THE commonest injury to the ankle joint is the inversion twist, with the foot in plantar flexion, yet descriptions of such injuries are often vague, inaccurate and contradictory.

Interest in these ankle joint injuries centres around the fact that the upper articular surface of the talus is about one quarter of an inch wider in front than behind, so that in dorsiflexion of the foot the wider part of the talus is engaged in the tibio-fibular mortise, and in plantar flexion the narrow portion (Fig. I). It is stated in Gray’s Anatomy that “the malleoli tightly embrace the talus in all positions of the ankle joint”, and a study of the articular surfaces, with their smooth cartilages at the sides, bears this out.

But when considering how the tibia and fibula adjust themselves to this variation of the talus difficulties immediately arise. The distance they have to separate is not quite the full difference between the breadth of the front and the back of the talus, as no one portion of the articular surface of either malleolus articulates with the whole articular surface of the talus, but even so a considerable adjustment has to be made, and made smoothly without effort, probably thousands of times every day. It can happen in only two ways: either the tibio-fibular joint widens and approximates with the movements of the ankle, and the thick interosseous ligament stretches and contracts like india rubber, or else the fibular malleolus is levered out, hinging on the tibio-fibular joint with subsequent bending inwards of the middle of the fibula.

Various opinions have been expressed as to what happens, but even such authorities as Gray and Cunningham give different explanations. Gray states that the movement is obtained “by slight separation of the lower ends of the tibia and fibula, and is consequent on slight movement at the inferior tibio-fibular joint. This movement is facilitated by a minor degree of gliding at the superior tibio-fibular joint”. What is meant by slight movement at the inferior tibio-fibular joint or a minor degree of gliding at the superior tibio-fibular joint is not explained. Cunningham states that “in dorsiflexion the broader anterior part of the trochlea tali is forced into the narrower posterior part of the tibio-fibular socket; this causes slight separation of the tibia and fibula with increased tension of the interosseus and transverse tibio-fibular ligaments. The talus is then most securely held between the malleoli. In plantar flexion, as the narrower part of the trochlea turns forward into the broader part of the socket, the malleoli spring together again, so retaining up to a point their grasp upon the sides of the talus . . .”; “but in fuller plantar flexion a little side to side play can be demonstrated in the joint. The strong ligaments provide the spring mechanism involved”.

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This appears to mean that the interosseous ligaments, and the anterior and posterior tibio-fibular ligaments have the properties of lengthening and springing the bones together again. I know no ligament which can lengthen and shorten in this way. Ligaments can be stretched by a steady, continuous pull, and they will shorten again in time, but they cannot do this hundreds of times a day like rubber bands; furthermore, histological sections of the interosseus ligament, made for this investigation, show mostly collagen and few elastic fibres. This explanation then must be ruled out. As regards the side to side movement in plantar flexion, this is denied by Gray, who states that “no appreciable degree of side to side movement can occur without stretching of the ligaments of the inferior tibio-fibular joints, and slight bending of the fibula”.

Piersol states: “The movements between the tibia and fibula are slight and not very definite. The head of the fibula may play a little forwards and backwards and the bone may rotate on its long axis.” This description could hardly be more indefinite.

The articular cartilage extends upwards from the ankle joint on the contiguous sides of the tibia and fibula for a distance of some 4 mm. below the interosseus ligaments which joins the two bones together. What movements can occur between these articular surfaces? I am inclined to think that the fibula rotates slightly in ankle joint movement, to adjust its articular surface to the outer articular surface of the talus and that this rotation occurs in this joint. Rotation, though, in itself will not separate the two bones sufficiently to adjust for the widening of the articular surface of the talus in front, also as the interosseus ligament cannot tighten and lengthen with the movement of the ankle joint, it follows that the tibio-fibular mortice must always be adjusted to suit the widest anterior section of the talus.

This matter has some practical bearing in applying the test for ligament tear by x-ray examination in forced inversion or eversion. The importance of differentiating between a sprain due to “a stretching or tearing of a few fibres”, and a dislocation due to “complete avulsion of the anterior and middle parts of the external ligament from the malleolus” has been described. The test consists in taking an accurate x-ray film of the ankle joint from in front on forced inversion, to see whether the talus tilts in the tibio-fibular mortice of the ankle joint. If tilting does not occur it is considered a sprain, if it does, it is a complete avulsion.

Agreement on the interpretation of this test is not complete. “Inversion of the foot occurs at the subtaloid joint and the talus remains in close contact with the malleolus in the normal foot...”. “In sprains without ligament tear the normal position of the talus is maintained even on full inversion, however strongly the foot is inverted.” “...On the other hand if the external ligament is avulsed inversion occurs at the ankle joint as well as at the sub-taloid joint. The patient is unable to prevent displacement by the resistance of his peronei muscles”...“exploration of the ankle joint shows that the anterior and middle bands of the external ligament are completely torn from