Fat pad impingement / Infrapatellar inflammation

What is fat pad inflammation (also known as fat pad impingement)?

Inflammation of the fat pad in the knee can be a stand-alone condition or can exist with other knee conditions such as [patella tendinopathy](https://www.ultrasound-guided-injections.co.uk/patella-tendinopathy-jumpers-knee/) or [patellofemoral (knee cap) pain](https://www.ultrasound-guided-injections.co.uk/patellofemoral-osteoarthritis-front-of-knee-pain-kneecap/). The majority of the fat pad sits underneath the knee cap, and can be felt as a ‘spongy/soft’ region. It is also known as Hoffa’s fat pad. It can become inflamed if you bang/knock your knee directly (e.g. falling onto your knee), or can be due to overuse. It is most common in active individuals particularly dancers and those that kneel as part of their job (e.g. a carpenter), but can also be an issue with runners and footballers. An MRI scan is the best way of diagnosing fat pad inflammation.

[Physiotherapy](http://www.complete-physio.co.uk/) is the first line treatment for fat pad inflammation and is likely to involve a period of taping and activity modification if the pain is severe followed by rehabilitation to strengthen weak muscles around the knee. However, it is not uncommon that an [ultrasound guided injection](https://www.ultrasound-guided-injections.co.uk/steroid-injection/) is required to settle the inflammation and should certainly be considered if pain is not settling. A [steroid injection](https://www.ultrasound-guided-injections.co.uk/steroid-injection/) can provide rapid pain relief and speed up your recovery.

What are the symptoms of fat pad inflammation?

* The main symptom is pain below the knee cap on the front of the knee
* Pain is aggravated with kneeling activities as well as impact activities that involve repetitive bending and straightening such as running and dancing
* Pain when you press the ‘soft/spongy’ region on the front of the knee just below your knee cap

If this sounds like your problem, read on below…

Other conditions that can mimic fat pad inflammation:

1. [Cartilage (meniscal) tear](https://www.ultrasound-guided-injections.co.uk/meniscal-tear-cartilage-knee/)
2. [Osteoarthritis of the knee](https://www.ultrasound-guided-injections.co.uk/knee-steroid-injections-pain-relief-osteoarthritis/)
3. [Patellofemoral (knee cap) pain](https://www.ultrasound-guided-injections.co.uk/patellofemoral-osteoarthritis-front-of-knee-pain-kneecap/)
4. [Prepatella bursitis](https://www.ultrasound-guided-injections.co.uk/prepatella-bursitis-housemaids-knee/)
5. [Pes anserine tendinopathy](https://www.ultrasound-guided-injections.co.uk/pes-anserine-tendinopathy-bursitis/)
6. [Patella tendinopathy (Jumper’s knee)](https://www.ultrasound-guided-injections.co.uk/patellofemoral-osteoarthritis-front-of-knee-pain-kneecap/)

Fat pad inflammation vs Patellofemoral (knee cap) pain

Fat pad inflammation causes localised pain at the front of the knee and causes tenderness (pain when you press it) below the knee cap. Whereas, patellofemoral joint pain causes a more diffuse (generalised) pain on the front of the knee and there are often no specific tender spots. This is because the irritation/pain is coming from behind the knee cap.

Both fat pad inflammation and patellofemoral knee joint pain are aggravated by squatting, prolonged walking and going downhill. In fact, they often occur together and can be quite hard to differentiate. An MRI scan can be helpful in determining the exact cause of your knee pain.

Anatomy of the infrapatellar fat pad

The infrapatellar fat pad (commonly known as Hoffa’s fat pad) is located at the anterior (front) of the knee joint. It is a large structure positioned just behind the patellar tendon and the knee cap. It is essentially the soft bit you can push at the front of the knee under your knee cap.

The infrapatellar fat pad has a rich blood and nerve supply making this structure highly sensitive and is considered a key pain generator in many knee conditions. It is enveloped within the knee joint capsule and is intrinsically linked to both the [meniscus](https://www.ultrasound-guided-injections.co.uk/meniscal-tear/) (the shock-absorbing cushion within the knee joint) and the inner lining of the joint capsule (Bennell et al., 2004). This inner lining is known as the synovial membrane and is also a common site for inflammation and pain. An inflamed synovium is called synovitis. Synovitis can be associated with anterior knee pain (Dragoo et al., 2012).

The exact function of the infrapatellar fat pad is still under investigation, but it is believed to act as a reservoir for cells used to repair the knee after injury. It is also thought to play an important role in the shock absorption and mechanics of the knee during movement (Dragoo et al., 2012).

What causes infrapatellar fat pad impingement/inflammation?

Fat pad impingement occurs when the infrapatellar fat pad can become impinged (pinched) between the patella (kneecap) and the femoral condyle (large bony prominence at the end of the long bone of the thigh). Impingement causes microtrauma within the fat pad, resulting in pain, swelling and inflammation. When the fat pad becomes swollen, the healing process becomes altered, resulting in fibrotic changes within the fat pad. This, in turn, causes further repeated episodes of impingement, driving a vicious circle of pain, swelling and impingement (Bennell et al., 2004).



Infrapatellar fat pad impingement can occur for many reasons, including:

* Overload of the extensor (quadriceps) mechanism such as when [running](https://complete-physio.co.uk/services/running-clinic/) and when kicking a ball during football.
* Hyperextension of the knee (over straightening of the knee), e.g. in gymnastics/dance
* Repeated episodes of kneeling often seen in [carpet layers](https://www.ultrasound-guided-injections.co.uk/prepatella-bursitis/).
* Direct impact to the front of the knee such as after a fall.
* Poor biomechanics – this is often seen in runners due to either week hip muscles or a pronated (flattened) foot arch.

However, the most common cause of infra-patella fat pad inflammation/impingement that we see at [Complete](https://complete-physio.co.uk/) is due to other associated knee conditions. Due to its close affiliation with the knee joint the infrapatellar fat pad is also often associated with:

* [Osteoarthritis](https://www.ultrasound-guided-injections.co.uk/knee-osteoarthritis-steroid-injections-pain-relief/)
* [Patellofemoral pain](https://www.ultrasound-guided-injections.co.uk/patellofemoral-osteoarthritis/)
* Ligamentous injuries, e.g. ACL
* [Meniscal tears](https://www.ultrasound-guided-injections.co.uk/meniscal-tear/)
* [Patella tendinopathy](https://www.ultrasound-guided-injections.co.uk/patella-tendinopathy-jumpers-knee/)
* [Post-operative pain](https://complete-physio.co.uk/return-running/) following an arthroscopy/keyhole surgery – when you have a knee arthroscopy/keyhole surgery, the surgeon passes though the fat pad with his instrumentation. This can cause prolonged pain and inflammation after the operation. (Draghi et al., 2016).

It is not uncommon that clients attend the clinic with a diagnosis of one of these above conditions, following an [MRI](https://complete-physio.co.uk/do-i-need-an-mri-scan/) scan or X-ray, but their actual pain is arising from the infra-patella fat pad.

How do you know if you have an infrapatellar fat pad inflammation/impingement?

Infrapatellar fat pad inflammation/impingement is a common source of anterior knee pain and is often associated with other knee issues.

**Symptoms of infrapatellar fat pad inflammation often include:**

* Sharp pain located at the front of the knee.
* Swelling surrounding the patella and the patellar [tendon](https://complete-physio.co.uk/services/tendon-clinic/).
* Pain with prolonged periods of standing or sitting with crossed legs.
* Pain with walking and [squatting](https://www.ultrasound-guided-injections.co.uk/?s=squatting).
* Pain during sport. In particular [running](https://complete-physio.co.uk/services/running-clinic/) and kicking activities.
* Pain with wearing high heels.
* Pain after periods of rest such as waking first thing in the morning or after [sitting in a desk](https://complete-physio.co.uk/services/ergonomic-assesment/).

How is an infrapatellar fat pad inflammation/impingement diagnosed?

A diagnosis of infrapatellar fat pad inflammation/impingement is made using both a [clinical assessment](https://complete-physio.co.uk/services/physiotherapy/) and [diagnostic imaging](https://complete-physio.co.uk/services/diagnostic-ultrasound/).

The assessment involves:

1. A clinical interview – this is used to understand how your pain started and what factors may be involved in its evolution. A full medical history is also taken. This is to rule out any other issues that may play a part in your pain, such as systemic inflammatory disorders including rheumatoid arthritis.

2. A physical assessment – this includes

* Knee joint range of movement testing.
* Quadricep and hip strength testing.
* Palpation (feeling) of the knee joint structures. This can sometimes be a little painful but is important to locate the structure causing your symptoms.
* Movement tests. Functional tests often include squatting, lunging, single leg balancing, walking and running assessments.

**Diagnostic imaging**

Although a clinical assessment can provide valuable information about your condition confirmation of an infrapatellar fat pad impingement requires diagnostic imaging. Fat pad impingement/inflammation is best visualised on a magnetic resonance imaging (MRI) scan. [MRI](https://complete-physio.co.uk/do-i-need-an-mri-scan/) is an excellent diagnostic tool routinely used to diagnose soft tissue pathology. Completing an MRI of the lengthy process and often takes between 30 minutes to an hour. This involves you lying still within the machine whilst it takes a sequence of images. The sequence of images forms to a complete view of your knee, from front to back.

**Diagnostic ultrasound imaging**

[Diagnostic ultrasound](https://complete-physio.co.uk/services/diagnostic-ultrasound/) (US) has the ability to provide real-time dynamic images of superficial soft tissues – it is a very useful “adjunct” to MRI and can give extra information on how the fat pads behaves in real times with knee movements. US is also used to carry out ultrasound-guided injections.

The infrapatellar fat pad is a superficial structure and therefore can be easily and accurately assessed using this imaging technique. Diagnostic ultrasound imaging is effective at diagnosing chronic fibrotic changes seen within the infrapatellar fat pad as well as inflammation.

At Complete your initial assessment will involve a full and accurate diagnosis of your symptoms using a combination of clinical testing and we will also carry out the diagnostic musculoskeletal scan.

How do we treat infrapatellar fat pad impingement?

Sample overview of 5 x cases.

<https://reader.elsevier.com/reader/sd/pii/S2211568414002009?token=1EE672A424F1D6C5A5B417FBDC76F5285DDBE18CB162111D292A728A5DDAB78D0917BED9B5F9D19AB01D57975BC7BF0C&originRegion=eu-west-1&originCreation=20220328173843>

A significant proportion of patients suffering from infrapatellar fat pad impingement/inflammation respond positively to simple advice and modulatrion of activity:

**This can be:**

Rebalancing of your activity programme to reduce the intensity of any aggravating activity (jumping sports, running, football, or martial arts are just some that can aggravate symptoms)

Introduce or increase other activities that do not seem to aggravate – some patients find that swimming or a change in running surface and intensity can allow symptoms to settle

Try intermittent use of oral antin-inlammatory medicine (NSAIDs) such as ibuprofen (as long as you have no contraindications).

If this does not work then you will likely benefit from physiotherapy input +/- injection therapy.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4789926/pdf/10.1177_1941738115611413.pdf>

[**Physiotherapy**](https://complete-physio.co.uk/services/physiotherapy/)**treatment for infrapatellar fat pad impingement commonly includes:**

* Providing information on avoiding aggravating symptoms.
* Produce a specific rehabilitation program to strengthen the muscles surrounding the knee and the hip.
* Prescribe a set of stretches for tight lower limb musculature.
* Re-education of abnormal movement patterns and biomechanics – this may mean changing the way you walk, run, squat or lunge.
* Occasionally your [physiotherapist](https://complete-physio.co.uk/team/) may support your knee by using therapeutic tape, designed to offload the fat pad and help relieve symptoms.
* [Soft tissue treatment](https://complete-physio.co.uk/services/sports-massage/) techniques and acupuncture are sometimes used to help relieve pain and tightness associated with your symptoms.
* Advice on footwear/orthotics if over-pronation of your foot has been implicated.

**What if conservative/physio management does not work on its own?**

If physiotherapy and a progressive home exercise program have failed to relieve your symptoms then you may be appropriate for an [**ultrasound-guided injection.**](https://www.ultrasound-guided-injections.co.uk/ultrasound-guided-injections-clinic/)

During this technique, a small dose of an anti-inflammatory medication known as a [corticosteroid](https://www.ultrasound-guided-injections.co.uk/steroid-injection/) is combined with the short-acting local anaesthetic and injected within the infrapatellar fat pad using real-time ultrasound guidance. The amount of anaesthetic will depend on the area of the inflammation and is judged on a case by case basis, but is usually 5-10ml. In some cases, further volume is added with sodium chloride (sterile injection of simple medical “salt water”). This “volume effect” has also has been researched as having the safe potential for an added positive effect.

<https://online.boneandjoint.org.uk/doi/abs/10.1302/1358-992X.97BSUPP_11.BSMB2015-034>.

It dopes not work for everyone, but can make a major difference to symptoms in 50-80+% of cases.

[Ultrasound-guided injections](https://www.ultrasound-guided-injections.co.uk/what-is-an-ultrasound-guided-injection/) have been proven to be significantly more accurate at delivering medication to the intended target than landmark guided injections. Research has also shown that this increased rate of accuracy results in fewer post-injection complications, is better tolerated by patients and is capable of providing significant pain relief.

**An ultrasound-guided corticosteroid injection is not a standalone**[**treatment**](https://www.ultrasound-guided-injections.co.uk/how-much-does-a-steroid-injection-cost-privately-uk/)**.**

The pain relief experienced from a corticosteroid injection allows you a [‘window of opportunity’](https://www.ultrasound-guided-injections.co.uk/steroid-injections-mask-pain/) to undertake a specific rehabilitation program. For the best outcome to be achieved Complete strongly recommend a course of physiotherapy commence within 2 weeks after injection, once your pain has settled.

Corticosteroid is an effective medication for reducing pain and inflammation associated with infrapatellar fat pad impingement and particularly useful in the following circumstances:

* If your pain has been persistent for over 3 months or is getting worse.
* If your pain is affecting the ability to sleep and waking you up.
* If your pain is affecting your ability to complete activities of daily living, work or partake in leisure activities
* If your pain is limiting your ability to complete your physio rehabilitation program.

Some researcher shave looked at “ablating” the fat pad with alcohol injections.

<https://pubmed.ncbi.nlm.nih.gov/17981168/>.

But in some cases this can aggravate, and is not something that FYSICL recommends or performs.

**If the above treatments do not resolve the symptoms within the time frame you are expecting/happy with, then we suggest a surgical opinion to be considered for partial excision of the fat pad as an option.**

[**https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6425896/pdf/ksrr-31-054.pdf**](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6425896/pdf/ksrr-31-054.pdf)

**I hope this above information helps in:**

* **Considering if you might have this condition.**
* **Your decisions on how you prefer to proceed with treatment if you have been diagnosed with the condition.**

If you have any further questions please contact the clinic for advice, or to arrange a call.

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