Orthotics

Support For

Osgood-Schlatter Apophysitis

By: Brian Jensen, DC

Over a century ago Osgood and Schlatter described a condition that develops in active adolescents. It is one of the most common causes of knee pain in young athletes. While it is frequently called a “disease,” this is actually a benign and self-limiting inflammation of the growing apophysis. It is caused by biomechanical factors, and will usually respond rapidly to appropriate conservative care.

Whenever a young patient presents with anterior knee pain, a close examination of the knee for swelling and tenderness will quickly identify this diagnosis. Radiologic studies are helpful in ruling out alternate pathologies but are not usually necessary, since the physical examination is the key. Unfortunately, some adolescents receive insufficient treatment, and they may present later in life as adults with higher levels of disability.

Gender, Age, Activity Factors

While the incidence is higher in boys, the frequency of Osgood-Schlatter apophysitis in girls has risen along with their increasing sports participation. The usual age range of the two genders varies, based on their respective timing of skeletal maturation. In boys, it is most frequently seen between the ages of 10 and 15 years, while girls between the ages of 8 and 13 years are more often affected. The course is chronic and tends to recur over a period of months to several years, but usually clears by the age of 18. In some patients, the symptoms may persist into adulthood, or will recur when the adult begins a new recreational or athletic endeavor.

The patient will present with anterior knee pain that is made worse with running, jumping, and ascending or descending stairs. There is usually no specific injury or event that is identified as the initiating cause. Involvement may be unilateral or bilateral. Palpation will disclose a tender and swollen region around the tibial tubercle at the insertion of the patellar tendon. Resisted extension of the knee at 90° usually increases the pain, while resisted straight-leg raising does not. Conditions to be ruled out include:
Sinding-Larsen-Johansson syndrome (apophysitis of the inferior pole of the patella); stress fracture; tendinitis; and bursitis. Remember also that hip pain in children (from problems such as Legg-Calve-Perthes disease and slipped capital femoral epiphysis) is frequently referred to the knee.

**Adolescent Considerations**

A common misconception is that Osgood-Schlatter is an avascular necrosis of the developing tibial tuberosity. In actuality, it is caused by an excessive biomechanical force being placed on the tibial tendon at its insertion into the growing tuberosity. This force disrupts the normal ligamentous attachments at the apophysis, causing inflammation, edema, and pain with use. The condition may result from a single major traumatic event, such as a violent contraction of the knee extensor muscles to prevent a fall. More commonly, repetitive microtrauma causes multiple tiny avulsion fractures of the apophysis. This is then followed by an inflammatory cycle, usually from repeated running and jumping during team sports.

A major contributing factor in this scenario is the element of growth. During a growth spurt, significant muscle-tendon imbalance commonly develops when the bones lengthen more rapidly than the muscles and connective tissues. This imbalance often results in tight and inflexible muscle groups. The relative inflexibility increases the traction forces on this site, and any repetitive athletic activity adds to the imposed stresses. Children with a patella alta (a high kneecap) appear to be at higher risk for developing the Osgood-Schlatter condition, since the higher position of the patella increases the tension in the patellar tendon and at the tibial tuberosity, especially when forcing the knee into full extension (such as during kicking or jumping maneuvers).

**Adult Considerations**

After the apophysis has fused to the tibia, the tibial tendon has a solid insertion point and the bones do not add to their length. For most patients, the symptoms from the Osgood-Schlatter condition resolve. However, when there has been a significant amount of fragmentation of the tibial tubercle, with ossicles in the patellar tendon, anterior knee pain can recur in adults. This is now caused by the altered biomechanics of the patellofemoral joint and the patellar tendon, combined with the stresses of recreational activities. In these cases, patellar tracking, shock absorption, muscle imbalances, and other functional aspects of knee joint performance need to be improved. In rare cases, conservative care fails, and surgical excision of the bony fragments is needed to improve biomechanical function.

**Adolescent Care**

*Restricted activity.* Jumping, sprinting, kicking, deep squats, and other activities that stress the tibial tendon are eliminated, while easy jogging is still encouraged. Immobilization is not recommended.

*Cryotherapy.* Frequent (hourly) ice massage and/or cold packs help reduce inflammation.

*Vitamin C with bioflavonoids.* A natural anti-inflammatory that can speed tendon healing.

*Lower extremity stretching.* Gentle, but repeated and progressive stretches to improve the length and flexibility of the quadriceps, in particular; but also the hamstring and gastrocnemius muscles.

*Lower extremity strengthening.* Hamstring curls and straight-leg raises are progressed to graduated eccentric strengthening of the tibial tendon (such as plyometric box jumps).

*Bracing and supports.* A strap or brace that provides support for the patellar tendon may be useful during athletic activities. Flexible, custom-made stabilizing orthotics which help to reduce shock and excessive tibial motion may allow a quicker return to sports, especially for patients with excessive pronation or supination.

**Adult Care**

*Lower extremity stretching.* Repeated and progressive stretches to improve the flexibility of the quadriceps, hamstrings, and gastrocnemius muscles.

*Lower extremity strengthening.* Hamstring curls and straight-leg raises are progressed to graduated eccentric strengthening of the tibial tendon (such as plyometric box jumps).
Orthotics

Orthotics for pronation. Flexible, custom-made stabilizing orthotics help to reduce the stresses on the patellar tendon and improve patellar tracking during tibial rotation.

Shock absorption. Orthotics with viscoelastic padding will decrease the amount of shock at heel strike.

Early Treatment Deters Later Problems

When the Osgood-Schlatter condition is not treated correctly, or when the child (or parents) determine that adolescent sports success is more important than the growing body, adult problems may ensue. In these cases, a close examination of lower extremity biomechanics will usually find that several problems have developed. Adjustments for chronic foot and ankle subluxation are often needed. Custom-made stabilizing orthotics are almost always necessary, to deal with any excessive pronation, fixed supination, calcaneal inversion, tibial rotation, and to absorb some of the shock of heel strike. When treated early, correctly, and managed conservatively, this condition should have no long-lasting effects on sports participation.

References

About the Author
Dr. Brian Jensen, a graduate of Palmer College of Chiropractic, practiced in Nebraska for 17 years. He speaks on a wide variety of topics, including orthotic therapy, posture, structural preservation, breaking free of the medical model of health care, and innovations in nutrition. Dr. Jensen is currently the Associate Director of Professional Education at Foot Levelers, Inc.