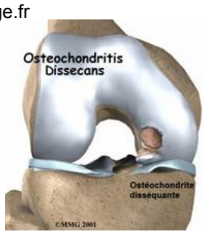
Osteochondritis dissecans (OCD)
femoral condyle

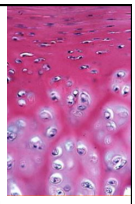
Pr JL Rouvillain, M Janoyer
(Fort de France University Hospital, Martinique)
jlrouvillain@orange.fr



Pathophysiology

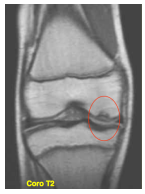
- Disruption of the epiphyseal plate vessels, varying degrees and depth of necrosis occur,
- resulting in a cessation of growth to both osteocytes and chondrocytes.
- Leads to disordered ossification of cartilage, resulting in subchondral avascular necrosis

Causes : Micro trauma



- Unclear but include
- Repetitive physical trauma : SPORTS +++
- Ischemia, avascular necrosis
- Hereditary and endocrine factors,
- Ratio of calcium to phosphorus,
- Anomalies of bone formation
- Non-inflammatory cause.

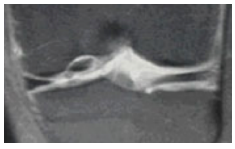
Epidemiology



- **Juveniles Form**
  - Teenager after 10 y
  - Male: 3/1
  - Rare : 20/ 100 00
  - 20 % bilateral
  - 70 % Medial condyle
- **Adulte Form*(Bad evolution)***

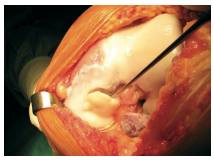
Clinic

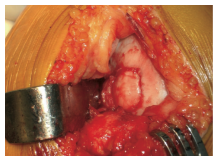
- Mecanical pain
- Some time : no sign
- Pseudo-locking, hooking, catching
- Locking knee if free osteochondral fragment

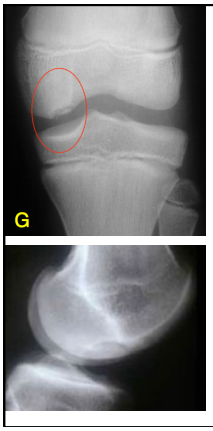


Physiopathology

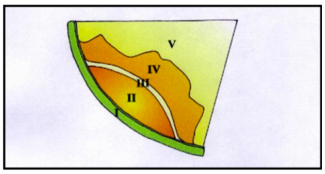
- Blood deprivation in the subchondral bone : Avascular necrosis
- Spontaneous Repair in teenager:
- Or fragmentation, and liberation on a free osteochondral fragment in the joint



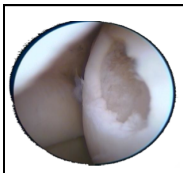




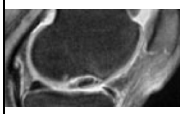
X Ray

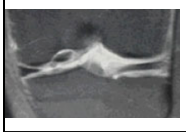


I : Cartilage
II: Avascular bone
III: Fibrous tissu
IV: Remodeling bone
V: Normal bone



IRM



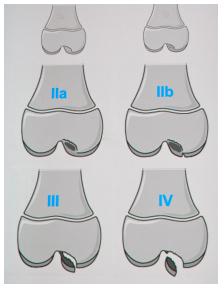


MRI Anderson classification

- I : Early Subchondral bone flattening in the epiphyseal plate before growth plate closure
- IIA : **Stable** Subchondral cyst present
- IIB : **Unstable** Incomplete separation of the osteochondral fragment due to repetitive trauma
- III : **Unstable** Effusions (fluid around an undetached, undisplaced osteochondral fragment)
- IV **Terminal** Complete separation (detachment) of osteochondral fragment(s); mechanical irregularities and formation of loose bodies

French Bedouelle classification

Teen ager :
80% stade I et II



III: Joint line modification

IV: Free osteochondral fragment

Non-surgical treatment For stable lesion

- For skeletally immature teenagers with a relatively small, intact lesion stage I and II
- Stop sports
- Even Immobilisation for four to six weeks in extension to remove shear stress from the involved area
- walking with weight bearing
- Arthroscopy indicated if no good results and MRI « instability »

Correlation of MRI to arthroscopic findings in Juvenile Osteochondritis dissecans

- C S Heywood
- Concordance between Arthroscopic stage and MRI stage : only 30%
- MRI Predicted 21/23 lesions to be instable, but only 1O was instable during arthroscopy

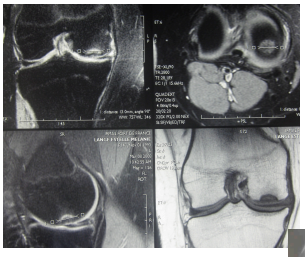
Cheng arthroscopic staging of osteochondritis dissecans

- A : Articular cartilage is smooth and intact but may be soft or ballottable
- B : Articular cartilage has a rough surface
- C : Articular cartilage has fibrillations or fissures
- D : Articular cartilage with a flap or exposed bone
- E : Loose, nondisplaced osteochondral fragment
- F : Displaced osteochondral fragment

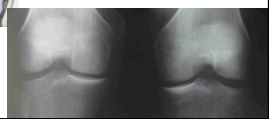
Transchondral Perforations

- Thin pin introduced with canula
- Power tool with slow velocity
- Deep enough to see bloob or fat globus
- Good results in teenager

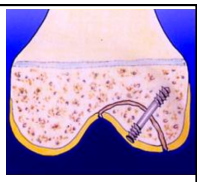
Perforations under Arthroscopy



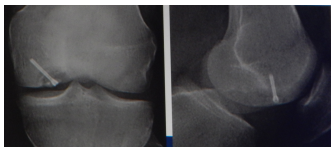
1 Year FU

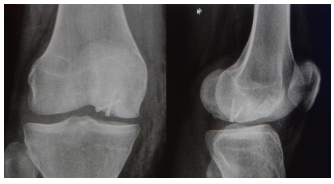


Screwing



Fixation with screws





OCN in adults

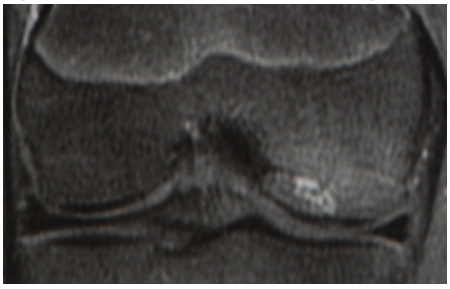
- Unstable, large, full-thickness lesions (stage III and IV) more frequent
- worse prognosis
- Surgery required in most cases

MRI

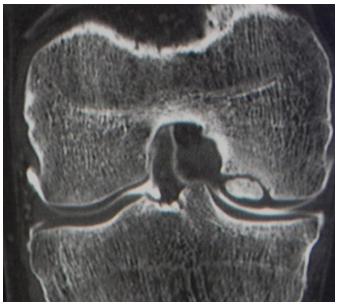
- Is the Fragment in place?
- Is it STABLE
- Is it viable
- Is the cartilage damaged ?

Viability : MRI T1 Fat Sat Gado

Signal enhancement in the fragment



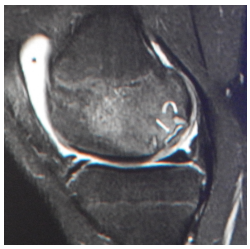
Arthro CT for cartilage continuity



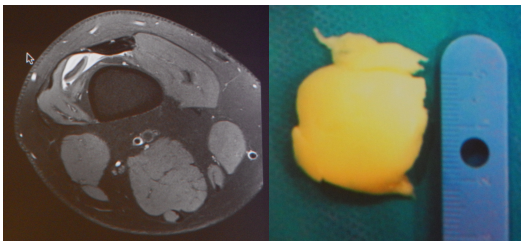
Stability : MRI criteria only valid in adult OCD

*Kijowski R, De **Smet** AA. Radiology. 2008 Aug;248(2):571-8.*

- High T2 signal intensity rim
- Surrounding cysts
- High T2 signal intensity Cartilage fracture line
- Fluid-filled osteochondral defect



Mobile fragment : Prefer refixation than Removal

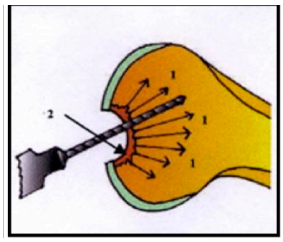


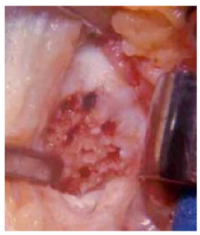
Fragment Fixation :

*Herbert screw fixation and reverse guided drillings, for treatment of types III and IV osteochondritis dissecans. **Kouzelis A**, Knee Surg Sports Traumatol Arthrosc. 2006*

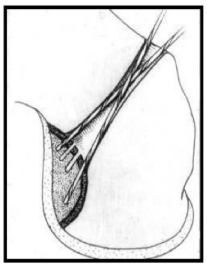
Scratching or drilling the osteochondral defect before fixation

Perforations without cartilage





Retro Drilling



If posterior lesion

Arthroscopy first

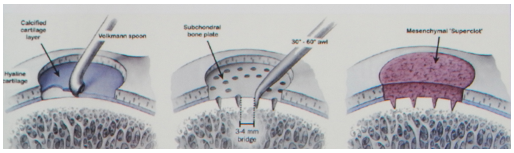
Control with Image intensifier

Perforations seems better than Micro fracture

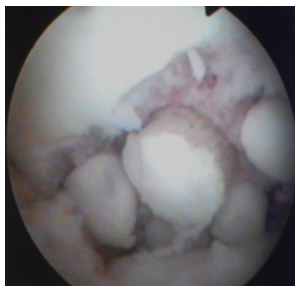
H Chen, J Orthop Research 2009

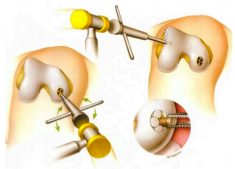
MF : compact and necrosis bone surraounding the defect

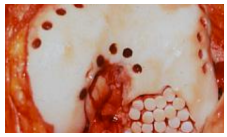
P : No necrosis and good communication with normal bone



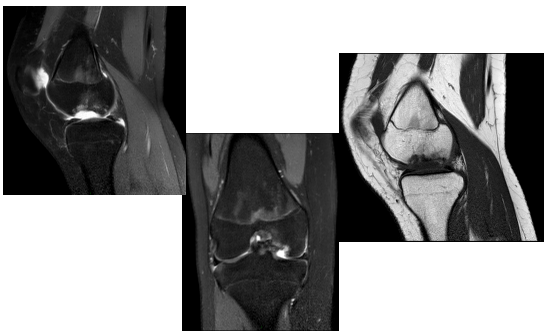
Mosaicplasty



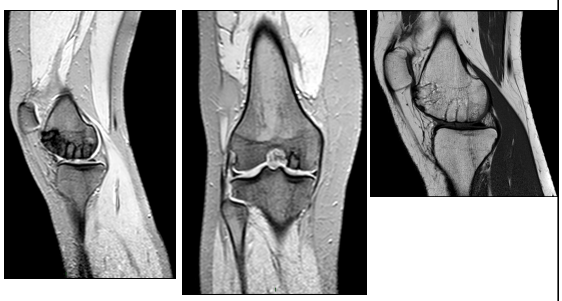




Female 15 y : Mosaïcplasty



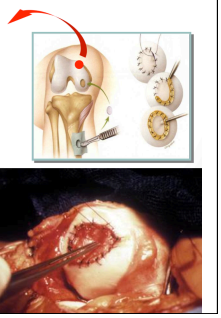
FU 3 years



Autologus Chondrocyte transplantation

Autologous chondrocyte implantation--technique and long-term follow-up.

***Brittberg** M. Injury. 2008*



3 Steps

•Autologus Cartilage removal

•Chondrocytes expanded in vitro

• Place into the defect in combination with a covering mechanical membrane-the periosteum.

Autologus transplantation Side effects

***Autologous** chondrocyte implantation: natural history of postimplantation periosteal hypertrophy and effects of repair-site debridement on outcome.*

***Henderson I** Arthroscopy. 2006 Dec;22(12):1318-1324.e1*

•Irregularities in the chondrocytes repartition

•Patch-related problems 73.7%

•Graft hypertrophy, hypertrophied repairs

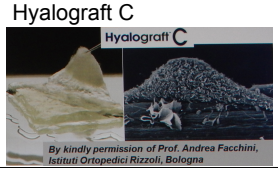
•Reoperation less than 2 years after implantation

Bio-scaffolds

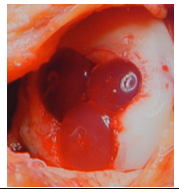
Autologous chondrocyte implantation in a novel alginate-agarose hydrogel: outcome at two years.

Selmi TA, Verdonk P, Chambat P, Dubrana F, Potel JF, Barnouin L, Neyret P
J Bone Joint Surg Br. 2008 May;90(5):597-604.

AMIC Geistlich Biomaterial Bioseed-C Implant Hyalograft C



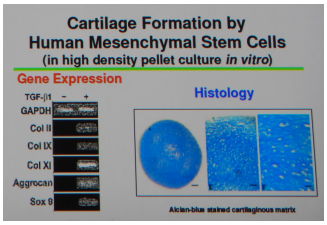
Cartipatch TBF



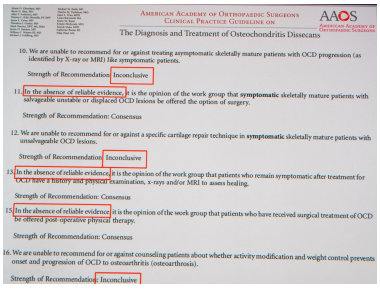
Pluripotent stem cells

*Induced **pluripotent stem cells** in medicine and biology.*

***Takahashi K**, Yamanaka S. Development. 2013 Jun;140(12):2457-61*



Treatment stage III and IV in adults



AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS CLINICAL PRACTICE GUIDELINE ON
The Diagnosis and Treatment of Osteochondritis Dissecans

10. We are unable to recommend for or against treating asymptomatic skeletally mature patients with OCD progression (as identified by X-ray or MRI) like symptomatic patients.
Strength of Recommendation: Inconclusive

11. In the absence of reliable evidence, it is the opinion of the work group that **symptomatic** skeletally mature patients with salvagable unstable or displaced OCD lesions be offered the option of surgery.
Strength of Recommendation: Consensus

12. We are unable to recommend for or against a specific cartilage repair technique in **symptomatic** skeletally mature patients with unsalvagable OCD lesions.
Strength of Recommendation: Inconclusive

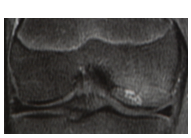
13. In the absence of reliable evidence, it is the opinion of the work group that patients who remain symptomatic after treatment for OCD have a history and physical examination, x-rays and/or MRI to assess healing.
Strength of Recommendation: Consensus

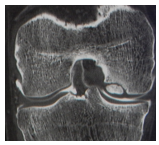
15. In the absence of reliable evidence, it is the opinion of the work group that patients who have received surgical treatment of OCD be offered post-operative physical therapy.
Strength of Recommendation: Consensus

16. We are unable to recommend for or against counseling patients about whether activity modification and weight control prevents onset and progression of OCD to osteoarthritis (osteoarthrosis).
Strength of Recommendation: Inconclusive

Adults indications

- Stade I et IIa
- Stade IIb
- Stade III et IV





Perforations

Fixation +/- perforations or mosaïcplasty

Fixation?

mosaïcplasty

or others

34th Caribbean Orthopaedic Congress
2nd Franco-Cuban Orthopaedic Congress
2014, March 31st to April 5th, -
National Hotel in Havana - Cuba