THE APPLIED ANATOMY OF THE LATERAL LIGAMENT COMPLEX OF THE ANKLE JOINT.

H. Evans Robson, M.B., B.S.

Mountsorrel, Leicestershire.

The ankle joint is a hinge joint, allowing movement in one plane predominantly, but permitting a small amount of play in other planes during planter flexion. Its ligaments are strong on the medial and lateral aspects, but weaker in front and behind. On both medial and lateral sides, the ligaments are arranged in a fan, with the apex on the tibia and fibular, and the distal attachments spread out on the talus and calcaneum, thus giving strong support to the joint throughout dorsi- and plantar flexion. The deltoid (medial) ligament is of typical fan structure, all its fibres being tense throughout the range of joint movement. These fibres are short, and strong, but the ligament can be damaged, in whole or in part, by forced eversion stresses of the foot that cannot be accommodated by the rotation of the mid-tarsal joint. Not infrequently the ligament remains intact and there is an avulsion fracture of the medial malleolus instead, - easily recognised on X-Ray, and likely to be treated conservatively or by open reduction, but regarded as a fairly serious bone injury.

Inversion stresses are much more frequent, and may also cause damage to the complex of ligaments on the lateral side of the ankle, or the bones to which these ligaments are attached. Anatomical and surgical descriptions of the lateral ligament itself agree in factual details (but not, of course, in nomenclature). There are three separate parts of the ligament, running in different directions, and having different accessory functions:

1. The anterior talo-fibular ligament - the anterior fasciculus of the lateral ligament - runs from the anterior edge of the lateral malleolus medially to the neck of the talus, reinforcing the weak anterior part of the joint capsule. In this situation it is easily injured by forced excessive plantar flexion, as in landing on the heel which catches on a step, by falling backwards on landing after a jump, by catching the toe in rough ground while kicking, or by kicking a ball that is heavier than expected or is obstructed by hitting another player at very short range. Often the injury is ignored for some weeks, until pain and limitation of movement, obvious when the patient kneels and sits back on his heels, cause him to seek advice. The damaged ligament insertion becomes adherent to the talus, and it may be necessary to manipulate under general anaesthetic to restore full plantar flexion, and this must of course be followed immediately by mobilising exercises.
2. The posterior talo-fibular ligament - the posterior fasciculus of the lateral ligament - is not damaged so frequently. It also takes a more or less medial course, reinforcing the posterior aspect of the capsule.

Injuries are one of the less common causes of the many that constitute "triple jumper's heel".

3. The calcaneo-fibular ligament, - the middle fasciculus of the lateral ligament - descends vertically from the tip of the lateral malleolus to the calcaneum, as shown in Figs. 1 and 2.

Fig. 1.

THE LATERAL LIGAMENT COMPLEX - RIGHT ANKLE

Fig. 2.

Like any other ligament injury, it can have a tear of a few fibres, or a subtotal tear involving about half its fibres or more, or a complete tear, leading to a residual instability of the joint, so often brushed aside as "weak ankles". Unless the patient is lucky enough to fracture the lateral malleolus as well, complete tears can easily be missed. Besides the usual antero-posterior and lateral views, severely sprained ankles should be X-Rayed whilst the foot is manipulated into inversion, when a wedge shape of the tibio-talar joint cavity displays the tear conclusively. Many orthopaedic surgeons consider open operation the treatment of choice for recurrent subluxations due to these tears, (Watson Jones, 1944), and some consider operative repair at the time of original injury if the patient's job, age or hobbies justify it. Conservative treatment for complete rupture needs prolonged immobilisation in a walking plaster, and the disability lasts as long as an uncomplicated fracture of the tibia.

COMPLETE TEAR OF MIDDLE FASCICULUS OF LATERAL LIGAMENT

The foot should be manipulated into full inversion whilst X-Rays are taken to show up complete tears.

Fig. 3.

The prognosis and treatment of sub-total tears of the calcaneo-fibular ligament depend on whether the lesion is on the internal or external surfaces of the ligament. Tears of the external surface allow a profuse and dramatic haemorrhage to occur, which may almost obscure the lateral malleolus, prevent the wearing of a shoe, and display a frightening array of colours from the subcutaneous haematoma. Prompt first aid lessens the swelling; immediate application of cold, - ice packs, the groundsman's hose, a stream or more conventional sink are usually available, and are more effective than the frequent changing of the cold packs recommended in the first aid books. After some fifteen minutes immersion, a supporting bandage should be applied starting on the dorsum of the foot, then down the medial side and under the sole, to keep the joint in eversion. This is the reverse direction to that in which roller bandages are applied elsewhere. Elevation of the limb for 12 to 24 hours should be enough to prevent further bleeding, and

the bandage can easily be removed once or twice a day for contrast baths, - immersing the foot alternately in hot and cold water, - a most effective way of treating swelling of this type.

Lesions of the internal surface often show little obvious swelling, although they are of much more serious significance. Bleeding occurs into the cavity of the ankle joint, and the dispersal of intra-articular blood is a much longer process than the resolution of a subcutaneous haematoma. It is essential that all ankle injuries be examined from behind as the haemarthrosis fills in the concavities at either side of the achilles tendon. (Bass, 1967). For this injury complete rest is needed, best given by means of a walking plaster. Adhesive strapping gives inadequate immobilisation for the haemarthrosis, and prevents the administration of contrast baths for the simple sprain.

INCOMPLETE TEARS OF THE LATERAL LIGAMENT; MIDDLE FASCICULUS

Fig. 4.

Other ligaments on the outer side of the foot are also involved in inversion injuries, and may either tear, or cause avulsion fractures of their bony attachments. The calcaneo-cuboid and cubo-metatarsal ligaments are functionally part of the lateral ligament complex, and may be damaged together with the main lateral ligament, or sustain localised injuries (Brown, 1948). A careful search through the fracture clinic's collection of X-Rays might produce (even in the pile classified as "no bone

injury") flake fractures of the tip of the malleolus, the neck of the talus, the calcaneum below the lateral malleolus, the posterior tubercle of the talus, the cuboid and the styloid process on the base of the fifth metatarsal.

In the treatment of the sprained ankle, as in all other sports injuries, it is essential that a precise diagnosis be made, and the essential pathological process be treated adequately.

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BOOK REVIEW

"SPORTS INJURIES"

Dr. D. S. MUCKLE

Oriel Press Price: £2.50

It is a pleasure to welcome a new name to the list of contributors to the literature of Sports Medicine. Dr. Muckle has produced an interesting little book which creates an immediately favourable first impression from the excellence of its general presentation. The lavish use of illustrations, and of differing type size and pattern all contribute to simplicity and ease of reading.

Upon closer inspection however one is left with a feeling of some disappointment. According to the jacket " 'Sports Injuries' is written for all trainers, coaches, players and schools and anyone interested in sport" (the author himself does not indicate the purpose of his book). If this book is written for the essentially lay reader then it contains too much specialist medical material, while there are important omissions specifically in the lack of reference to home treatment.

In setting out to be dogmatic in his presentation (rightly for a book of this type) Dr. Muckle falls victim to his own dogmatism in those areas where he is less at home than in dealing with his own immediate experience (his interest in body contact sport, particularly Association Football is very obvious from the text). He is for example vulnerable in his comments for the use of physiotherapy and his treatment of the subject of back injuries appears somewhat sketchy in relation to other areas.

Despite these criticisms there is nevertheless a lot of useful information in this book and it is an admirable first effort on the author's part in seeking to get to grips with translating the complexities of Sports Medicine into the language of the coach or trainer.

There is only one thing about this book which I really do not like at all and that is its price. At £2.50 this is excessive to say the least, but the author cannot be blamed for this.

J. G. P. Williams, F.R.C.S.Ed., D.Phys.Med.