Rehab Considerations for Cartilage Restoration of the Knee

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DISCLOSURE

I have no relevant disclosures related to this topic.

Objectives

Discuss potential candidates and surgical options for cartilage restoration procedures.

Identify safe guidelines for rehabilitation based on the most recent research.

Outline return to activity guidelines.
Chondral defect

Small area of damage to articular surface and underlying bone.

Focal
- Traumatic, osteochondritis dessicans, necrosis
- More defined borders

Degenerative
- Instability, malalignment
- Less defined borders

Chondral defect

Description (Falah 2010)
- Grade - Outerbridge
- Location
- Size - surface area
- Shape
- Wall description
- Severity
  - Partial
  - Full
  - Extending into subchondral bone

Chondral defect

Most common among young active patients.

Traumatic event causes stress through cartilage and into subchondral bone.

Some data suggest that up to 60% of knees requiring arthroscopic surgery may have focal lesions (Tyler 2012).

Conservative management (Falah 2010):
- Mainly for symptom relief in mild cases
- Will not help defect or possible progression
Surgical Candidates

“The purpose of surgical intervention is to improve symptoms and prevent degenerative changes by achieving structural and biomechanical restoration of the articular cartilage.” – Seo et al.

Patient Selection based on (Camp et al):
• Age
• Activity level
• Etiology
• Lesion Grade
• Lesion quality
• Lifestyle considerations

Chondral Defect Procedures

Microfracture
Osteochondral Autograft Transfer (OATS)
Osteochondral Allograft Transplant (OCA)
Autologous Cartilage Implant (ACI)

Post-Operative Management

Each procedure and surgeon will have different criteria.

Within same procedure there may be subtle shifts in early stage rehab based on description of the defect.
• Location, size, etc...

One common theme.....
Insurance/Plan of Care

Be mindful of visits in the short, intermediate and long term.
- Return to activity in many cases does not begin until after 6 months.
- 20/30/45 visit per calendar year patients may run into limits.

Key Observations

Symptom Monitoring
- Pain is the easy symptom.
- Effusion can be huge indicator that something is wrong.
- Mechanical symptoms/reproducible crepitus shouldn’t be ignored, but kept in context.

These symptoms should be monitored during the length of treatment particularly at transitions between phases or with large progressions.

Concomitant injuries will provide complications to rehab, consider in progression and expectations for rehab.
Post-Operative Management

**Early/Protection Phase**

- Generally, weeks 0-6
- Goals:
  - Protect graft/repair
  - Normalization or pain free ROM
  - Minimize pain/effusion
  - Regain quad activation
- Vast majority of protocol will include a period moderate to complete weight bearing restriction over the course of the first 4-6 weeks (Kane et al).
- Typical to use a hinged knee brace for up to 6 weeks.

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**Early/Protection Phase**

- Early exercise is encouraged within the structure of the goals for this phase.
  - Passive/AAROM ROM
  - Isometrics – quad/hamstring/glutes
  - Leg lifts
  - Patellar mobility
- Modalities use for effusion/edema control and quad muscle facilitation should encouraged as appropriate.

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**Phase Progression Considerations**

**Biological Healing/Time**
- Is healing uninterrupted?

**Imaging**

**Criterion**

*HINT:* Revisit each phase’s therapy goals.
Post-Operative Management

Transition Phase
- Generally, weeks 7-12
- Goals:
  - Improve strength (Quad)
  - Normalization or pain free ROM
  - Increase/Restore functional activity (walking, ADLs, etc.)
- During this phase, weight bearing training is important to recondition the knee to postures necessary to everyday function.
  - Consider proprioceptive loss/change with limited weight bearing over 4-6 weeks. → If you don’t use it you lose it! (Davis’ Law)

Post-Operative Management

Transition Phase Progression
- Has gait normalized?
- Is strength within acceptable range of non-operative side?
- Is prolonged weight bearing tolerated?
- Is balance/proprioception restored?
- How are you measuring these during this phase to ensure valid and consistent progress is made?

Post-Operative Management

Remodeling Phase
- Goals:
  - Improve strength and endurance globally
  - Increase/restore functional activity (walking, ADLs, etc.)
- During this phase, open chain activity can be progressed with continued symptom monitoring.
- Use tools at your/your patients disposal for prescription.
  - Aquatic Therapy
  - Alter-G?
- Low Impact activity return based on healing.
Post-Operative Management

Maturation Phase
- Goals:
  - Graded return to activity
  - Load and impact are factors for activity selection during return.
  - Healing and graft size/location are factors for selecting timeframe and progression.

Return to Activity

Graded and healing/symptom based.
No real consensus on criteria based return.
- Is criteria necessary to achieve high return rate?
- 76% overall rate of return via Krych et al but 93% for OAT procedure.

Value in establishing readiness both physically and psychologically.
- Assess based on requirement for activity
- Identify remaining deficits/imbalance that may put patient at risk

Summary

Clinical Guidelines for best practice exist for cartilage restoration procedures to ensure safe, efficient and cost effective rehabilitation and return to activity.

Most notable and successful among these are protocols for protected weight bearing and activity throughout the early and moderate term phases of rehabilitation which should be reinforced across all medical professions.

Graded return to activity should be based on biologic healing time, criterion based progress and pertinent physical exam/imaging studies.
References