Diagnostic Imaging Review

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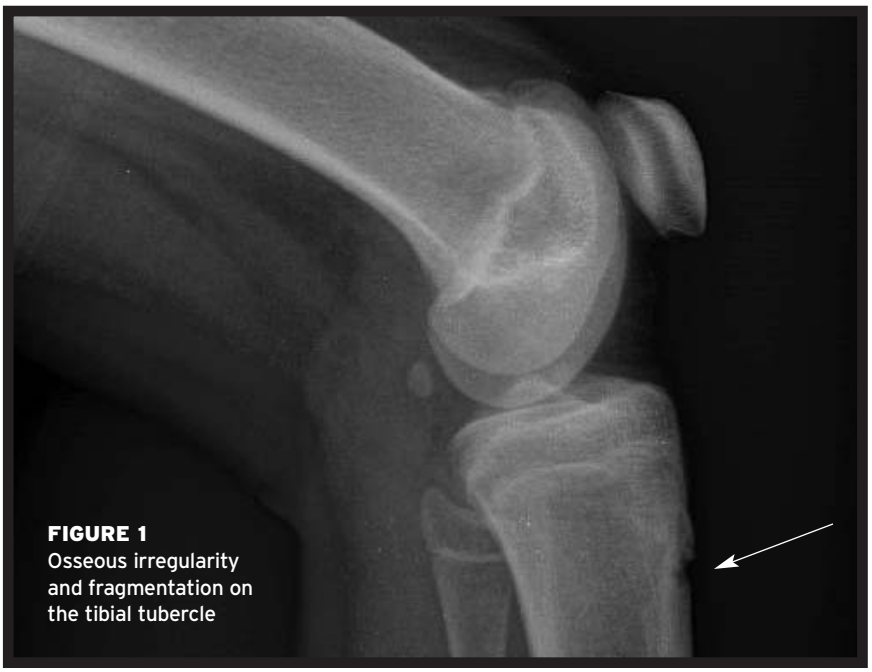

FIGURE 1
Osseous irregularity and fragmentation on the tibial tubercle

A common cause of knee pain in athletic children

CASE

A 13-year-old female presented with a 4-day history of left knee pain. The pain had come on suddenly. The patient stated that after she walked home from school, she had some moderate knee discomfort; then, after dinner, she noticed increased pain and swelling just below her patella. The pain was now constant, worse with bending and walking up stairs, and slightly better with rest. The patient was very active, playing volleyball and soccer, but denied any recent trauma or history of injury to her knees. She did not recall having any similar symptoms in the past.

On physical examination, obvious swelling was noted below the knee joint. The patient experienced pain with palpation below the patella and with passive flexion of the knee along with extension of the knee against resistance. She also complained of pain when performing a shallow knee bend. No joint effusion or locking of the knee was observed, and she had full range of motion at the hip, knee, and ankle joints. McMurray sign and the anterior and posterior drawer signs were all absent. No pain was elicited when valgus and varus stresses were applied on the knee. The results of the examination of the right knee were normal. A radiograph was ordered (see Figure 1). **What does this image suggest is the most likely diagnosis?**

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DISCUSSION

Figure 1 is a lateral plain radiograph of the knee in a skeletally immature patient. The film reveals no gross fracture or dislocation. A fabella is seen in the posterior aspect of the knee. The tibial tubercle demonstrates some osseous irregularity and some fragmentation, suggestive of Osgood-Schlatter disease. No patellar tendon calcification or gross soft tissue swelling is noted adjacent to the tibial tubercle.

In 1903, after observing a similar pattern of knee symptoms in young athletic patients, Dr. Robert Osgood and Dr. Carl Schlatter identified the condition and coined the term *Osgood-Schlatter disease*. This condition is actually not a disease but rather more of an overuse injury. It usually occurs when continual strain is placed on the anterior tibial tubercle by the patella tendon, causing a partial separation of the tonguelike epiphysis of the anterior tibial tubercle. The femoris muscle is one of the largest muscle groups and inserts on a relatively small area of the tibial tuberosity, resulting in high tension on the insertion site. In children and young adults, additional stress is placed on this cartilaginous site through repetitive flexion and extension at the knee, which occurs in sports such as volleyball, soccer, gymnastics, and baseball. In growing children, the attachment of the patellar tendon to the tibial tuberosity is more tenuous; eventually, traumatic changes occur along the insertion point of the tibial tuberosity, causing the tendon to avulse from the bone. Once the bone or cartilage is pulled away, it continues to grow, ossify, and enlarge, leading to swelling of the knee and even pain in the area.[1]

Osgood-Schlatter disease is typically seen in boys between the ages of 12 and

15 years and in girls between the ages of 8 and 12 years, and it has a male to female ratio of 7 to 1.[1] Bilateral involvement is common, but unilateral involvement can occur as well.[1] Clinical symptoms may vary; some patients have mild symptoms, including vague, intermittent knee pain. Others may experience severe, constant pain that is exacerbated during physical activity and relieved during rest.[1] On physical examination, edema and soft tissue swelling around the tibial tuberosity may be present. Tenderness can be elicited with palpation over the tibial tuberosity at the site of the patellar tendon insertion. Reproducible pain occurs with flexion of the knee and extension of the knee against resistance. The knee joint is typically unaffected since Osgood-Schlatter disease is not intra-articular.

Diagnosis is clinical and can be made by physical examination findings in a child or young adult who points to pain over the tibial tuberosity, which is found to be swollen.[2] Plain radiographs of the knee can be ordered, especially when the condition is unilateral, to rule out infections, tumors, and other disease processes.[1] A lateral radiograph will show irregularity of the apophyses with separation from the tibial tuberosity in early stages of the condition and fragmentation in the later stages. If the diagnosis in still in question after plain radiographs are reviewed, MRI can be ordered.

Treatment is conservative, with the focus on reducing pain and swelling. NSAIDs should be prescribed, along with wrapping the knee until the child can perform his or her usual activities without subsequent pain or discomfort.[3] Quadriceps and hamstring exercises may be helpful as well. If conservative management is unsuccessful, referral to an orthopedic surgeon for consultation is recommended. Osgood-Schlatter disease is self-limited in most children, and symptoms generally completely resolve within 1 to 2 years. At the completion of the adolescent growth spurt, children usually remain asymptomatic; some may have a bony prominence that remains as a permanent marker of the event.[2,3]

Our patient was treated with 3 weeks of anti-inflammatory medication, along with strengthening exercises, and her symptoms almost completely abated. Two months after the initial onset, she was able to resume her usual sport activities without discomfort. JAAPA

Julie Vajnar, PA-C, RT, department editor

REFERENCES

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