



**DR. CARL DIRAIMONDO AND DR. BRIAN KURCZ  
TIBIAL TUBERCLE TRANSFER POST-OP THERAPY PROTOCOL**

**Phase 1 – Maximum Protection Phase (0-6 weeks)**

<b>Goals for Phase 1</b>	<b>Precautions for Phase 1</b>
<ul style="list-style-type: none"><li>• Protect tibial tubercle transfer</li><li>• Minimize effusion</li><li>• ROM per guidelines listed, emphasis on extension</li><li>• Encourage quadriceps function</li><li>• Scar tissue mobility</li></ul>	<ul style="list-style-type: none"><li>• Avoid open/resisted knee extension</li><li>• Avoid open and closed kinetic chain hip strength (including SLR)</li><li>• Avoid ambulation without brace locked at 0 degrees for first 4 weeks (pending WB)</li></ul>

**Immobilization/Weight Bearing**

- TTWB with brace locked in full extension

**Range of Motion**

- 0-90 degrees, emphasis on extension

**Brace**

- Brace locked in full extension
- Progression of opening brace is dependent upon controlled pain, appropriate quad strength, and controlled effusion per physician discretion

**Manual Therapy**

- Scar mobilization
- Patellar mobility drills
- Soft tissue mobilization to hamstrings, quadriceps, gastrocnemius-soleus, IT Band
- PROM/AROM knee flexion per ROM guidelines listed above

**Strengthening**

- Quadriceps strengthening:
  - **0-6 Weeks:** Quadriceps setting
  - **2-6 Weeks:** Terminal knee extension in prone (and standing once WBAT)
- Hip strengthening:
  - Initiate isometrics
- Core strengthening
- Upper body ergometer

**Modalities**

- Cryotherapy 3 x per day for 20 minutes each with knee elevated above heart
- Issue compression and Kinesiotape appropriate for edema
- NMES for quadriceps function:
  - Home NMES unit recommended for first 8 weeks following surgery, per physician and therapist discretion
  - NMES to be used at home 3x a day for 20 minutes each



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**Phase 2 – Progressive Range of Motion and Early Strengthening (6-12 weeks)**

<b>Goals for Phase 2</b>	<b>Precautions for Phase 2</b>
<ul style="list-style-type: none"><li>• Minimize effusion</li><li>• Gently increase ROM to full</li><li>• Normalize gait with heel-toe pattern</li><li>• Wean from knee brace</li><li>• Open and closed kinetic chain strengthening</li></ul>	<ul style="list-style-type: none"><li>• Avoid lunges</li><li>• Avoid overloading surgical site</li><li>• Avoid deep squatting for 16 weeks (greater than 90°)</li></ul>

**Immobilization/Weight Bearing**

- WBAT with crutches but can wean from crutches as appropriate

**Range of Motion**

- Gradual return to full ROM, emphasis on extension, per physician discretion

**Brace**

- Progression of opening brace is dependent upon controlled pain, appropriate quad strength, and controlled effusion per physician discretion

**Manual Therapy**

- Scar mobilization
- Patellar mobilization
- Soft tissue mobilization to hamstrings, quadriceps, gastrocnemius-soleus, IT Band
- PROM/AROM knee flexion per ROM guidelines listed above

**Strengthening**

- Quadriceps strengthening:
  - **6-8 Weeks:** Begin multi-plane straight leg raising and closed kinetic chain strengthening program
  - **8-10 Weeks:** Progress open and closed kinetic chain program from bilateral to unilateral
- Hip strengthening:
  - Initiate open kinetic chain progressing to closed kinetic chain multi-plane hip strengthening
- Core strengthening
- Begin stationary bike
- Initiate proprioception drills (week 10)
- Blood flow restriction training as appropriate at 10 weeks (sooner with surgeon clearance)

**Modalities**

- NMES for quadriceps function as indicated per phase 1.



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**Phase 3 – Progressive Strengthening (12-16 weeks)**

<b>Goals for Phase 3</b>	<b>Precautions for Phase 3</b>
<ul style="list-style-type: none"><li>• Progress muscle strength, endurance, and balance</li></ul>	<ul style="list-style-type: none"><li>• No kicking in pool for 12 weeks</li><li>• Avoid twisting and pivoting for 12 weeks</li><li>• Avoidance of impact activity until able to pass functional testing</li></ul>

**Stretching**

- Continue stretching of all lower extremity musculature, as appropriate

**Manual Therapy**

- As needed to maintain range of motion and flexibility

**Strengthening**

- Advance open and closed kinetic chain strengthening (avoid knee extensions)
- Increased intensity on bike, treadmill, and elliptical trainer
- Begin gym strengthening leg press, hamstring curls, ab/adduction

**Neuromuscular Control**

- Increase difficulty and intensity on proprioception drills

**Aquatics**

- Initiate pool running program



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**Phase 4 – Advanced Strengthening and Functional Drills (16-24 weeks)**

**Goals for Phase 4**

- Minimize pain and inflammation
- Restore strength and endurance
- Restore neuromuscular control
- Initiate impact activity and begin sport and/or work specific tasks

**Week 16**

- Continue pool running program advancing to land as tolerated

**Week 20**

- Advance gym strengthening
- Progress running/sprinting program –see return to run protocol
- Begin multi-directional field/court drills
- Begin bilateral progressing to unilateral plyometric drills
- Follow-up appointment with physician

**Return to Competition**

- Sports testing for return to competition 6 months post-op per physician's release