



Articular Cartilage Repair Rehabilitation Protocol

Phase 1 (0-6 weeks post-op)

Rehabilitation Goals

- Protection of healing tissue from load and shear forces
- Restoration of full passive knee extension
- Gradual improvement of knee flexion
- Regain adequate quadriceps control

PRECAUTIONS

- WB dependent upon location, size, and condition of recipient site

Crutches

Two-crutch ambulation, WB wearing brace per the schedule below Posterior lesion or small anterior lesion (< 2 cm)

- Weeks 1-2: Non-weightbearing
- Weeks 3-4: Foot flat WB @ 0-10% body weight
- Weeks 4-6: Partial weight-bearing @ 25-50% body weight o Wks 5-6: Partial weight-bearing @ 50-75% body weight

Brace

ROM brace locked into extension during WB activity

CPM

- Start 6-24 hours post-surgery at 0-45 deg
- Increase 5-10 deg per day as tolerated
- Goal: 6 weeks, 6-8 hours per day in 2 hour sessions



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Rehabilitation

- Frequent use of cryocuff and/or ice with lower extremity elevated
- Begin patellar mobilizations (10 reps each direction TID) after suture/staple removal
- Begin scar massage after incision site sloughs/scar is formed

Weeks 1-2

- **ROM 0°-90°**
- Calf pumping with tubing
- Static quad sets (with e-stim until patient able to do 10 SLRs without extension lag)
- Heel slides - assisted as needed
- Supine passive extension to 0° extension
- Gentle hamstring stretching
- SLRs: All directions - may add light weight when pain free
- Electrical muscle stimulation during quadriceps exercises

Weeks 3-4

- **ROM 0°-110°**
- Short arc quads 90°-40° may add light weight when pain free
- Stationary bike for ROM. NO RESISTANCE
- General LE stretching (calf, HS, quads, HF, hip adductors)

Weeks 5-6

- **ROM 0°-120°**
- UBE and/or well leg cycle
- Beginning level pool exercises - deep water jogging
- Seated bilateral calf raises
- Seated ankle disk training

Follow-Up

- Physical Therapy: Weekly
- Ortho: ~6 weeks post-op
- Supervised rehabilitation: 2-3 x per week as needed

Documentation

- Precautions
- Pain level, medications, modalities
- Observation: (incision sites) - Signs/symptoms of infection? Site healing well? Effusion?
- Neurovascular status: Distal pulses, motor and sensation intact? Presence of calf pain?
- Knee ROM & quadriceps function

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Articular Cartilage Repair Rehabilitation Protocol

Phase 2 (7-16 weeks post-op) (Remodeling)

Rehabilitation Goals

- Gradually increase to full ROM and WB
- > 80% quadriceps and hamstring strength return

PRECAUTIONS

- NO walk to run until 4 months post-op

Crutches

Discontinue crutches at 7-8 weeks for posterior and small anterior lesions if normal gait

Brace

- Discontinue ROM brace at 6 weeks if able to perform 30 ASLR without lag
- Consider unloading brace for femoral condyle lesions

Rehabilitation

- Progress to the following exercises and increase intensity gradually when patient is ready (i.e., no increase in knee pain or effusion since the previous exercise session)
- *Note: all strengthening should be done using low weights, high reps, and in painless ROM*



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Articular Cartilage Repair Rehabilitation Protocol

Phase 2 (7-16 weeks post-op) (Remodeling)

Weeks 7-8

- Weight shifts
- Stationary bike for conditioning with light weight.
- General LE stretching (calf, HS - add quads, HF, hip adductors)
- Gait training (cone walking, marching, retrowalking, carioca, shuffles, etc.)

Weeks 9-10

- Double leg mini-squats (0-45°) - add unilateral minisquats @~week 10 Bilateral calf raises - add unilateral calf raises @~week 10 Step-ups
- Progressive strengthening (calf press, leg press, squats (0-60°), HS curls, hip abd/add) (first set: 30 repetitions, then 1 additional sets at the same weight to muscle failure)
- Progressive pool program as tolerated

Weeks 11-16

- Progressive standing balance exercises (body blade, plyoball, platform training, etc.)
- (progress in duration, intensity, double leg to single leg, etc.)
- May gradually add elliptical and stairmaster for conditioning
- Progressive strengthening: calf press, leg press, squats (0-60° at 11-12 wks, 0-90° at 13-16wks), HS curls, hip abd/add (first set: 20 repetitions, then 2 additional sets at the same weight to muscle failure)

Follow-Up

- PT: Bimonthly
- Ortho: ~12 weeks post-op
- Supervised rehabilitation: 2-3 x per week as needed

Testing

Y-balance testing: month 3 & 4

Documentation

- Precautions, pain level, medications, modalities
- Effusion
- Knee ROM & quadriceps function
- Gait

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Articular Cartilage Repair Rehabilitation Protocol

Phase 3 (5-10 months post-op) (Maturation)

Rehabilitation Goals

- Jog at own pace and distance without pain by 6 months
- > 90% quadriceps and HS strength return
- \geq 90% hop for distance

PRECAUTIONS

- **NO** walk to run until 4 months post-op
- **NO** participation in contact/collision sports until ~9 months post-op

Brace

Consider unloading brace for femoral condyle lesions

Rehabilitation

- Continue phase II exercises as needed
- Progress in duration and intensity of exercise only if there is no increase in knee pain or effusion since the previous exercise session.



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Articular Cartilage Repair Rehabilitation Protocol

Phase 3 (5-10 months post-op) (Maturation)

Weeks 16-20

- Aerobic conditioning (biking, elliptical, stairmaster)
- General LE stretching: 5-10 minutes (calf, HS, quads, HF, hip adductors)
- Progressive strengthening (calf press, leg press, squats (0-60°), HS curls, hip abd/add) (first set: 10 repetitions, then 2 additional sets at the same weight to muscle failure)
- Progressive balance training as need
- Progressive jogging program (Begin jogging for 5-10 minutes TIW - increase time and/or distance no more than 10-20% per wk)

Weeks 20+

Progressive functional training: Begin at 25-50% intensity and progress gradually (jumping, hopping, directional jogging, carioca, shuffles, etc.)

Weeks 24+

Sport specific drills: Begin at 25-50% intensity and progress gradually

Follow-Up

- PT: Monthly
- Ortho: ~6 months post-op
- Supervised rehabilitation: 1-2 x per week as needed

Testing

- Hop tests: months 5 & 6, then as needed until > 90% symmetry
- Y-balance test: months 5 & 6, then as needed until > 90% symmetry
- Dynamic movement quality (video analysis, LESS & single leg hop): months 5 & 6, then as needed

Documentation

- Precautions, pain level, medications, modalities
- Effusion
- Knee ROM & quadriceps function
- Gait

Miscellaneous

- After 6 months post-op: Exercises in phase III are continued, gradually increasing intensity & duration as tolerated
- The recommendation is to wait until 9-12 months post-op to return to contact/collision sports. This time period may be adjusted slightly by the surgeon and therapist according to patient progress.



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