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Research Paper Review

Patellofemoral Pain: Consensus Statement from the 3rd International Patellofemoral Pain Research Retreat held in Vancouver, September 2013

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Witvrouw E, Callaghan MJ, Stefanik JJ et al.

ANALYSIS

Reviewed by Dr. Jeff Muir DC (Research Review Service)

Author's Affiliations

Qatar Orthopedic and Sports Medicine Hospital, Doha, Qatar; Department of Rehabilitation Sciences and Physiotherapy, Ghent University, Belgium; Manchester Academic Health Science Centre (MAHSC), University of Manchester, UK; other academic institutions worldwide.

Background Information

Approximately 25-40% of all knee problems seen in sports injury clinics relate to the patellofemoral joint (1, 2). These problems present more commonly in females, and are characterized by diffuse pain over the anterior aspect of the knee. Typically, patellofemoral pain (PFP) is aggravated by activities which increase the compressive forces through the patellofemoral joint (PFJ) (i.e. squatting, stair climbing, prolonged sitting, etc.), and by repetitive activities like running, jumping, stair climbing and so on.

The unfortunate thing about PFP is that conservative treatment can often fail, leading to disappointment in patients and frustration among clinicians. The variability in treatment results both clinically and in the literature is likely due to the fact that underlying factors which lead to the development of PFP are not being addressed and are likely not the same for all PFP patients.

This consensus piece was developed at an international meeting of clinicians and researchers. Its goal is to better understand the factors that contribute to the development of PFP and how to adequately manage them clinically.

SUMMARY

Natural History of PFP and Local (knee region) Factors that Influence PFP

- PFP is common in adolescents between 12-17 yoa.
- While it is understood that PFP is more common in women, the prevalence is even higher in adolescents, generally.
- There is no high quality evidence to support the theory that PFP can or will progress to patellofemoral osteoarthritis (PFOA). In spite of the apparent lack of data, there still might be subgroups who may develop frank radiographic PFOA, neither PFP or PFOA, or both. This requires much more research to be elucidated.
- Having said that, the prevalence of PFOA is generally high. There is data suggesting that medial PF compartment damage is highly prevalent and might be more prevalent than damage in the lateral compartment.

Local (knee region) Factors that Influence PFP

- New evidence has shown that abnormal structure/alignment of the PFJ may lead to cartilage damage and focal areas of loading, leading to bone marrow lesions. Specifically, these changes have been associated with patella alta and abnormal trochlear morphology.
- The theory is that structural anomaly, in combination with poor biomechanics (and not anomaly alone), will increase the likelihood of PFP. On the other hand, in those with normal structure, poor biomechanics may not matter, as no study has specifically studied PFJ structure and mechanics in the same cohort.
- It has also been questioned whether the Q-angle actually is a risk factor for PFP. A recent systematic review indicates that there is no relationship between the two variables, making it doubtful that Q-angle has any relevance to the development of PFP.
- Limited evidence shows that there are a myriad of local structures that can cause nociception/pain in PFP cases. These structures include: the infrapatellar fat pad, increased water in the subchondral bone in athletes and bone marrow lesions in cases of PFOA. There is no new evidence showing that the retinacula contributes to nociception.

Trunk and Hip Mechanics and PFP

- Excessive hip adduction and or internal hip rotation is associated with PFP in women, adding to the growing consensus that proximal mechanics are altered in women with this condition. Unfortunately, these mechanics have not been reported as consistently in men – meaning that rehabilitation goals might need to be gender-specific.
- There are conflicting results as to whether contralateral pelvic drop is seen to a greater degree in patients with PFP, compared to pain-free individuals.
- It has also been hypothesized that sagittal plane trunk mechanics are important in PFP. This means that assessing and treating the core is very important in this population.
- The effects of fatigue on lower extremity kinematics remain unclear. One recent study showed, after an exhaustive run, alterations of the hip and knee in the sagittal plane, but not in the frontal or transverse planes (3). While this may be true, a different study reported no changes in

the kinematics of the hip over the course of a run in those with PFP, in spite of the presence of adaptations observed in the study's control group (4). The problem which likely contributes to the variability in the results is the onset of progression of pain itself. Does pain lead to poor kinematics as a form of compensation, or do kinematics lead to pain?

- Other investigations have found that hip extension moments are reduced in patients with PFP during running and that isometric hip extension is weaker in patients with PFP. It has been shown that this weakness can be exacerbated further by intense activity, such as an exhaustive run.
- Further evidence has shown that activation of the gluteus medius is delayed and of shorter duration in patients with PFP. Unfortunately, this has not been a consistent finding, likely due to differences in methodology and patient population.

Knee and Foot Mechanics and PFP

- Altered quadriceps activation patterns have been found in patients with PFP. However, what this really means in terms of injury is yet to be determined.
- The importance of rearfoot inversion to the development of injury remains unclear. Those with PFP use more of their available rearfoot eversion during gait than do healthy controls. Greater rearfoot inversion might be related to hip adduction in those with PFP. Prospective studies indicating a relationship between these two variables need to be performed.
- Greater tibial internal rotation may provide a potential link between PFP and distal factors.

Innovations in Rehabilitation of PFP

- Exercises focusing on strengthening posterolateral hip muscles reduce pain and improve function when performed alone or in combination with multimodal therapy (5-7).
- Movement feedback during treadmill running may change movement patterns of people with PFP, which might reduce symptoms associated with this condition.
- Increasing hip abductor and extensor strength does not affect LE kinematics associated with PFP. (Writer's note: my interpretation of this is that one needs to integrate newfound strength with better movement quality – something that is inherently difficult to do).
- Therapeutic modalities have not shown consistent benefit in patients with PFP (this could be said for most clinical conditions).

CLINICAL APPLICATION & CONCLUSIONS

This consensus statement paper underpins a very popular movement in the manual therapy/rehabilitation sciences fields today: clinicians should indeed check the knee in an attempt to identify the source of nociception, while also checking the segments above and below for poor movement quality. Briefly, clinicians should understand the trunk, hip, ankle and foot mechanics of the patient in order to find specific functional targets for their intervention. The identification of subgroups is the proverbial 'holy grail' for PFP research. The hope is that these studies might lead to insights into the pathophysiology of PFP and allow clinicians and researchers to identify specific targets for treatment in every patient. This is a noble and important goal in many areas of manual medicine.

STUDY METHODS

This paper was a consensus of statement from the 3rd International Patellofemoral Pain Research Retreat held in Vancouver, Canada in September, 2013.

STUDY STRENGTHS / WEAKNESSES

Strengths

- The authors discussed and came to a consensus about the nature of PFP and what avenues we as clinicians might take to identify the key structures to target with treatment.

Weaknesses

- While the authors did state that we should examine specific targets, they did not offer any research or opinion on the best methods to use to identify key functional issues that might contribute to PFP. This consensus piece would have felt more complete if they discussed the best functional, orthopaedic or palpatory testing needed to identify potential barriers to recovery.

Additional References

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