Connecticut Orthopaedics

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Articular Cartilage Restoration—
Tibiofemoral Compartment
Post-Operative Protocol

Phase I - Maximum Protection
Weeks 0-6

- Brace settings
  - Week 1: 0-30 degrees
  - Weeks 2-6: 0-45 degrees
- Weight bearing progression with use of axillary crutches
  - Week 1: <20% of body weight
  - Weeks 2-3: progress to 30% of body weight
  - Weeks 4-6: progress to 60% of body weight
- Initiate quadriceps muscle activation
- Initiate range of motion (restrictions apply to unloaded and loaded motion)
  - Week 1: 0-30 degrees flexion
  - Weeks 2-3: 0-90 degrees flexion
  - Weeks 4-6: 0-125 degrees flexion
- CPM use 6 hours a day for 6 weeks
  - No brace use when using CPM
  - Range of motion on CPM consistent with ROM restrictions listed above.

Goals

- Reduce inflammation and pain
- Protect surgical repair
- Maintain full knee extension range of motion
- Gradually progress knee range of motion per above restrictions
- Maintain strength and motion of non-operative joints
- Quadricep activation

Exercise progression

- Passive/active knee range of motion
- Quad sets, hamstrings sets, glute sets
- Multi-plane open kinetic chain strengthening (i.e. straight leg raises, avoid patellofemoral provocative exercises)
- Initiate bike with no resistance to facilitate ROM at 4 weeks
- Use of BFR (blood flow restriction) therapy to facilitate strengthening during weight bearing restrictions
- Patellofemoral mobilizations
- Gait training
- Elevation and cryotherapy to assist with swelling reduction

Phase II- Progressive Stretching and Early Strengthening
Weeks 6 to 12:

- Brace unlocked allowing full flexion mobility
- Weight bearing progression with use of single axillary crutch
  - Weeks 7-8: progress to 80% of body weight
  - Full weight bearing by week 10
- Full range of motion
- Progress closed chain strengthening from double limb to single limb
- Initiate balance and proprioception exercises

Goals
- Reduce inflammation and pain
- Protect surgical repair
- Full knee range of motion
- Maintain strength of non-operative joints
- Normalizing gait pattern

Exercise progression
- Able to gradually increase resistance on bike at 6 weeks
- Initiate elliptical at 10 weeks
- Initiate closed chain strengthening in double limb progressing to single limb
- Maintain squat depth at 90 degrees or above
- Step up progression
- Gait training
- Elevation and cryotherapy to assist with swelling reduction

Phase III- Progressive Strengthening
Weeks 12 to 24:
- Discontinue brace
- Full weight bearing
- Advance strengthening exercises
- Balance and proprioceptive exercises

Goals
- Reduce inflammation and pain
- Protect surgical repair
- Full knee range of motion
- Progress limb strength
- Normal gait pattern

Exercise progression
- Progress closed chain single and double limb strength as able
    - Avoid patellofemoral provocative exercises (lunges, leg extension)

Phase IV- Advanced Strengthening, Running Progression, and Plyometric Training
Months 6 to 9:
- Administer Preliminary functional test at 6 months for MD to review
- Initiate straight line jogging at 6 months if proper biomechanics are demonstrated and symmetry on functional test
- Initiate plyometric training in double limb with gradual progression to single limb
- Advance strengthening program
- Able to return to low-impact recreational activities (walking, biking, elliptical, swimming)

Goals
- No swelling
- Full range of motion
- Normal gait pattern
- Symmetrical strength and power

Exercise progression
- Single limb closed chain strengthening
- Proprioception drills
- Basic ladder series
- Linear jogging progression
- Basic plyometric box progression
- Gym strengthening progression

Phase V- Return to Sport

Months 9 to 12:
- Progress plyometric training to single limb, multi-plane, change of direction, and deceleration
- Advance strengthening program
- Administer Return To Sport functional test prior to 12 month follow up appointment with MD for physician to review

Goals
- No swelling
- Full range of motion
- Normal gait pattern
- Symmetrical strength and power

Exercise progression
- Advanced ladder series
- Change of direction with running and jumping
- Sport specific field/court drills
- Gym strengthening progression

Criteria to be released for return to sport
- Follow-up examination with the physician
- Pass Return To Sport functional test at >90% (involved vs. uninvolved limb)
- Display symmetry and confidence in high-speed cutting, multi-plane plyometric drills, sprinting and decelerating

Anticipated return to sport:
- 12 months for contact and non-contact athletes

Revised ***