C A S E
OF
PRIMARY EXCISION OF THE ANKLE-
JOINT.

WITH OBSERVATIONS.

BY
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(Received December 16th, 1873—Read January 27th, 1874.)

WILLIAM C—, October 10th, residing at 42, Ormond Yard, Great Ormond Street, was admitted into St. George's Hospital on the 20th of February, 1873. A horse had run away with him and fallen upon his right leg. The lower extremities of the tibia and fibula protruded through a horizontal wound, for about two inches on the outside, and rather to the front of the situation of the right ankle-joint. The sole of the foot was turned inwards and backward. The protruding bones were perfect, with the exception of the internal malleolus, which was broken off and left attached to the internal lateral ligament. The external lateral ligament had been completely ruptured, but none of the surrounding tendons were ascertained to have been injured. Without making any attempt to reduce the dislocation, the protruding extremities of the bones were sawn off, so as to remove

the whole of the articulating surfaces. The foot was then turned still farther inward, and the articulating surface of the astragalus was removed. This was effected by a thick narrow saw and a strong pair of bone nippers, bent at an angle. The internal malleolus was left in its position, attached to the internal lateral ligament. The cut surfaces of bone were easily brought into apposition. The wound was washed with a solution of carbolic acid, and carbolized dressings were applied.

Scarcely any constitutional disturbance followed the operation. In the course of three weeks a swelling appeared on the inner side of the ankle, and an abscess formed. From this some matter continued to discharge for several days. On the 7th of April the wound through which the bones had protruded was almost healed, and the patient was able to get up.

On the 22nd of April there appeared to be good union between the lower extremity of the tibia and upper surface of the astragalus. The patient could walk fairly on the leg.

On the 3rd of May, the patient having used his leg very freely, there was considerable swelling round the ankle, and the portion of the wound which remained unhealed had a sloughy appearance. These symptoms subsided after a rest of two or three days.

May 5th.—The foot turned slightly inward and a mechanical apparatus was applied to keep it straight. He left the hospital on the 4th of June for the Atkinson Morley Convalescent Hospital, where he stayed three weeks. He then returned to St. George's for a few days. He could now walk without support and without pain. There was no swelling of the part, and the wounds were firmly healed. The astragalus appeared very strongly united to the tibia, but there was considerable motion between the bones of the tarsus. This patient was again admitted into St. George's Hospital on the 1st of October, as the stiff, high-heeled boot which he wore had chafed the ankle and produced a small ulcer on the former cicatrices on each side, and also for the purpose of

having a drawing made of the leg (see woodcut). He had walked five miles of his own accord the day before his admission, without pain or inconvenience. He was finally discharged at the end of October. The leg altogether was about half an inch shorter than the other, and he walked with a slight limp.

Mr. Hancock, in his exhaustive work on 'The Human Foot,' has given a table of thirty-seven cases in which complete resection of the ankle-joint has been performed. All these were cases of secondary amputation; and there is, I believe, no case on record, with the exception of that of which I have

now given the particulars, of *complete* primary resection of the joint.¹

Hey (of Leeds), Gooch, and subsequently many other surgeons, have removed portions, or the whole of the protruding extremities of the tibia and fibula in cases of compound dislocation; and although many successful cases are recorded of this practice, the results on the whole have not been such as to lead to its general adoption. But, in truth, these instances were not cases of resection of the joint. The articular surfaces of the tibia and fibula were alone removed, and that often imperfectly. The cartilage covering the astragalus was left either entirely or in part. When the parts were replaced, the cut surface of the tibia would be brought into apposition with the cartilage covering the astragalus. Union between such different structures is impossible; and if the parts could unite at all, it would only be after the cartilage had become absorbed, or completely altered in its nature. Cartilage being a non-vascular tissue, undergoes changes very slowly, especially when in a comparatively healthy condition. Some time ago I amputated the leg of a girl through the knee-joint, and left the cartilage on the condyles of the femur. The girl was of a highly strumous constitution, and the wound did not heal. It became necessary, after the lapse of six or seven months, to remove a portion of the lower extremity of the femur. The cartilage covering the condyles then, to the naked eye, appeared exactly in the same condition as when the leg had been amputated in the first instance. If then, in amputation of the ankle-joint, the cartilage of the astragalus was left, it would probably be long before it would be removed. During that time no union could take place, and suppuration in the joint would necessarily be kept up.

¹ A case is recorded by Mr. Maunder, in the 'Reports of the London Hospital,' in which primary excision of the ankle-joint was performed, and in which nearly the whole of the articular cartilage on the upper surface of the astragalus was removed. The case, however, was one of a complicated nature, and the patient appears to have died of pyæmia consequent upon necrosis of a portion of the fibula.

In one of the first so-called excisions of the knee which I witnessed, the disease was confined to the femur, and the extremity of the femur alone was removed. When the parts were placed in position, the cut cancellous structure of bone was brought into contact with the smooth cartilage. The operation was not successful; and from what we now know such an operation could never have been generally introduced into surgical practice. It has indeed been suggested that union between the tibia and astragalus in excision of the ankle-joint is not desirable, but that a movable joint should, if possible, be secured.¹ Such an observation might apply to the upper extremities of the body. But even here a complete resection of a joint would be advisable where it can be performed, on account of its comparative safety. In the lower extremities firmness and stability are the conditions necessary for a useful limb.

The mode in which the tibia and fibula were dislocated in the case I have related indicate the way in which the bone may most easily be displaced in an ordinary excision of the ankle-joint, so as to facilitate the removal of the articular cartilages. In performing the operations on the dead body in imitation of the effects produced by the accident in the case related, the following steps may be taken. A longitudinal incision may be made over the internal malleolus, and as much of the periosteum as may be, and the ligaments, detached. The malleolus is then held by a pair of bone forceps and cut with a Hey's saw on a level with the ankle-joint. The saw should be broad, so as to allow this part of the operation to be completed by a pair of strong bone nippers. If the saw is narrow, the bone nippers will not pass readily into the groove.

The internal malleolus being removed, the foot is placed on its inner side, and an incision is made for two inches along the posterior border of the fibula, and is carried forward nearly at right angles from the lowest point of the external malleolus to the outer edge of the long extensor of the

¹ Garraway, 'British Medical Journal,' 1862.

toes. The periosteum and ligaments are then detached from the external malleolus, and it is removed in the same way as the internal. The lower extremity of the tibia may now be made to protrude through the wound on the outer side, and removed with the greatest facility. This accomplished, the sole of the foot is turned inward, and the upper surface of the astragalus is presented at the wound. The foot now should be held firmly, and with a thick keyhole saw the upper surface of the astragalus may be sufficiently detached without the saw interfering with the surrounding parts, to enable the surgeon to complete the operation with the cutting pliers. The whole of the cartilage on the upper part of the astragalus may in this way be removed, and a perfectly smooth surface of bone left. This is placed in apposition to the corresponding surface of the tibia, and maintained in that position. In this operation it is essential that the internal malleolus be removed or entirely detached from the tibia. The mere division of the ligaments is not sufficient. If the internal malleolus is left connected with the tibia, it prevents this bone from being dislocated outwards. After the internal malleolus is detached, the tibia and fibula may easily be dislocated outward, but when the external malleolus is detached, these bones cannot be dislocated inwards. This is illustrated in a case of Mr. Moore's, published by Mr. Hancock.¹ Mr. Moore cut down on the fibula, and excised the lower inch and a quarter of that bone. Continuing the incision in a curve across the instep to the interior point of the inner malleolus, but not through the anterior tendons, he endeavoured to dislocate the foot inwards, but could not do so.

It is evident then, as indeed may be readily proved upon the dead body, that there is a great difficulty in dislocating the tibia and fibula outward while the internal malleolus remains attached; and there is also a great difficulty in dislocating the bones of the leg inward, even when the external malleolus is removed. This also is proved by a case recorded by Mr. Hancock,² in which Mr. Hussey performed the following operation :

¹ 'The Human Foot,' p. 309.

² *Ib.*, p. 287.

"A similar incision was made over the front of the joint from behind and above the outer malleolus, to a point a little above the inner malleolus, dividing the skin and subcutaneous fat and areolar tissue only. The flap of skin was raised, the fascia opened on each side of the fibula, the peronei muscles separated from the fibula, and the bone divided by cutting pliers about two inches above the extremity. The fragment of the fibula was seized by strong forceps and drawn forwards, the ligaments were divided, and the bone removed. After dividing the ligaments at the inner side of the joint, the foot could not be everted sufficiently to throw the inner malleolus out of the wound so as to use the saw for its removal. Mr. Hussey, therefore, applied the cutting pliers to the lower end of the tibia above the malleolus. The blades were not equal in length to the whole thickness of the bone, the gouge was therefore used in cutting away so much of the cancellous structure and articular surface as seemed necessary. With his finger in the joint he felt the articular surface of the astragalus to be rough and bare of all cartilage, and he cut it away with a gouge."

I have verified the difficulties of performing both Mr. Moore's and Mr. Hussey's operations on the dead subject, but I prefer giving such illustrations from cases in which the operation has actually been performed on the living body. It would appear, then, that excision of the ankle-joint cannot be readily performed either by attempting to dislocate the bone of the leg inward, nor by trying to dislocate them outward, unless the internal malleolus be previously removed.

The mode of excising the ankle-joint which I have described, namely, by removing the internal malleolus first, and by dislocating the tibia and fibula outward, has not hitherto been described. I believe it, however, to be by far the simplest and best of all the operations of the kind. In Mr. Hancock's mode of performing excision of the ankle-joint, he commences his "incision behind, and about two inches above the external malleolus, carrying it forwards beneath that process across the front of the joint, and terminating about two inches above and behind the internal malleo-

lus.”¹ In this operation the tendons of the tibialis pasticus and flexor communis have to be detached from the groove behind the internal malleolus, and if this is not done completely there is a difficulty in everting the foot so as to complete the operation.²

In the last edition of ‘Pirie’s Surgery’ it is stated—

“The operation can be most satisfactorily performed by making a semilunar incision on the outer side, raising up the flap, cutting off the under extremity of the fibula, opening the joint, bending the foot inwards, and cutting the bones with pliers.”³ In ‘Holmes’ Surgery’ Mr. Hancock’s operation is advocated. Mr. Buchanan operated by a simple incision on the outside of the ankle. The elder Moreau made an incision on each side of the ankle, and divided the tibia *in situ*.

In Hancock’s and Holmes’ operation the tibia, as far as may be, is dislocated inward. In Moreau’s, Pirie’s, and Buchanan’s the tibia and fibula would be dislocated outward with the greatest difficulty, if at all, as no mention is made in them of the removal of the internal malleolus. The removal of the articular surfaces of the bones completely by any of these operations necessarily involves great disturbance of the surrounding parts, from the saw playing between the tendons and the bones; or if the operation be performed with a gouge, a very irregular surface of bone is left. In either case it would be extremely difficult, as experience has proved, to leave a smooth surface of the tibia, and a corresponding surface of the astragalus which would come into fair apposition; and the suppuration which would in either case probably follow would add to the danger of the patient, and retard the healing of the wound. In the case recorded at the commencement of this paper I left the internal malleolus detached, being unwilling at the time to add to the extent of the wound; but in an ordinary excision of the ankle, primary or secondary, I should prefer to remove the internal malleolus, whether detached or not.

¹ Op. cit., p. 277.

² Ib., p. 292.

³ 3rd ed., p. 818.