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EDITORIALS AND ANNOTATIONS

INJURY TO THE LIGAMENTS OF THE ANKLE

The complicated pattern of bony injury at the ankle can be understood only if it is related to the ligamentous injuries which lead to it. By cadaver experiments J. G. Maisonneuve in 1840 first showed this complex relationship and described the high fracture of the fibular neck, which bears his name, as a sequel to rupture of the inferior tibio-fibular ligament. He emphasised the importance of lateral rotation as the cause of most ankle fractures, and like many innovators was laughed at for his pains. Malgaigne, among others, poked fun at him for describing a lesion which, before radiography, had never been seen. Radiology, which confirmed his theories of bony injury, concentrated attention on it, and the story of ligamentous injury was neglected until the 1930's, since when there has been an increasing volume of work published.

In a short dissertation it is essential to dismiss lesions of the deltoid ligament early. Its strength is such that avulsion of the medial malleolus is very much more common than rupture, and when rupture does occur the ligament is stripped from the surface of the medial malleolus. The bulk of the ligament and its natural form maintain apposition of the torn ends, and surgical repair is very seldom needed. It can safely be left to itself in most cases. Injuries of the lateral ligament cannot be so simplified, and their consideration is complicated by the relationship of the ligament to the inferior tibio-fibular joint and the natural variation in the degree of relaxation of the ligament.

Let us first discuss injuries of the inferior tibio-fibular joint. The ligaments involved are all short. They are in close relationship to bone and as is usual in such a situation throw out fibrous tissue readily and repair firmly. The only prerequisite for satisfactory restoration is accurate bony alignment. If manipulation fails, this is often easily achieved by fixing the medial malleolus with a single screw, or occasionally when the fibular malleolus is unstable by inserting an intramedullary pin or a temporary oblique screw above the joint. Diastasis properly reduced and maintained introduces no particular difficulties or late complications. Failure to recognise rupture of the tibio-fibular ligaments may, however, lead to an abduction deformity at the ankle joint which is extremely difficult to deal with effectively, and its early recognition, with or without a fracture, is therefore important. Two points of interest may be enlarged upon. The posterior tibio-fibular ligament extends behind the tibia and wraps the posterior surface in a thick sheath. This sheath may be peeled away from the bone in posterior displacement of the fibula, often with avulsion of the posterior tibial tubercle, but when the tubercle is not involved bone may form between the split surfaces of the ligament producing the posterior tibial flake analogous to the Pellegrini-Stieda lesion in the knee. Of the greatest rarity is posterior dislocation of the fibula without fracture, and with a relatively intact interosseous membrane. This may resist attempts by manipulation to slip the fibula over the posterior tibial tubercle and require open leverage or division of the posterior tibio-fibular ligament or the interosseous membrane.

The lateral ligament is a composite structure which shows minor anatomical variations of its three components. The posterior talo-fibular ligament is virtually never ruptured. Avulsion of the bony tubercles occurs before rupture of the ligament, and the fibular malleolus and the talus have been appropriately referred to as the "Siamese twins" of ankle injury.
The anterior talo-fibular ligament is weak, and the anterior capsule of the ankle is inevitably torn with it. Rupture without demonstrable talar tilt may follow plantarflexion and inversion injury; this must be excluded by strain radiography, because it cannot be easily excluded by clinical examination, nor can it be satisfactorily distinguished from the associated rupture of the calcaneo-fibular portion of the lateral ligament. This is the important section of the ligament which stabilises both the posterior talo-calcaneal joint and the ankle joint, and the common lesion leading to tilting of the talus is rupture of both the anterior talo-fibular ligament and the calcaneo-fibular ligament.

Freeman has done well to draw our attention in this number of the Journal to the results of the common methods of managing this injury and to the side issues involved. The serious effect of plaster immobilisation in prolonging disability is clearly shown, but this has been demonstrated with equal force in the treatment of calcaneal fractures and in the treatment of first degree lateral rotation fractures at the ankle. We also have the inescapable fact that only surgical repair can guarantee a stable ankle after this injury, although surgical intervention demonstrates that, in over half the cases explored, approximation of the torn ends of the ligament is adequate to permit normal repair. It seems impossible to devise any method except exploratory incision to determine this, and close argument can only follow a series of cases in which accurate anatomical assessment of the injury at the time of repair is recorded and the percentage of these cases in which the two ends of the calcaneo-fibular ligament are torn away from each other is known. A series of cases in which the undisplaced ligaments are ruptured and in which they are left unrepaired must be contrasted.

In the absence of precise information we must pick our way carefully. Open operation introduces hazards, because the skin in this area is thin, and damage by incision and swelling may jeopardise its blood supply. Only young and active people demand an absolutely stable ankle. It seems right that surgical repair should therefore be limited to such people, and the advantage of operation past the age of forty-five carefully weighed. It is also an unavoidable conclusion from Freeman's findings that some compromise in treatment must be made. If the ligament is not repaired firmly enough to permit mobility at the ankle joint a short time after operation, then the repair has been only partly effective in avoiding subsequent stiffness. As only inversion can separate the torn ends, it is sufficient to prevent this movement by a J-shaped plaster slab running down the inner or outer side of the leg and under the heel. This permits mobilisation of the forefoot, and the plaster may be removed after three weeks. An attempt is made by this to gain the advantages of open repair without the complication of residual joint stiffness from full plaster immobilisation. Some incompatability in treatment, however, remains.

Finally, we are left the analysis of complications after rupture of the calcaneo-fibular ligament, namely the persistent minor disabilities encountered in the first two years after injury but which seldom persist longer. These are: 1) demonstrable talar tilt (clearly due to inadequate repair of the calcaneo-fibular ligament and cured by ligamentous reconstruction); 2) persistent pain about the ankle joint, general stiffness and discomfort, and often local tenderness over the anterior fibio-fibular ligament and below it, sometimes called a 'chronic sprain' of the ankle; 3) 'going over,' or instability of the ankle, examined by Freeman in his last paper; and 4) vasomotor changes, producing persistent local oedema and occasional venous dilution about the joint.

It is remarkable that in the series of forty-two cases reported in Freeman's paper on instability of the foot after injuries to the lateral ligament, no case of persistent pain over the anterior fibio-fibular ligament is reported. This may emphasise the effectiveness of his three treatments, but elasticity of the inferior fibio-fibular joint is variable, and tilting of the talus sufficient to rupture the calcaneo-fibular ligament is also sufficient in many cases to force the tibia and fibula apart. This may produce a marginal fracture of the talus, of which he reports two cases. Radiological assessment of the laxity of the syndesmosis will only record gross laxity.
Clinical laxity, which can be detected by comparison between the mobility of the fibula in the tibial groove with that of the uninjured side, may contribute to the syndrome of "functional instability," and is one of the causes of persistent pain at the lower tibio-fibular joint, though probably not the only cause of pain called a "chronic sprain." Fortunately, many of these cases respond to a local injection of hydrocortisone under local anaesthetic. In other cases new bone in the anterior tibio-fibular ligament, which may be heterotopic or due to minor avulsions of the tibial or fibular tubercles, requires excision.

The syndrome of "functional instability" is real, and the ingenious hypothesis of Freeman is an interesting contribution based on his experimental work on joint innervation. That it is the only explanation is however in some doubt. It may play a part together with laxity of the tibio-fibular joint and nipping of swollen tissues in the joint, followed by involuntary muscular inhibition. Assessment of this complaint remains inaccurate and cannot be measured. If it could be demonstrated that local anaesthesia of the ligaments on the lateral side of the ankle also produced functional instability, then supposition that this mechanism was important would be changed to conviction.

The old adage that "a sprain is worse than a fracture" gets some support from the follow-up of treatment and justifies the importance and the recognition of complete or partial ruptures of the lateral ligament and their careful and systematic treatment. To them as to other soft-tissue injuries the Latin motto "nemo me impune lacessit" is particularly appropriate.

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