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INTRODUCTION

COURSE OBJECTIVES

After completing this course, the learner will be able to:

1. Describe the anatomy and mechanics of the patellofemoral joint.
2. Describe the etiology of patellofemoral pain syndrome (PFPS).
3. Describe the diagnosis, examination, and classification of patients with PFPS.
4. Describe an appropriate evidence-informed physical therapy treatment plan for a patient with PFPS.
5. Describe the surgical interventions and postoperative rehabilitation considerations used in treating PFPS.
6. Identify outcome measures and prevention strategies for PFPS.

Patellofemoral pain syndrome (PFPS) is one of the most common lower extremity disorders seen in orthopedic practice (Wood, Muller, & Peat, 2011) and is very common in active individuals. PFPS is the most common injury in runners (Taunton, Ryan, Clement, Lloyd-Smith, & Zumbo, 2002) and is prevalent in 12% to 15% of the military population (Boling et al., 2010). Patellofemoral pain occurs more frequently in women than in men (Boling et al., 2010; Taunton et al., 2002). PFPS is related to a combination of factors involving overuse and overload of the patellofemoral joint and may involve biomechanical issues and muscular dysfunction (Bolgla & Boling, 2011; Juhn, 1999). The multifactorial etiology of PFPS has led to much controversy regarding causes, classifications, and optimal interventions for this disorder. For these reasons it is one of the most challenging knee problems to manage. Stanley James has referred to PFPS as the “black hole of orthopaedics” (Dye, Stäubli, Biedert, & Vaupel, 1999, p. 46) because, as Scott Dye summarizes, “No single theory has fully clarified the problem or resulted in treatment leading to predictable resolution of symptoms” (Dye et al., 1999, p. 46). Conservative interventions have proven to be effective for some individuals, but PFPS’s high recurrence rate and level of chronicity emphasizes the importance of identifying and addressing underlying causes of pain (Stathopulu & Baildam, 2003). Recent research has generated some consensus on the best management strategies for PFPS examination and treatment. This course will present the latest evidence and expert consensus regarding the management of patellofemoral disorders.

This intermediate-level course reviews relevant anatomy and important biomechanical considerations for the loading of the patellofemoral joint during static and dynamic activities. Evidence regarding the reliability and validity of commonly used examination techniques is presented. Discussion of etiology and presentations of various categories of PFPS will clarify the classification process and selection of treatment strategies based on the unique signs and symptoms for each individual. The current evidence regarding efficacy of interventions is presented, as well as appropriate outcome measures.
to assess patient progress and clinically important changes. Operative procedures for the patellofemoral joint and postoperative rehabilitation principles are discussed. Finally, prevention strategies are outlined with evidence regarding the efficacy of those programs.

This course presents the latest, evidence-based examination and treatment approaches for conservative management of PFPS and postsurgical rehabilitation for patellofemoral disorders. Upon completing this course, the learner will be able to evaluate, classify, and provide evidence-based examinations, interventions, and treatment progressions for patients with PFPS. This course will benefit physical therapists, physical therapy assistants, and athletic trainers who are involved in the treatment of individuals with PFPS.
Patellofemoral Pain Syndrome: Current Concepts in Evaluation and Treatment

ANATOMY

Bony Architecture

The patella is a triangular-shaped sesamoid bone embedded within the quadriceps tendon. It is the largest sesamoid bone in the body (Levangie & Norkin, 2011). The superior aspect of the patella is curved and is called the base. The inferior aspect is pointed and referred to as the apex (Neumann, 2010). The posterior surface of the patella is covered with articular cartilage that is typically 4 to 5 mm thick (Neumann, 2010). This is one of the thickest cartilage layers in the body. The thickness is made necessary by the need to withstand the heavy compression loads that cross this joint. A vertical ridge running approximately in the center of the posterior surface of the patella divides the patella into medial and lateral facets. The medial and lateral facets are flat, slightly convex surfaces (Levangie & Norkin, 2011). Some patellae have a second vertical ridge near the medial border, creating another facet called the odd facet at the extreme medial border of the patella (Levangie & Norkin, 2011). Because of the abnormal shape of the facets, the patellofemoral joint lacks congruency and is susceptible to instability. The patella articulates with the femur in the intercondylar (trochlear) groove of the femur, forming the patellofemoral joint (PFJ; Figure 1). This groove is concave medial to lateral and convex from top to bottom (Levangie & Norkin, 2011). The trochlea gets deeper from proximal to distal (Tecklenburg, Dejour, Hoser, & Fink, 2006). The lateral femoral condyle is typically more anterior than the medial condyle, which serves to stabilize the patella laterally. The stability of the PFJ is influenced by the shape of the trochlear groove and is affected by both the depth and steepness of the slopes. Dysplasia of the trochlear groove may lead to decreased stability of the PFJ.

Patella Soft-Tissue Attachments

The fibrous capsule of the knee joint encloses the patellofemoral joint along with the medial and lateral tibiofemoral joint (Neumann, 2010). The internal surface of the knee joint capsule is lined with a synovial membrane (Neumann, 2010). The anterior aspect of the capsule attaches to the margins of the patella and the patellar tendon and is reinforced by the quadriceps tendon and medial and lateral patellar retinacular fibers (Neumann, 2010). The retinacular fibers are extensions of the connective tissue covering the vastus lateralis, vastus medialis, and iliotibial band (Neumann, 2010). The lateral retinaculum consists of two layers: the superficial oblique retinaculum and the deep transverse retinaculum (Waryasz & McDermott, 2008). The superfi-


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