«Χρόνιες κακώσεις και σύνδρομα καταπόνησης γόνατος: Κλινική προσέγγιση»

ΣΙΔΕΡΙΔΗΣ ΑΡΙΣΤΟΤΕΛΗΣ

ΟΡΘΟΠΑΙΔΙΚΟΣ ΧΕΙΡΟΥΡΓΟΣ
TheMIS ΟΡΘΟΠΑΙΔΙΚΟ ΚΕΝΤΡΟ
ΘΕΣΣΑΛΟΝΙΚΗ
ISAKOS & ICRS Teaching & Training center

Disclosures

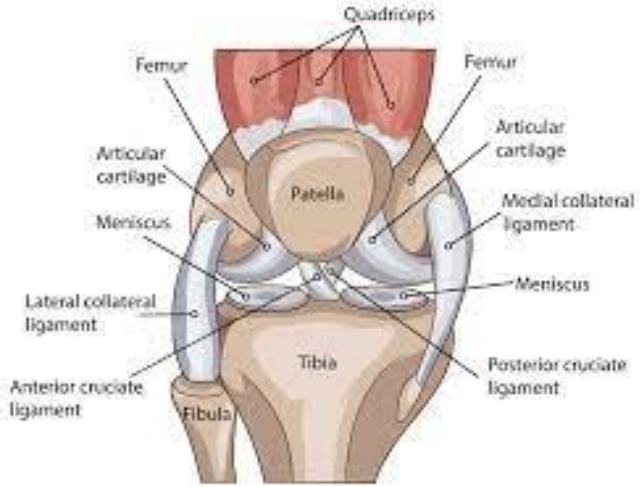
I have no financial disclosures to report

Στοιχεία της άρθρωσης του γόνατος

- **Οστά :**
  - **Οστικό οίδημα**
  - **οστεονέκρωση**

- **Χόνδρος**
  - **Χρόνιες κακώσεις του χόνδρου.**
  - **Διαχωριστική οστεοχονδρίτιδα.**

- **Σταθεροποιητικά στοιχεία του γόνατος**
  - **Εκφύλιση των μηνίσκων**
  - **Αστάθεια προσθίου χιαστού**



- **Δυναμικά στοιχεία του γόνατος:**
  - **Πρόσθιος πόνος του γόνατος – επιγονατιδομηριαίο σύνδρομο**
  - **Τενοντίτιδες**
  - **Pelegrinni stieda**

- **Αρθρικός θύλακος και υμένας - υμενική πτυχή**

Bone- Marrow oedema - Osteonecrosis

- Bone marrow oedema syndrome is a **diagnosis of exclusion** that is characterized by **pain and increased interstitial fluid within bone marrow** without an obvious cause. It is frequently misdiagnosed as its clinical presentation is highly variable and nonspecific.

- As such, it may be referred to by a plethora of terms, including "**transient osteoporosis**," "**regional migratory osteoporosis**," and "**algodystrophy**"

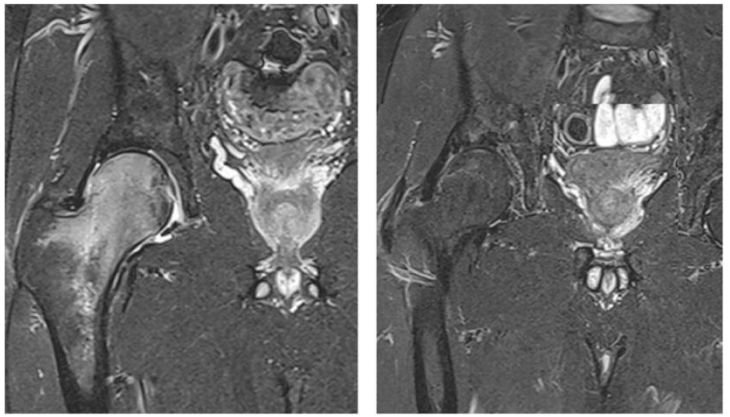
Bone Marrow Oedema Syndrome:Arthroscopy
Donald D. Davis; Steven M. Kane. December 2, 2020.

Osteonecrosis

- Osteonecrosis of the knee (also known as avascular necrosis) is a painful condition that occurs when the **blood supply** to a section of bone in the femur or tibia **is disrupted**. Because bone cells need a steady supply of blood to stay healthy, osteonecrosis can ultimately lead to **destruction of the knee joint and severe arthritis**.
- Osteonecrosis of the knee most often occurs at the **medial** femoral condyle, however, it may also occur at the lateral femoral condyle or at the tibial plateau

BMO

- While bone marrow oedema syndrome is by definition pain and marrow oedema of unknown etiology, there is evidence that this phenomenon is associated with **metabolic disturbances, including vitamin D deficiency**.
- Bone marrow oedema syndrome was originally described in pregnant women during the third trimester. Other reviews have cited cirrhosis and type IV hyperlipoproteinemia as being associated with an increased incidence of bone marrow oedema syndrome



Bone Marrow Oedema Syndrome:Arthroscopy
Donald D. Davis; Steven M. Kane. December 2, 2020.

osteonecrosis

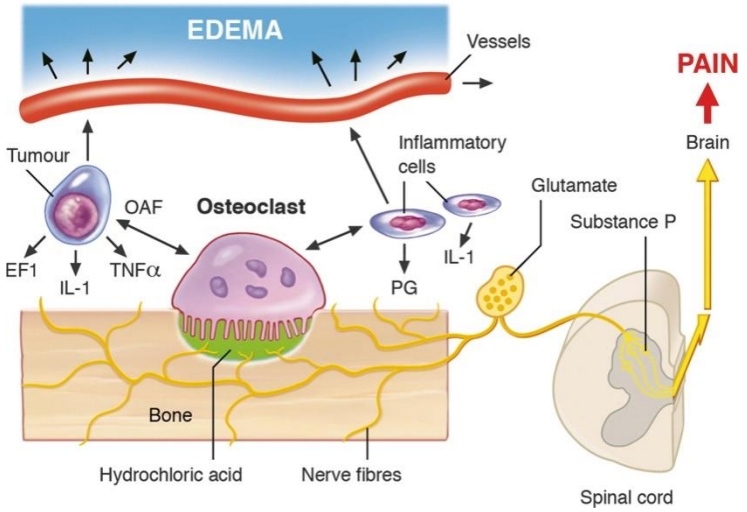
- Osteonecrosis develops when the blood supply to a segment of bone is disrupted. Without adequate nourishment, **the affected portion of bone dies and gradually collapses**. As a result, the **articular cartilage** covering the bone **also collapses**, leading to disabling **arthritis**.

- Osteonecrosis of the knee can affect anyone, but is more common in people **over the age of 60**.
- **Women** are three times more likely than men to develop the condition.

- Bone marrow oedema syndrome is a condition in the **lower extremities** in 98% of presentations and rarely appears in the upper limbs.
- **Middle-aged men** (aged 30 to 60) and **young women** (aged 20 to 40) are most likely to be affected with an incidence of 3 to 1 in men and women.
- Bone marrow oedema syndrome is often a **migratory phenomenon** and occurs bilaterally in 41% of patients.

Bone Marrow Edema Syndrome:Arthroscopy
Donald D. Davis; Steven M. Kane. December 2, 2020.

- The pathogenesis of bone marrow oedema syndrome remains unknown. **Vascular anomalies**, decreased **fibrinolysis** (especially in pregnant women), and **thromboembolism** have all been proposed as possible etiologies, but a definitive cause remains elusive. Ultimately, the pain is likely caused by the **aggravation of neurovascular bundles within the bone marrow** due to **increased intraosseous pressure** caused by the increased fluids in the bone marrow interstices



Bone Marrow Edema Syndrome:Arthroscopy
Donald D. Davis; Steven M. Kane. December 2, 2020.

Osteonecrosis

Risk Factors

- **Injury.** A knee injury—such as a **stress fracture** or dislocation—combined with some type of trauma to the knee, can damage blood vessels and reduce blood flow to the affected bone.
- **Oral corticosteroid medications**. Steroid-induced osteonecrosis frequently affects multiple joints in the body.
- **Medical conditions.** Osteonecrosis of the knee is associated with medical conditions, such as **obesity, sickle cell anemia, and lupus.**
- **Transplants.** Organ transplantation, especially kidney transplant, is associated with osteonecrosis.
- **Excessive alcohol use**. Overconsumption of alcohol over time can cause fatty deposits to form in the blood vessels as well as elevated cortisone levels, resulting in a decreased blood supply to the bone.

BMO

Patients with bone marrow oedema syndrome often present with complaints of

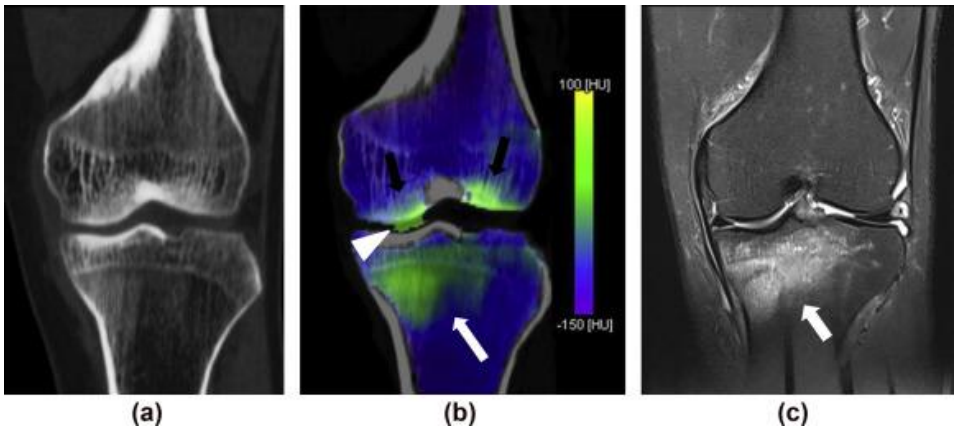
- **Severe pain** that **limits functionality** and daily activities.
- **Pain and swelling during rest and activity**, which may occur suddenly or insidiously.
- **Tenderness and swelling** in the area of the syndrome.
- Classically, joint spaces are intact, as arthralgia and joint effusion are not common in the presentation.

OSTEONECROSIS

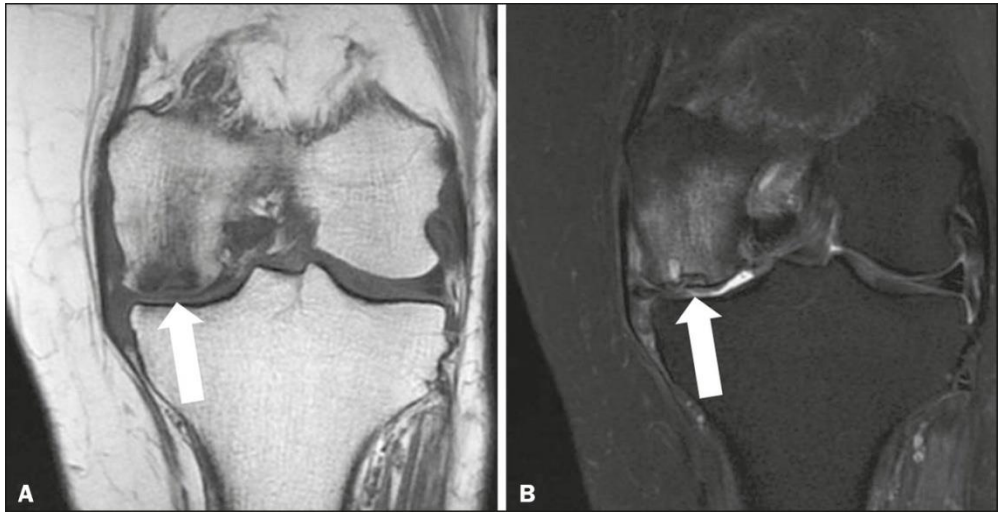
- Same symptoms **more persistent** and worsening by time

BMO

- Radiographs will typically begin to show **osteopenia a month or two after the presentation of symptoms.**
- **CT scans may** be ordered to assess **local demineralization**, as well as to rule out other causes of pain and swelling such as malignancy or infection.
- Nevertheless**, MRI** is a much better test for the assessment of bone marrow oedema syndrome, as **oedema can be detected within two days of symptom onset**. MRI will show a decreased signal on T1 weighted images and an increased signal on T2 and STIR images.
- Blood work is typically benign, but there may be **decreased levels of vitamin D**. This finding may also warrant bone mineral density testing and treatment if necessary



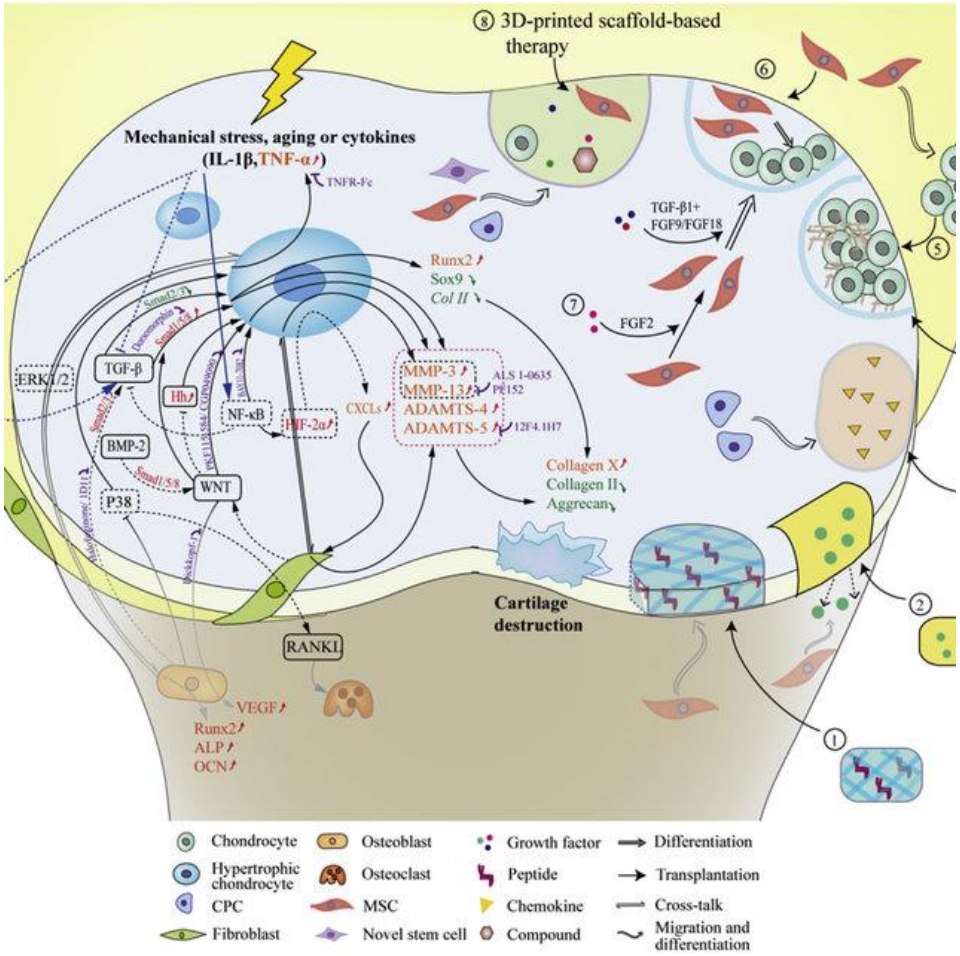
OSTEONECROSIS

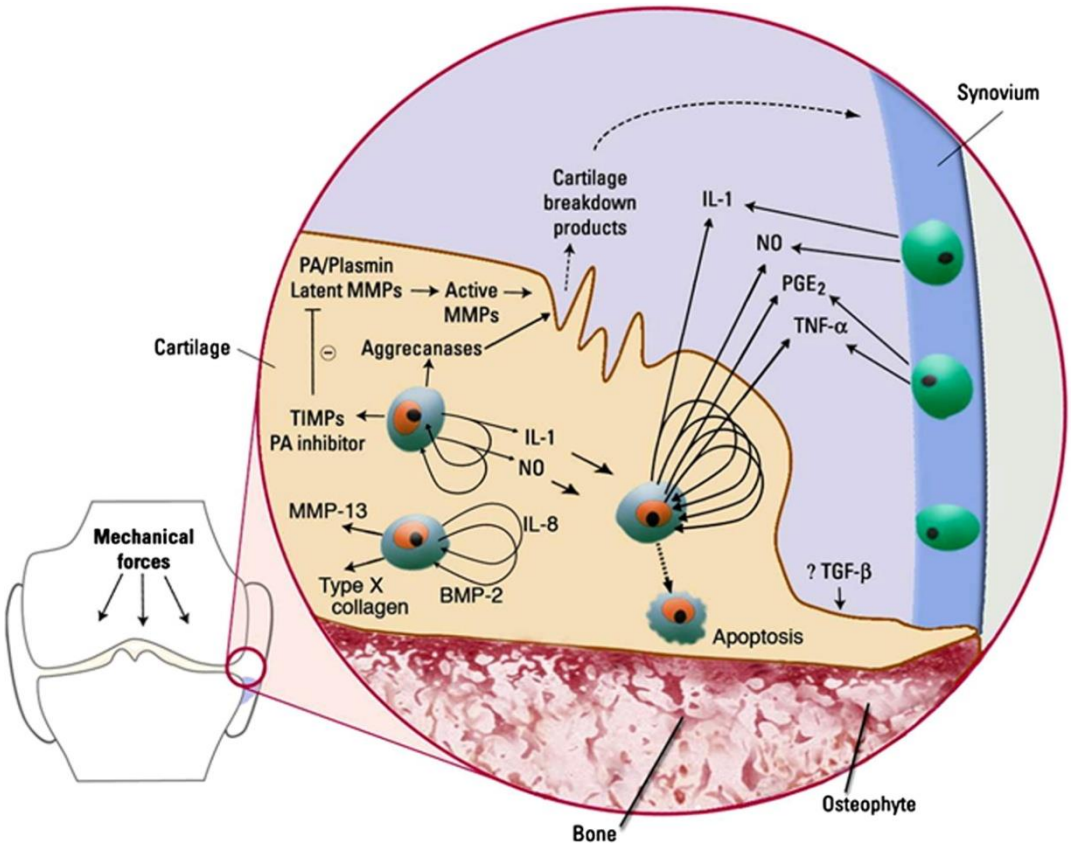


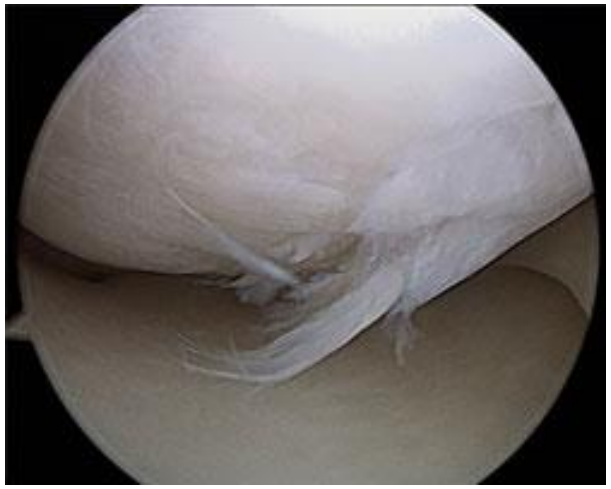
Bone marrow oedema syndrome
has a broad differential diagnosis.

Trauma,
malignancy,
infection,
osteonecrosis,
complex regional pain syndrome,
stress fractures

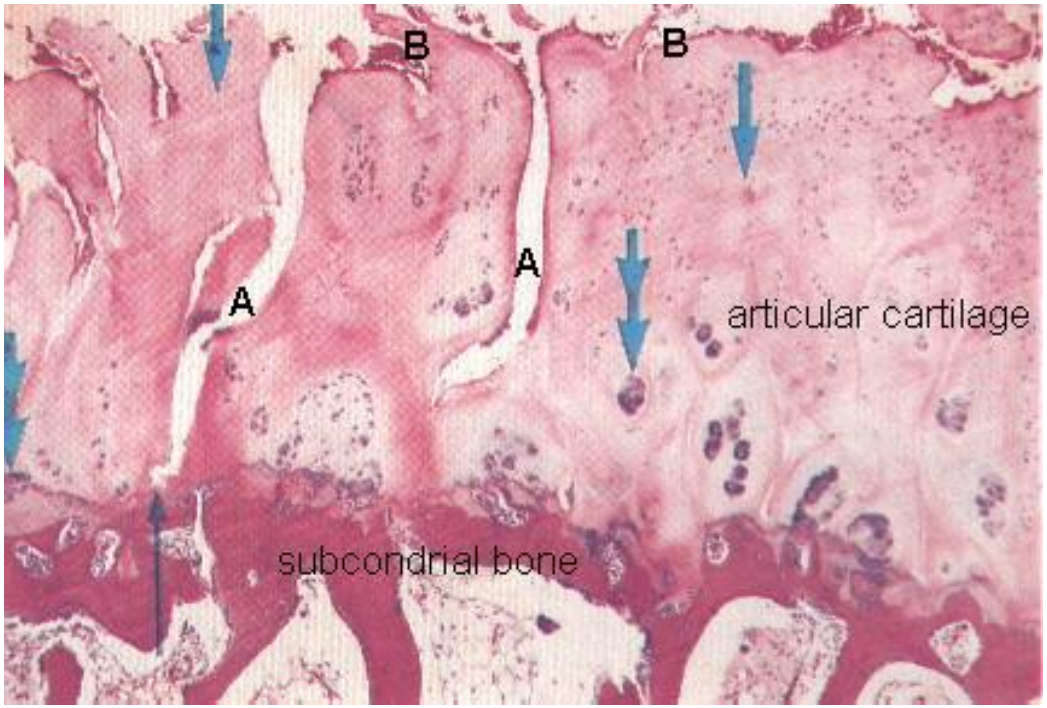
CARTILAGE LESIONS
ACUTE OR CHRONIC INJURY







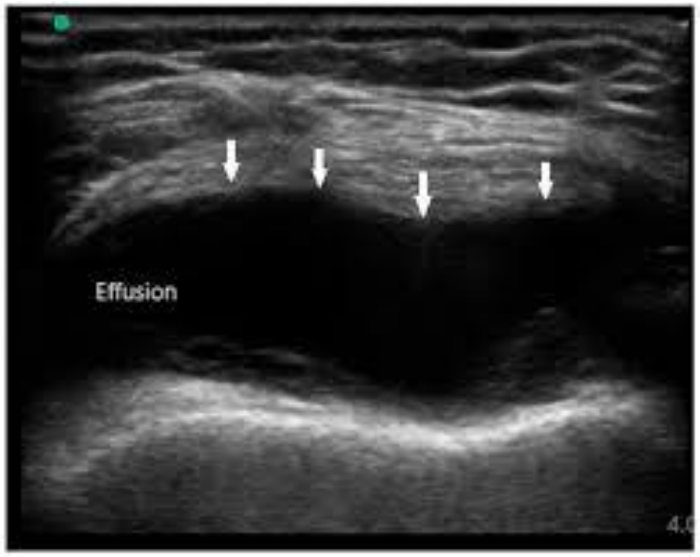
LIMITED HEALING PROCESS OF CARTILAGE IN VIVO



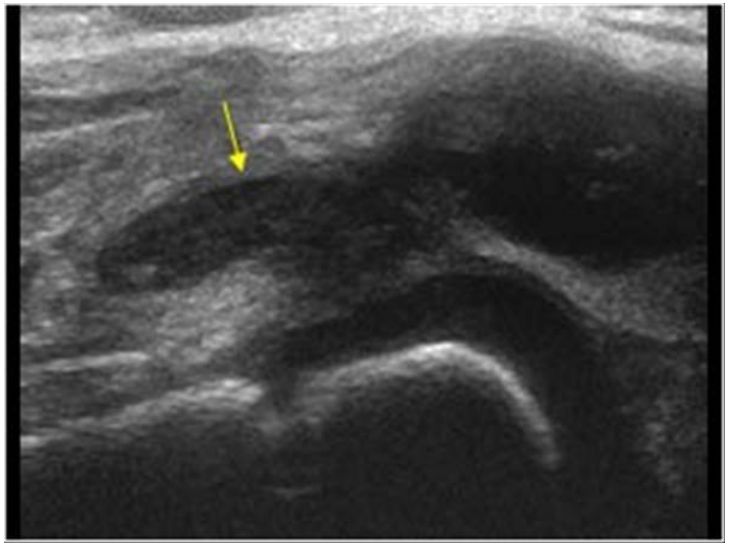
CARTILAGE LESIONS - Symptoms
NO AESTHETIC NERVATION

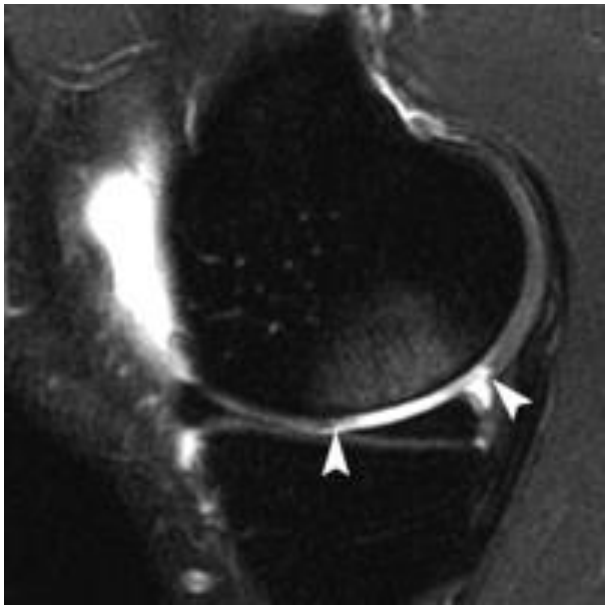
- No or limited pain difficult to delemit
- Swelling usually limited
- Dysfunction
- Stiffness
- Locking or clicking
- Giving way

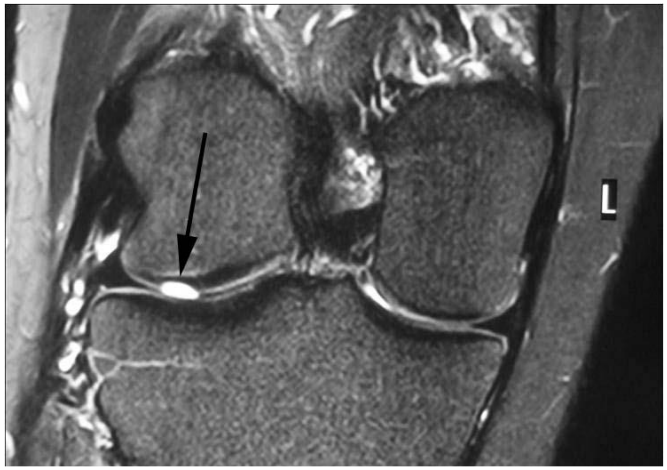
Reumatoid knee



Cartilage lesion

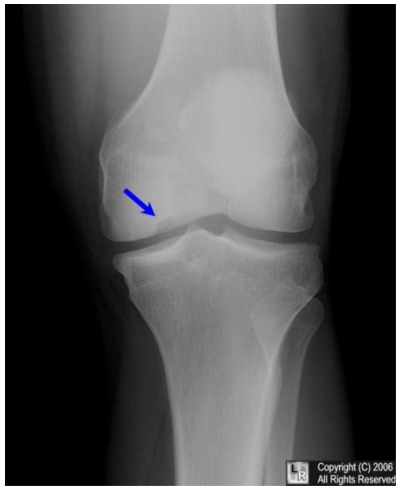






Osteochondritis dissecans

- Osteochondritis dissecans (OCD) is a pathological condition that results in **destruction of subchondral bone** with **secondary damage to overlying articular cartilage**. Factors such as inflammation, ossification, and repetitive trauma contribute to the pathogenesis of OCD.



Location

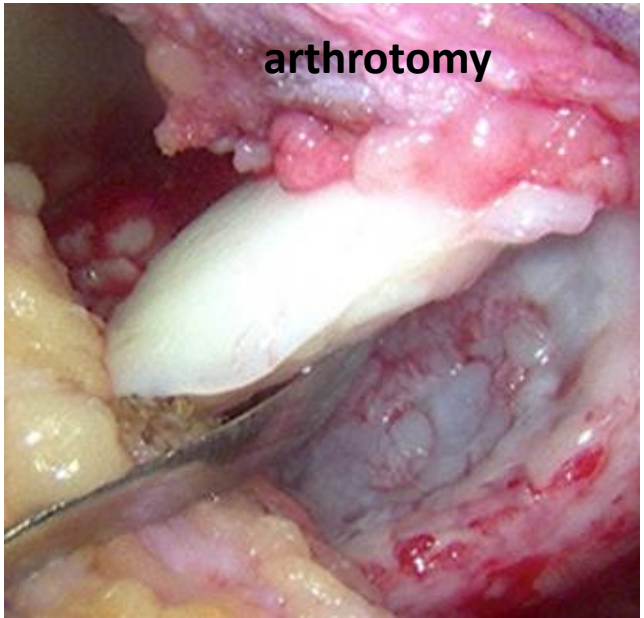
The “classic” location

✓Lateral aspect of the medial femoral condyle - 80%

Location

✓Lateral femoral condyle – 15%

✓Patellofemoral – 15%



- **Antalgic gait :** When OCD in the classic location - Affected leg in relative external rotation - **Wilson sign**
- **Aching and activity-related knee pain** (usually anterior)
- **Knee effusion**
- **Crepitus**
- **Mechanical symptoms (clicking, popping, locking)** → unstable lesion or loose body
- **Decreased ROM**
- **Quadriceps atrophy** (chronic cases)
- **Wilson test** - pain during extension with tibia internally rotated

Imaging

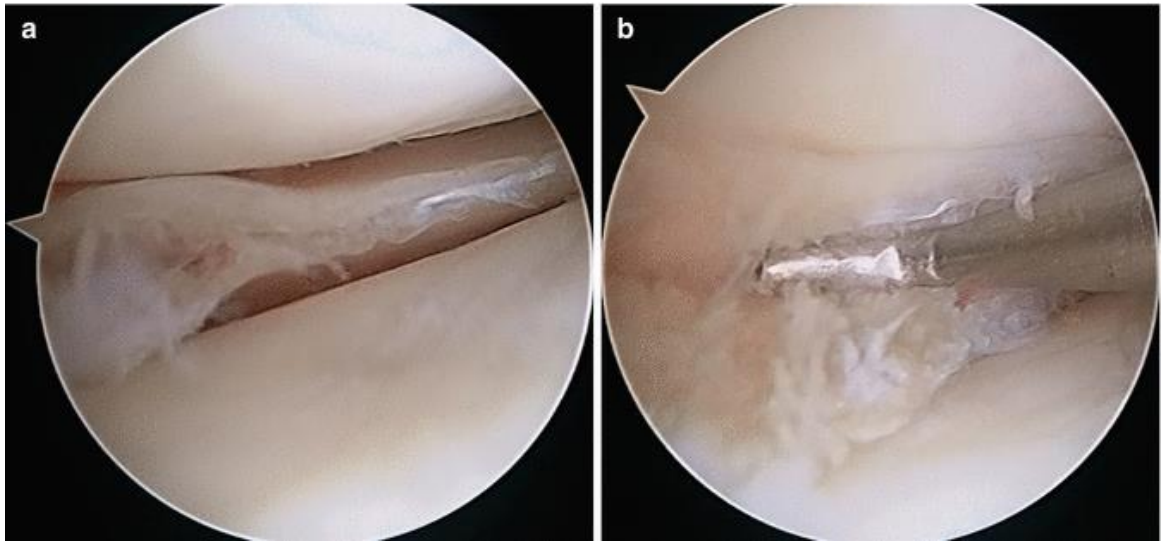
X-rays

- Anteroposterior
- Lateral
- Merchant views
- Tunnel views (30o flexion weight-bearing anteroposterior)

MRI

- The gold standard
- Indicate lesion size, location and depth
- Stability – Severity

Meniscus Degeneration



The symptomatic degenerative meniscus continues to be a source of discomfort for a significant number of patients.

World Journal of Orthopedics

Online Submissions: http://www.wjgnet.com/esps/
Help Desk: http://www.wjgnet.com/esps/helpdesk.aspx
DOI: 10.5312/wjo.v5.i5.597

World J Orthop 2014 November 18; 5(5): 597-602
ISSN 2218-5836 (online)

TOPIC HIGHLIGHT

WJO 5th Anniversary Special Issues (5): Knee

Degenerative meniscus: Pathogenesis, diagnosis, and treatment options

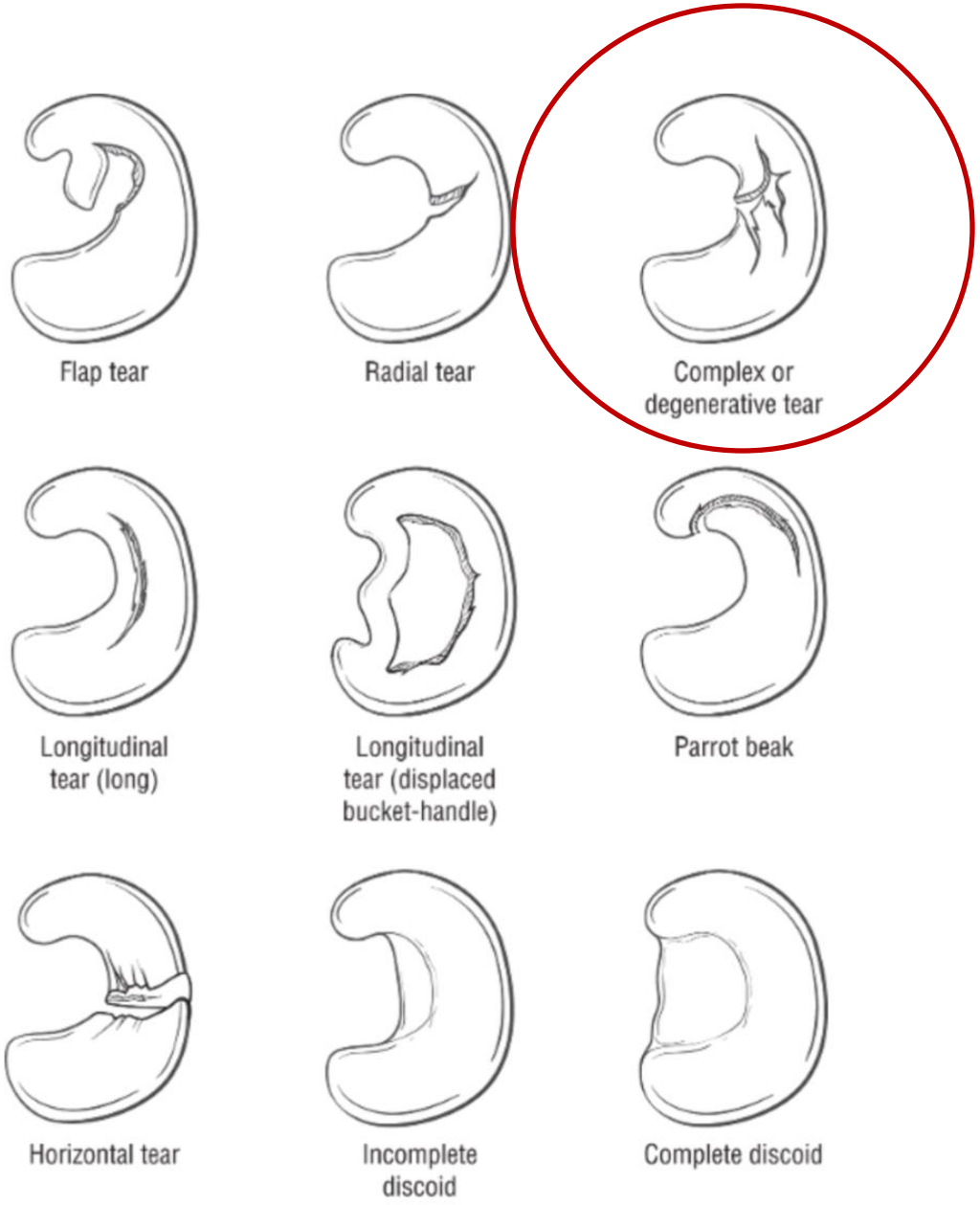
Richard Howell, Neil S Kumar, Nimit Patel, James Tom

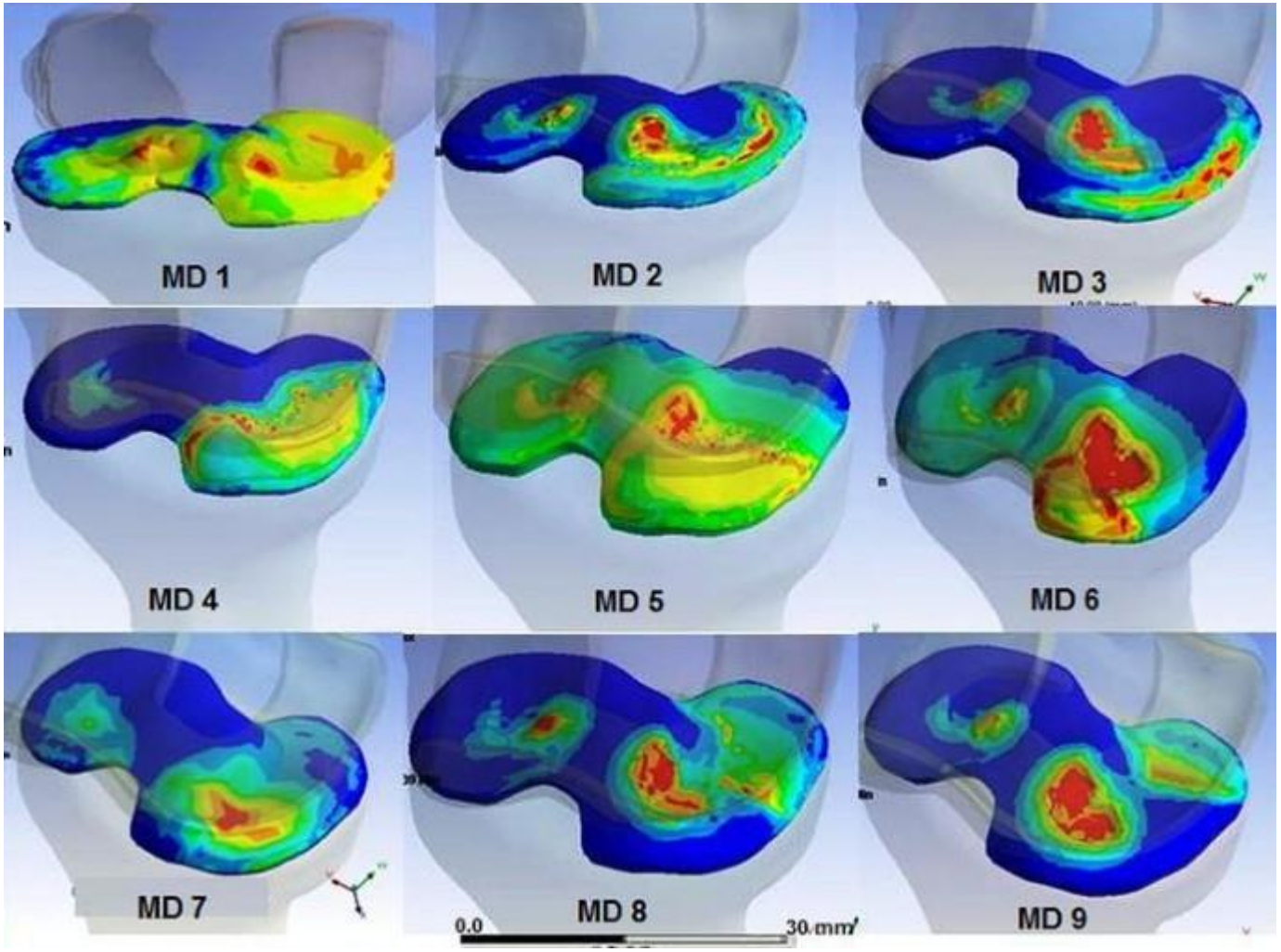
Meniscal tears can be classified as **acute or degenerative.** Acute tears are from excessive force applied to a normal knee and meniscus. This is different from a degenerative tear, which **results from repetitive normal forces acting upon a worn down meniscus**.

Knee pain accompanied by mechanical symptoms. Patients are typically over the age of 30 and often complain of insidious onset of symptoms with no known traumatic event.

Typical mechanical symptoms include **painful clicking, popping, locking, catching, and giving way**

- Joint line tenderness,
- positive McMurray’s or Apley test,
- locking,
- palpable or audible clicking
- rare joint effusion
- Most often, passive and active range of motion is full


Flap tear
Radial tear
Complex or degenerative tear
Longitudinal tear (long)
Longitudinal tear (displaced bucket-handle)
Parrot beak
Horizontal tear
Incomplete discoid
Complete discoid



Knee Published: 30 November 2012

Changes in the loading of tibial articular cartilage following medial meniscectomy: a finite element analysis study

Halil Atmaca, Cevdet Cumhur Kesemenli, Kaya Memişoğu,

Knee Surgery, Sports Traumatology, Arthroscopy **volume 21**, pages2667–2673 (2013)

SAVE THE MENISCUS

IS IT ALWAYS POSSIBLE?

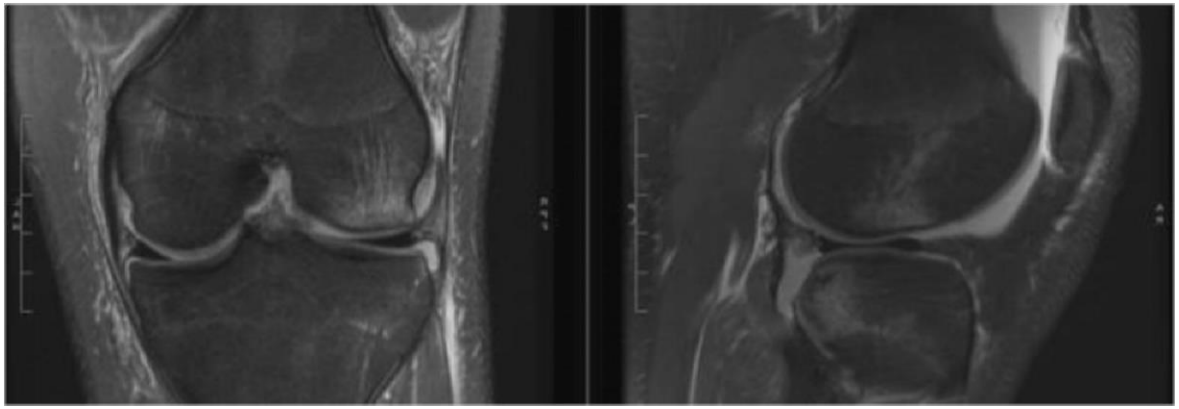
20% - 30% FAILURE

DIFFICULT IN DENEGERATIVE MENISCUS

ACL Instability

- **5.000 ACL ruptures per year in Greece?**
- **ACL tear is rarely isolated.**

  Meniscal lesions, bone marrow lesions, cartilage injuries, compressive fractures



Function, osteoarthritis and activity after ACL-rupture: 11 years follow-up results of conservative versus reconstructive treatment

M. A. Kessler H. Behrend S. Henz G. Stutz A. Rukavina M. S. Kuster

Knee Surg Sports Traumatol Arthrosc (2008) 16:442–448

- **After ACL-rupture** there seems to be **a far greater risk 33% of degenerative joint disease** than in the unaffected population and this has been quantified by various authors, namely, **McDaniel 40% , Indelicato 54% , Neyret 80% .**

Role of ACL initial trauma

Intra-articular bleeding activate **inflammatory pathways** with long-term effects

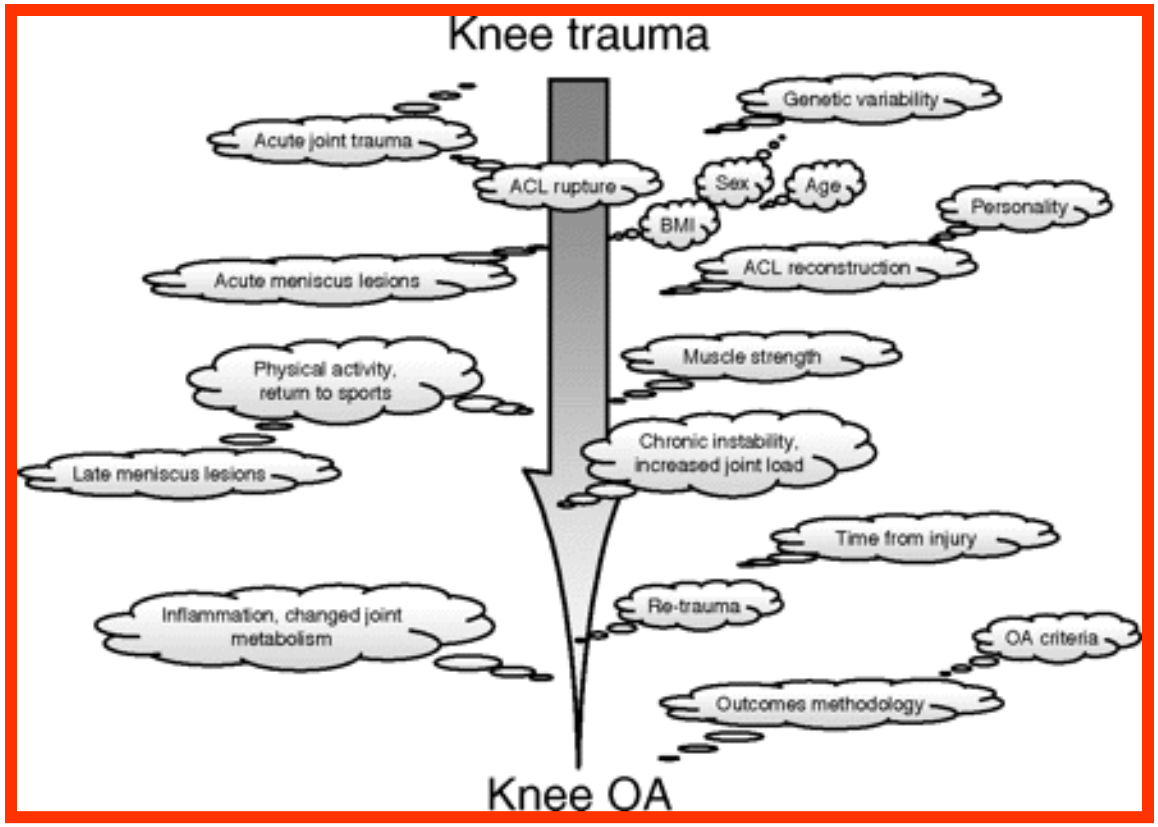
Release of **cytokines, proteases** results in damage to the type II collagen network

Levels of cytokines and proteases remain increased (like in OA) for **many years**

Even in the absence of symptomatic instability these events are associated with OA

Cameron et al. AJSM 2007

Chronic instability (anterior)



Recurrent injury

An ACL injury may develop into chronic ACL deficiency, which can lead to an unstable knee. Patients can develop an ACL deficiency if they have had an untreated ACL injury or an ACL injury that was unsuccessfully treated. ACL deficiency can cause damage to the joint and osteoarthritis

J Am Acad Orthop Surg. 2014 Jan;2(1):26-35.
Anterior Cruciate Ligament Insufficiency: Principles of Treatment RL Larson, M Tailon

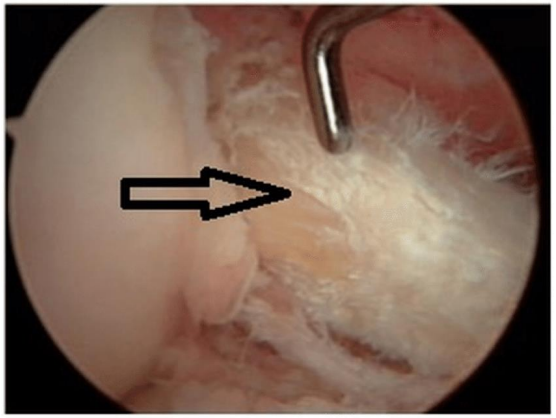
Chronic Anterior Cruciate Ligament Deficiency

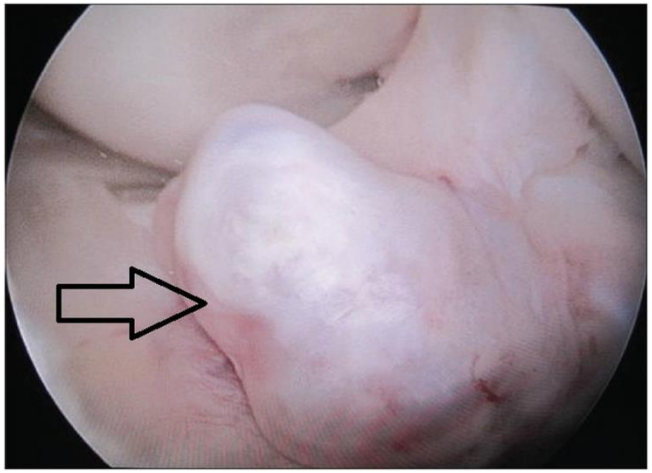
- **unstable** knee joint
- knee often **buckles,** especially in sports
- recurrent **pain and swelling**

ACL – KNEE INSTABILITY

Pivot shift test

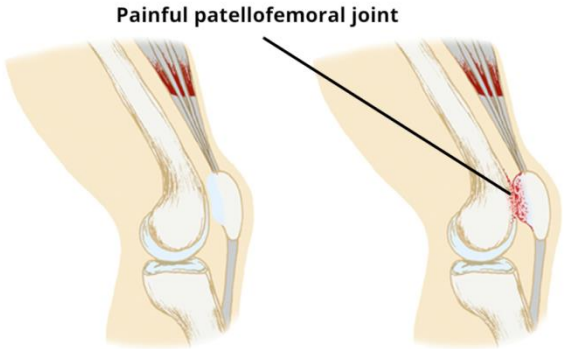
Lachman – Noulis test





ANTERIOR KNEE PAIN – PATELLOFEMORAL PAIN SYNDROME PFPS

- There is no clear consensus in the literature concerning the terminology, aetiology and treatment for pain in the anterior part of the knee.
- The term '**chondromalacia patellae**', defined at the beginning of the 20th century to describe pathological changes of the retropatellar cartilage

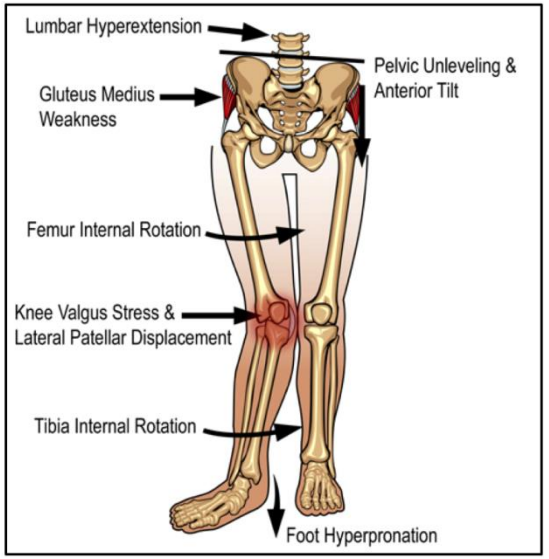


Patellofemoral Pain Syndrome A Review of Current Issues
Roland Thomeé, Jesper Augustsson and Jon Karlsson : Sports Med 2019 Oct; 28 (4): 245-262

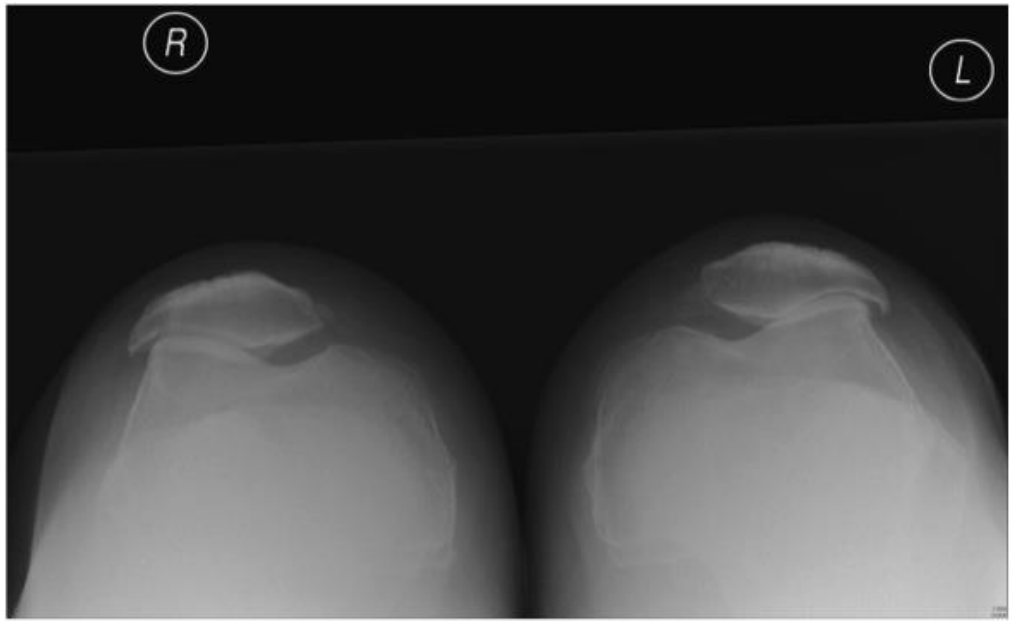
The aetiology is still unclear in many patients.

3 major contributing factors increasing the risk of developing PFPS are discussed:

- **malalignment of the lower extremity and/or the patella,**
- **muscular imbalance of the lower extremity**
- **and overactivity.**



Muscle tightness in the quadriceps and hamstrings or abductors weakness have been proposed as an important factor associated with knee extensor mechanism disorders and anterior knee pain



(a)

(b)

- Anterior knee pain,
- complaints of crepitus,
- giving way and catching,
- occasional sensations of stiffness
- sensations of swelling
- Clarke’ s test

Pellegrini stieda

- Pellegrini-Stieda lesions, named after early twentieth century Italian and German surgeons Augusto Pellegrini and Alfred Stieda, are defined as ossifications of the medial collateral ligament (MCL) at or near its proximal insertion on the medial femoral condyle.

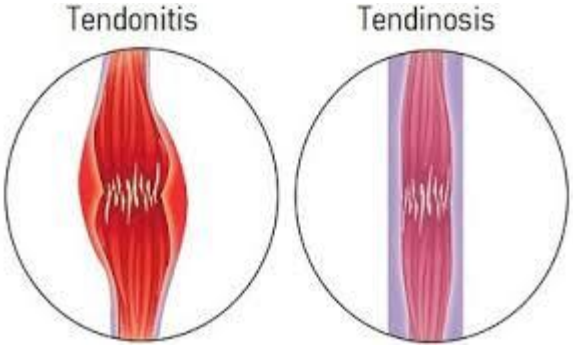
The etiology of Pellegrini-Stieda is thought to be an **insult to the medial collateral ligament** causing damage and acute **inflammatio**n that sets into motion a process of **delayed ossification**. This insult has been classically described as a **macrotrauma**, whether direct or indirect, causing **valgus stress** with disruption of the MCL fibers.

- Pain
- Stiffness
- Painful valgus stress test
- Oedema
- Local Temperature
- Lidocaine test

Pellegrini Stieda Disease Martin Weaver; Andrew l. Sherman. Arthroscopy March 17, 2021.

Knee Tendoninitis - Tendinosis

- Degeneration
- Rupture
- NSAIDS



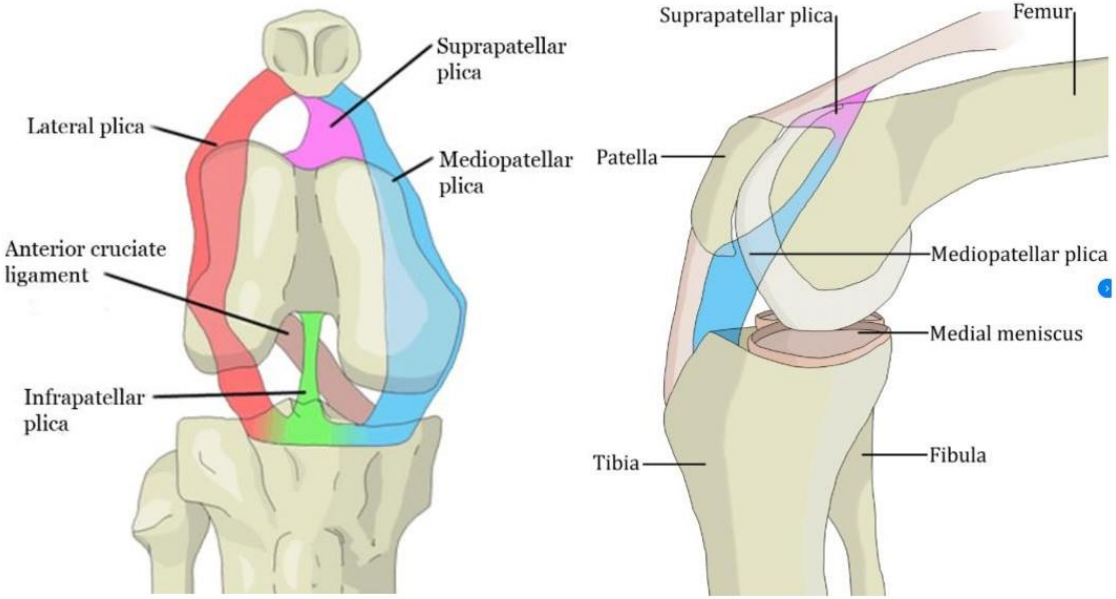
- **Tendinopathy** is a common overuse injury caused by **repeated and prolonged stress** on a tendon.
- This repeated stress (**micro-trauma**) on the tendon can lead to the tendon becoming **thickened and tiny tears developing** in the tendon.
- The rate of breakdown within the tendon exceeds the rate of repair, this can lead **to pain and dysfunctio**n.

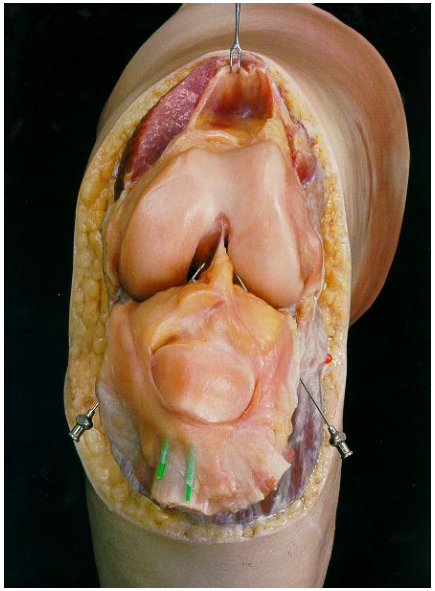
- **Patellar tendinitis**, also known as **jumper's knee**, is an overuse injury of the patellar tendon.
- Typically the pain and tenderness is at **the lower part of the kneecap**, though the upper part may also be affected.
- Generally there is **no pain** when the person is at **rest**.
- Complications may include patellar tendon rupture.

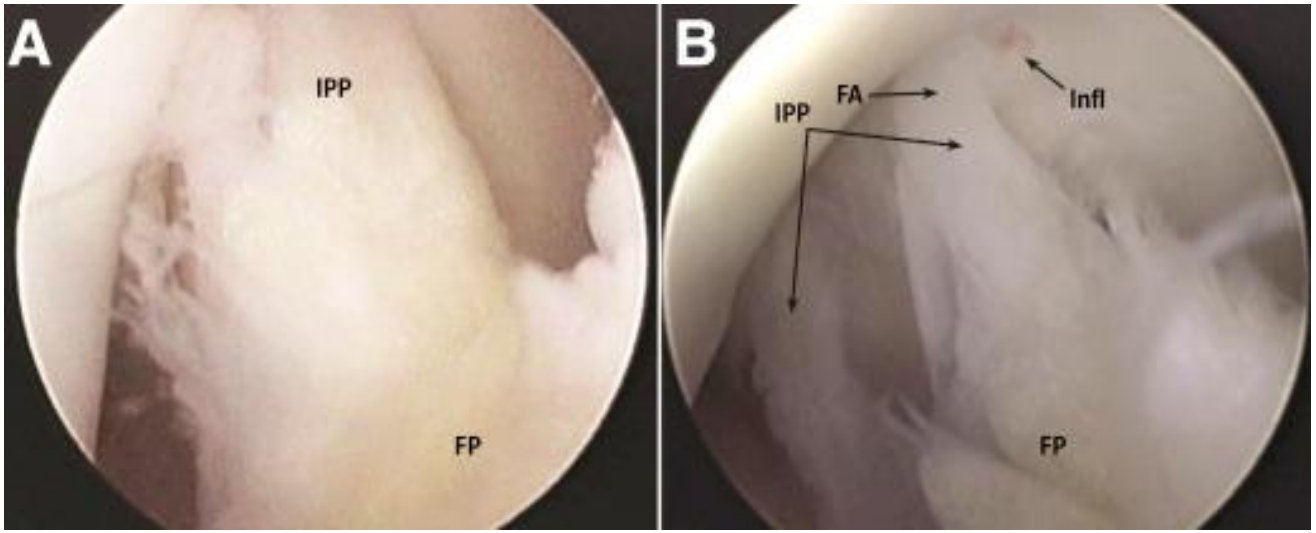
- Pain especially in active knee extention or passive flexion
- Oedema - tenderness
- Muscle atrophy - weakness
- Locking
- Painful walking

Plica

- Redundancy of Joint Synovium
- Mechanical disturbuncy
- Palpable pain (anterior medial or lateral)
- Clicking in 90 d flexion



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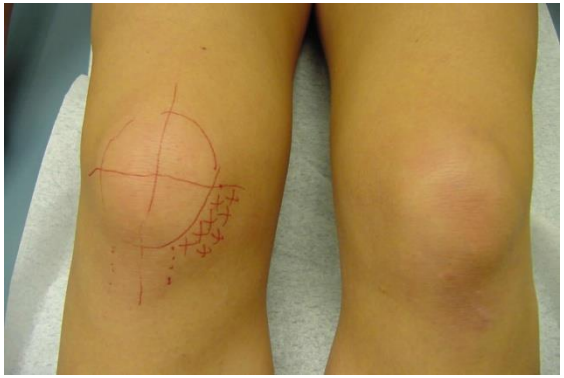
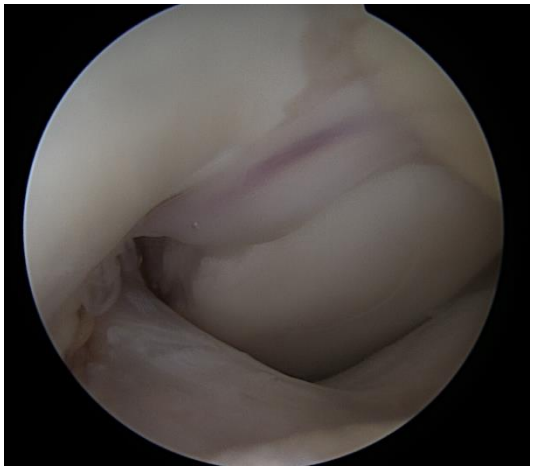
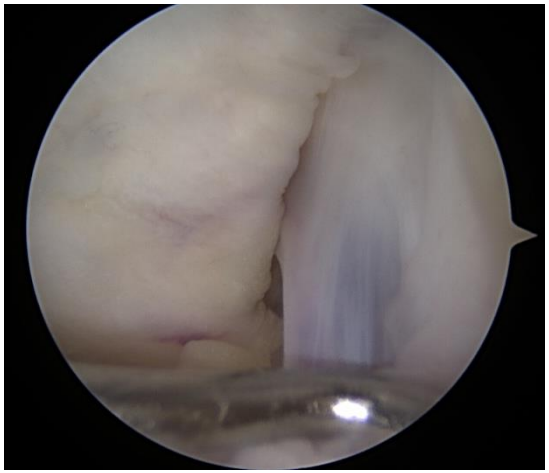
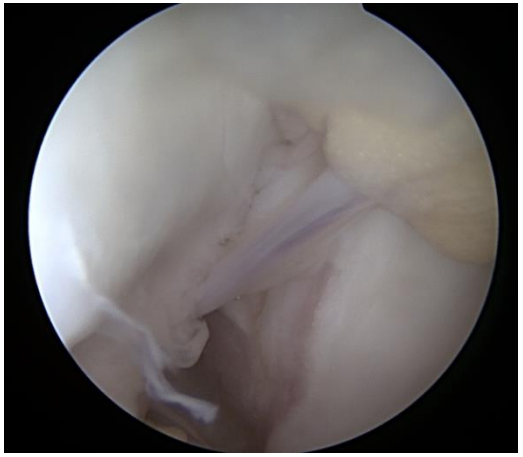


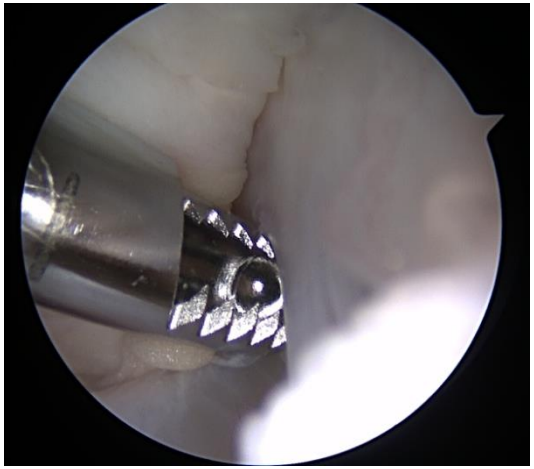


Extension



Flexion





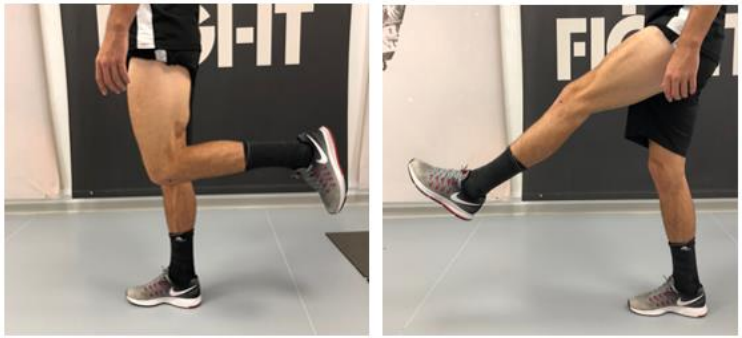
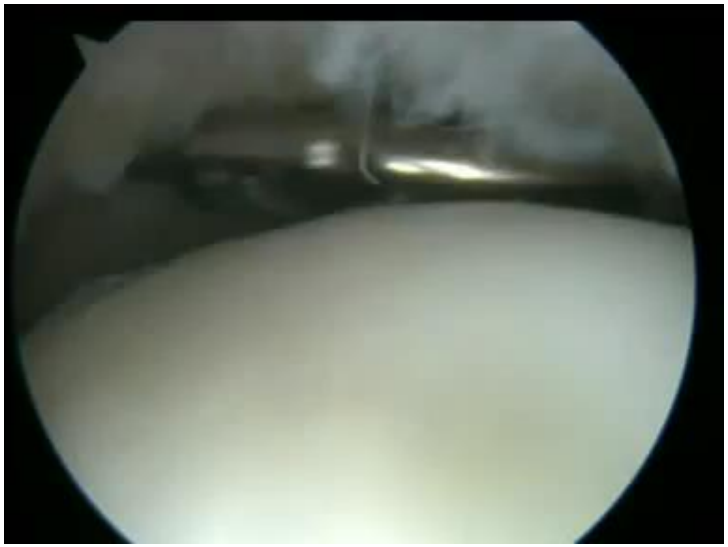


Figure 3: Active Hyperextension Test



Hugston plica test

- Locate the pain
- Stress tests
- Swelling
- Kinematics - measuring
- Special tests

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THANK YOU FOR LISTENING

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