CHAPTER 26
Lateral Release for Fixed-Valgus Deformity

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VALGUS DEFORMITY IN TOTAL KNEE ARTHROPLASTY

Fixed-valgus deformity of the arthritic knee can be a difficult and challenging problem in total knee arthroplasty. Varus deformity is more commonly encountered, and therefore most surgeons are more comfortable with the surgical principles and releases used on the medial side of the knee. At our institution, at the time of knee replacement we encounter fixed-varus deformity (50 to 55%) three times more frequently than fixed-valgus deformity (10 to 15%). Ligament balancing and changes in boney anatomy of the valgus knee may be more difficult to correct than with varus deformity. In addition, the correct sequence and technique of release of the lateral structures remain controversial. Many different techniques to correct valgus deformity have been described, and they demonstrate the lack of a consensus among surgeons. Potential complications—including peroneal nerve palsy, flexion or extension instability, and patellar maltracking—also make correction of valgus deformity challenging.

PATHOPHYSIOLOGY

The normal knee is aligned with a femorotibial angle of 6 to 7 degrees valgus, has a full range of motion, and may be slightly more lax laterally in flexion. In arthritis of the knee, loss of bone and cartilage leads to instability, which can be classified as either symmetric or asymmetric. In response to the instability, adaptive changes occur. In fixed-valgus deformity the instability is asymmetric, and the surgeon is faced with deficiency of the lateral bone and cartilage, contracture of the lateral ligaments and capsule, stretching of the medial ligaments, and contracture of the iliotibial tract. The structures that may be “tight” include the lateral capsule, lateral col-lateral ligament, arcuate ligament, popliteus tendon, lateral femoral peristeum, distal iliotibial band, and lateral intermuscular septum. In addition, there may be asymmetric wear of the posterior condyles with excessive wear of the posterolateral condyle. This wear has implications in surgical technique if the posterior condyles are utilized to reference femoral component rotational alignment. Some authors have also reported external rotation deformity of the proximal tibia due to the tight iliotibial tract.

SURGICAL TECHNIQUES

Implant Selection

The successful results of total knee arthroplasty with the posterior-stabilized design are well documented in the literature. In severe deformity, the PCL is often contracted and may limit correction of the deformity as described by Krackow’s “cruciate limitation effect.” Even when an attempt at PCL-retention was made, Lauren-cian found that in 16% of knees he had to release the PCL. Appropriate soft tissue balancing is much easier if the PCL is sacrificed. We believe it is much simpler to substitute a mechanical PCL for the diseased and contracted PCL in the severely deformed knee and that the results for the average surgeon will be better when the PCL is sacrificed routinely than when an attempt is made at soft tissue balancing with partial releases of the PCL and use of a posterior cruciate-retaining prosthesis. We therefore recommend use of the posterior-stabilized design.

In elderly low-demand patients, we prefer to use a constrained condylar knee to avoid the morbidity of extensive releases on the lateral side of the knee and to avoid the potential complications of peroneal nerve palsy and instability in flexion or extension. Bullek and
associates (1996) evaluated the results of index-constrained condylar total knee arthroplasty in 28 patients with 34 TKAs. The average age was 74.5 years, and the average preoperative deformity was 22 degrees valgus. No attempt at soft tissue balancing with lateral releases was made. Sixty-two percent required lateral retinacular releases for patellar tracking. All 34 TKAs (100%) had excellent (25 knees) or good (9 knees) results at an average follow-up of 3 years, and there was no evidence of early loosening or osteolysis. In younger patients, every attempt should be made to balance the knee and to avoid use of the constrained implant to eliminate the concern of early loosening in the more active, younger population.

In some cases with bone deficiency, a modular implant with metal augments, offset stems, and variable tibial polyethylene thicknesses may be useful. In valgus deformity, patellar tracking is almost always an issue with lateral release rates reported from 62 to 100%. Though one may speculate that the use of an implant that provides both left- and right-sided femoral components may improve patellar tracking, proper patellar preparation, and correct femoral component rotation are critically important.

### Bone Cuts

Our preference is the medial parapatellar approach for all cases. Lateral osteophytes are often present and should be removed. The significance of the lateral osteophytes is debatable because the LCL’s insertion on the fibular head takes the ligament away from the tibial rim, and therefore, lateral osteophytes do not typically bowstring the LCL the way that the medial osteophytes often impinge on the MCL. However, Keblish and colleagues (1991) reported fewer LCL, popliteus, and capsule releases when the overhanging osteophytes were removed and a laminar spreader used to “tease” the joint apart in flexion and extension.

Femoral component rotational alignment is important in the valgus knee to avoid flexion instability after lateral ligamentous release. The surgical epicondylar axis may be helpful for rotational alignment of the femoral component in the valgus knee (Fig. 26.1). Most current total knee instrumentation systems reference the rotation of the femoral cuts from the posterior condyles with some built-in “external rotation”—often around 3 degrees. However, in severe valgus deformity, the posterolateral condyle may be more worn, and therefore the amount of “external rotation” may need to be increased in reference to the posterior condyles. Because of the variability and posterolateral wear, the surgical epicondylar axis is a better reference for femoral component rotation than the posterior condyles—especially in valgus knees. In a recent study, we measured the posterior condylar angle (defined as the angle formed by the tangent to the posterior condyles and a line through the epicondyles as depicted in Figure 26.1) in 107 consecutive TKAs in 88 osteoarthritic patients and found the posterior condylar angle to be $3.29 \pm 1.93$ degrees for varus knees, $3.25 \pm 2.25$ for knees with no deformity, and $5.37 \pm 2.29$ for valgus knees. This led us to note that the posterior condylar angle was significantly greater in valgus knees compared to the other deformities ($p < 0.05$). The large standard deviations denote the variability of the posterior condylar angle in these osteoarthritic patients, and demonstrate that for valgus knees the surgical epicondylar axis is a more anatomic and consistent landmark.

The medial and lateral epicondyles are readily identified during routine exposure of the knee joint. The medial epicondyle is a horseshoe-shaped ridge on the medial femoral condyle that serves as the femoral attachment of the superficial fibers of the medial collateral ligament. The center of the medial epicondyle is an indentation or sulcus where the deep fibers of the MCL insert. However, in those knees where a sulcus is not easily palpable, the center of the sulcus is marked.

This forms a semicircle, which is then completed into a