

Stress fracture of the navicular bone

Nine cases in athletes

Nine cases of stress fractures of the tarsal navicular bone were treated in athletes. The diagnosis was made with radiographs and bone scan within 6 months. Only two patients were treated surgically. The only poor result was seen in a patient in whom the fracture was only explored.

Antero Hulkko
Sakari Orava
Pekka Peltokallio¹
Ilkka Tulikoura¹
Markku Walden²

Department of Surgery, Keski-Pohjanmaa Central Hospital and Sports Injury Clinic of Keski-Pohjanmaa (Medirex), Kokkola, ¹Department of Surgery (II Clinic of Surgery), University Central Hospital, Helsinki and ²Department of Occupational Health, Finnish Broadcasting Company, Helsinki, Finland

Correspondence: S. Orava MD, Tervakuja 10 c, 67100 Kokkola 10, Finland

Stress fracture of the navicular bone in man is rare (Roick et al. 1969, Towne et al. 1970, Torg et al. 1982). We report nine cases of this condition, collected over a 10-year period at a centre for sports injury.

Patients and methods

The patients were 18–22 years old; six were males and three females (Table 1). The symptoms were mild. Pain was felt over the proximal foot, at first only during hard exercise, but later also after mild training. Slight tenderness and swelling were sometimes observed over the navicular.

In four cases plain radiograms revealed the fracture line (Figure 1). Tomography was positive in five

Table 1. Stress fractures of the tarsal navicular

1	18	F	Baseball	1	+			Conservative
2	18	F	Hurdles	1	?	+		Conservative
3	19	M	Cross-country skiing	1	+			Conservative
4	19	M	High jump	1	+			Compression screws
5	22	F	High jump	1	–	+	+	Conservative
6	22	M	Football	1.5	?	?	+	Plaster cast
7	19	M	Running	2	?	+	+	Curettage, bone transplantation
8	20	M	Long jump	2	–	+	+	Conservative
9	20	M	Running	6	+	+		Exploration

The result after 3–6 months follow-up was good in all cases except Case 9.



Figure 1. Case 7. Sagittal stress fracture of the tarsal navicular in a middle-distance runner 2 months after the onset of symptoms.

cases, of which four were diagnostic (Figure 2). In four cases, of which one was diagnostic, the isotope scan showed locally increased uptake at the fracture site.

The interval between onset of symptoms and establishment of the correct diagnosis varied from 1 to 6 months.

Four patients avoided physical exercise, but had no other treatment. One patient used walking sticks for 3 weeks and one was immobilized in a cast for 1 month without weight bearing.

Surgery was performed in three cases. In one patient cancellous bone transplantation followed by immobilization was performed. One patient was treated by 2 compression screws followed by immobilization

because of a displaced fracture (Figure 3). In one patient, only an exploration of the fracture was done; because of pseudoarthrosis and osteoarthrosis on both sides of the navicular bone, no osteosynthesis was done. This last patient was not able to continue his sporting career, but did not have symptoms in everyday life. The end result in the other eight patients was good, and radiographic healing occurred in all. They returned to full athletic activity about 6 months after the treatment.

Discussion

Among stress fractures, navicular bone fracture is one of the most uncommon (Meurman 1981, Torg et al. 1982). In a series of 142 stress fractures in athletes only one occurred in the tarsal navicular (Orava et al. 1978). These fractures have been diagnosed, however, relatively more often during recent years, probably because of more intensive training and better diagnostic methods (Torg et al. 1982, Gailliant et al. 1983, Graff & Krahll 1984, Persson et al. 1984). According to the literature and own experience this stress fracture is particularly found in athletes taking part in sports involving jumping and sprinting.

In cases of chronic mid-foot pain, plain radiograms should be obtained. Tomograms may show the fissure line before it is visible in plain radiograms, as in some of our cases. Isotope scanning shows increased activity at the frac-

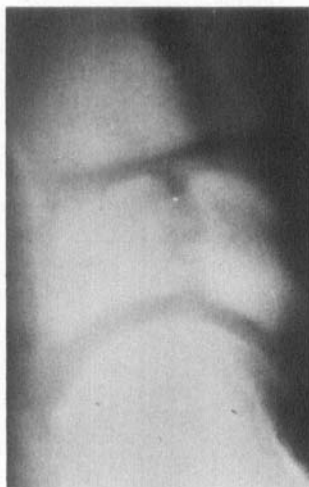


Figure 2. Case 2. Tomogram of a stress fracture of the tarsal navicular bone.

Figure 3. Case 4. Stress fracture of the tarsal navicular in a 18-year-old high jumper treated with compression screws.

ture site at an earlier stage (Wilcox et al. 1977, Meurman 1981, Graff & Krahle 1984), and may be the only positive finding of this fracture (Persson et al. 1984). The clinical signs and symptoms are diffuse and minimal. In long-lasting cases the pain may also be felt at rest and may cause limping.

In early cases immobilization in a plaster cast is recommended, especially if there is a visible fracture line (Torg et al. 1982, Gailland et al. 1983). If only a fissure line is found, avoidance of all athletic activities is sufficient, provided that there is a strict follow-up by radiographic examinations. In cases of delayed diagnosis and pseudoarthrosis, the treatment should be surgical with a compression screw or staple fixation or bone transplantation (Hunter 1981, Torg et al. 1982, Graff & Krahle 1984). The prognosis is usually good, but recurrence of the fracture may occur if physical activity is resumed too early.

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