Surgical treatment of Jones fractures

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Summary. A transverse fracture of the proximal part of the fifth metatarsal is rarely caused by direct trauma but is usually secondary to overload [8]. These fractures, when treated conservatively, have a high recurrence rate and give rise to prolonged sporting inactivity. The clinical and radiographical difference between an acute versus a stress fracture will decide on further treatment. A reversed graft, by an asymmetrical trapezoid autograft, offers a simple and effective surgical solution for non-union and delayed union of Jones fractures in sportsmen.

Proximal fifth metatarsal fractures must be separated into two different types [3, 6]:
1. A fracture of the tuberosity, usually caused by inversion trauma. Union is easily achieved with plaster immobilisation.
2. A transverse fracture of the proximal part of the fifth metatarsal or Jones fracture.

The Jones fracture is troublesome to manage. This fracture occurs within 1.5 cm from the tuberosity, requires prolonged immobilisation, and has a high rate of non-union with conservative treatment. Refractures are also very frequent on conservative treatment.

These problems are due to the intramedullary sclerosis which most of these fractures show initially or during further treatment. This sclerosis is in fact initiated by microfractures and occur also in a stress predilection area.

Predisposing factors for this fracture area:
1. Sports activity. The fracture is frequent in soccer and basketball players. A common element in both sports is the pivot movement; a sudden twist on a fixed forefoot.
2. Cavovarus foot [5]. Enlargement of the transverse arch decreases the mobility between the fourth and fifth metatarsal, and leads to stiffness of this segment.
3. Supination and adduction of the forefoot, increasing the strain on the fifth metatarsal.

Not all Jones fractures are stress fractures, but they all occur in the same predilection-area within 1.5 cm from the tuberosity and just distal to the articulation between the fourth and fifth metatarsal. Kavanaugh [4], Torg and Zelko [8] recognized these problems and proposed a classification into three types:
1. Acute fracture (Fig. 1): No previous history of pain. X-rays show a sharp, well-defined fracture line, minimal cortical hypertrophy and no sclerosis.
2. Delayed union (Fig. 2): Always a history of previous injury or prodromal symptoms. X-rays show a widened fracture line, periosteal new bone formation and intramedullary sclerosis.
3. Non-union. A typical history of repetitive trauma and complete obliteration of the medullary canal by sclerotic bone.

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Fig. 1. Acute fracture
Fig. 2. Delayed union
The treatment of choice for type 1 is plaster immobilisation, strictly non-weight-bearing, for 6–7 weeks. Non-unions and delayed unions in sportsmen will only benefit from operative intervention.

The aim of this study is to present a new surgical technique and results for these two types.

Material and methods

We reviewed ten patients with delayed or non-union of a Jones fracture with a mean follow-up of 4 years after an inlay graft procedure. All were soccer players participating in sports on a regular basis. Five of them described prodromal symptoms 3–4 weeks before the fracture occurred; the others indicated a sudden twist tackle as the cause of the fracture.

The mean interval between fracture and definitive treatment was 8 months (range 3–15 months). All patients had been treated conservatively with a mean of 12 weeks' plaster cast immobilisation and 2–3 refractures in the non-union group. X-ray examination showed six delayed unions and four non-unions.

Surgical procedure

The fracture site is exposed subperiosteally by a dorsolateral incision. A trapezoid section of bone, measuring $0.7 \times 2.0\,\text{cm}$ and taken asymmetrically on the fracture, is outlined and removed (Fig. 3). The canal is curetted and all sclerotic bone removed. Next, the autograft is jammed back into its base as a reversed graft (Fig. 4).

A below-knee cast is applied for 6–8 weeks and weight-bearing permitted after 2 weeks.

Results

Postoperatively, all patients resumed running after 10 weeks and regained normal sporting activity in a mean of 3 months. Figure 5 shows the typical appearance of a healed fracture. Only one complication occurred, a refracture, but it occurred distally to the inlay graft and healed well on plaster immobilisation.

On review, these patients, with a mean postoperative follow-up of 49 months (15–72 months), were all pleased. Apart from one with a refracture, none had ever experienced any problem and all had regained the same level of activity as before the fracture. Podoscopic examination revealed five patients to have a pronounced cavovarus foot.

Discussion

The fact that half of our patients presented definite prodromal symptoms of pain or discomfort in this area during sporting activities indicate that the Jones fracture is often a fatigue fracture. Since all of our patients were involved in sports at an intensive level, and half showed a