

Articular Cartilage Post-Op Rehabilitation

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Articular Cartilage Lesions

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

Knutsen G, Engebretsen L, Ludvigen T, et al. Autologous Chondrocyte Implantation Compared with Microfracture in the Knee. JBJS 86-A (3) 2004. 455-464.
Manske RC. Post Surgical Orthopedic Sports Rehabilitation Knee and Shoulder. Chapter 20 & 21. 2006 St. Louis. Mosby-Eleiver

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

Reference: Gillogly SD, Myers TH, Reinhold MM. Treatment of Full-Thickness Chondral Defects in the Knee with Autologous Chondrocyte Implantation. J Orthop Sports Phys Ther 2006 36(10) 751-764.

**AUTOLOGOUS CHONDROCYTE
IMPLANTATION**

Post-Op Rehabilitation Protocol

PHASE I

- Non-weight bearing – 2 weeks – size of lesion
- Toe–touch weight bearing at approx. 3 weeks
- PWB – 4 to 6 weeks
- FWB – 6 to 8 weeks
- Regain full extension, slow flexion, total leg control, hamstring re-lengthening, patella mobilization
- CPM for joint nutrition
- Multi-Angle Isometrics
- Core Stabilization

Reference: Stroud R. CPM's Therapeutic Benefits. Rehab Management August/September 2006 48-50.

Weight bearing Status

- Non-weight bearing for two weeks
 - Size of lesion and location < 2.0cm² (Condyle)
- Toe-touch weight bearing at three weeks at 25% BW
- PWB of 50% body weight between week 4 and 6 with locked full extension.
- FWB at 8 weeks – condyle lesion
- FWB at 6-8 weeks – patella lesion

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

Leg Control Exercises and Flexibility

- Hamstrings and gastro-soleus stretching (re-lengthening)
- Leg control – SLR – all directions
- Active extension 90 to 45 degrees with condyle lesions, slower with patella lesions.
- Co-contraction with H/Q
- Multi-angle isometrics
- Electrical stimulation as needed for quadriceps recruitment
- Core Stabilization

Core Stabilization Phase I

- Multi-directional hip strengthening – Standing SLR X 4
- Bridging
- Swiss ball – Assisted to unassisted
- Seated on ball quad sets to leg raises

PHASE II

Goals

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

Weight Bearing

- Full weight bearing with good leg control by 6-8 weeks

Gillogly S, Voight M, Blackburn T. Treatment of Articular Cartilage Defects of the Knee with Autologous Chondrocyte Implantation. JOSPT 28 (4), 1998. 241-251.

Early Strengthening

- 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
- Wobble board
- Core Stabilization – Phase II – hamstrings bridge roll
- Total Gym – Sub-max BW Loading

Phase III

Goals

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

PHASE III

Exercise Application

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

Functional Tests

- Balance test
- Isolated strength test within 70% 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

PHASE IV

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
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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
