Rehabilitation Protocol for Proximal Hamstring Repair

This protocol is intended to guide clinicians through the post-operative course for proximal hamstring repair. This protocol is time based (dependent on tissue healing) as well as criterion based. Specific intervention should be based on the needs of the individual and should consider exam findings and clinical decision making. The timeframes for expected outcomes contained within this guideline may vary based on surgeon’s preference, additional procedures performed, and/or complications. If a clinician requires assistance in the progression of a post-operative patient, they should consult with the referring surgeon.

The interventions included within this protocol are not intended to be an inclusive list. Therapeutic interventions should be included and modified based on the progress of the patient and under the discretion of the clinician.

Considerations for the Post-operative Proximal Hamstring
Many different factors influence the post-operative proximal hamstring rehabilitation outcomes, including chronicity of injury prior to surgery, length of retraction, number of tendons involved, pre-surgical gluteal motor control/strength and presence of any concomitant sciatic neural tension. It is recommended that clinicians collaborate closely with the referring physician regarding the above.

If you develop a fever, intense calf pain, uncontrolled pain, or any other symptoms you have concerns about you should call your doctor.

PHASE I: IMMEDIATE POST-OP (0-2 WEEKS AFTER SURGERY)

| Rehabilitation Goals | • Allow healing of repaired tendon  
|                      | • Initiate early restricted and protected ROM  
|                      | • Prevent muscular atrophy  
|                      | • Decrease pain and inflammation  
| Weight Bearing       | • TDWB with crutches  
| Precautions          | • Post-op hip brace to limit hip flexion (45°)  
|                      | • Brace at all times (aside from exercise and bathing)  
|                      | • Avoid hip flexion with knee extension  
| Range of Motion      | • Active assisted and passive hip and knee flexion  
|                      | • Hip flexion ROM limit 60° flexion  
| Interventions        | Manual Therapy  
|                      | • Peri-incisional mobilization  
|                      | • STM along hamstring muscle group as needed  
|                      | • Myofascial (no lotion) release to posterolateral glute and lateral hamstring fascia/muscle (proximal 1/3 of lateral thigh)  
|                      | • Attain and maintain neutral iliac position ipsilateral and contralateral to injured side with manual posterior rotations to ilium  
|                      | Stretching  
|                      | • Nerve gliding (sciatic neural flossing): if neural tension exists – Do not stretch the hamstring  
|                      | • Hip flexors in Thomas test position (maintain neutral pelvis/spine throughout stretch)  
|                      | • Gastrocnemius/Soleus stretching  

Therapeutic Exercise
PHASE II: INTERMEDIATE POST-OP (2-6 WEEKS AFTER SURGERY)

Rehabilitation Goals
- Reduce/resolve pain and edema
- Good motor control and pain-free functional movements

Weight Bearing
- PWB 50% with crutches

Precautions/Guidelines
- Continue post-op hip brace **Hip flexion limit to 60°**
- Increase brace hip flexion limit at week 4 gradually to **90° by week 6**
- Avoid hip flexion with knee extension
- No active hamstrings yet
- No active hip extension exercises

Range of Motion
- Active-assisted and passive hip and knee flexion

Additional Interventions
*Continue with Phase I interventions as indicated*

Manual Therapy
- Scar mobilization
- Gentle cross friction massage to proximal tendon including proximal to attachment on ischial tuberosity
- Manual trigger point release as needed (common area is within distal 1/3 of biceps femoris)
- Manual trigger point release as needed with ART (active release therapy) to piriformis, quadratus femoris
- Anterior hip glides with and without external rotation at the hip (hip in neutral to slightly extended)
- Posterior/inferior belted hip mobilizations as needed for full flexion (belted quadruped position with active movement into child’s pose)

Stretching
- **Hip external rotation in flexion**
- **Limit/avoid piriformis stretching** (massage instead)

Therapeutic Exercise
- **Gluteal setting in prone**
- **Gluteal setting in supine**
*above must be mastered before progressing any gluteal or hamstring muscle strengthening*
- **Low Double Leg (DL) Bridge**
- **Side-lying hip abduction**
- **Standing calf raises**
- Strengthening of uninvolved limb ok

Criteria to Progress
- 2+ weeks post-operative

PHASE III: LATE POST-OP (6-12 WEEKS AFTER SURGERY)

Rehabilitation Goals
- Normalized gait
- Gradually progress to full ROM
- Improve neuromuscular control
- Increase strength
- Enhance proprioception and kinesthesia

Weight Bearing
- Progressively wean crutches over the next 2 weeks to FWB

Precautions/Guidelines
- Discontinue brace at 6-8 weeks, per MD

Range of Motion
- Progressive active hip and knee flexion
- Active stretching all uninvolved muscle groups
### Additional Intervention
*Continue with Phase I-II
Interventions as indicated

<table>
<thead>
<tr>
<th>Therapeutic Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL Bridge with band around thighs</td>
</tr>
<tr>
<td>DL Bridge with ball squeeze</td>
</tr>
<tr>
<td>DL Bridge with Upper back on the bench</td>
</tr>
<tr>
<td>Plank with alternating leg lifts</td>
</tr>
<tr>
<td>Side plank with leg lift (on left knee until stronger) or oblique twists</td>
</tr>
<tr>
<td>Straight Leg Raise (SLR)</td>
</tr>
<tr>
<td>Hamstring (HS) curls antigravity</td>
</tr>
<tr>
<td>Hip extension antigravity</td>
</tr>
</tbody>
</table>

- 10 weeks postop:
  - Single Leg (SL) bridge, back on floor, foot on bench
  - Progress to ankle weight for all leg lifts PRE
  - Wall slides
  - Clam shells
  - Partial squats
  - Step ups
  - Step downs

### Cardiovascular Exercise
- Stationary bike
- Progressive slow walking on level surfaces
- No running

### Criteria to Progress
- Normalized gait all surfaces
- Good control with functional movements without antalgic movement patterns
- Hamstring strength 5/5 in prone with knee at 90° flexion

### PHASE IV: TRANSITIONAL (13-16 WEEKS AFTER SURGERY)

#### Rehabilitation Goals
- Full ROM
- Improve neuromuscular control
- Improve strength/power/endurance
- Enhance dynamic stability

#### Precautions/Guidelines
- Neoprene support as needed
- No pain during strength training

#### Additional Interventions
*Continue with Phase I-III interventions as indicated

<table>
<thead>
<tr>
<th>Therapeutic Exercise:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentle hamstring stretching</td>
</tr>
<tr>
<td>Cautious use of weight training machines</td>
</tr>
<tr>
<td>Single leg closed chain exercises</td>
</tr>
<tr>
<td>Resisted step ups using sports cord around waist from behind</td>
</tr>
<tr>
<td>Double Leg Hamstring ball roll out (eccentric portion only) --&gt; DL eccentric and concentric --&gt; SL eccentric portion only --&gt; SL eccentric and concentric</td>
</tr>
<tr>
<td>Double Leg deadlift, short range --&gt; progressing to Single Leg no rotation</td>
</tr>
<tr>
<td>Double Leg deadlift – wide abducted leg stance with band around forefeet – pushing into abduction during eccentric phase of deadlift</td>
</tr>
<tr>
<td>Progress to single leg with spine rotation deadlift</td>
</tr>
<tr>
<td>Bridge on ball – eccentric portion only double leg → progressing to single leg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cardiovascular Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk progression on level surface with gradual increase in speed and distance</td>
</tr>
<tr>
<td>Preparing to run</td>
</tr>
</tbody>
</table>

Massachusetts General Brigham Sports Medicine
**Criteria to Progress**

- Good neuromuscular control in all planes without pain
- HHD testing: To initiate plyometrics:
  - LSI hamstring strength >70/80%
  - LSI glute med strength >80%
  - LSI quad strength >80%
- To initiate running:
  - LSI hamstring strength >80/90%
  - LSI glute med strength >90%
  - LSI quad strength >90%
  - Single leg hop cluster (distance, triple, cross over, 6 meter timed) >85%

---

**PHASE V: EARLY RETURN TO SPORT (16-20 WEEKS AFTER SURGERY)**

<table>
<thead>
<tr>
<th>Rehabilitation Goals</th>
<th>Precautions/Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Emphasis on gradual return to recreational activities</td>
<td>• Neoprene support as needed</td>
</tr>
</tbody>
</table>

**Additional Interventions**
*Continue with Phase II-IV interventions as indicated*

**Therapeutic Exercise:**
- Progressive strengthening avoiding overload to HS
- Progress speed of resisted steps and add forward lean
- SL dead lift with band under stance leg: hold for resistance
- Reverse Lunge on Slider: Progress load bearing and add concentric/eccentric phase:
  - Part 1: Eccentric hamstring with core strength exercise:
  - Part 2: in full lunge position:
- Short range Nordic HS to physio ball height → progress range to ground depth
- Kettle bell swing
- Retro lunge slide

**Cardiovascular Exercise**
- Walk-to-jog progression
- No sprinting
- No speed work

**Criteria to Progress**

- Full ROM
- No pain/tenderness
- Satisfactory clinical exam including isokinetic testing
- Walk to jog progression

---

**PHASE VI: UNRESTRICTED RETURN TO SPORT (20-24 WEEKS AFTER SURGERY)**

<table>
<thead>
<tr>
<th>Rehabilitation Goals</th>
<th>Additional Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Progressively increase activities to prepare for unrestricted functional return</td>
<td><em>Continue with Phase II-V interventions as indicated</em></td>
</tr>
</tbody>
</table>

**Therapeutic Exercise**
- Continued isotonic strengthening exercises above
- Continue ROM exercises
- Progressive running/speed and agility
- Jump training after 22 weeks

**Cardiovascular Exercise**
- Progress step ups to resisted jump onto steps
- Plyometric progression
  - Double leg up/down
  - Double leg forward/back
  - Alternating lateral bounding
  - Single leg jump
  - Progress plyometrics to resisted plyometrics using sports cord around waist
- Ladder drills
- Falling start runs: see below for details
- Mini hurdle runs
Sprint progressions (5 times each)
- 10 yard → 20 yd → assisted deceleration with band around waist → deceleration lean
- 40 yard sprints at 90%

Criteria to Progress
- To Return to Play:
  - LSI Hamstring strength > 95%
  - LSI Glute strength > 95%
  - LSI quad strength > 95%
  - Single leg hop cluster (distance, triple, cross over, 6 meter timed) > 95%
  - Good acceleration, deceleration, change of direction control
  - 60 second timed step-down test 80 bpm, with excellent control
  - 60 second timed Lateral leap 60 bpm, with excellent control

Revised 10/2021

Contact
Please email MGHSportsPhysicalTherapy@partners.org with questions specific to this protocol

References:
Return to Running Program

This program is designed as a guide for clinicians and patients through a progressive return-to-run program. Patients should demonstrate > 80% on the Functional Assessment prior to initiating this program (after a knee ligament or meniscus repair). Specific recommendations should be based on the needs of the individual and should consider clinical decision making. If you have questions, contact the referring physician.

**PHASE I: WARM UP WALK 15 MINUTES, COOL DOWN WALK 10 MINUTES**

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>W5/J1x5</td>
<td>W5/J1x5</td>
<td>W4/J2x5</td>
<td>W4/J2x5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td></td>
<td>W3/J3x5</td>
<td>W3/J3x5</td>
<td>W2/J4x5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 3</td>
<td>W2/J4x5</td>
<td>W1/J5x5</td>
<td>W1/J5x5</td>
<td></td>
<td></td>
<td>Return to Run</td>
<td></td>
</tr>
</tbody>
</table>

Key: W=walk, J=jog

**Only progress if there is no pain or swelling during or after the run**

**PHASE II: WARM UP WALK 15 MINUTES, COOL DOWN WALK 10 MINUTES**

<table>
<thead>
<tr>
<th>Week</th>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20 min</td>
<td>20 min</td>
<td></td>
<td>20 min</td>
<td>25 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>25 min</td>
<td>25 min</td>
<td>25 min</td>
<td>30 min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>30 min</td>
<td>30 min</td>
<td>35 min</td>
<td>35 min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>35 min</td>
<td>40 min</td>
<td>40 min</td>
<td>40 min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>40 min</td>
<td>45 min</td>
<td></td>
<td>45 min</td>
<td></td>
<td>45 min</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>50 min</td>
<td>50 min</td>
<td>50 min</td>
<td></td>
<td>50 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>55 min</td>
<td>55 min</td>
<td>55 min</td>
<td></td>
<td></td>
<td>60 min</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>60 min</td>
<td>60 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Recommendations**

- Runs should occur on softer surfaces during Phase I
- Non-impact activity on off days
- Goal is to increase mileage and then increase pace; avoid increasing two variables at once
- 10% rule: no more than 10% increase in mileage per week
Agility and Plyometric Program

This program is designed as a guide for clinicians and patients through a progressive series of agility and plyometric exercises to promote successful return to sport and reduce injury risk. Patients should demonstrate > 80% on the Functional Assessment prior to initiating this program. Specific intervention should be based on the needs of the individual and should consider clinical decision making. If you have questions, contact the referring physician.

**PHASE I: ANTERIOR PROGRESSION**

<table>
<thead>
<tr>
<th>Rehabilitation Goals</th>
<th>Agility</th>
<th>Plyometrics</th>
<th>Criteria to Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Safely recondition the knee</td>
<td>• Forward run</td>
<td>• Shuttle press: Double leg ➔ alternating leg ➔ single leg jumps</td>
<td>• No increase in pain or swelling</td>
</tr>
<tr>
<td>• Provide a logical sequence of progressive drills for pre-sports conditioning</td>
<td>• Backward run</td>
<td>• Double leg:</td>
<td>• Pain-free during loading activities</td>
</tr>
<tr>
<td></td>
<td>• Forward lean into a run</td>
<td>o Jumps on to a box ➔ jump off of a box ➔ jumps on/off box</td>
<td>• Demonstrates proper movement patterns</td>
</tr>
<tr>
<td></td>
<td>• Forward run with 3-step deceleration</td>
<td>o Forward jumps, forward jump to broad jump</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Figure 8 run</td>
<td>o Tuck jumps</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Circle run</td>
<td>o Backward/forward hops over line/cone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ladder</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Criteria to Progress**

• No increase in pain or swelling
• Pain-free during loading activities
• Demonstrates proper movement patterns

**PHASE II: LATERAL PROGRESSION**

<table>
<thead>
<tr>
<th>Rehabilitation Goals</th>
<th>Agility</th>
<th>Plyometrics</th>
<th>Criteria to Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Safely recondition the knee</td>
<td>• Side shuffle</td>
<td>• Double leg:</td>
<td>• No increase in pain or swelling</td>
</tr>
<tr>
<td>• Provide a logical sequence of progressive drills for the Level 1 sport athlete</td>
<td>• Carioca</td>
<td>o Lateral jumps over line/cone</td>
<td>• Pain-free during loading activities</td>
</tr>
<tr>
<td></td>
<td>• Crossover steps</td>
<td>o Lateral tuck jumps over cone</td>
<td>• Demonstrates proper movement patterns</td>
</tr>
<tr>
<td></td>
<td>• Shuttle run</td>
<td>• Single leg (these exercises are challenging and should be considered for more advanced athletes):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Zig-zag run</td>
<td>o Lateral jumps over line/cone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ladder</td>
<td>o Lateral jumps with sport cord</td>
<td></td>
</tr>
</tbody>
</table>

**Criteria to Progress**

• No increase in pain or swelling
• Pain-free during loading activities
• Demonstrates proper movement patterns
# PHASE III: MULTI-PLANAR PROGRESSION

<table>
<thead>
<tr>
<th>Rehabilitation Goals</th>
<th>• Challenge the Level 1 sport athlete in preparation for final clearance for return to sport</th>
</tr>
</thead>
</table>
| **Agility**          | • Box drill  
| &bullet; Continue with Phase I-II interventions &bullet; Star drill &bullet; Side shuffle with hurdles |
| **Plyometrics**      | • Box jumps with quick change of direction  
| &bullet; Continue with Phase I-II interventions &bullet; 90 and 180 degree jumps |
| **Criteria to Progress** | • Clearance from MD  
| &bullet; Functional Assessment  
| &bullet; ≥90% contralateral side  
| &bullet; Psych Readiness to Return to Sport (PQRS) |