Articular Cartilage Rehabilitation

Rehab Summit
Omni Orlando Resort at ChampionsGate
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Articular Cartilage

• Functions of the Articular Cartilage
  – Distribute load
  – Absorb shock

• Defects progress to:
  – Degenerative arthritis
  – Long-term disability
Articular Cartilage Defects
a treatment challenge

• Most full-thickness defects are symptomatic
  – Pain, swelling, locking, catching, grinding

• Left untreated, significant articular defects progress
Surgical Considerations

- Micro-fracture
- OATS
- Autologous Chondrocyte Implantation


Micro-Fracture Rehab Guidelines

Phase One – Pre-Functional

• Protection of healing articular cartilage
• Re-gain full resting extension
• Pre-ambulation leg control and core stabilization
• Re-establish hamstrings and quadriceps control.
Weight Bearing Status

• 0-2 weeks – non-weight bearing to touch down
• 2-4 weeks – partial weight bearing to full
• >4 weeks – discontinue crutches with normal gait and leg control
Micro-Fracture Rehab Guidelines

Phase One – Exercises – Protective Weight Bearing
- Core Stabilization – Swiss ball series
- OKC – standing straight leg (SLRx4)
- Hamstrings/Quadriceps co-contraction
- Progressive flexion range of motion
- CPM – for joint nutrition
- Patella mobilization
- Hamstrings functional re-lengthening
Micro-Fracture Rehab Guidelines

Phase Two – Return to Function

• Progressive range of motion and flexibility
• Bicycle for warm-up
• Advanced core stabilization – hamstrings bridge roll
• Early proprioception retraining
• Balance board/Bosu - double to single leg
• PRE – Hamstrings, Quadriceps and hip abduction
• Closed kinetic chain progression – mini squat series – balance vector training
• Total gym – leg press progression

Strength Goal – 30% - 20% of contralateral
Micro-Fracture Rehab Guidelines

Phase Three – Return to Activity

• Progressive strengthening – total leg
• CKC progression with functional testing
• Advanced proprioception training
• Strength goal 90% > quadriceps/hamstrings
  – Low impact sports – 8 weeks
  – Moderate impact sports – 8-12 weeks
  – High impact sports – 12-16 weeks
Autologous Chondrocyte Implantation
a superior treatment method

- Biological treatment approach
- Regenerates a durable hyaline-like articular surface
- Repair tissue which matures, rather than deteriorates over time
- Expected outcomes
  - Symptom relief
  - Return of normal joint function
  - Return to previous level of functioning
- Goal: reduce further surgical interventions, claims expenditures, incidence of disability

AUTOLOGOUS CHONDROCYTE IMPLANTATION

Post-Op Rehabilitation Protocol

PHASE I – Pre-functional

- Non-weight bearing – 2 weeks – size of defect (< 2cm² condyle)
- Toe–touch weight bearing at approx. 3 weeks (25%-45% BW)
- PWB – 4 to 6 weeks (50%-Full BW)
- FWB – 6 to 8 weeks (depends on size of defect and rehab response)
- Regain full extension, slow flexion, total leg control, hamstrings re-lengthening, patella mobilization, hamstrings/quadriceps co-contraction
- CPM for joint nutrition
- Multi-Angle Isometrics
- Core Stabilization

Range of Motion

• CPM as instructed – full extension to 40 degrees for 2 to 3 weeks. Increase 5° – 10° per day
• Positional Extension
• Flexion to 90 degrees by 2 weeks
• Flexion to 105 degrees by 3 weeks
• Flexion to 115 degrees by 4 weeks
• Flexion to 120+ degrees by 6 weeks
• Patellar mobilization
• Stationary Bicycle low resistance
PHASE II

Return to Function Phase

Goals

• Increase ROM to functional limits
• Improve quadriceps control
• Begin functional activities

• Balance Board - BOSU
• P.R.E. as tolerated for quadriceps & hamstrings open kinetic chain extension cautiously
• Begin closed kinetic chain terminal knee extension
• Mini-squats, leg press & balance retraining, lateral & front step-up
• Continue bicycle
• Treadmill if available – retro-training - Elliptical
• Core Stabilization – Phase II – hamstrings bridge roll
• Total Gym – Sub-max BW Loading
PHASE III

Return to Activity Phase

• Increase functional activities
• Increase strength and endurance
• Promote kinetic stabilization

Functional Tests

• Balance test
• Isolated strength test within 70% of contralateral extremity
Phase III

Return to Activity Phase

Goals

• Hamstrings 30% contralateral extremity
• Quadriceps 20%-30% of contralateral extremity
• Balance Testing within 10 seconds of contralateral extremity
Advanced Exercises

• Leg press and all other closed kinetic chain activities as before
• Balance vector training
• Lateral step-ups, 2” – 4” – 6” – 8”
• Stepper – Elliptical - Swimming
• P.R.E. open kinetic chain strengthening as tolerated – Patella Protection 90° - 40°
• Forward Lunges
• BOSU – single leg
• Fitter, slide board
• Plyo-toss – balance training – uneven surfaces
Goals:
• Return to full function
• Strength to 90% of contralateral extremity
• Balance – Proprioception

Functional Training Program:
• Closed kinetic chain stabilization
• Balance tri-plane
• Return to light running
• Sports specific agility training as needed
Return to Sports

• Return to sports programs:
  • Low impact sports – 6 months
    • Swimming
    • Cycling
    • Skating
  • High impact sports – 8 to 9 months
    • Jogging
    • Aerobics
    • Golf
    • Large lesions may be delayed to 9 to 12 months
  • High impact contact sports – 12+ months
    • Football
    • Soccer
    • Basketball
    • Baseball