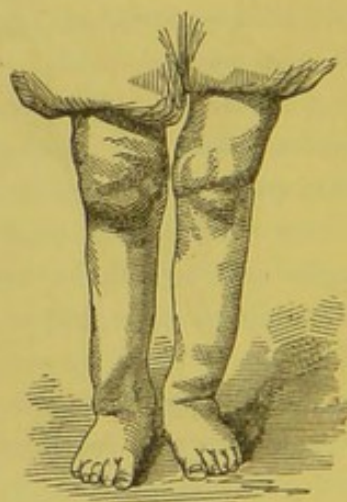


Fig. 2.

show the boy's condition before and after operation. He was seen by me at the Children's Hospital in July of this present year, quite healthy and well, and with his genu valgum cured.

CASE III.—H. P., aged 6, was admitted under Mr. Reeves and kindly transferred to my care. She was the only surviving child of four. She was extremely rickety; her ligaments were loose; the long bones were curved. When she stood, the left knee was completely behind the right one, and the malleoli even then were some inches apart. Her parents were both poor and neglectful. Reeves's operation was performed on the left leg on April 4th; plaster bandages as usual. On April 29th, the right leg was operated on the same way. The condyles were quite soft, so that they could be, and were, cut with the chisel without the aid of a mallet; the chisel accidentally cut its way into the joints, and there was considerable effusion into the left knee, and slighter effusion into the right one. An India-rubber bandage and an ice-bag were applied, and the effusion quickly subsided. The genu valgum was cured. Of course, the rickety curvatures and the loose ligaments remained *in statu quo*. The notes were taken by Mr. R. E. R. Morse, as also the following.

CASE IV.—James T., aged 5; a severe case of genu valgum. The deformity had first become apparent twelve months ago. It was said to be increasing rapidly. The usual operation and after-treatment were adopted. Figs. 3 and 4 show the boy's condition before and after the operation. I



Fig. 3.

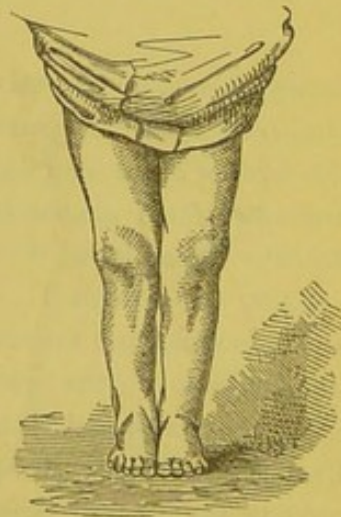


Fig. 4.

have a third photograph, showing the amount of flexion, which was voluntarily possible on the eleventh day after the operation. It was about three-quarters of the maximum. There was not the slightest effusion into either joint. The legs were operated on at four days' interval between the first and second.

CASE V.—John M., aged 3, was admitted under my colleague Mr. A. Caesar, and subsequently transferred to my care. He was an exceedingly rickety child. The epiphyses generally were large; the tibiae were also curved. The boy had well marked double genu valgum, which was said to be becoming rapidly worse. His parents brought him to the hospital expressly to have "something done; they knew of some other child which had been cured". I operated on both knees on the same day, June 17th, 1879, putting up the legs in plaster bandages afterwards; ice-bags were then applied. The deformity was quite overcome. Four days later, the plaster was removed; and on the following day the photograph, of which Fig. 5 is a copy, was taken. It

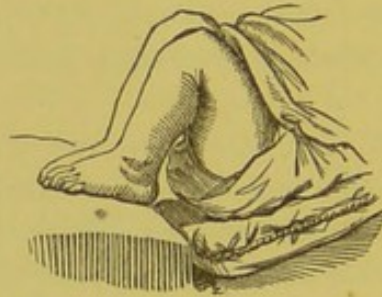


Fig. 5.

shows the amount of flexion of the joint which was voluntarily possible thus early after the operation, and to my mind completely proves that this form of operation may, if carefully performed, be completely *extra-articular*; for I cannot think that such movement would have been *voluntarily* performed if the joints had been opened.

CASE VI.—Joseph T., aged 5½, had a double genu valgum. The usual operation and the after-treatment were followed. There was very slight effusion into the joints. I had to use considerable force in straightening the limbs, and then did not succeed entirely to my satisfaction. I record the case, for it is probable that the line of the incision into the condyle was too transverse, that is, *not sufficiently corresponding to the axis of the femur itself*. It will be obvious to anyone, that the difficulty of displacing the loosened condyle upwards sufficiently to allow the leg to be brought into the straight line, will be in proportion as the incision into it is more or less oblique. I am inclined to regard the slight effusion into the joint in this particular case as the result of the pressure which was necessary to straighten the limb.

In doing this operation, it is to be borne in mind that a sufficiency of the condyle must be loosened; otherwise, in straightening the limb, the internal tuberosity of the tibia will impinge on the stump of the condyle, and this will effectually prevent a complete reduction of the deformity. The chisel ought to be so directed that the lowest part of the incision shall correspond to the lowest level of the external condyle, which should always be carefully ascertained before an operation is commenced.

I must acknowledge my great indebtedness to my surgical colleagues Mr. Arthur Cæsar and Mr. Reeves for many of the cases, and for their beds which they placed at my disposal, as well as for help at the operations.

