ANTERIOR KNEE PAIN often poses a significant clinical challenge to practitioners. Knee injuries account for 15% of all football-related injuries, and the knee has been the most-injured body part in six of the last seven NCAA football seasons. For anterior knee pain, differential diagnoses include patellofemoral syndrome, chondromalacia patellae, quadriceps tendinitis, plica syndrome, osteochondritis dissecans (OCD), acute patella fracture, patellar instability, and bony ossicle formation. Bipartite patella is an atypical diagnosis in sports, with occurrence rates of 1–4% to 2–6% being reported.

Bipartite patella is a congenital ossification anomaly involving the patellar sesamoid bone. It is usually clinically asymptomatic. Research suggests that 77% of patellae ossify from the center, and the other 23% ossify from either two or three centers. Secondary ossification sites typically appear around the age of 12 years. The cause of this anomaly is regional variation in blood supply that can lead to vascular ischemic changes in the patella. These changes support the idea that bipartite patella formation is caused by marginal fractures that eventually lead to nonunion from these vascular insufficiencies.

Saupe classified bipartite patellae based on the position of the accessory ossification center. Type I presents with an ossification site at the inferior pole and has a prevalence rate of approximately 5%. Type II, with a 20% incidence rate, presents with a lateral site of ossification, and Type III has a superior lateral ossification site and a 75% prevalence rate.

Bipartite patella is often diagnosed as the result of an incidental radiographic finding. A practitioner might mistake bipartite patella for an acute patellar fracture. Initial physical examination will be unremarkable with the exception of localized point tenderness and a palpable bony prominence. Skyline, standard anteroposterior, and lateral views are recommended for diagnostic evaluation. Plain-film radiographs should always be taken bilaterally to assess for a true bipartite patella. Patients will present with bilateral radiographic abnormalities in approximately 50% of cases.
Figure 1 Excised fragment from patient that measured approximately 3.75 cm in length. Fragment excised from the superior lateral aspect of the patella, characteristic of a Saupe Type III, bipartite patella. Surgically, the fragment was grossly unstable and was removed without incident.
a program that involved stationary cycling, range-of-motion exercises, and quadriceps strengthening. At 4 weeks postsurgery, the patient began aquatic therapy and sport-specific, closed-chain quadriceps-strengthening exercises. He was cleared to start running 6 weeks after surgery and began weight lifting 2 weeks later. Ten weeks postsurgery, the patient was cleared and took part in full spring football drills without complaint or recurrence of pain.

Discussion
Because of the congenital nature of this anomaly, many athletes will present with nothing more than localized anterior knee tenderness and perhaps a bony prominence. The patient involved in this case study had participated in organized football for 12 years before his diagnosis. Symptomatic bipartite patella is a rare knee condition, and although atypical, the diagnosis of symptomatic bipartite patellae should be considered. In addition to a thorough history and physical exams, plain-film radiographs are helpful in the diagnosis.

Many patients will improve with nonoperative care, but highly competitive athletes who do not respond to nonoperative care might need surgical intervention. The choice of surgical method depends on the stability of the fragment and type, as graded by Saupe’s classification. Open excision of the fragment, lateral release, and internal fixation are methods described in the literature. Postoperative care should involve wound care, early range-of-motion exercises, aquatic therapy, cardiovascular exercise, and quadriceps strengthening. Excellent results will yield a full return to function and an absence of localized tenderness.

Conclusion
Symptomatic bipartite patella can be a frustrating injury for the athlete and the clinician. Highly competitive athletes have both operative and nonoperative treatments available to them. The benefits of the various surgical options should be considered in relation to the athlete’s clinical and radiographic examination. An experienced surgeon can help guide the decision-making process and help return the athlete to optimal performance.

References

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