

Prognosis of fracture of the talus in children

21 (7–34)-year follow-up of 14 cases

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14 children suffering from a fracture of the talar neck or body were examined after 21 (7–34) years. The talar neck was fractured in 10 children and the talar body in 4. 3 fractures were displaced and primarily treated with reduction and immobilization. Nondisplaced fractures were treated conservatively. All fractures healed. All patients with displaced fractures had exercise-induced pain at fol-

low-up. Of 11 patients with nondisplaced fractures only 1 had minor complaints.

CT and conventional radiographs showed arthrosis in the talocrural joint and normal subtalar joints in those with displaced fractures. The radiographic findings were normal after nondisplaced fractures.

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In childhood and adolescence talar fractures constitute one third of all tarsal fractures (von Kurz et al. 1984, Rasmussen and Schantz 1986) and the prognosis is generally considered good (Blount 1954, Mindell et al. 1963, Hahn and Stock 1984, Mazel et al. 1986), although some authors have reported poor long-term results (Spak 1954, Sullivan and Jackson 1958, Linhart and Höllwarth 1985). In general, the series described in the literature are small or casuistical.

We report the long-term prognosis following talar fractures in childhood.

Patients and methods

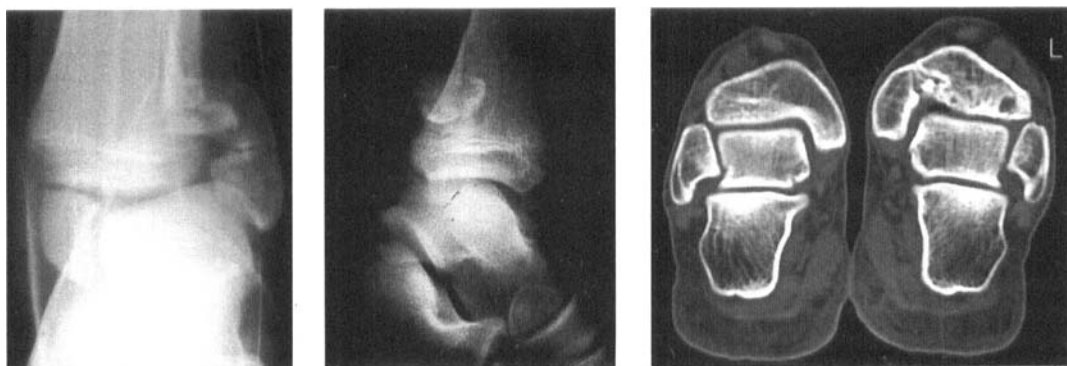
During a period of 35 years (1955–1990) 90 children (< 15 years old) with fracture of the talus were seen at the University Hospital in Odense. 18 had an osteochondral lesion, and 50 a minor fracture (avulsion, fracture of the posterior, medial and lateral processes). The remaining 22 children had a fracture of the talar neck or body. The mean age was 10 (4–14) years. Charts from the Casualty Department and radiographs were reviewed. 3 patients had a fracture of the distal talar neck, 14 of the proximal talar neck, and 5 a fracture of the talar body.

At follow-up 14 patients were available. 1 patient had died, 2 refused to participate and 4 could not be located. 1 patient with only 2 years of follow-up was excluded. The mean follow-up period was 21 (7–34)

years. 6 patients had other fractures in the region, 4 of these of the lateral malleolus. 3 fractures—all through the proximal talar neck—were displaced. 2 of these were accompanied by a fracture of the lateral malleolus and 1 by a bimalleolar fracture. The displacement involved in all cases the subtalar joint, and in 1 case also the talocrural joint. In 7 patients the mechanism of trauma was falling from a height more than 1 meter. In 3 patients the fracture was caused by a traffic accident. In the remaining 4 patients the fracture was caused by direct trauma or by falling less than 1 meter. All of the displaced fractures were caused by violent trauma.

All nondisplaced fractures were treated conservatively. The displaced fractures were primarily treated with reduction and in 1 case fixation with Kirschner wires. In 2 cases the reduction was open. In these 2 patients a 2–3 mm displacement in the talar fracture persisted postoperatively but with a good position of the associated malleolar fracture.

Radiographs at follow-up included Brodén's (1949) projections, lateral, oblique and AP views. The CT-examination was performed with a Philips Tomoscan LX in a coronal and horizontal plane. The slice thickness and spacing were 3 mm, and for comparison both sides were examined. During the CT-examination the feet were immobilized by a vacuum air bag. The patients were asked about the presence of pain (none, pain at rest, pain on walking or on exercise), limitations in spare-time activities, changes or influence of their choice of educa-



Case 4. A displaced fracture of the left proximal talar neck and associated bimalleolar fracture in a 13-year-old girl. Treated with reduction to exact position. CT-scanning at follow-up 18 years after the trauma shows arthrosis in the talocrural joint and deformity of the distal tibia. The patient suffers pain following normal daily activities.

Table 1. Observations in 14 children with fracture of the talus

No.	Age	Sex	Displacement ^a	Treatment ^b	Follow-up (years)	Clinical results		Radiologic sequelae ^c
						Reduced ROM	Pain	
<i>Distal talar neck fractures</i>								
1	11	F	None	—	4	34	—	—
2	14	F	None	—	3	28	—	—
<i>Proximal talar neck fractures</i>								
3	8	M	St / Tc	Open	10	23	+	+
4	13	F	St / —	Closed	6	18	—	+
5	11	F	St / —	Open ^d	6	11	—	+
6	6	M	None	—	6	17	—	+
7	10	M	None	—	9	7	—	—
8	12	M	None	—	12	24	+	—
9	14	M	None	—	?	29	—	—
10	6	F	None	—	4	24	—	—
<i>Talar body fractures</i>								
11	4	F	None	—	5	25	—	—
12	9	M	None	—	7	11	—	—
13	8	F	None	—	4	27	—	—
14	13	M	None	—	7	18	—	—

^a St Subtalar and Tc Talocrural joint displacement.

^b Reduction and weeks of plaster fixation.

^c Case 3 had arthrosis in the talonavicular and talocrural joints, cases 4 and 5 only in the talocrural joints.

^d + K-wire fixation

tion/employment. A clinical examination included mobility in the talocrural and subtalar joints, registration of muscular atrophy and deformities of the foot.

Results

In the 11 patients with nondisplaced fractures the radiographic findings at review were normal. The clinical examination was normal except in 1 patient with reduced mobility in the subtalar joint and in 1 patient who had pain after walking (Table 1).

All of the 3 patients with displaced fractures complained of pain following walking or running. In 2 patients this had influenced their choice of education and employment. Reduced mobility was found in the subtalar joint in 1 case. No other abnormalities were found. Radiographs and CT-scans showed arthrosis in the talocrural joint in these 3 patients. The subtalar joints were normal. In 2 cases the arthrosis was related to the malleolus fracture as well as the central part of the talocrural joint. In the patient with a fracture displacement involving both the subtalar and the talocrural joint, arthrosis was also found in the talonavicular joint. The arthrosis found in these 3 patients

was severe with reduction of the joint space, irregularities in the joint surface and secondary signs of arthrosis, i.e., subchondral cyst formation and osteophytes.

Discussion

A relationship between malleolar fractures of the supination type and proximal talar neck fractures has been suggested (Sneppen and Buhl 1974). In our series, 3 of 4 patients with complaints at follow-up suffered displaced proximal talar neck fractures associated with malleolar fractures of the supination type. At follow-up, arthrosis located in the talocrural joint was found in all 3 patients and in 2 cases also in relation to the malleolus fracture. The associated fractures of the malleoli and/or subluxation in the talocrural joint contribute to the development of pain and arthrosis. An accurate reduction including the associated fractures in the region seems to be important. The talar fractures, however, are often difficult to retain. In 2 cases a 2–3 mm displacement persisted after open reduction. It is possible that an operation technique using lag screws might produce better results (Szyszkowitz et al. 1985).

We found no cases with osteonecrosis. This is probably because of the low number of displaced fractures. In adults the risk of osteonecrosis is high in central talar fractures and the risk increases with increasing displacement (Canale and Kelly 1978, Penny and Davis 1980). In children there is more controversy regarding the risk of osteonecrosis. A good prognosis after nondisplaced talar neck fractures has been reported (Blount 1954, Mindell et al. 1963, Hahn and Stock 1984). The incidence of osteonecrosis following central displaced fractures has been reviewed by Schwarz and Gebauer (1983). Linhart and Höllwarth (1985) found no difference in the prognosis when comparing children and adults, and found a ratio of necrosis of 27 percent following nondisplaced talar neck fractures.

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