



 ASPETAR

 Qatar Orthopaedic and Sports Medicine Hospital

 مستشفى أسبتر

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Fat Pad Syndrome

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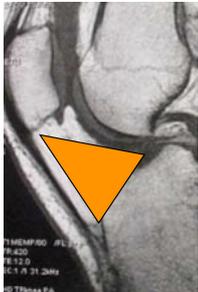
 Qatar Orthopaedic and Sports Medicine Hospital

 Doha

 Qatar

Background

- Do you believe in ...
- ...Fat Pad Syndrome?!



Definition?

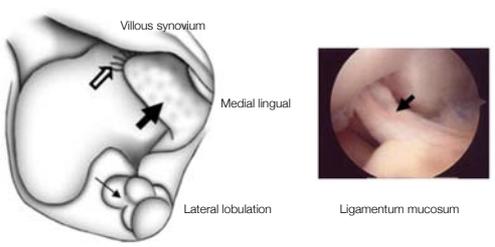
- **A. Hoffa: The influence of the adipose tissue with regard to the pathology of the knee joint. JAMA, 42 (1904)**
 - described an isolated impingement of the infrapatellar fat pad as an inflammatory hypertrophy of the articular adipose tissue and considered it relevant in causing knee pain and/or impairment of knee function.
- Under-representation in the medical literature has created a low level of knowledge of both normal and pathologic fat pad appearance.
- In most cases, the diagnosis of fat pad pathology is still made as an exclusion, rather than as a defined pathologic process.

Anatomy

- The infrapatellar fat pad (IFP) is an intracapsular, extrasynovial structure that fills the anterior knee compartment. Its posterior surface is covered with synovial lining. It's a body of adipose tissue that occupies the space formed by the patella and patellar tendon, tibial plateaus, and the femoral condyles.
- The anterior interval has been defined as the space between the IFP anteriorly and the anterior tibia posteriorly



Anatomy



Villous synovium

 Medial lingual

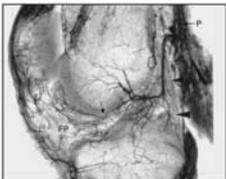
 Lateral lobulation

 Ligamentum mucosum

Brooker et al.

Vascularization

- The IFP is vascularized by a rich anastomotic network. Branches coming from the inferior, superolateral and superomedial genicular arteries.



Dragoo et al.

Pain generator

- Rich innervation and relationship with the highly innervated synovium.
- Dye SF, Vaupel GL, Dye CC (1998) Conscious neurosensory mapping of the internal structures of the human knee without intraarticular anesthesia. *Am J Sports Med* 26(6):773-777:
 - Neurosensory mapping of the internal structure of the knee without anesthesia. Severe pain was reported during **probing** of the meniscal capsular margin, the infrapatellar fat pad, and the insertion site of the cruciate ligaments, whereas minimal pain was reported during probing of the cartilage and the inner rim of the meniscus.
- Bennell K, Hodges P, Mellor R, Bexander C, Souvris T (2004) The nature of anterior knee pain following injection of hypertonic saline into the infrapatellar fat pad. *J Orthop Res* 22(1):116-121:
 - **Hypertonic saline injections** into the fat pad in healthy volunteers produced strong knee pain in regions similar to those in patients with anterior knee pain.

Pain generator

- The IFP produces different **growth factors** (bFGF, VEGF), as well as pro-inflammatory tumour necrosis factor- α (TNF α) and interleukin-6. In addition to the general promotion of inflammation, TNF α has been shown to induce matrix metalloproteinases and thus extracellular matrix breakdown, bFGF may promote fibrogenesis, and VEGF production could lead to angiogenesis and scarring within the IFP.
- The local production and release of these substances may contribute to the progression of inflammation, fibrosis and pain within the IFP.

So?

- Regarding these data, it could be assumed that pathology of the fat pad could be an underlying cause of anterior knee pain and inflammation
- In 1962, Smillie differentiated between **primary hypertrophy**, which is found rarely, and a more common **secondary disease**, which was thought to be caused by ligamentous or meniscal lesions
- Today we know that several other diseases affect Hoffa's fat pad.
 - Trauma with contusion or laceration,
 - repeated microtrauma, especially in sports activity,
 - arthritis and/or synovialitis,
 - femoropatellar joint dysplasia and/or dysbalances,
 - operatively or traumatically induced scar tissue or arthrofibrosis



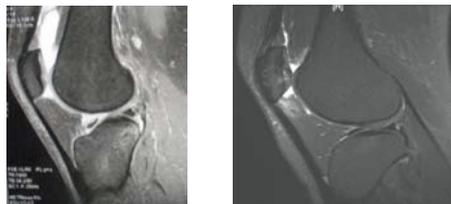
History and clinical examination

- **Pain** (burning or aching) in the infrapatellar or retropatellar tendon regions, which is exacerbated by movement or loading of the knee
- **The Hoffa test.** Firm pressure is applied with the thumb inferior to the patella outside the margin of the patellar tendon with the knee in 30-60° of flexion. The knee is fully extended, and increased pain in the infrapatellar fat pad indicates a positive test. The test is repeated on both the medial and lateral side.
- The IFP may be tender, firm or enlarged on examination.
- Other signs: Extension block, decreased patellar mobility, especially in the proximal direction, and a positive patellar tilt test.



Imaging

- Sagittal MRI has been the most commonly used modality to assess pathologies in the IFP.



Diagnosis

- Patellar tendinopathy
- Chondropathy
- Synovial disorders
- Mass-like abnormalities



Nonoperative Treatment

- Physical therapy: "to restore the biomechanics of the patellar tracking"
- Muscle training: Quadriceps, Gluteals
- Gait training
- Taping: "the inferior pole of the patella must be tilted out of the fat pad to decrease the irritation of the fat pad"
- Injections: corticosteroids

Anterior Knee Pain?

Operative Treatment

- Fat Pad excision
 - Complete or Partial?



Ogilvie-Harris DJ, Giddens J. Hoffa's disease: arthroscopic resection of the infrapatellar fat pad. *Arthroscopy* 1994; 10 (2): 184-7

Kumar D, Alvand A, Beason JP. Impingement of infra-patellar fat pad (Hoffa's Disease): results of high-portal arthroscopic resection. *Arthroscopy* 2007; 23 (11): 1180,1186.

von Engelhardt LV, Tokmakidis E, Lahner M, et al. Hoffa's fat pad impingement treated arthroscopically: related findings on preoperative MRI in a case series of 62 patients. *Arch Orthop Trauma Surg* 2010; 130 (8): 1041-51

Conclusion

- Primary Fat Pad Syndrome?
- Secondary pathology of Infrapatellar Fat Pad: Yes
 - "Tetchy" and sensitive anatomical structure!

