Osteotomy for mono-compartment osteoarthritis of the knee is one of the most common indications for deformity correction surgery. Because arthrosis is already present, the goal of treatment is to preserve the knee joint and delay the need for TKR as long as possible. Although many patients who undergo osteotomy never require TKR, the osteotomy must be performed with the assumption that each patient must remain an optimal TKR candidate after surgery. There are three compartments in the knee joint: medial, lateral, and patellofemoral. Arthritis may predominantly affect one or more of these. The most common compartment affected is the medial compartment. This chapter focuses predominantly on medial compartment osteoarthritis (MCOA) and, to a lesser extent, on the other two compartments.

Fig. 16-1
Jackson and Waugh (1961) types of HTO for MCOA. The osteotomy was made distal to the tuberosity in the diaphyseal bone, either as a closing wedge or dome osteotomy. The dome was concave distal. The osteotomy level is fairly distal to the CORA, leading to a translational deformity.

Deformities in Association with MCOA

The deformities in association with MCOA can be subdivided into bone and joint (soft tissue) deformities.

Bone Deformities

- Femur: varus or valgus, with or without recurvatum or procurvatum, with or without torsion
- Tibia: varus, with or without torsion, with or without procurvatum or recurvatum

Joint Deformities

- LCL laxity
- MCL laxity
- Plateau depression
- Lateral subluxation
- Patellar maltracking
- Flexion contracture

The concept of high tibial osteotomy (HTO) to treat MCOA is credited to Jackson and Waugh (1961), who reported on eight procedures (Fig. 16-1). They performed an osteotomy distal to the tibial tuberosity; both
Coventry (1965) type of HTO. Closing wedge osteotomy was made proximal to the tuberosity, close to the CORA.

Maquet (1976) "barrel vault" dome osteotomy. This dome osteotomy is made proximal to the tuberosity, with the concavity facing distally. The center of rotation of the dome (ACA) is distal to the tuberosity and therefore far from the CORA. This induces a marked translational deformity.

The medial plateau force is 70% in single-leg stance when the mechanical axis passes through the center of the knee in a normally aligned knee. The medial plateau force is 95%, with only 6° of mechanical tibiofemoral varus. The medial plateau force is reduced to 50% with 4° of valgus and 40% with 6° of valgus. (Modified from Hsu et al. 1990.)

closing wedge and concave distal dome osteotomies were described. Difficulties with bone healing in the subtuberosity region led Coventry (1965) (Fig. 16-2) to report on a closing wedge osteotomy proximal to the tuberosity through cancellous bone. Maquet (1976, 1980) reported on a concave distal dome osteotomy (Fig. 16-3). The Maquet osteotomy was designed to take advantage of the rapid metaphyseal bone healing of the region above the tuberosity and to add an element of adjustability.

Fujisawa et al. (1979) divided the medial and lateral plateaus by the percentage of distance from the center of the knee. The medial and lateral edges of the medial and lateral plateaus were considered to be 100%, and the center of the knee was considered to be 0%. The best results from HTO were obtained when the mechanical axis line of the limb passed through the 30%–40% lateral plateau region. We call this the Fujisawa point.