

## Tillaux fractures of the tibia in (adolescents)

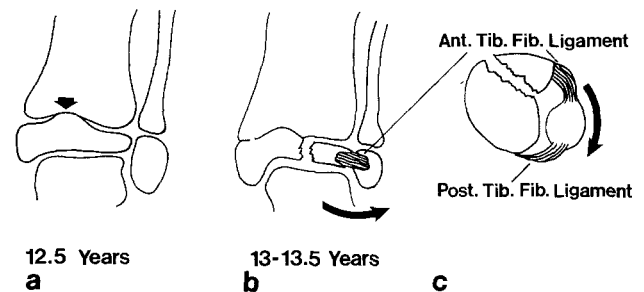
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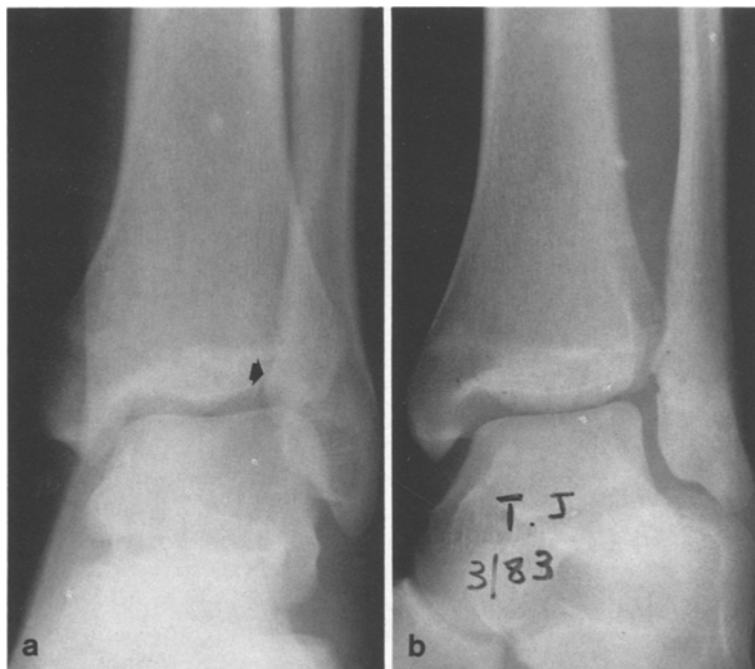
**Abstract.** The juvenile "Tillaux" fracture occurs in a specific age group and may be misinterpreted as a simple sprain if proper examination is not performed. Anatomic reduction is necessary to prevent long term damage to the ankle joint. Computed tomography is of help in the evaluation of adequacy of reduction.

Paul Jules Tillaux, a 19th century French physician, described the mechanism of a specific distal tibial fracture that bears his name. However, according to Kleiger and Mankin, this fracture was first described by Sir Astley Cooper in 1822, 12 years prior to Tillaux's birth [1]. The injury results from lateral rota-

tion of the forefoot causing tension on the anterior tibiofibular ligament and avulsion of a fragment of the anterolateral tibia.



**Fig. 1.** **a** Fusion of the distal tibial physis begins centrally (*arrow*). **b** Fusion progresses medially - the lateral physis may remain open for up to six months or one year. **c** Axial view of fracture

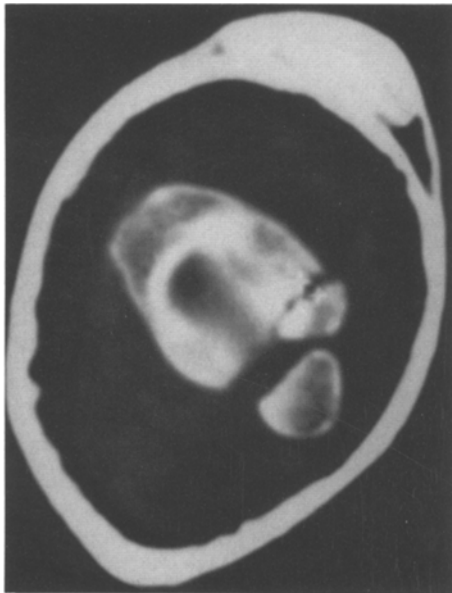


**Fig. 2.** **a** Juvenile Tillaux fracture-A-P view. The fracture of the lateral tibial epiphysis (*arrow*) is partially obscured by the overlying fibula. Note complete fusion of the medial two thirds of the physis. **b** Mortise view. The fracture line is better seen. Note open lateral physis



**Fig. 3.** The fracture is seen at junction of fused and unfused physis. Lateral growth plate is widened

**Fig. 4. a** The physis is almost completely fused; a small avulsed fragment (*arrow*) is evident. The separation of fragments is best seen in this A-P view. **b** Angled view. Separation not as well seen



**Fig. 5.** Post reduction CT of Tillaux fracture shows approximately 2 mm gap between fragments - considered satisfactory

In adolescents, the distal tibial growth plate begins to close in its mid portion and fusion later progresses medially (Fig. 1a). However, for a period of 12 to 18 months, the lateral physis may remain unfused, rendering it particularly vulnerable to injury (Fig. 1b). Tension on the anterior tibiofibular ligament results in a fracture at the junction of the fused and unfused growth plate (Fig. 1c). This “juvenile Tillaux fracture” is in reality a Salter Type III injury that is associated with this peculiar type of physal closure.

The radiographic diagnosis of juvenile Tillaux fracture is usually straightforward but may be obscured by the overlying fibula (Fig. 2a). Best seen in the mortise view, the fracture produces a vertical or, less commonly, an oblique fracture line through the epiphysis (Fig. 2b). The lateral unfused portion of the growth plate may widen (Fig. 3). On occasion, an avulsion fracture may occur after almost complete closure of the epiphyseal growth plate, as in the adult type of injury (Fig. 4).

The majority of these injuries respond to closed manipulation and application of a long leg cast with the foot in medial rotation [1]. On occasion, the displaced fragment may rotate and insinuate itself between the tibia and fibula requiring open reduction. Less commonly, soft tissue or periosteum, interposed between the fragments, will prevent ade-



**Fig. 6.** Medial malleolar fracture and associated lateral epiphyseal (Tillaux) fracture (*arrow*). Note widening of ankle mortise resulting from injury to tibio-fibular ligaments

quate realignment [2]. Anatomic apposition of the articular surface is necessary, however, if future arthritic changes of the tibiotalar joint are to be prevented.

Computed tomography is helpful in determining whether any post reduction diastasis

remains between the fractured fragments; a gap of more than 2 millimeters is considered unacceptable (Fig. 5). Well penetrated, in-cast, mortise view plain films, however, are usually satisfactory for evaluating the alignment of the articular surface.

On rare occasion, other injuries may accompany the typical lateral epiphyseal fracture of Tillaux (Fig. 6). While epiphyseal injuries of young children have a significant risk of premature growth plate fusion and angular deformity, this complication is not encountered in the juvenile Tillaux fracture because the physis is near closure at the time of injury [3].

### References

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Received: 27 January 1989; accepted: 2 March 1989

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