Fracture of the proximal tibia six months after Fulkerson osteotomy

A REPORT OF TWO CASES

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The Fulkerson osteotomy has proved to be a reliable treatment for subluxation of the patella due to malalignment. Aggressive rehabilitation in the early postoperative period is unwise since the proximal tibia is weakened by the oblique osteotomy. Early weight-bearing and unrestricted activity have caused fractures in a few patients. Even late in the postoperative period the osteotomy may adversely influence the biomechanical properties of the proximal tibia.

We describe two athletes who sustained a fracture of the proximal tibia, during recreational activities, six months after a Fulkerson osteotomy. Both had been bearing full weight for about ten weeks without complaint. Bony healing of the osteotomy had been demonstrated on plain radiographs at ten and at 12 weeks. After a Fulkerson osteotomy, jogging and activities which impose considerable impact force should be discouraged for at least nine to 12 months.

We describe two patients who sustained a fracture of the proximal tibia during recreational sports six months after a Fulkerson procedure.

Case reports

Two men, aged 30 and 51 years, underwent anteromedialisation of the tibial tuberosity for chronic patellofemoral pain. Both had subluxing malalignment with positive clinical and arthroscopic findings of patellofemoral osteoarthritis. After a lateral release, an anteromedial tibial tubercle transfer was carried out as described by Fulkerson, with an osteotomy angle of 45°. The postoperative regimen of physiotherapy included unrestricted passive and active mobilisation and toe-touch weight-bearing with a detachable knee immobiliser for six weeks. Full weight-bearing was not allowed until the osteotomy had consolidated. Neither patient had skeletal dysplasia, metabolic bone disease or other types of skeletal disorder.

After six months, while jogging, both patients sustained transverse, undisplaced fractures of the proximal tibia (Fig. 1). The mechanism of injury was a stumble and fall with distortion of the knee. Both patients had started weight-bearing two weeks after the osteotomy had consolidated, as shown on plain radiographs taken at 12 and at 14 weeks after surgery.

These were the only such injuries in our series of 37 osteotomies of the tibial tuberosity. In both cases, the fracture occurred at the level of the inferior aspect of the osteotomy. Treatment was by immobilisation in a long leg cast and healing occurred without complication (Fig. 2). When seen at 24 months, both patients had a full range of movement. The clinical results were excellent (95/100 points) and good (85/100 points) according to a modified Lysholm knee score. Pain was rated on a visual analogue scale from 0 to 100 and decreased from 80 to 20 and from 40 to 30, respectively.

Discussion

The Fulkerson procedure is one of the more common techniques of osteotomy for the treatment of patellofemoral malalignment with degenerative changes. If the selection of patients is appropriate, the short- and mid-term func-
tional results are satisfactory and patellofemoral alignment can be restored. Fracture of the proximal tibia after a Fulkerson procedure is a complication related to technique. Because of the specific geometry of the proximal tibia a considerable cross-sectional area of bone is divided by the oblique osteotomy. Fulkerson himself observed that the proximal tibia is weakened. Fracture has been reported in a few cases after the original protocol for rehabilitation, which consisted of complete immobilisation in extension for four weeks, had been modified to early movement exercises and weight-bearing as tolerated. All fractures occurred within the first three months after surgery.

On the basis of these experiences the protocol was modified again to early continuous passive movement and protected weight-bearing for six to eight weeks. Jogging was discouraged for six months and competitive sports for nine to 12 months. No further fractures have since been reported in the literature.

Our patients sustained fractures of the proximal tibia six months after operation followed by the current rehabilitation protocol. In both, the healing of the osteotomy had been demonstrated on radiographs at ten and 12 weeks. There had been no complications and full weight-bearing had been achieved without discomfort for more than ten weeks when the fractures occurred. Therefore, we do not consider that technical deficiencies at the time of surgery caused the fractures. The fractures were not due to high-impact trauma. We conclude that the effect of the oblique osteotomy on the biomechanical properties of the proximal tibia outlasts the process of bony healing. We now discourage jogging for a period of nine months and contact sports or other activities causing high-impact forces for at least 12 months.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References