ABSTRACT

Purpose. To review outcomes of open wedge osteotomy of the proximal medial tibia for malunited tibial plateau fractures.

Methods. Seven men (mean age, 36 years) underwent open wedge osteotomy of the proximal medial tibia for instability secondary to malunited tibial plateau fractures of Schatzker types IV (n=3), V (n=1), and VI (n=3). Five patients had been treated conservatively and 2 surgically.

Results. Patients were followed up for 12 to 30 months. Five patients achieved complete correction of the deformity, whereas 2 had residual articular surface depression of <2 mm. All patients were satisfied with their improvement in stability and knee function. One patient developed anterior cruciate ligament deficiency and instability and underwent anterior cruciate ligament reconstruction. No patient developed any complication related to wound healing. No delayed loss of correction was observed.

Conclusion. Open wedge osteotomy of the proximal medial tibia is recommended for young adults with instability of the knee joint secondary to malunited proximal tibial plateau fractures. The technique is simple and does not require specialised training or any specific instrumentation.

Key words: fractures, malunited; osteotomy; tibia

INTRODUCTION

Osteotomy enables re-positioning of the healthy bone/cartilage in the weight-bearing position. Open wedge osteotomy of the proximal medial tibia has been used for treatment of unicompartamental osteoarthritic knees until unicompartamental arthroplasty became popular. Closed wedge osteotomy of the proximal tibia for valgus and varus knee deformities enables optimal correction of the deformity, quick healing of the cancellous bone, easy fixation of fragments using staples, and evaluation of the articular surface. We reviewed the outcomes of open wedge osteotomy of the proximal medial tibia for malunited tibial plateau fractures.
MATERIALS AND METHODS

Between January 2008 and June 2009, 7 men (mean age, 36 years) underwent open wedge osteotomy of the proximal medial tibia for instability secondary to malunited tibial plateau fractures of Schatzker types IV (n=3), V (n=1), and VI (n=3). Five patients had been treated conservatively and 2 surgically.

All osteotomies were performed by a single team of surgeons. A medial parapatellar approach was used. The patella, patellar tendon, joint lines, and proposed incision site were marked, cleaned, and draped free. The surgical exposure was limited in that the knee joint was not opened; the mean incision length was 2.5 inches and extended just distal to the tibial tuberosity. The periosteum on the subarticular part of the proximal tibia was elevated. An oblique osteotomy was started distally at the level of the tibial tuberosity and ended medially at the intercondylar area; it was opened with the intercondylar area acting as a hinge. A tricortical piece of iliac crest (4-cm long) was harvested and inserted into the osteotomy site from the anteromedial aspect subperiosteally (Figs. 1 and 2). Placement of the graft was checked using image intensification; the graft was pushed further inside if needed. The graft was impacted after correction in the coronal plane on the anteroposterior view and the posterior slope on the lateral view was confirmed under image intensification. The incision was closed over a surgical drain. In one patient, the graft was further stabilised with 2 cancellous screws (Fig. 3).

Postoperatively, parenteral antibiotics were administered for 5 days, and the sutures removed on day 14. A long-leg cast was applied for 3 weeks and then a brace for the next 6 weeks; patients were not allowed to bear weight while ambulating. Gradual progressive weight bearing was encouraged at week 8. At week 16, all patients showed radiological union. Patients were followed up for discomfort at the operative site, range of motion, radiological status of the osteotomy site, and residual deformity at weeks 2, 6, 8 and 16, and yearly thereafter.

![Figure 1](image1) Preoperative planning of the open wedge osteotomy of the proximal medial tibia.

![Figure 2](image2) Surgical steps: (a) marking and opening of the osteotomy and (b) placement of the tricortical graft.

![Figure 3](image3) Patient 6: the fracture has been fixed twice with (a) cancellous screws and then with (b) plating. After open wedge osteotomy, (c) 2 cancellous screws are used to stabilise the fragments.
RESULTS

Patients were followed up for 12 to 30 months. Five patients achieved complete correction of the deformity (Fig. 4), whereas 2 had residual articular surface depression of <2 mm. All patients were satisfied with improvement in their stability and knee function. One patient developed anterior cruciate ligament deficiency and instability, for which a reconstruction was performed. No patient developed any complication related to wound healing. No delayed loss of correction was observed.

DISCUSSION

Open wedge osteotomy of the medial metaphyseal tibia does not compromise limb length. It enables correction of medial ligamentous laxity and operation on the diseased compartment enabling correction of up to 15º of deformity, but it is less stable than closed wedge osteotomy. Thus, fragment fixation is of critical importance. The procedure is indicated for limbs with a good healthy vascular status, excellent triceps strength, osteoarthritis limited to a single compartment, and pain/disability compromising the quality of life. An unstable knee (lateral tibial subluxation of >1 cm) with a narrow medial joint space and/or bone loss (2–3 mm), knee flexion contracture (>15º), limited knee flexion (<90º), major knee deformities (>15º) and associated inflammatory arthropathies are contraindications for open wedge osteotomy. The procedure “unloads the overloaded” and 80% of patients with unicompartmental osteoarthritic knees reported satisfactory results at the 5-year follow-up.1,2

Although open wedge osteotomies of the lateral intra-articular tibia1,2 and of the medial intra-articular tibia3–5 have been reported, none demonstrated utility in post-traumatic malunions.

We recommend this surgery in young adults (in whom resorting to total knee arthroplasty is too early) with instability of the knee joint secondary to malunited proximal tibial plateau fractures. The instability produced by malunion is very disabling and cannot be treated conservatively. This procedure can prevent secondary arthritis caused by malunion. The tricortical graft is subperiosteal and supported by the strong medial collateral ligament; fixation with screws is usually not needed. The graft also prevents any delayed loss of correction. The technique is simple and does not require specialised training or any specific instrumentation. It can be performed at any basic operating facility in developing countries.

REFERENCES