

# Patellofemoral joint pain (PFJP) in Adolescents

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Based on Physio Edge podcast episode 39 with Dr Michael Rathleff

## Prevalence of PFJP in Adolescents

6-7% of Adolescents between 15-19 y.o. suffer with PFJP

There are 2 main groups of adolescents with PFJP

1. Active adolescents - playing sport most days. Doing more than their body can cope with
2. Inactive - Don't play sport or challenged their body with sport. They walk up and down stairs every day, and perform physical education. Their exercise tolerance is limited, and even a small amount of exercise creates an overload issue

Active adolescents often have a high training load that often do not reduce their training load when they have pain, due to the integral nature of sport to their life. A subgroup reduces their activity when they have pain, and quickly ramp up their activity when they are painfree, bringing their pain back on.

## Common reasons for failure of Physiotherapy

- We often jump to prescribing exercises. They may be doing too much, too soon, and we need to talk to them about load management, and modifying their activity.
- If they have an overuse injury, adding exercises to their program may increase their overload issue
- Exercises - explain WHY they are doing the exercises to help improve adherence to the exercise program. Adherence is often low in this group, so initiatives to make it easier for them to perform the exercises can help.
- Explain the link between performance of exercises and recovery. 3-4 x/week - 55% will recover, with exercises of 1x/week, only 20% will be recovered in 1 year.
- Encourage 3x/week, and explain if they do not perform the exercises 3x/week there is very little chance the exercises will help.

## Diagnosis and Differential Diagnosis

### PFJP

- The subjective history will guide your diagnosis. Clues include:
- Diffuse anterior knee pain, worse with stairs, running
- Came on insidiously, not with a particular event
- Hurts everytime load is placed on a bent knee
- Stairs - particularly down stairs
- Increased pain with increased knee flexion eg larger stairs or going up 2 steps at a time

Patients with pain from **Osgood-Schlatters Disease** will have pain over the Tibial Tubercle

**Patellar tendinopathy** patients are often involved in jumping sports, and present with insidious onset of localised pain on the inferior pole of the patella

**Sinding-Larsen-Johanssen (SLJ) Disease**. Patients (10-14yo) will report pain over the inferior pole of the patellar from the enthesis. This condition has an insidious onset, similar to Patellar Tendinopathy, and is treated similarly.

Sudden onset of pain at the inferior pole of the patellar should be investigated for **Patellar sleeve fractures** (chondral or osteochondral avulsion injury at the inferior pole of the patella).

**Osteochondritis Dissecans (OCD)** - Often report the same type of pain as PFJP, but often have locking of the knee, which is not common in PFJP. Refer to orthopaedic specialist and for MRI to identify bone fragments.

If they have a specific incident or trauma instead of insidious onset, then keep other issues in mind eg Meniscal injuries, patellar sleeve fractures.

## Examination

Diagnostic tests are more useful for ruling out other conditions. Patellar apprehension/grind test is not a useful tests, as it causes pain, which then limits the patients ability to perform exercises. Compresses a lot of structures, and will not differentiate PFJP.

Pain localisation. Ask specific questions to identify exactly where they have their pain. Apps like Navigate Pain can be used for the patient to draw their area of pain

Fat pad impingement test - Passive knee extension with AP pressure on the infrapatellar fat pad. Differentiate if this is their normal pain. Irritation of the fat pad can also exist in combination with PFJP. The fat pad extends proximally medially and lateral, and can contribute to anterior knee pain.

Palpation - tibial tubercle, over the fat pad, inferior pole of the patella

## Treatment

Explain that "reducing" sport for a short period is important, rather than "stopping" sport. Modify their activity level, and assess the effect of this on their knee pain. If this helps over 4 weeks, exercises can then be used in combination with slowly returning to sport.

Load management is vital for resolving their anterior knee pain. Play as much sport as they can that doesn't aggravate their knee pain. Using a VAS of less than 3 when playing sport. If they can't get under 3, have a short break for a few weeks to get under 3.

- Warmup session can then be introduced. Monitor their knee pain during training and the next morning, keeping their pain under 3.
- Decrease length of training first, and then frequency. You can reduce training to every second day.
- Increase frequency of training first, then the length of training.
- This is quite hard to implement, and can be hard for the athlete to keep to the restricted schedule
- Alternatives can be used eg do some individual running or cycling in the short term so they are more easily able to modify the time

## Exercise program

Start with hip strengthening for increased proximal control for 4/52.

- Hip extension, abduction and ER are often limited in strength
- Standing hip extension with resistance tubing, and lying hip abduction initially
- Make sure they are challenging themselves when performing their exercises, so they get an improvement in strength
- Provide guidelines for how to increase the resistance of the elastic band eg shortening by 5cm eg from 50cm to 45cm when they can get to 14 reps

## **Orthotics**

Research on orthotics in PFJP has only been performed on adults. You can look for issues with foot control in standing, and identify if there is an alteration in pain with an off-the-shelf orthotic added. Some adolescents are highly unlikely to ever perform their exercises, and orthotics may help to achieve a positive effect in these individuals. Ideally do not replace the orthotic once it has worn out

## **Identifying individuals that will benefit from specific strengthening**

Strength testing has limitations of comparison. Quite a lot of adolescents have bilateral anterior knee pain, so side to side comparison is not possible, and there are no validated strength measures for different ages.

Strength deficits may be a result of PFJP rather than a cause. 10-15year olds with PFJPS do not have the same strength deficits as older individuals. Comparing 12-15 yo, hip and knee strength may be the same in individuals with and without PFJPS in individuals.

PFJPS may be more due to too much, too soon rather than decreased strength, however strength training for the hip can have a positive improvement in their PFJP.

## **Taping**

Fat pad unloading - use a V to elevate the patellar, with the apex of the V at the Tibial Tubercle  
For hyperextenders - Tape posterior knee to limit extension.

## **Sitting**

Limit knee flexion in sitting eg not sitting with feet tucked up under their chair to limit the compression in PFJPS

## **Exercise progression**

After regaining hip strength and control, you can incorporate squats and lunges. Pain free, or with a maximum of VAS 3. Start with bodyweight, then use backpacks for increased weight, with 10-12 repetitions. This can be progressed to single leg squats as long as they don't cause any pain.

Speed and ROM is important with exercise prescription. Time under tension (TUT) is the total concentric, isometric and eccentric phase. An 8 second TUT per repetition, with 80 seconds for one set of 10 is a good guide. This is made up of 3 seconds eccentric, 2 second hold, and 3 second concentric phase.

## **Stretching**

Strengthening is a more important part of the program than stretching. There is more important components than stretching, and the focus needs to be on activity modification and strengthening than stretching.

## **Prognosis and predictors of recovery**

Males > females

Shorter length of time > Longer period with PFJPS

Lower pain levels > Higher pain levels

## **Goal setting**

In individuals with a shorter period of time to recovery, such as a boy with pain for a short period of time and lower pain levels, make a goal of return to sport in a couple of months.

With an individuals with an longer expected time to recovery, use shorter term goals with successes, and set longer term goals. Eg short term - ride bike a period of time without pain, with a longer term goal of walking the dog for an hour.

Incorporate the parents into the recovery and load modification.

## **Treatment of the group that do not do any sport**

Often have decreased hip and knee strength, so you can start with strengthening immediately. Start with hip strengthening, then after 4 weeks progress to knee strengthening with eg knee extensions with theraband, then progressing to lunges, squats and one leg squats.

## **Biomechanics**

Identify patterns of movement that may be contributing to their pain eg pelvic drop, knee going medial or lateral.

Check how they carry their backpack up and down stairs. Backpacks on one shoulder may also contribute to their pain and recovery.

## **Resources & Links**

Podcast: Patellofemoral pain in Adolescents with Dr Michael Rathleff: [clinicaledge.co](http://clinicaledge.co)

Video on Diagnosis of Anterior Knee Pain: [clinicaledge.co](http://clinicaledge.co)

Fat pad taping with Christian Barton - YouTube: <https://www.youtube.com/watch?v=C8MVnVxH2c8>

Dr Michael Rathleff on Research Gate: [http://www.researchgate.net/profile/Michael\\_Rathleff](http://www.researchgate.net/profile/Michael_Rathleff)

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