CRITICALLY APPRAISED TOPIC

Treating Patients with Patellofemoral Pain Syndrome Using Regional Interdependence Theory: A Critically Appraised Topic

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Clinical Scenario

Many athletic endeavors involve combinations of complex movement patterns that display athleticism, efficiency of movement, and artistic impression. The musculoskeletal system is under significant stress during both practice and competition or performance. Because of this, an athlete may be susceptible to overuse and chronic injuries.1 Due to the nature of athletics, athletes may continue to train through pain, which contributes to compensation and dysfunction.1 Athletics may be viewed as a complex series of movements that involve significant strength, flexibility, stability, and cardiovascular endurance.2

Patellofemoral pain syndrome (PFPS) is a common pain disorder experienced by both young and adult patients.3,4 Females appear to be 2.33 times more likely to develop PFPS as compared with males.5,6 It has been reported that PFPS accounts for 25–40% of all knee problems seen in a sport clinic.5 Teitge7 surveyed physical therapists, primary care physicians, and sports medicine physicians to establish how many patients they see with patellofemoral pain (PFP). Of the 57,555 patients seen, 1,782 presented with anterior knee pain (AKP), of which 303 were coded as PFPS.7,8 The diagnosis of PFPS is made based upon the presence of anterior or retropatellar knee pain in the absence of other specific pathology.9 PFPS may be aggravated by activities such as squatting, ascending and descending stairs, prolonged sitting, and repetitive activities such as running.10

The source of PFPS is multifaceted, and once factors that have a direct relationship to pain (ligament tear, acute trauma, arthritis, joint replacement) are ruled out, a large percentage of patients remain with what is termed “idiopathic patellofemoral pain”.11 The following factors are thought to contribute to the development of PFPS: quadriceps weakness, excessive foot pronation, forefoot kinematics, increased Q angle, patella alta, iliotibial band and vastus lateralis tightness,
malalignment of the femur (excessive hip adduction and/or hip internal rotation), imbalance in the quadriceps musculature, and weakness of the proximal hip musculature. According to a consensus statement from the 3rd International Patellofemoral Pain Research Retreat, new research has added to the consensus that proximal upper extremity factors and distal lower extremity factors play significant roles in the development of PFPS. The PFPS consensus statement represents updated knowledge of PFPS that will allow clinicians to evolve their knowledge and integrate findings into their clinical practice.

The regional interdependence (RI) model is defined as the notion that “a patient’s primary musculoskeletal symptom(s) may be directly or indirectly related or influenced by impairments from body regions and systems regardless of proximity to the primary symptom(s)” Sueki and Chanocas described the importance of RI when understanding how the body attempts to restore homeostasis following injury and disruption to the set physical parameters of the body. The alterations or compensations the body goes through will remain long after the injured tissue has healed, and, more often than not, if the true cause of the compensation is not discovered the body will continue to remain in an unequal state. It is difficult to ascertain how the RI concept fits into the current medical model. The causes behind this uncertainty are twofold. First, clinicians are expected to determine a diagnostic label, and second, not all musculoskeletal pain will allow for such a clear-cut diagnosis. Traditional diagnoses, which exclude the RI model, may limit subsequent treatment options if and when a more detailed evaluation is performed. Also, clinicians may be labeling musculoskeletal pain without there being clear and precise signs and symptoms. The importance of screening the proximal and distal joints to the site of pain cannot be emphasized enough; without thorough evaluation valuable information regarding dysfunction may be missed and injury mismanagement will occur.

In accordance with RI theory, many researchers have found that there is a strong relationship between pain location and subsequent dysfunction in unrelated structures, for example, the torso and knee. Traditionally, PFPS has been treated by an intense focus on the knee. While this once was a logical tactic, current research has provided a strong foundation as to why expanding upon a localized evaluation should be considered along with traditional methods for treatment of any pain exhibited. The RI concept may allow clinicians to provide a more comprehensive approach to evaluation and subsequent treatment.

**Focused Clinical Question**
Is there current evidence to suggest patients suffering from PFPS will benefit from treatment approaches away from the knee, specifically neuromuscular re-education to the proximal hip musculature or manual therapy techniques applied to the lumbopelvic hip complex?

**Search Strategy**
A computerized search was completed in February and March 2014. The search terms used were:
- Patellofemoral pain syndrome (PFPS)
- Anterior knee pain (AKP)
- Neuromuscular reeducation
- Regional interdependence

The criteria for study selection were as follows.

**Inclusion Criteria**
- Published in the last 12 years (2003–current)
- Limited to the English language
- Studies involving subjects who currently have symptoms of PFPS
- Studies using interventions aimed at musculoskeletal regions proximal or distal to the knee
- Studies using neuromuscular re-education techniques

**Exclusion Criteria**
- Studies investigating treatment options directed at the knee
- Studies investigating knee pain not associated with PFPS

**Results of Search**
Summary of Search, Best Evidence Appraised, and Key Findings
- The search of the literature provided 35 possible resources (see Figure 1)
- Three sources were identified as textbooks
- Seven studies met the inclusion criteria