Anterior Opening Wedge Osteotomy of the Tibia for the Treatment of Genu Recurvatum

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Introduction

The surgical management of a genu recurvatum (hyperextension of the knee) is rare. It should be considered for symptomatic patients who suffer from significant asymmetrical genu recurvatum (more than 20°). Distinction should be made between an idiopathic symmetric genu recurvatum and a secondary genu recurvatum due to a bony or ligamentous lesion.

It is of major importance to evaluate the recurvatum clinically as well as radiographically. The evaluation should be compared to the contralateral side (Fig. 18.1).

Fig. 18.1 Asymmetrical genu recurvatum

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Radiological Workup

(Cf chapter on surgical indications for arthritis.) The aim of this workup is to quantify the overall recurvatum in both knees and to calculate the amount of recurvatum residing in the femur or/and tibia (Fig. 18.2).

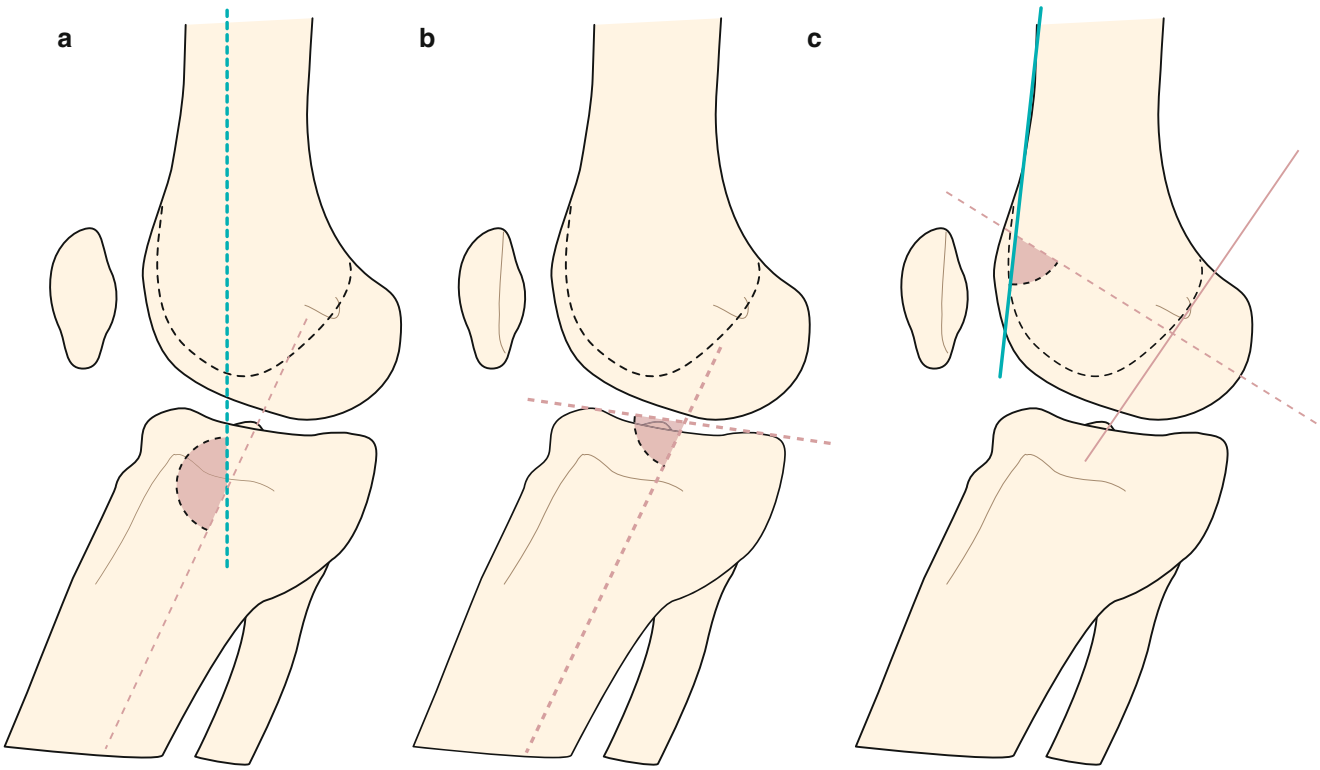

Fig. 18.2 Radiological measurements of femoral and tibial recurvatum. (**a**) Global recurvatum (angle between anatomical femoral and tibial axes). (**b**) Tibial slope. (**c**) Epiphyseal femoral angle between the femoral anterior tangent line and the Blumensaat line perpendicular

Anterior Opening Wedge Tibial Osteotomy

Indications

- Deformity secondary to poliomyelitis: the recurvatum should not be corrected completely since it has a stabilizing effect on the lower limb. This effect on stability is important in these patients who frequently lack a functional quadriceps muscle.
- Chronic posterior laxity: reducing the posterior tibial translation.
- Bony recurvatum at the level of the tibia (negative tibial slope) due to a fracture malunion or secondary to growth plate arrest of the anterior aspect of the proximal tibial physis (Fig. 18.3).

Fig. 18.3 Negative tibial slope

Technique

This technique has been described by Henri Dejour and F. Lecuire (Fig. 18.4). The anterior opening wedge osteotomy is performed at the level of the tibial tubercle (TT) with a posterior hinge. The hinge is situated at a level of the insertion of the fibers of the posterior cruciate ligament and the attachment of posterior knee joint capsule on the tibia.

The anteromedial skin incision is made in line with the medial border of the patellar tendon (Fig. 18.5). An osteotomy of the tibial tubercle is performed. The bone block should be 6–8 cm long and should reach into the metaphyseal bone (cf Fig. 18.6 and chapter on episodic patellar dislocation). Guide pins are introduced anteriorly approximately 4 cm below the joint line directed posteriorly and aimed at the level of the insertion of the posterior cruciate ligament fibers and proximal to the insertion of the posterior capsule (Fig. 18.7). Medially, a large periosteal elevator is inserted underneath the fibers of the superficial medial collateral ligament. Laterally the tibialis anterior muscle insertion is partially released.

The osteotomy is completed with an oscillating saw underneath the guide pins and always staying in contact with the guide pins. The osteotomy should be situated proximal to the tibiofibular joint (Fig. 18.8). Opening of the osteotomy is achieved by the sequential introduction of several osteotomes (cf surgical technique for opening wedge high tibial osteotomy).

Generally, each osteotome or 1 mm of opening achieves a correction of about 2°. The final correction should take into account not only the bony genu recurvatum measured radiologically but also the clinical genu recurvatum. A bony recurvatum of 20° but with only a clinical recurvatum of 10° should not be corrected by 20°. This degree of correction could result in a clinical flexion deformity that is poorly tolerated by the patient.

Remark: *An anterior tibial osteotomy frequently increases varus of the tibia. Therefore, the osteotomes should be inserted from the medial side during opening to minimize this effect.*

The posterior cortex is weakened with the 3.2 mm drill (cf technique HTO). The final correction should be controlled clinically to avoid a hypercorrection in flexion. The osteotomy is fixed by two Blount staples on either side of the tibial tubercle (Fig. 18.9).

Cortical and cancellous iliac crest bone grafts are needed to fill the osteotomy (Fig. 18.10). The tibial tubercle osteotomy is fixed using two 4.5 AO screws introduced anteroposteriorly. The patellar height should not be modified. In other words, the osteotomy bone block is proximalized by the same amount as the opening wedge osteotomy in order to avoid a patella infera (Figs. 18.11 and 18.12).

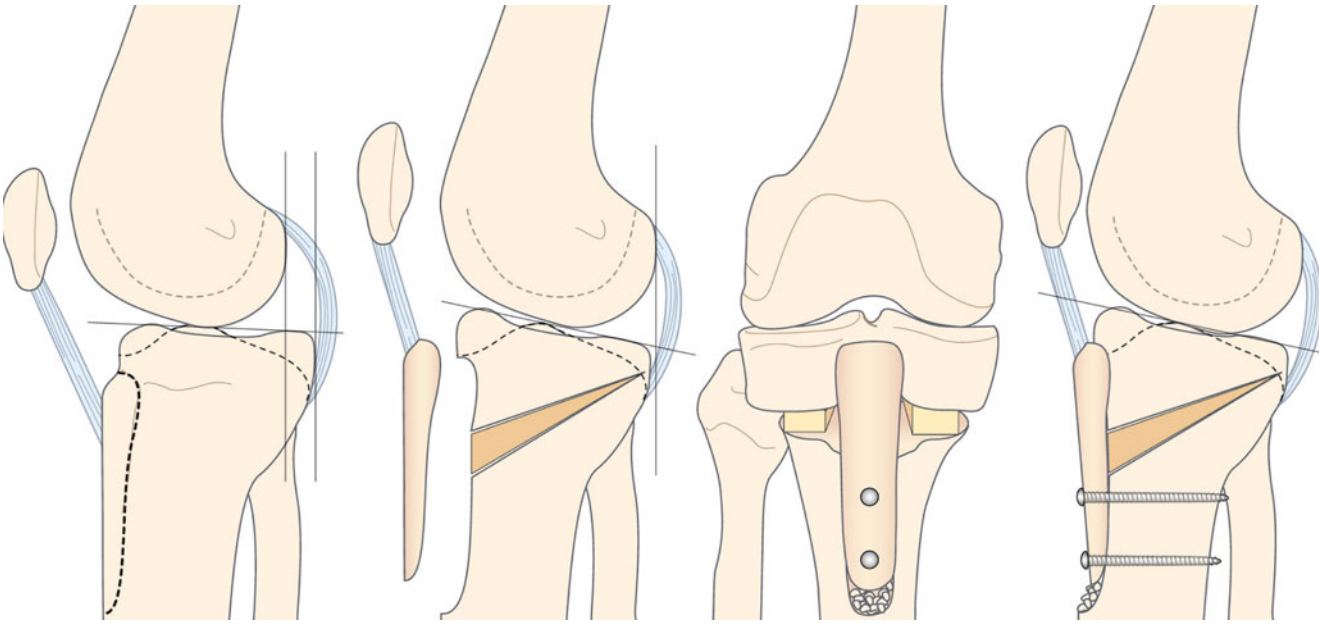

Fig. 18.4 Surgical technique for anterior opening wedge osteotomy

Fig. 18.5 Skin incision

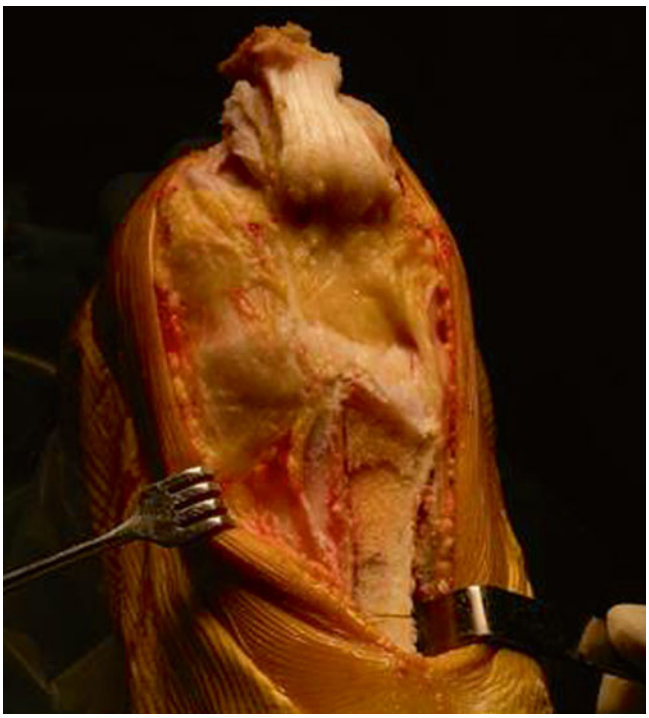

Fig. 18.6 Tibial tubercle osteotomy

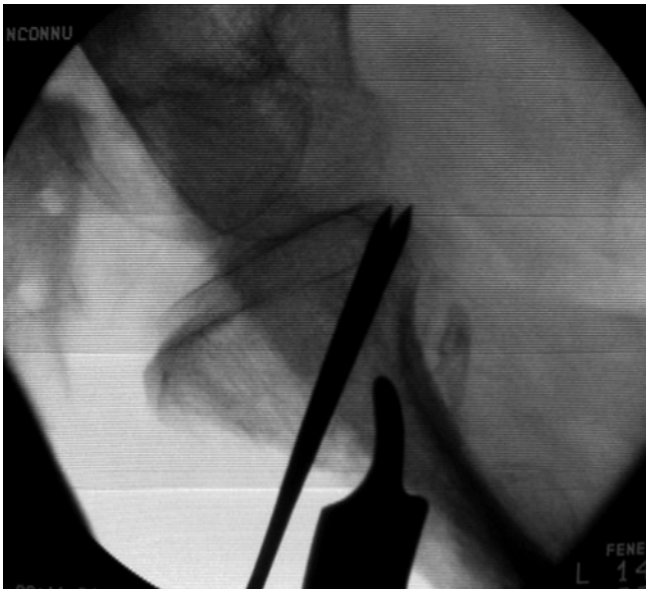

Fig. 18.7 Intraoperative fluoroscopic control of guide pin positioning

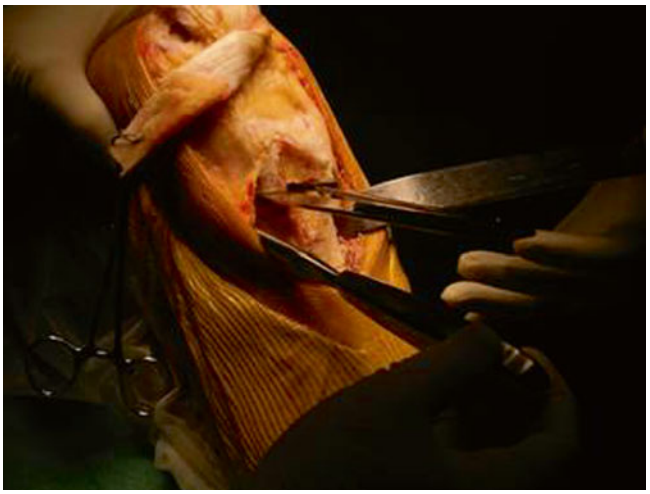

Fig. 18.8 Tibial osteotomy underneath the guide pins to avoid epiphyseal fracture

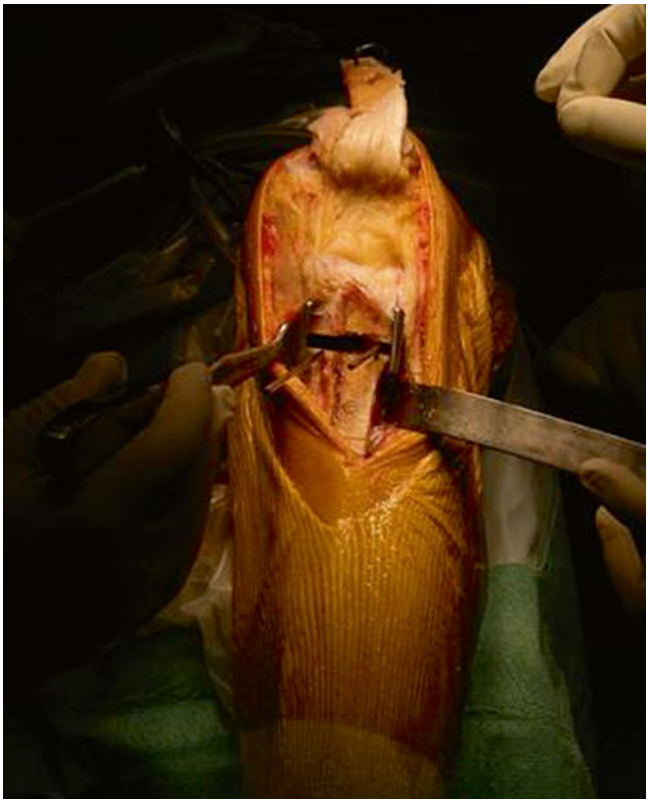

Fig. 18.9 Fixation by two Blount staples

Fig. 18.10 Bone grafts to fill the osteotomy

Fig. 18.11 Tibial tubercle fixation

Fig. 18.12 Postoperative x-rays

Postoperative Guidelines

- Non-weight bearing for 2 months and walking with crutches.
- Progressive mobilization of the knee, limited to 90° for 60 days (to ensure consolidation of the tibial tubercle osteotomy).
- Bracing at 10° of flexion.
- Postoperative radiographs should include a lateral radiograph of the knee to measure the obtained correction.