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ON SYMMETRICAL BILATERAL FRACTURE OF THE TUBEROSITAS TIBIAE AND EMINENTIA INTERCONDYLOIDEA

By

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Bilateral and symmetrical fractures are comparatively rare. A necessary condition for the occurrence of such lesions must be that the same trauma exerts the same effect on both extremities. In 1944 the writer treated bilateral, fairly symmetrical fractures of the calcaneus in 2 seamen. The ship was hit by a mine, and the patients were on the deck, which was flung into the air.—Bilateral femoral fractures may be seen, for instance, after traffic or war accidents, but are undoubtedly seldom exactly symmetrical. Following a fall where the patient has extended both arms while stumbling, symmetrical fractures of the distal end of either radius may occur. This lesion has been observed by the writer at least twice. Bilateral rupture of the quadriceps tendon has been described by James. Avulsion fracture of the tuberositas tibiae, extending upward and posteriorly into the knee-joint and loosening the intercondyloid eminence, is not often seen, and the writer has been unable to find descriptions in the literature of symmetrical bilateral fractures of this localization. Such a case is therefore reported in the following.

A smith's apprentice, aged 17, was walking down a fairly steep flight of stairs. There was an iron band along the edge of the steps. When he was 2 steps above a landing, he stumbled, as one of his heels was caught by the iron band. He fell forward and tried to find support against the wall opposite. He did not succeed and fell on to the landing. Unfortunately, detailed information cannot be given, as the accident was not observed by others and this was all the patient could state. He did not faint but was unable to get to his feet again.—X-rays of both knees showed practically symmetrical fractures of both tuberosities of the tibiae. They had both been avulsed, and the fracture-line extended upward and posteriorly, the fractures thus being intra-articular. The centre part of the proximal extremity of the tibiae had also been avulsed; see Figs. 1, 2, 3 and 4. The frag-

Fig. 1.

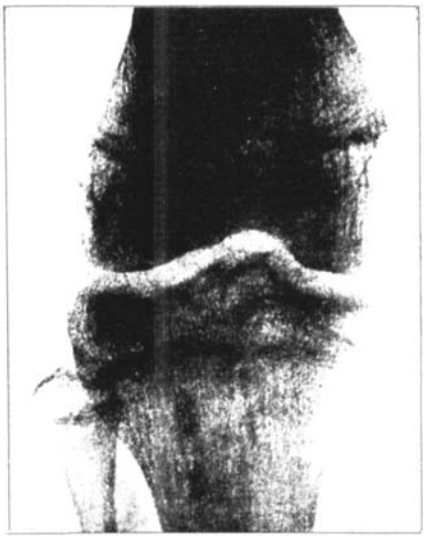

Fig. 2.

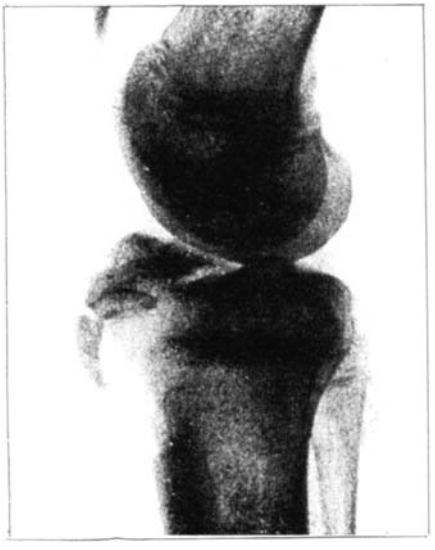

Fig. 3.

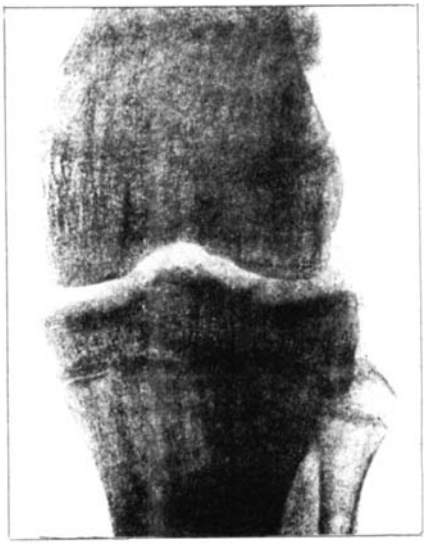

Fig. 4.

Figs. 1, 2, 3 and 4 show bilateral symmetrical fracture of the tibial tuberosities with avulsion of the anterior part of the eminence in lateral and frontal exposures respectively.

Fig. 5.

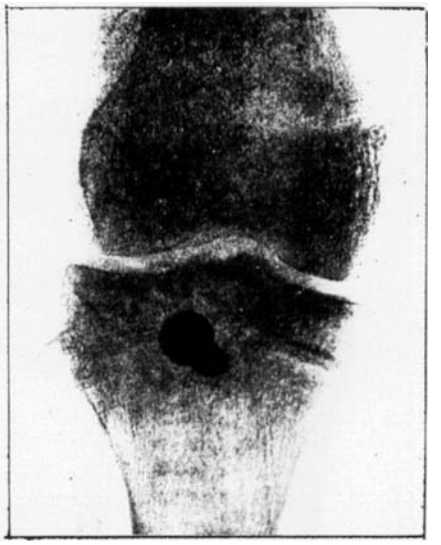

Fig. 6.

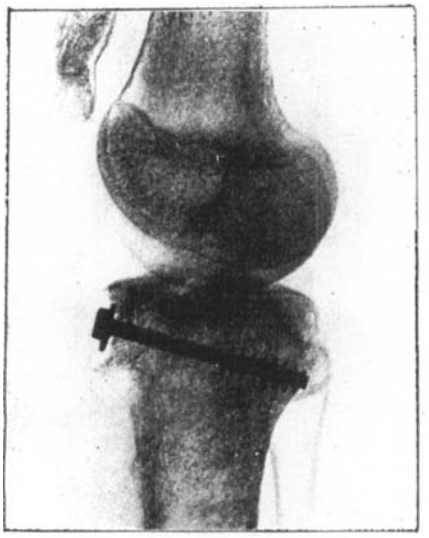

Fig. 7.

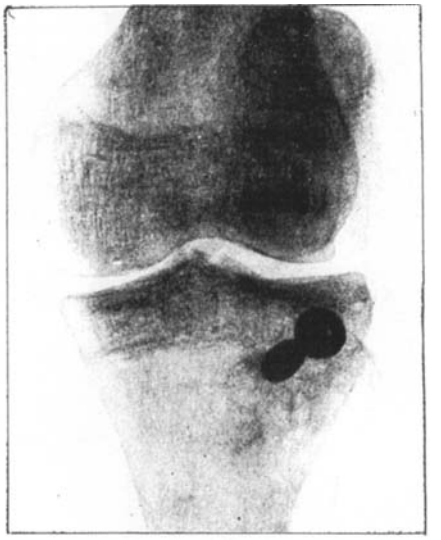

Fig. 8.

Figs. 5, 6, 7 and 8 **show the same two knees 2 months after operation. The tuberosities are now *in situ* and fixed with a metal screw.**

ments could not be replaced in the normal position by manipulation. The boy had just had pneumonia and had been in bed for 1 month in his home. The accident happened on his first day out of bed. Hgb. 65 per cent., S.R. 40 mm/1 hr. Therefore we dared not operate on him at once. Plaster bandages were applied to both legs. After 1 month the patient had recovered so much that osteosynthesis could be performed with a butterfly-screw.

A curved incision was made below both tuberosities. These could then be turned up, so that it was possible to look into the knee-joints behind the inferior patellar ligament. Part of the base of the eminence was on the avulsed fragment. The fragment was returned fairly easily to its normal position where it was fixed with a screw. However, in the left knee, 2 screws were applied. The tuberosity was fixed in addition with perlon sutures. Two months later, one of the screws in the left knee had to be removed, as it had caused erosion of the skin. Otherwise the course was completely uneventful.

After 6 weeks the plaster bandages were removed, and active exercise was instituted. The patient began to put his weight on his legs after 12 weeks. At first it was very difficult for him to walk; it was as if he had lost control entirely of his legs and equilibrium. Four months after the operation, however, his gait was almost normal; the mobility of both knees was practically unimpeded. There was a slight prominence below both knee-joints. There was no swelling.

According to Watson-Jones, this affection is seen only up to the age of 18 years when the epiphyseal line in the upper end of the tibia closes. The affection occurs when the knees are bent by great force, as a rule gravitation, against the maximally contracted quadriceps tendons. As the muscles cannot give way, the tendons can be avulsed with the tuberosity and the upper end of the tibia.

Nobody had observed the accident in this case, but the boy had been walking down a flight of stairs. One heel was caught, and he thought he had fallen down and hurt the patella against the floor. It is most natural to think that he contracted his quadriceps muscles maximally, and that gravitation forced his knees into complete flexion when he fell. The force had thus been so great that both tuberosities were avulsed.

The affection has only been described a few times in the literature: Watson-Jones, Clarke and Fairbank. In the large monographs in the Scandinavian literature on the fracturing of the proximal end of the tibia, see, for instance, Mikkelsen, Hultén, von Bahr and several others, this particular fracture is not mentioned.

After the age of 18 when the epiphyseal line in the upper end of the tibia has closed, the firmness here is so great as to prevent this fracture.

As a consequence of the same trauma in conjunction with violent flexion of the knees with maximally contracted quadriceps tendons the following lesions may occur:

(1) Rupture of the insertion of the quadriceps tendon from the proximal border of the patella;
(2) transverse fracture of the patella;
(3) avulsion of the inferior patellar ligament, and, lastly,
(4) avulsion fracture of the tuberositas tibiae.

The first lesion is seen especially in elderly individuals with brittle tendons; the second occurs chiefly in the middle-aged, while the last two lesions occur chiefly in younger individuals.

Between the 10th and 13th years there appears—according to Alban Köhler—a proboscis-shaped prominence which originates from the upper tibial epiphysis and extends tongue-shaped down over the anterior surface of the tibial diaphysis. At the distal end of this prominence is the so-called "anterior epiphysis" which later forms the tuberosity. This epiphyseal nucleus fuses after ossification with the above-mentioned prominence at the age of 15 years. At the age of 18 or 19 the upper epiphyseal line closes finally. The inferior patellar ligament is inserted on the upper anterior part of the tibia, though chiefly on the part above the anterior epiphyseal nucleus. Considering this development, it is easily understood that young individuals whose epiphyseal line has not closed yet may get either an avulsion of the ligament with its insertion and the epiphyseal nucleus, or—if the insertion holds—a fracture in the upper epiphyseal line. Following especially violent traumas the fracture may extend posteriorly and pass up through the base of the intercondyloid eminence.

Treatment should aim at anatomically correct reposition. If this cannot be achieved by bloodless procedures, internal fixation should be carried out. This is also the case if the fracture cannot be retained in a satisfactory position. If only the ligament has been avulsed with a small splinter of bone, internal fixation should be the rule. Watson-Jones argues against the use of nails and screws and will only recommend fixation of the end of the bone with catgut. In the present case with its large displacement it was necessary, with a view to satisfactory reposition and retention, to perform fixation with a vitallium screw.

SUMMARY

The writer reports a case of bilateral symmetrical fracture of the tibial tuberosity with partial avulsion of the intercondyloid eminence. It was treated with open reposition and fixation with vitallium screw. The result was good.

RESUME

L'auteur rapporte un cas de fracture bilatérale symmétrique de la tubérosité tybiale avec avulsion partielle de l'éminence intercondyloïdale, traitée par reposition sanglante et fixation avec vis de vitallium. Les résultats ont été bons.

ZUSAMMENFASSUNG

Der Verfasser berichtet über einen Fall von doppelseitiger symmetrischem Bruch der tuberositas tibiae mit teilweisem Abriss der eminentia interconyloidea. Er wurde mit blutiger Reposition und Fixierung mittels Vitalliumschraube behandelt. Ein gutes Resultat wurde erzielt.

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