



NEWSLETTER

Anterior Knee Pain

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Problem:

Anterior knee pain is a term used to encompass many conditions affecting structures on the front of the knee. The majority of cases can be attributed to patellofemoral pain syndrome (PFPS) or an abnormal tracking of the patella (knee cap) on the femoral groove (thigh bone) secondary to changes in lower extremity alignment, muscle imbalance, or training errors². The multifactorial nature of this condition likely contributes to the increased incidence and prevalence of this disorder within our clinic.



PFPS is the most common LE condition seen in orthopedic practice and the most common overuse injury in the active population²⁴. It is attributed to 25-40% of all knee problems in sports medicine centers and 25% of all injuries in runners. In addition, as seen in other knee conditions PFPS is more common in females who are 2.2 times more likely to experience PFPS than males³. There are many factors which contribute to this increased incidence of injury and the increased risk seen in females versus males.

The nature of this condition requires a thorough Physical Therapy examination of the entire lower quarter of the body. The diagnosis of PFPS can be elusive clinically, but recent evidence suggests our strongest diagnostic test is resisted strength testing of the quad (+ Likelihood ratio (LR) 2.2), but 2 of 3 positive tests within a clinical examination cluster (pain with quad contraction, pain with squatting, and pain with palpation) demonstrated a (+) LR of 4.0⁷. Further, the eccentric step down test (+ LR 2.34, - LR .70) offers value for the differential diagnosis and the identification of precipitating or perpetuating impairments impacting the knee joint²⁰. The examination of the knee joint and surrounding joints and structures is required to design an individualized treatment approach customized to the patient's impairments.



Evidence: Manual Therapy

A recent literature review found level B evidence for the utilization of manual therapy on the lower quarter in patients with PFPS⁴. Crossley et al. demonstrated improved stair climbing function following manual therapy to the patellofemoral and tibiofemoral joints of the knee⁹. Additional studies looking at manual therapy directed at joints within the lower quarter have also been demonstrated to be effective in the management of PFPS. Iverson et al. demonstrated an immediate decrease in quadriceps inhibition (weakness) following lumbopelvic manipulation in patients with PFPS^{25,26}. This research also demonstrated a >50% reduction in pain with functional activities following

lumbopelvic manipulation in a subgroup of patients with PFPS. One clinical variable was associated with success from this treatment approach. A side to side difference in hip IR >16 degrees improved the probability of success from 45% to 80% (+LR 4.6)¹⁵.

Recently Lowry et al. demonstrated improvements in pain and disability utilizing manual therapy, exercise, orthotics and taping in a series of patients with PFPS¹⁷. It appears a multimodal Physical Therapy approach to the structures of the lower extremity may offer more effective and efficient management of a patient's symptoms.



Evidence: Exercise

Herrington et al. examined the benefits of open chain (foot off the ground) compared to closed chain strengthening (foot on the ground) in patients with PFPS. Both groups improved short term strength and function, but no statistical differences were found between groups¹³. This indicates the ability to benefit from both lower and higher impact exercises on a patient's condition allowing the Physical Therapist to tailor the exercise prescription to the patient's symptoms. A recent randomized, controlled trial demonstrated improved pain and function in a group of females with PFPS performing knee and hip strengthening compared to a knee strengthening and a control group¹¹. In addition, Mascal et al. demonstrated improved pain and function in two females with PFPS utilizing a

proximal and distal lower quarter strengthening program¹⁸. This research highlights the importance of hip strengthening within a global exercise approach in patients with PFPS.

Clark et al. also examined the efficacy of the individual components of physiotherapy in subjects with anterior knee pain. Patients who were in a group that included exercise were significantly more likely to be discharged at three months than non-exercising patients⁵. This research is consistent with a trend in musculoskeletal conditions indicating the combination of manual therapy and exercise may be our most effective management strategy.



Evidence: Taping

Patellar taping produces a clinically meaningful change in patients' with chronic knee pain, but conflicting results in these studies indicates a subgroup of patients may be most appropriate for this intervention²⁹. Lescher, et al. developed a clinical prediction rule to determine which patients with PFPS would be most likely to benefit from patellar taping. Two variables, (+) patellar tilt test and >5 degree tibia varum, increased the probability of success from 52 to 83% in patients with PFPS¹⁶. Further, Derasari, et al. documented an inferior glide of patella produced through taping increased patellofemoral joint surface contact area reducing the pressure across the joint during functional activities in patients with chronic PFPS⁹. Taping may produce either a mechanical or

neurophysiologic effect, but early evidence indicates its' importance in the management of this condition.



Evidence: Orthotics

PFPS has been associated with altered foot positioning which can alter mechanics at the knee leading to increased pain with activity. Orthotics have been shown to be effective at improving foot positioning and reducing knee pain in the short term, but evidence is conflicting¹⁹. A randomized study evaluating the effects of custom orthotics for knee pain found custom orthotics were effective at decreasing knee pain and improving running tolerance¹⁴. Conversely, foot orthotics were not superior to physical therapy management, nor was

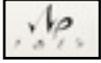
there any additional improvement by adding orthotics to a Physical Therapy programs⁶.

A recent systematic review supported the use of foot orthoses to prevent a first episode of overuse conditions, but demonstrated no difference between custom and prefabricated foot orthoses. Evidence was insufficient to recommend foot orthoses for the treatment of lower limb overuse conditions²³. It appears orthotics have a role in a small percentage of patients with PFPS, but should not be used outside of a multimodal management strategy including manual therapy, taping, and exercise.

Conclusion:

In conclusion, anterior knee pain is a common musculoskeletal injury. Patients should seek out Physical Therapy services for an

appropriate evaluation and intervention program designed to reduce recurrence and allow safe return to prior levels of activity.



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