Imaging of Articular Cartilage Lesions: What to Look for Preoperatively

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Disclosures

• None

Standard cartilage imaging: every patient!

• Good set of standard plain radiographs
  • Standing AP, PA flexion
  • Lateral
  • Merchant
• Hip to ankle long-leg standing
• MRI (3T if possible)
What am I looking for on imaging?
- Focal or diffuse process
  - Cartilage lesion vs OA
- Background factors
  - Why did lesion occur?
- Lesion factors: size, location, acuity, bone involvement
  - Surgical planning

What does imaging tell me?
- Focal or diffuse process
  - Cartilage lesion vs OA
- Background factors
  - Why did lesion occur?
- Lesion factors: size, location, acuity, bone involvement
  - Surgical planning

Which patients are candidates for cartilage restoration?
- Focal defects
- Diffuse arthritis
What does imaging tell me?

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Surgical Treatment Options for the Management of Symptomatic Focal Cartilage Lesions of the Femur: U.S. Femoral Condyle vs Patellar/ Femoral

Correction of Background Factors

- < 2-4 cm²
  - Low Demand/ Older
    - Palliative
    - MFX
    - OAT
  - High Demand/ Younger
    - 1. Osteochondral Autograft
    - 2. Cell Based Repair
- > 2-4 cm²
  - High or Low Demand
    - 1. Osteochondral Allograft
    - 2. Cell Based Repair
Learning from Failure in Cartilage Repair Surgery:
An Analysis of Failure Mode of the Primary Procedure in Consecutive Cases at a Tertiary Referral Center

• Purpose:
  - To determine common failure modes in primary cartilage restoration
  - Goal: Improve surgical decision-making and patient outcomes

• Materials & Methods:
  - Tertiary care center experience, single surgeon
  - All revisions for failed cartilage surgery 2011 – 2017

Study Population:
• 59 procedures in 53 patients

Lesion Location:
• Medial femoral condyle most common failed location (54% of cases)
• Trochlea least common (15% of cases)

Primary Procedure:
• Microfracture most common index procedure
• Various allograft forms more rare

Failure Mode:
• Underlying malalignment predominant consensus reason for failure (56%)

Results

Valgus Proximal Tibial Osteotomy
Varus Distal Femoral Osteotomy

Be careful of calculation

Patellofemoral background factors
  • Trochlear dysplasia
  • Patella alta
  • Lateralized tubercle
  • Tight lateral retinaculum
19 year old male
- Pain and patella instability
- True J-sign tracking
- Patella cartilage defect
  - Background factors
    - 10 degrees valgus
    - Trochlear dysplasia
    - MPFL insufficiency
    - Patella alta
    - TT-TG 24 mm

First stage

Intra-op J-sign
Second stage: ACI implantation

Second stage

Correction of J-sign 3 months post-op
What does imaging tell me?

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MRI: Size of lesion

Size matters!

32M acute LFC lesion

Use axial MRI
MRI: Chondral or osteochondral

36F trochlear lesion

[Images of MRI scans and histological sections]
Patella chondral defect s/p failed MFX

Inferomedial patellar lesion

MRI: Bone status

Experience comes from experience.
27M MFC OC defect

Intentional overcorrection
Cartilage Imaging

- Develop standard approach for every patient
- X-rays can help determine focal vs diffuse lesions, background factors
- Study MRIs to plan cartilage surgery; size, location, acuity, bone involvement
Thank You

17F OCD lesion MFC

32F failed MFX, ACI, OC allograft
Case example

- 15yo M
- OCD fixation performed elsewhere
- Prolonged septic arthritis
- Now complains of pain and instability
Diagnostic Scope

Physical Examination

Varus thrust

• Remove if limited for time