P
atellofemoral pain syndrome (PFPS) is arguably one of the most frustrating musculoskeletal conditions a certified athletic trainer/therapist faces. Many articles have been written about the causes and treatment of PFPS, and perhaps this plethora of information adds to the frustration clinicians feel when attempting to choose from a variety of treatment options. This article presents suggestions for a clinical treatment for patellofemoral pain based on current research and theory.

**McConnell Taping**

In 1986 Australian physiotherapist Jenny McConnell revolutionized the clinical management of patellofemoral pain. She promoted a special taping procedure to reposition the patella in conjunction with exercises purported to specifically re-educate the VMO. She suggested that the taping procedure corrects patellar malalignment, sufficiently reducing patellar pain to facilitate the performance of strengthening exercises that ultimately enable pain-free function.

McConnell’s claims led to several studies examining the effect of taping on patellar alignment. One study used static magnetic resonance imaging (MRI) to compare patellar positions at 8 angles of non-weight-bearing knee flexion under three conditions: patellar tape, bracing, and no tape. The researchers found that the tape caused a change in alignment at only one point in the range of motion, which they considered irrelevant to dynamic function. Another study that examined patellar positions in partial weight bearing produced results similar to those of Worrell et al. Temporary alignment changes were observed, but 10–15 min of agility and sprinting activities eliminated the effect.

Although research has not substantiated McConnell’s claims of improved patellar alignment, substantial reduction in pain has been documented. Independent studies have not corroborated McConnell’s anecdotal claim of pain reduction in 96% of her patients, but Conway et al. reported a 13% reduction in pain, Cushnaghan et al. reported a 25% reduction in pain, Worrell et al. reported an 85% decrease in pain, and Cerny reported a 94% change in pain levels.

There are several possible explanations for the variability in level of pain relief reported by the various authors: variability in patients’ pain levels prior to treatment, differences in the amount of discomfort elicited...
by various activities, differences in the characteristics of the PFPS patients, differences in methods of reporting changes in pain level, or the possibility of a placebo effect. Another possible reason for the wide variation in reports of pain reduction is the inconsistency in reporting on patients’ pain. Factors contributing to the difficulty of comparing one author’s findings to that of another include the variation in methods used to identify changes in pain levels, the clarity of the report of their methods, and patients’ information such as severity or perceived severity of the activity, duration of symptoms, or other factors that could influence changes in pain levels. Nevertheless, a statistically significant reduction in pain was observed in each study. The question then becomes, if taping does not change patellar alignment, what is the mechanism by which pain is reduced?

According to Conway et al., there are three possible mechanisms by which taping or bracing reduces pain: biomechanical factors (change in position during function), neurological factors (altered neural input and muscular response), and psychological factors.

Neurological Factors

Pain Modulation and PFPS

Although scientific evidence is lacking, some authors have theorized that bracing and taping may reduce pain via stimulation of cutaneous sensory receptors. One current theory for pain relief is a modification of the original Gate Control theory and includes the notion that the larger and faster-conducting afferent fibers synapse with enkephalin interneurons. In turn, these enkephalin interneurons release enkephalin that inhibit the transmission of the A-delta and C fibers to block pain.

Kinesthesia and PFPS

Patients with PFPS have been found to have deficient kinesthetic capabilities, and stimulation of cutaneous receptors has been shown to improve knee kinesthesia. Specifically, knee kinesthesia has been shown to improve with the use of a sleeve-type knee brace, and the functional capabilities of persons with PFPS has been shown to improve with the application of tape. Therefore, patellar taping or bracing may enhance kinesthesia and neuromuscular control by stimulating cutaneous mechanoreceptors.

Psychological Factors

There are two primary mechanisms by which psychological factors may impact pain: placebos and the suggestion of expected outcomes.

The Placebo Effect

The placebo effect occurs when a patient’s condition improves with a treatment that has no quality which would alter the patient’s condition. The existence of this phenomenon has consistently been shown in pharmacological studies. Recent studies have demonstrated the impact of the placebo effect in the areas of orthopedic surgery and manual therapy. Patients who received either arthroscopic joint debridement or a simple arthroscopic incision—without insertion of the instrument—reported improvement, and all were satisfied with the outcome of the procedure. Placebo massage treatment to the wrong area has also been shown to produce positive results.

The Power of Suggestion

The power of suggestion is another strong psychological factor that clinicians use daily. We provide our patients with suggestions of expected outcomes from a treatment before it is administered. “This will make you feel a lot better.” “After a couple of treatments, you will see a significant improvement.” We are able to dissuade the patient’s fears with such statements of conviction and reassurance.

Rehabilitation Program for PFPS

Any therapeutic exercise program should be based on specific functional goals that are established before the program is implemented, and that serve as criteria for progression to increasingly demanding activities. The pyramid in Figure 1 illustrates the logical progression of one factor building upon another until the ultimate goal of optimal functional performance is achieved.