BBJI
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Postoperative Rehabilitation Guidelines BMAC Implantation- Femoral Condyle

The following protocol is intended as a general guideline for physical therapist, athletic trainer, and patient after BMAC bone marrow autograft concentrate implantation. These guidelines are designed to facilitate the expedited and safe return to athletic or professional activity and is based on a review of the current scientific principles of knee rehabilitation. For the treating health care provider this protocol should not serve as a substitute for individualized clinical decision making during the patient's post-operative course following BMAC bone marrow autograft concentrate implantation. It should rather take into consideration the individual's physical findings, progression, and possible post-operative limitations. If the therapist or patient requires assistance or encounters any postoperative complication they should consult with **the surgeon.**

Phase I : Weeks 0-6 (Protection Phase)

- NWB with crutches for femoral/tibial lesions for 2 weeks, then start PWB at 25% of body weight
  and advance 25% every week until 100% after 6 weeks
- CPM: start day after surgery at 0-30 and advance as tolerated (use 6-8 hours/day for 6 weeks)
- Edema reduction
- Electrical stimulation, biofeedback
- Patellar mobilization
- Limited arc ROM: Avoid range at which defect articulates (range provided by surgeon)
- Multi-angle isometrics (co-contractions), ankle pumps, SLR
  - Ok to use NMES
- Stationary bike with NO resistance
- Hamstring curls, hip abductor/gastrocnemius strengthening
- Well leg exercises
- Pool therapy
  - To start after 4 weeks if possible
- Cryotherapy

Phase II Weeks 7-12 (Activation Phase)

- Gradually progress to WBAT based on symptoms/lesion size(on script)
- Progress to full ROM
- Aqua jogging,
- Limited arc ROM until 12 weeks (start mini squats, limited arc leg press by week 8)
- Bike with gradually increasing resistance
- Treadmill walking as tolerated
- Strengthening
  - Hamstring, hip abductor, gastroc/soleus strengthening
  - Well leg exercises
  - Front/Lateral step-ups
- Balance drills
- Cryotherapy
- Monitor carefully for pain and effusion and reduce activities if symptomatic

Phase III Weeks 13-24 (Progression Phase)

- Continue all exercises from Phase II
- FULL ROM for all strengthening exercises
  - Open kinetic chain: Progressive squatting/leg press/lunge program
  - Avoid open kinetic chain exercises for patellofemoral defects for 4 months
  - Limit squatting <110 degrees with maximal body weight for 3 months after meniscal repair
  - Avoid squatting/leg press if with patellofemoral pain → resume isometric exercises
- Cardiovascular endurance training
  - Bike, elliptical, Nordic-Track
- Advance proprioceptive exercises
- Monitor carefully for pain and effusion and reduce activities if symptomatic
- Cryotherapy

Phase IV Weeks 25-48 (Functional Activity Phase)

- Initiate low impact exercises (jogging) at 6 months if no pain/effusion, sufficient quad control
- Normalize strength, flexibility, endurance, and neuromuscular control
- Start plyometric drills at 7-9 months
- Progress running and start agility program
- Initiate increased impact, cutting, jumping drills at 9-12 months
- Advance sport-specific agility exercises
- Start sport-specific skill training at 9-12 months
- Continue sport-specific skill program and functional progression
- Gradual return to sport (MD directed)
- Return to High-impact sports at 9-15 months (MD directed)
- Cryotherapy after every exercise session

Before Return to Sport:
- MRI evaluation
- Isokinetic testing (concentric) of hamstrings (goal 100%) and quadriceps (goal >90%)

- Single leg hop test (goal >90%)
- Complete functional knee scores (subjective scoring, ICRS, IKDC, Tegner, Lysholm, KOOS)