Chondral lesions in top players. What can we do?
Antonio Maestro MD, PhD.
Gijón (Spain).

Introduction:
• Cartilage injuries are a very difficult problem. Avascular surroundings.
• Many reasons for discrepancy exist today in medical literature. Very controversial.
• Lack and demand of exact classification. (ICRS classification).
• Symptoms definition of exact cartilage injuries are doubtful.
• Discrepancy between symptoms and MRI findings.
• Future: arthritis? Depends on the severity?

The REAL problem:
• Cartilage doesn’t heal!! The response to damage is fibrocartilage with different collagen fibrils than normal cartilage.
• We need two sliding surfaces in the joint.
• We need the biomechanical integrity of the rest of the joint.

Aspects to take into account:
• Implication of the baseplate on the damage (depth).
• Unstable or stable full thickness (size).
• Joint loading area or surface.
• The whole scenario: Alignment of the limb, stability, meniscus condition (in knee), focal or multicompartimental, goals of the patient, expectations, social, occupational or out-of-sport environment. Unrelated-to-sport environment.

We need:
• To make an accurate diagnosis and explain the prognosis to the patient. Patients need to know the importance of postoperatory protocol and expected outcomes before the surgery.

1. - WHAT can we do?
✓ Non surgical (controversial):
  ▪ Oral chondroprotection.
  ▪ Viscosupplementation.
✓ Surgical:
  o Palliative techniques:
    ▪ Debridement/chondroplasty.
    ▪ Arthroscopic lavage. Thermal radiofrequency (RF).
  o Marrow stimulation techniques:
    ▪ Microfractures or marrow-bone stimulation. Avoid the drilling (Not heat necrosis because of drilling). Keep the subchondral plate.
  o Osteochondral transplant techniques:
    ▪ Autografts OATS (Osteochondral Autografts Transfers).
    ▪ Mosaic autografts.
    ▪ Allografts.
  o Cell based repair techniques:
    ▪ ACI (autologous Chondrocyte Implantation),
    ▪ MACI (Matrix-induced autologous chondrocyte implantation).
    ▪ ICC (Instant Centro Cell).
(MACI vs ICC: volume and quantity of the cells put in the scaffold. ICC: we put the cells in the scaffold. MACI: the
scaffold is available with the chondrocytes cultured impregnated in).

✓ Problem:
  o Recovery and time for returning to play depends on the technique we have done.
  o Cost issues: Hospital Expenses, OR, Cartilage Culture, scaffold. Two surgeries, Time…

2. - WHAT does the patient want to hear?
  Quick and Safe return to sport.
  When can the patient return to play:
    • No radiographic evidence of complications.
    • Normal physical examination. ROM, quadriceps strength, no effusion).

3. - How can stiffness be minimized?:
   I. Intraoperative strategies for minimizing stiffness: minimal invasive surgery. No overshooting the base plate.

4. - What we do gain from the medical literature?
  • Controversy still exits between the different therapeutic options.
  • Studies are variable regarding indications with respect to age and size of the lesion.
  • Variability between population and sports.
  • The real important issue is whether there is cartilage fragment stability or not.
  • Everybody agrees with necessary biomechanical stability, alignment and support or protection of the loading area (meniscus).

5. - Future enhancements:
  • Better diagnosis (T2-Mapping).
  • Improve the Scaffolds?
    o Requirements:
      - Biodegradability.
      - Biocompatibility.
      - Porosity.
      - Adhesion.
  • Gene therapy?
  • Methods for fixing the fragments, but If it ain’t broken don’t fix it.

6. - Penalties of cartilage reconstruction:
  • More than base plate.
  • Keep the Misalignments, Resect to much meniscus or maintain the instability.
  • Allow the limb load very early.
  • Know the Chondral odds and possibilities.

7. - Examples:
   - Case for MACI-ICC:
      Grade III ICRS acute knee chondral injury no more than 4 cms. on a young active patient, without misalignment of the limb axis, with integrity of the stabilizers of the knee (ligaments and meniscus) or the medial talus dome without anything else.
      • Shave and remove cartilage fragments
      • Curettes the remnant cartilage layer. Curettes better than motorized shavers for removing the cartilage and borders.
• Penetrate with perforations 3 for cm².
• Take a biopsy for chondrocyte culture and possible (future) ICC.
• Gentle lavage.
• Partial discharge for 6-8 weeks with two crutches.
• Culture the chondrocytes and wait for evolution.
• If it’s necessary, and depending on the symptoms: second surgery for ICC.

- Case against MACI-ICC:
  Diffuse or grade IV ICRS chondral injury on a sedentary patient with misalignment and chronically damage of the knee or ankle (meniscus, ligaments or multicompartimental injuries). We need to associate other therapeutic procedures for stabilizing or unloading the joint:
  • Microfractures.
  • Osteotomy.
  • Meniscal repair or use of allograft.
  • ACL reconstruction.
  • Fresh Allograft.
  • PRP?. Mesenchymal Stem Cell?.
  • Is there a role for supplementary viscosupplementation?

9. - DON’T FORGET:
• Anything in the knee could become worse after surgery.
• Don’t treat MRI, we should treat symptoms (symptomatic defects).
• Be more aggressive if you have planned to do surgery for other articular pathology (ACL, PCL, meniscus).
• The possibility of taking a biopsy for cartilage culture and in a second time implant it.
• Learning curve:
  ▪ Know your technical possibilities in order to avoid pitfalls and to perform the surgery.
• Try to reproduce the articular congruency or gliding surfaces.
• BIOLOGICAL issues plus MECHANICAL good atmosphere is necessary for success of any cartilage technique procedure.
• “Cells are the key to all tissue regeneration” Arnold Chaplan (Nov 2000, Tampa. Florida).
• Future: use of Stem Cells and Growth factors.

10. - REFERENCES


• Lubowitz JH. Arthroscopic Microfracture May Not Be Superior to Arthroscopic Debridement, But Abrasion Arthroplasty Results Are Good, Although Not Great. Arthroscopy 2015; 31(3):506-11.


