

## Patellar Tendon Repair – Physical Therapy Protocol

### Phase I – Immediate Post-Surgical Phase (Day 0-14):

#### Goals:

- Prevent and recognize early signs of infection
- Minimize post-operative pain
- Minimize post-operative edema
- Prevent complications from prolonged immobilization
- Protect repair

#### Precautions:

- Weight bearing as tolerated
- Brace locked in extension at all times
- Assistive device for ambulation as needed

#### Things to Avoid:

- Active and passive knee flexion range of motion
- Quadriceps activation/strength
- Formal PT visits


#### Criteria for progression to the next phase:

- Clearance from MD at first post-operative visit to begin formal PT

#### **Information for the Patient:**

This section is to serve as guidance and exercise suggestions prior to the start of formal PT at first post-surgical follow up.

<p>Education: Prevent and recognize early signs of infection</p>	<p>It is important to prevent infection of the surgical incision by avoiding exposure to germs. Wash hands with warm soapy water for a minimum of 20 seconds or use alcohol-based sanitizer prior to touching anything near your surgical incision. Keep incision dry and follow MD instructions for dressing changes and/or removal of dressings. Report any changes in drainage (especially green or yellow drainage, increased redness/heat around the joint or incision, development of a fever (chills, sweating, high temperature) or significant changes in pain level.</p>
<p>Education: Protect repair</p>	<p>Early on in your recovery, your tendon repair has a decreased tolerance to load. Load on the repair is increased by stretch, or by activating the quadriceps muscle. To decrease load and decrease the likelihood of complications it is important to comply with use of your brace and crutches as directed early on in recovery. Later in your rehabilitation it will be important to stress the repair in controlled ways, but this should always be guided by your physical therapist and surgeon.</p>

<p>Education: Prevent complications of prolonged immobilization</p>	<p>Prolonged immobilization, while necessary, does have side effects. The two biggest concerns are blood clots (DVT) and tissue atrophy. Blood clots form because of loss of intralimb pressure which helps with return of blood back to circulation through the venous system mainly because of loss of muscular contractions in the leg. To combat this, we can use external pressure (compression wraps etc.), elevation of the limb (to help passive venous return) and controlled active muscle contractions (see ankle pump exercise below). Likely your Physician will also have given you a blood thinner in addition for the first few weeks after surgery.</p> <p>In order to prevent tissue atrophy it is important to bear as much weight as tolerated through the limb (while complying with use of brace to keep the leg full out straight when walking) and to try to remain as active and mobile as tolerated within reason.</p>
<p>Education: Managing post-operative pain/edema</p>	<p>Edema, or fluid build up in and around the joint, can be managed with use of compression, elevation and active muscle contractions, similar to those described above. Note that it is not unusual to have some soft swelling of your calf or ankle after lower extremity surgery.</p> <p>Pain management can be complex and should vary based on the individual, however. Some basic guiding principles include using opiate pain medications sparingly (or not at all if possible), always use medications as directed by your surgeon (including over the counter pain medication).</p> <p>Cryotherapy (ice) can also be used as effective pain management as can adequate mobility, sleep, stress management and proper diet. As always with pain management, learn to listen to the body and rest when needed but avoid being overly sedentary for prolonged periods.</p>
<p>Ankle Pumps - Pump your ankles up and down to promote blood flow in the lower legs - If possible, elevate legs on bolster or pillows to improve bloodflow *Perform with knee brace locked in extension</p>	

Passive  
Extension  
Stretch (Heel  
prop)  
-Place heel  
elevated on  
towel or  
other firm  
elevated  
surface  
-Relax to  
allow gravity  
to extend the  
knee  
-A small  
weight can  
be used over  
the knee to  
increase  
stretch if  
tolerated  
\*Perform  
with knee  
brace locked  
in extension



### **Phase II – Protection Phase (1<sup>st</sup> postop visit- Week 5):**

#### Goals:

- Continued minimization of post-operative pain/edema
- Progress knee flexion PROM
- Progress to full weight bearing status with use of brace
- Initiate quadriceps activation exercises
- Initiate proximal/distal strengthening (hip, back, abdominals, ankle)

#### Precautions:

- Knee flexion PROM
  - Light overpressure only for PROM
  - **Progress 10 degrees/week until 90 degrees achieved**
- Hinged brace locked in extension for standing/walking/sleeping
  - Brace worn at night until week 6 unless otherwise specified by surgeon
  - Can unlock for sitting/laying (brace angle can be unlocked to available PROM, but not to exceed PROM progression noted above)
- Assistive device for ambulation as needed

Things to Avoid:

- Quadriceps/knee flexion stretching
- No external load/resistance to quadriceps (AROM activation exercises only i.e. quadriceps setting, short/long arc quad with no resistance, SLR)

Criteria for progression to the next phase:

- Full passive knee extension PROM
- FWB in brace with no pain
- Seated active knee extension to 0 degrees

**Phase III – Intermediate phase (Week 6 – 15):**

Goals:

- Wean assistive devices if any are still used
- Initiate gait training focused on symmetry with use of hinged brace (including stairs)
- Restore full A/PROM of knee flexion
  - Begin stationary bike when able
- Initiate progressive quadriceps loading/resistance exercises (see appendix A for principles and considerations)
  - Can initiate use of blood flow restrictive training (BFR) (see appendix B)
- Restore static single leg balance
- Continue to progress proximal/distal strengthening
  - Can initiate use of blood flow restrictive training

Precautions:

- Hinged brace unlocked for ambulation (0-60 degrees) provided patient demonstrates sufficient quad control during stance to prevent buckling
  - Use brace until week 8 unless otherwise specified by surgeon
  - Patient should demonstrate sufficient quad control, weight bearing tolerance and single limb stability prior to discharge of brace
- No weight bearing with flexion >90 deg until after 8 weeks
- A/PROM should be cautioned not to progress faster than 10 degrees per week before 12 weeks post-op

Things to Avoid:

- Aggressive quadriceps stretching
- No maximal voluntary contractions of quadriceps (manual muscle tests, dynamometric assessments until week 16)

Criteria for progression to the next phase:

- Good recovery of quadriceps strength
  - Supine Straight leg raise without extensor lag
  - Or 100% quad set compared to contralateral side (measured by sphygmomanometer in mmHg)<sup>1</sup>
- Knee flexion PROM to at least 120 degrees

- Single leg stance to 30 seconds on involved side with no significant compensatory pattern
- Symmetrical gait pattern without use of assistive device
- Symmetrical stair negotiation without reliance on UE

#### **Phase IV – Advanced strengthening phase (Week 16-23):**

##### Goals:

- Restore full ROM and muscle length of quadriceps
- Restore quadriceps strength (quad index preferred)
- Restore single leg dynamic balance/eccentric control (Y balance preferred)
- Initiate return to run/jog protocol as tolerated
- Restore proximal/distal strength to symmetry with contralateral side

##### Precautions:

- None

##### Things to Avoid:

- Pain more than delayed onset muscle soreness (DOMS) during or following exercise especially in the anterior knee/extensor mechanism

##### Criteria for progression to the next phase:

- Quad index of at least 75% (hand held dynamometry preferred, if not sphygmomanometer is acceptable or MMT 5/5)<sup>1,2</sup>
  - Isokinetic dynamometry should be held until 6 months and reserved for cases where advanced return to sport/activity is needed
- Symmetrical strength measures in hamstrings, hip and ankle (dynamometry preferred)
- Y balance test within 90% of contralateral side
- Symmetry in gait while jogging

#### **Phase V – Return to activity phase (Week 24-32):**

##### Goals:

- Progress running/sprinting program
- Improve multidirectional dynamic movements and control of acceleration/deceleration
- Improve power in plyometrics and landing mechanics
- Restore full quadriceps strength
- Return to sport/competition with minimal risk of re-injury

##### Precautions:

- None

##### Things to Avoid:

- Pain (more than DOMS) during or following exercise/training especially in the anterior knee/extensor mechanism

Criteria for discharge from skilled therapy:

- Pass all criteria of the BWH Lower Extremity Return to Sport Standard of Care
- Quad index of at least 85% (measured by dynamometry, isokinetic preferred)
  - If dynamometry is unavailable, it is encouraged to use a different objective method to assess force output of the extensor mechanism such as 1 repetition max testing or refer to PT practice with appropriate equipment.<sup>3</sup>