PATELLOFEMORAL INSTABILITY (SUBLUXATION AND DISLOCATION)

Anatomy and Function

The knee joint is composed of two distinctly separate articulations. The tibiofemoral joint is formed by the thigh bone (femur) meeting the shin bone (tibia). The patellofemoral joint is formed by the kneecap (patella) gliding along a groove (trochlea) of the femur. The quadriceps muscles in the front of the thigh attach to the patella and continue via the patellar tendon to insert into the tibia. When the quadriceps muscles contract, the knee straightens (extends). The patella protects the knee from a direct blow and, more importantly, creates a fulcrum that increases the mechanical efficiency of the action of the quadriceps muscles.

Patellofemoral Alignment

The Q-angle (quadriceps angle) is a measurement that describes the alignment of the patella with respect to the tibia and femur. If a line is drawn along the long axis of the femur to the center of the patella, and another line is drawn from the center of the patella to the insertion of the patellar tendon to the tibia (tibial tubercle), then an angle is formed called the Q-angle. If the Q-angle is greater than 15 degrees, there may be a tendency of the patella to “track” or move laterally (toward the outside of the knee). Lateral tracking over a long period of time, injury and other factors may cause breakdown of the patellofemoral joint surfaces. The patella can partially dislocate (subluxate) or completely dislocate from a direct sideways blow to the knee or if the Q-angle temporarily increases too much due to outward rotation of the leg and foot (such as when pivoting).

Diagnosis of Patellofemoral Instability

Pain in the front of the knee and a sensation of “looseness” of the kneecap are common complaints. If the patella partially dislocates (subluxates) the knee will “give-way” or buckle.

If this condition is suspected, your doctor may order x-rays of your knee that will show the position of the patella in the trochlear groove. Patellar tracking can be tested during the physical examination. Your doctor may ask you to extend (straighten) your knee while he holds your tibia first rotated inward then rotated outward. If your knee feels better when you extend your knee while the tibia is held internally rotated (decreasing the Q-angle) and feels worse when you extend your knee while tibia is held in external rotation (increasing the Q-angle), then you may have lateral patellar instability.
Treatment of Patellofemoral Instability

The treatment for patellofemoral instability can be either non-operative or operative.

Non-operative Treatment

Non-operative treatment consists of the following:

- Bracing and lateral knee supports to help hold the patella in place.
- Exercises to strengthen the quadriceps muscles
- Activity modification - avoiding excess pivoting sports

Operative Treatment

Operative treatment for patellofemoral instability consists of surgery to re-align the patella and to decrease the Q-angle. Surgical treatment can be divided into two basic types:

- Proximal re-alignment procedures
- Distal re-alignment procedures

Proximal re-alignment

Proximal re-alignment consists of making a small incision at the knee and lengthening the restraining structures on the outside of the patella and/or shortening the ligaments on the inside of the patella. This procedure is usually used in young patients in whom the growth plates are still open. Proximal re-alignment is often done in combination with a distal re-alignment procedure.

Distal re-alignment

Distal re-alignment consist of making a small incision over the upper tibia. The surgeon then uses a bone-cutting instrument to cut the tibial tubercle (to which the patellar tendon attaches) so that the bone and patellar tendon can be moved medially or toward the inside of the knee. The piece of bone is reattached to the tibia using two screws. This procedure realigns the pull of the quadriceps muscles across the knee by decreasing the Q-angle. After surgery a knee brace is worn to protect the knee for about six weeks until the bone is healed. You may bear partial weight on the leg when using the immobilizer and crutches when you are comfortable doing so. The two screws can be removed when the bone is completely healed (after about six months) if they are tender. This is a relatively minor procedure.
Results of Surgery and Risks

Results of both proximal and distal patellar re-alignment procedures are good when performed on appropriately selected patients. In patients who have pre-existing injury to the joint surfaces (such as chondromalacia), knee pain and crepitus (joint noise) can persist. In most instances, however, knee function improves after surgery due to better knee mechanics.

Risks of surgery:
- wound infection
- continued pain
- delayed bone healing
- loss of motion