DISLOCATION OF THE UPPER END OF THE FIBULA

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Dislocation of the superior tibio-fibular joint is unusual. When it occurs it may escape recognition, and this may explain the scant attention that has been accorded to the condition in surgical literature. Even comprehensive text-books on joint injuries tend to dismiss this one in a few lines. It has been said that "the head of the fibula is like a poor relation of the knee." Complete dislocation apart, if this region be carefully examined whenever the tibia or the ankle has been damaged, it will be found that minor degrees of injury to the superior tibio-fibular joint are not uncommon.

Nélaton (1874) described the first recorded case, in a patient treated by Sanson, one of his colleagues. Since then little has been written about the injury: one comprehensive review was published by Lyle in 1925, and some cases were reported more recently in parachutists (Lord and Coutts 1944, Vitt 1948).

The purpose of this paper is to report five cases and to discuss the types of dislocation, the clinical features and the treatment.

CASE REPORTS

Case 1—A man aged thirty-four stepped from a stile on to his left leg. The ground was slippery, and his leg slid medially behind the right, and he sank down on it. He immediately complained of pain over the outer aspect of the knee. One of us (J. C. R. H.) was with him, and found the left fibular head dislocated forwards. Reduction was easily accomplished by pressure on the upper end of the bone, which caused a distinct click and immediate relief from the pain. The patient was able to walk forthwith, but had a vague discomfort in the leg for a few days.

Case 2—An Indian man aged twenty-seven was admitted to hospital for recurrent locking of his right knee, ascribed to a torn lateral cartilage after an injury four months before. It was noticed that the heads of both fibulae were abnormally prominent and mobile. They could be moved in a medio-lateral direction through about half an inch. Radiographs confirmed this excursion (Fig. 1). The patient stated that he had been conscious of this mobility since childhood, and as a schoolboy would
Case 3—A woman aged forty-five fell from a window fifty feet above a stone pavement. She was admitted with multiple injuries which included a grossly displaced fractured pelvis, a comminuted fracture of the left femur, a crushed lumbar vertebra and an open fracture of the right great toe. During the three or four days after her admission attention was focused on these serious injuries and on her critical general condition. It was then noticed for the first time that the head of the right fibula was unduly prominent and tender (Fig. 2). Radiographs confirmed the existence of an anterior dislocation (Fig. 3).

This patient recovered from her fractures. The fibular dislocation remained unreduced, and the head of the bone was still tender six months later. She was eventually able to walk without any discomfort in the leg, but her gait has been affected by her other injuries.

Case 4—A man aged thirty gave an exact description of the way in which he injured his leg. While he was walking across a sloping hillside his lower foot (the right) slipped, causing him to slide sideways. He fell with his right leg extended, and sat down heavily on his left leg, which was flexed beneath him. He felt pain over the outer side of the left knee, and was able to bear weight only with discomfort. When he was seen in hospital later the same day the head of the fibula was palpable to the front and
outer side of the lateral tuberosity of the tibia. Any attempt to move the fibular head caused severe pain, but movements of the knee were full and painless. Radiographs showed an anterior dislocation of the fibula (Fig. 4).

The first attempt to reduce the deformity after infiltrating the area with a local anaesthetic was unsuccessful. The next day a second attempt was made under general anaesthesia, but this also failed.

Open reduction was performed a few hours later, through a curved longitudinal incision over the head of the fibula. Part of the extensor digitorum longus was stretched over the bone and was dissected off it. The joint capsule was incised anteriorly, and a metal spike was inserted under the fibular head and used to lever it laterally. The head then returned to its normal position with a snap, and appeared stable. A pressure dressing was applied. The patient was able to walk with only a slight limp four days later. Three weeks later the function of the leg was normal.

Case 5—A man aged thirty-two was brought to hospital from a nearby playing field where he had injured his right knee during a game of rugby football. The injury was sustained when he was heavily tackled, but he could not describe the exact form of the strain thrown on his knee, or the direction in which it had acted. On attempting to stand, he had felt a severe pain in the knee and became conscious of a tender
FIG. 6
Case 5—Radiographs showing anterior dislocation of the fibula.

FIG. 7
Case 5—Normal radiographs of the same knee taken three years earlier, for comparison.
swelling at its lateral side. Three years earlier this knee had been injured in a similar fall. On that occasion, too, a painful swelling had appeared at the lateral side, but the patient had immediately manipulated the knee himself, whereupon the deformity disappeared and normal function was soon restored.

When seen an hour and a half after the injury the patient was unable to stand except with his knee slightly flexed. The displaced head of the fibula formed a prominent and tender swelling at the side of the knee (Fig. 5). There was no effusion, and full flexion of the joint was possible, but the last few degrees of extension caused discomfort. There was no neurological disturbance.

Radiographs confirmed the existence of an anterior dislocation of the fibula (Figs. 6 and 7). An attempt at reduction while the patient was conscious was abandoned on account of severe pain. Thirty minutes later the dislocation was easily reduced under general anaesthesia. A thumb was placed on the fibular head, and with the knee slightly flexed pressure downwards and backwards restored the bone to its normal position with a loud click. The reduction appeared stable. No dressing was applied and full function was regained within four days.

DISCUSSION

ANATOMY

The superior tibio-fibular joint is a plane articulation between two facets each invested with cartilage, and having a synovial lining which may communicate with the knee. Its size, shape and mobility are all subject to considerable variation; and it has been shown (Barnett and Napier 1952) that the plane in which it lies may vary from being almost horizontal to one steeply inclined to the horizontal. It may well be that the ease, or otherwise, with which dislocation occurs is related to the plane and mobility of the joint, but we have not been able to discover any report on this subject. Ordinary radiographs, such as those from our own patients, do not show the joint in sufficient detail to permit of any conclusion being reached.

The joint depends for stability on the structures distal to it which bind the tibia and fibula together—the interosseous ligament, the fibrous bands about the lower tibio-fibular joint—and on the ligaments of the superior joint itself. These consist of anterior and posterior thickenings in a tough capsule, the anterior being the more pronounced. They run to the front and back of the lateral condyle of the tibia, and there blend with the bone.

Of the structures related to the joint, the lateral popliteal nerve, which lies on the neck of the fibula, is the most noteworthy inasmuch as it sometimes suffers injury when dislocation occurs.

From the foregoing, and from a study of the skeleton, it will be realised that the head of the fibula, though normally firmly secured by the ligaments described, is in a potentially unstable position. If the ligaments are torn, it is liable to roll forwards or backwards on the circumference of the tibia; and these are, in fact, the displacements commonly observed.

Anterior dislocation—Previous writers (Lyle 1925, Peregalli 1955) are agreed that anterior dislocation is about twice as common as posterior dislocation, and it is to that group that our present series belongs. There is similar agreement on the usual mechanism by which the injury is produced—a fall with the knee flexed and adducted. A typical history is that related in our Case 1, and the patient in Case 4 suffered very similar violence. It seems certain that both these patients, in falling extended one leg before them. The rear leg adducted beneath it, and they sat down heavily on it. In such a position the biceps tendon, contracting violently, jerks the head of the fibula laterally, and produces a subluxation. (All anterior dislocations are initially lateral ones, for the plane of the joint is behind the lateral condyle of the tibia.)

Sometimes the injury is caused by falling from a height (see Case 3) and it is interesting that several dislocations have been described in parachutists.*

* A parachutist is trained to land with his feet together and his knees slightly flexed. He is blown across the ground by the prevailing wind and may well, if "coming in sideways," have one leg forced behind the other as he subsides on both.
For the sake of completeness mention should be made of the occasional occurrence of this injury simply from a violent muscular contraction. Thus Klose's patient, cited by Lyle (1925), dislocated his fibula as he sprang up from a kneeling position.

**Posterior dislocation**—Dislocation of the fibular head posteriorly is much more unusual. Descriptions of the condition in the literature suggest that it occurs about half as frequently as anterior dislocation. Its importance lies in its liability to be complicated by peroneal nerve lesions, which otherwise are rare. Backward dislocation is usually the result of direct violence to the knee in flexion when, the superior tibio-fibular ligaments having been torn through, the action of the biceps determines the position of the fibular head.

**Upward dislocation**—Unlike those previously described, this deformity—sometimes termed total dislocation—cannot occur as an isolated injury. It is, in any event, rare, but when it occurs it forms part of a serious ankle injury, usually sustained by a fall from a height. The foot is forced laterally, diastasis of the lower tibio-fibular joint occurs and the whole fibula—which may or may not fracture—is forced proximally until its upper end dislocates. The interosseous membrane of the leg must suffer coincidental damage, but the direction (downwards and laterally) of a majority of its fibres is such that they probably do not rupture.

**Non-traumatic dislocations or subluxation**—To the foregoing must be added a group of patients in whom the fibular head has become displaced in consequence of a local growth disturbance such as that induced by acute osteomyelitis. The lesion is sometimes seen in amputation stumps; or may occur as part of a congenital state associated with lax ligaments (Case 2).

**CLINICAL FEATURES**

Immediately after injury the patient may be unable to walk because of pain felt about the lateral side of the knee on weight bearing. Inspection reveals the fibular head lying in an abnormal position, where it is easily palpable between thumb and forefinger. The soft tissues about it—probably because they are relatively avascular—show little swelling or bruising. The head itself is extremely tender and the biceps tendon stands out in unnatural relief (unless, it is said, the displacement is upwards, relaxing the tendon). Hydrarthrosis and haemarthrosis of the knee are not seen in simple dislocations. Movements of the knee are not markedly restricted, but inversion and eversion of the ankle may be precluded by pain which is felt at the site of the dislocation. Neurological complications are rare, but should be sought. A foot drop is unusual, but on occasion there is some numbness of the foot for a few days after the injury.

These features are characteristic enough to permit an exact diagnosis, but in one of our patients (Case 3) the condition was not recognised because she was suffering from several other and more serious injuries.

**TREATMENT**

The dislocation can usually be reduced by a simple manipulation: the foot is strongly inverted, the knee is flexed to relax the biceps tendon, and, on the application of direct pressure to the head of the fibula, it returns to its normal position with an audible snap.

Once reduced, the dislocation will not usually recur. A crepe bandage, or strapping, is commonly advised and a few days' rest enjoined. The patient may thereafter bear weight on the injured limb and should receive physiotherapy to restore full function.

If manipulation does not effect a reduction, or if the dislocation recurs, operation is indicated. It has been suggested that open reduction is more often required in posterior dislocations than in anterior ones. Recourse to operation was necessary in one of our cases in which the shape of the lateral tuberosity of the tibia was considered to be responsible for the failure of manipulative treatment.

Other authors have reported instances of instability and recurrent dislocation after reduction. In such a case treatment might be either by arthrodesis of the joint or by temporary fixation with a transfixed pin or screw.
SUMMARY

1. Dislocation of the upper end of the fibula is probably less unusual than the paucity of the published reports suggests.
2. Dislocation may be anterior or posterior, anterior dislocation occurring about twice as often as posterior. Rarely the fibula moves proximally.
3. In most cases a closed manipulation suffices for reduction, and a full and rapid return of normal function follows.
4. Five cases are described. In one case operative reduction was required.

We acknowledge with gratitude the permission of Mr Charles Gray to report one of these cases, and the assistance we have received from the Photographic Department of the Royal Free Hospital in the preparation of the illustrations.

REFERENCES


SIMPLE DISLOCATION OF THE SUPERIOR TIBIO-FIBULAR JOINT

Report of a Case

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Dislocation of the superior tibio-fibular joint has been reported only forty-six times. Macklin, Hartmann and Peterson (1940) reported forty cases of simple anterior or posterior dislocation. Vitt (1948) reported four cases, and Delaney, MacDonald and MacNab (1956) reported another two cases.

CASE REPORT

A footballer aged eighteen was one of four players leaping for the ball at the same time. He was bumped as he was coming down and landed with his extended foot and leg inverted under him. He was conscious only of an intolerable pain in the knee and was unable to bear weight.

On examination, the head of the fibula was immediately apparent in a forward position, and was exquisitely tender on palpation. He complained of "pins and needles" in the outer border of the calf, but there was no paresis. Radiographs showed the head of the fibula displaced anteriorly (Fig. 1).

Under thiopentone anaesthesia the dislocation was reduced easily by backward pressure of the thumbs with the knee extended (Fig. 2).

The knee was rested in a plaster cylinder from groin to ankle for two weeks. Since its removal he has displayed no disability.