Complications of Patellofemoral Surgery

David C. Hillsgrove and Lonnie E. Paulos

With a better understanding of the anatomy and biomechanics of the patellofemoral joint and the more specific indications for surgical intervention, complications of patellofemoral surgery should become less frequent. However, seemingly innocuous procedures can result in severe functional disability if complications arise. Nothing can substitute for carefully planned and performed procedures in avoiding such complications. This chapter will address the complications of patellofemoral surgery, their avoidance, and guidelines for treating complications that may occur.

As a sesamoid bone within the quadriceps tendon, the patella floats in the femoral groove with increasing degrees of flexion. Normally, the patella is well seated in the groove by 30° of flexion. Both static and dynamic restraints influence patellar tracking and thus extensor mechanism function. The static restraints include the bony congruence and geometry, as well as the knee ligaments. A dysplastic femoral sulcus will predispose to patellar subluxation and dislocation. Excessive femoral anteverision or tibial external rotation will result in an increase in the lateral vector pull on the patella during flexion, leading to lateral tracking. Rotational stability afforded the knee by the anterior cruciate ligament and medial collateral ligament prevent excessive valgus and external rotation that can contribute to abnormal patellofemoral articulation. The patellofemoral ligaments are significant restraints to medial and lateral patellar glide. Overrestraint or underrestraint can influence patellar tracking and alter normal articular pressures. The dynamic stabilizers are the quadriceps muscle, most importantly the vastus medialis obliquus (VMO). Deficiency of the VMO because of developmental abnormality or acquired atrophy lead to further lateral subluxation of the patella.

The common complaints of patellofemoral problems include pain, grinding, giving way, subluxation, and dislocation. These are the end result of several etiologies including developmental and acquired abnormalities. A systematic history and physical examination will most often delineate the primary cause. At times, more than one abnormality can be identified. Developmental problems include lateral patellar compression syndrome (LPCS), malalignment, and patellofemoral dysplasia. LPCS is the result of a tight lateral retinaculum that inhibits the normal distribution of joint reactive forces in the patellofemoral joint, leading to an overload of the lateral patellar facet and the lateral femoral condyle. Passive patellar tilt is 0° or less, patellar glide is less than two quadrants, and the lateral retinaculum is often tender to palpation. A patient presenting with these findings without significant malalignment is a candidate for a lateral release if conservative measures fail. Malalignment may be diagnosed proximally, distally, or both. It is characterized by examining the proximal soft-tissue restraints and the tubercle sulcus angle at 90°. By determining the site or sites of abnormality, a proximal realignment, including lateral...
release and medial reefing, may be necessary with a distal procedure such as a tibial tubercle osteotomy, if indicated. Patellofemoral dysplasia encompasses abnormalities of the patella or the femoral sulcus, excessive femoral anteversion, and excessive Tibial external rotation. No predictable surgical option exists; however, derotational osteotomies are occasionally performed. Injury to the extensor mechanism, arthritis, and failed complicated surgical intervention represent acquired disorders of the patellofemoral joint. Open reduction and internal fixation offers the best results following patella fractures amenable to holding fixation. Partial or total patellectomy remains an option in highly comminuted fractures. Ruptures of the patellar tendon or quadriceps tendon are best treated with early repair. Isolated posttraumatic arthritis or osteoarthritis of the patellofemoral joint may be treated with anteriorization of the tibial tubercle or, less desirably, by partial or total patellectomy. Such procedures are contraindicated in multicompartiment osteoarthritis or inflammatory arthritis. In these cases, total knee replacement may be required if symptoms warrant. Patellofemoral replacement is still considered to be experimental.

The patellofemoral joint often assumes a passive role in reconstructive procedures such as anterior cruciate ligament or posterior cruciate ligament surgery. However, the central third patellar tendon used as autogenous graft is popular. Transpatellar tendon exposures for tibial plateau and distal femoral procedures have limited applications. As demonstrated, several conditions may require direct or indirect alteration of the patellofemoral joint (Table 14.1). Complications may occur and must be dealt with as meticulously as the original surgery if a satisfactory outcome is to be obtained.

Complications of Lateral Release

Release of the lateral retinaculum and capsule was first described in the English literature in 1974 by Merchant and Mercer for patients with recurrent subluxation or dislocation of the patella. Arthroscopic lateral release was further championed by Metcalf in 1982. Small retrospectively reviewed 10,262 knee arthroscopies for complication including 446 lateral releases. Complications developed in 7.2% of patients of which 65% were hemarthroses. Other complications include deep vein thrombosis (DVT) and infection. Direct correlation of lateral release to incidence of hemarthrosis was found with the use of a tourniquet, subcutaneous technique, and the use of a drain for 24 hours. Hemarthrosis inhibits forceful contraction of the quadriceps leading to atrophy, which is most pronounced in the vastus medialis. Small recommended release of the tourniquet prior to closure in order to examine the superior lateral genicular artery for bleeding and also the use of a drain for 2 to 3 hours postoperatively.

Should a tense hemarthrosis develop, consideration should be given to sterile aspiration. This is performed with an 18- or 16-gauge needle placed superolaterally in the suprapatellar pouch. A 1% lidocaine with epinephrine may be instilled followed by a compressive dressing and application of ice to prevent recurrence. Surgical exploration is rarely indicated. Treatment of DVT and infection are based on local and systemic factors.

The goal of lateral release is to lessen the restraining factor of the distal aspect of the vastus lateralis origin from the intermuscular septum and the epicondyle. Extensive release of the vastus lateralis, as advocated by some, has led to pronounced quadriceps weakness, medial subluxation of the patella, quadriceps tendon rupture, and patellar hypermobility. Hughston and Deese retrospectively reviewed 54 patients who underwent lateral release 6 to 8 cm above the superior pole of the patella and failed to improve or had worsening symptoms following release. Clinically detectable medial subluxation was found in 50% of patients. Atrophy and retraction of the vastus lateralis were also found. In another study of patients with failed lateral release, Shellock et al. used kinematic magnetic resonance imaging (MRI) to demonstrate medial subluxa-