CASE REPORT

Correction of tibial deformity in Paget’s disease using the Taylor spatial frame

E. Tsaridis, S. Sarikloglou, E. Papasoulis, S. Lykoudis, I. Koutroumpas, V. Avtzakis

From General Hospital of Kavala, Greece

A 64-year-old man presented with a severe deformity of the tibia caused by Paget’s disease and osteoarthritis of the ipsilateral knee. Total knee replacement required preliminary correction of the tibial deformity. This was successfully achieved by tibial osteotomy followed by distraction osteogenesis using the Taylor spatial frame. The subsequent knee replacement was successful, with no recurrence of deformity.

Patients with Paget’s disease often present with a single-bone deformity and mechanical overloading of the adjacent joint, which becomes osteoarthritis.1-3 Excellent results may be achieved by total joint replacement,4,5 but the complexity of the deformity in some patients can cause technical difficulties.4-6 A corrective osteotomy before or at the time of total joint replacement may be needed,3 and, if combined with distraction osteogenesis, will allow gradual correction of the deformity.

Case report

A 64-year-old man with monostatic Paget’s disease of the left tibia presented with severe disability and advanced osteoarthritis (OA) of the ipsilateral knee.

There was significant deformity of the tibia, with 18° varus at the knee, 24° of anterior bowing, 15° of internal rotation and 2 cm shortening (Fig. 1). His alkaline phosphatase was raised but he was not on medical treatment.

We decided to treat the tibial deformity prior to total knee replacement (TKR). Correction was achieved using a Taylor spatial frame (Smith & Nephew, Memphis, Tennessee). Under epidural anaesthesia, the frame was applied and a proximal subperiosteal tibial osteotomy was established at the apex of the deformity, 13.5 cm distal to the joint line (Fig. 2). A total of 1.5 cm of the fibula was resected at the same level. The frame consisted of two rings, each 180 mm in diameter, and six struts. The rings were fixed with three 5 mm half-pins.

Fig. 1a

Fig. 1b

Fig. 1c

a) Photograph showing the appearance of the tibia before correction. b) Anteroposterior and c) lateral radiographs showing the tibia before correction.
Distraction osteogenesis was initiated after ten days on a computer-based schedule. Each component of the deformity was to be corrected over 40 days. The patient was taught to perform the strut adjustments at home. The only problems during the distraction phase were a minor pin track infection at two sites and mild pain. These were both treated conservatively. Three months later, there was clinical and radiological evidence of union and the frame was removed.

Two months later, TKR was carried out using the Consensus Knee System prosthesis (Hayes Medical Inc., El Dorado Hills, California) under epidural anaesthesia. During the operation, there was partial avulsion of the patellar tendon from the tibial tuberosity and the knee had to be splinted in extension for six weeks after operation. The operating time was 120 minutes, with a peri-operative blood loss of 450 ml.

At follow-up one year after the TKR (Fig. 3), the patient was walking normally and his knee flexed from 0˚ to 90˚. His Knee Society score had improved from 12 pre-operatively to 79, and his functional score from 0 to 80. There was no recurrence of the deformity (Fig. 4).

**Discussion**

Total knee replacement can give excellent results for patients with OA of the knee secondary to Paget’s disease. The severity of the deformity may cause technical difficulties with exposure of the joint, partial avulsion of the patellar tendon, disproportion between the femur and the tibia, and an inability to use standard intramedullary guides or to restore the mechanical alignment of the limb, which can preclude the insertion of a standard prosthesis. If there is severe extra-articular deformity of either the femur or the tibia, a corrective osteotomy may be necessary. This is usually performed prior to the TKR as a separate procedure. The stability of the Taylor spatial frame allows early weight-bearing and provides an ideal environment for both new-bone formation and soft-tissue healing.

Patient compliance with this technique is essential and has been simplified by the introduction of computer-generated schedules and easy-to-read struts.

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**