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The achilles tendon is the major tendon in the lower leg that connects to the heel bone. This tendon functions to allow you to “push down” with the ankle. Repair of the tendon will allow a return to function of the ankle for routine activities such as climbing stairs, walking, and ultimately running and jumping. This rehabilitation protocol is meant to serve as a guide for you and your therapist. If you have any questions or concerns please contact Dr. Mc Millan at 609-747-9200.

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

<b>Rehabilitation Goals</b>	<ul style="list-style-type: none"> <li>• Protect repair</li> <li>• Protect the skin incision</li> <li>• Minimize muscle atrophy in the quads, hamstrings, and glutes</li> </ul>
<b>Weight Bearing</b>	<ul style="list-style-type: none"> <li>• Non-weight bearing on crutches for 2 weeks</li> <li>• When climbing stairs, make sure you are leading with the non-surgical side when going up the stairs, make sure you are leading with the crutches and surgical side when going down the stairs</li> </ul>
<b>Intervention</b>	<p><i>Range of motion/Mobility</i></p> <ul style="list-style-type: none"> <li>• <a href="#">Supine passive hamstring stretch</a></li> </ul> <p><i>Strengthening</i></p> <ul style="list-style-type: none"> <li>• <a href="#">Quad sets</a></li> <li>• NMES high intensity (2500 Hz, 75 bursts) supine knee extended 10 sec/50 sec, 10 contractions, 2x/wk during sessions—use of clinical stimulator during session, consider home units distributed immediate post op</li> <li>• <a href="#">Straight leg raise</a> <ul style="list-style-type: none"> <li>○ <b>**Do not perform straight leg raise if you have a knee extension lag (with brace/cast removed)</b></li> </ul> </li> <li>• <a href="#">Hip abduction</a></li> <li>• <a href="#">Prone hamstring curls</a></li> </ul>
<b>Criteria to Progress</b>	<ul style="list-style-type: none"> <li>• Pain &lt; 5/10</li> </ul>

### ***PHASE II: INTERMEDIATE POST-OP (3-6 WEEKS AFTER SURGERY)***

<b>Rehabilitation Goals</b>	<ul style="list-style-type: none"> <li>• Avoid over-elongation of the Achilles</li> <li>• Reduce pain, minimize swelling</li> <li>• Improve scar mobility</li> <li>• Restore ankle plantar flexion, inversion, and eversion</li> <li>• Dorsiflexion to neutral</li> </ul>
<b>Weight Bearing</b>	<p><i>Walking</i></p> <ul style="list-style-type: none"> <li>• Partial-weight bearing on crutches in a boot</li> <li>• Skin must be healed in order to weight bear</li> </ul>

	<ul style="list-style-type: none"> <li>Gradually wean heel lift: start with 3 wedges, removing one per week</li> </ul>
<b>Additional Intervention</b> <i>*Continue with Phase I interventions</i>	<i>Range of motion/Mobility</i> <ul style="list-style-type: none"> <li>PROM/AAROM/AROM: ankle dorsiflexion**, plantar flexion, inversion, eversion, ankle circles <ul style="list-style-type: none"> <li>**do not dorsiflex ankle beyond neutral/0 degrees</li> </ul> </li> </ul> <i>Cardio</i> <ul style="list-style-type: none"> <li>Upper body ergometer</li> </ul> <i>Strengthening</i> <ul style="list-style-type: none"> <li>Lumbopelvic strengthening: <a href="#">side-lying hip external rotation-clamshell</a>, plank</li> </ul> <i>Balance/proprioception</i> <ul style="list-style-type: none"> <li>Joint position re-training</li> </ul>
<b>Criteria to Progress</b>	<ul style="list-style-type: none"> <li>Pain &lt; 3/10</li> <li>Minimal swelling (recommend water displacement volumetry or circumference measures like Figure 8)</li> <li>Full ROM PF, eversion, inversion</li> <li>DF to neutral</li> </ul>

### PHASE III: LATE POST-OP (7-8 WEEKS AFTER SURGERY)

<b>Rehabilitation Goals</b>	<ul style="list-style-type: none"> <li>Continue to protect repair</li> <li>Avoid over-elongation of the Achilles</li> <li>Normalize gait</li> <li>Restore full range of motion</li> <li>Safely progress strengthening</li> <li>Promote proper movement patterns</li> <li>Avoid post exercise pain/swelling</li> </ul>
<b>Weight Bearing</b>	<ul style="list-style-type: none"> <li>Weight bearing as tolerated in boot without lift</li> </ul>
<b>Additional Intervention</b> <i>*Continue with Phase I-II Interventions</i>	<i>Range of motion/Mobility</i> <ul style="list-style-type: none"> <li>Gentle <a href="#">long-sitting gastroc stretch</a> as indicated</li> <li>Gentle stretching all muscle groups: <a href="#">prone quad stretch</a>, <a href="#">standing quad stretch</a>, <a href="#">kneeling hip flexor stretch</a></li> <li>Ankle/foot mobilizations (talocrural, subtalar, and midfoot) as indicated</li> </ul> <i>Cardio</i> <ul style="list-style-type: none"> <li><a href="#">Stationary bicycle</a>, flutter kick swimming/pool jogging (with full healing of incision)</li> </ul> <i>Strengthening</i> <ul style="list-style-type: none"> <li><a href="#">4 way ankle</a></li> <li><a href="#">Short foot</a></li> <li>Lumbopelvic strengthening: <a href="#">bridges on physioball</a>, <a href="#">bridge on physioball with roll-in</a>, <a href="#">bridge on physioball alternating</a></li> <li>Gym equipment: <a href="#">hip abductor and adductor machine</a>, <a href="#">hip extension machine</a>, <a href="#">roman chair</a></li> <li>Progress intensity (strength) and duration (endurance) of exercises</li> </ul> <i>Balance/proprioception</i> <ul style="list-style-type: none"> <li>Double limb standing balance utilizing uneven surface (wobble board)</li> <li>Single limb balance progress to uneven surface including perturbation training</li> </ul>
<b>Criteria to Progress</b>	<ul style="list-style-type: none"> <li>No swelling/pain after exercise</li> <li>Normal gait in a standard shoe</li> <li>ROM equal to contra lateral side</li> <li>Joint position sense symmetrical (&lt;5 degree margin of error)</li> </ul>

### PHASE IV: TRANSITIONAL (9-12 WEEKS AFTER SURGERY)

<b>Rehabilitation Goals</b>	<ul style="list-style-type: none"> <li>Maintain full ROM</li> <li>Normalize gait</li> <li>Avoid over-elongation of the Achilles</li> <li>Safely progress strengthening</li> <li>Promote proper movement patterns</li> <li>Avoid post exercise pain/swelling</li> </ul>
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<b>Weight Bearing</b>	<ul style="list-style-type: none"> <li>Weight bearing as tolerated</li> </ul>
<b>Additional Intervention</b> <i>*Continue with Phase I-III interventions</i>	<p><i>Range of motion/Mobility</i></p> <ul style="list-style-type: none"> <li>Gentle <a href="#">standing gastroc stretch</a> and <a href="#">soleus stretch</a> as indicated</li> </ul> <p><i>Strengthening</i></p> <ul style="list-style-type: none"> <li><a href="#">Calf raises</a> concentric</li> <li><a href="#">Knee Exercises</a> for additional exercises and descriptions</li> <li>Gym equipment: <a href="#">seated hamstring curl machine</a> and <a href="#">hamstring curl machine, leg press machine</a></li> <li><a href="#">Romanian deadlift</a></li> </ul>
<b>Criteria to Progress</b>	<ul style="list-style-type: none"> <li>No swelling/pain after exercise</li> <li>Full ROM during concentric calf raise</li> <li>Normal gait</li> </ul>

### ***PHASE V: ADVANCED POST-OP (3-5 MONTHS AFTER SURGERY)***

<b>Rehabilitation Goals</b>	<ul style="list-style-type: none"> <li>Safely progress strengthening</li> <li>Promote proper movement patterns</li> <li>Avoid post exercise pain/swelling</li> </ul>
<b>Additional Intervention</b> <i>*Continue with Phase II-IV interventions</i>	<p><i>Cardio</i></p> <ul style="list-style-type: none"> <li>Elliptical, stair climber</li> </ul> <p><i>Range of motion/Mobility</i></p> <ul style="list-style-type: none"> <li><a href="#">Standing gastroc stretch</a> and <a href="#">soleus stretch</a> as indicated</li> </ul> <p><i>Strengthening</i></p> <ul style="list-style-type: none"> <li><a href="#">Calf raises</a> eccentric</li> <li><a href="#">Seated calf machine</a> <ul style="list-style-type: none"> <li>**The following exercises to focus on proper control with emphasis on good proximal stability</li> </ul> </li> <li><a href="#">Squat to chair</a></li> <li><a href="#">Hip hike</a></li> <li><a href="#">Lateral lunges</a></li> <li>Single leg progression: <a href="#">partial weight bearing single leg press</a>, slide board lunges: <a href="#">retro</a> and <a href="#">lateral</a>, <a href="#">step ups</a> and <a href="#">step ups with march</a>, <a href="#">lateral step-ups</a>, <a href="#">step downs</a>, <a href="#">single leg squats</a>, <a href="#">single leg wall slides</a></li> </ul>
<b>Criteria to Progress</b>	<ul style="list-style-type: none"> <li>No swelling/pain after exercise</li> <li>Standing Heel Rise test</li> <li>No swelling/pain with 30 minutes of fast pace walking</li> <li><a href="#">Achilles Tendon Rupture Score (ATRS)</a></li> <li><a href="#">Psych Readiness to Return to Sport (PRRS)</a></li> </ul>

### ***PHASE VI: EARLY to UNRESTRICTED RETURN TO SPORT (6+ MONTHS AFTER SURGERY)***

<b>Rehabilitation Goals</b>	<ul style="list-style-type: none"> <li>Continue strengthening and proprioceptive exercises</li> <li>Safely initiate sport specific training program</li> <li>Symmetrical performance with sport specific drills</li> <li>Safely progress to full sport</li> </ul>
<b>Additional Intervention</b> <i>*Continue with Phase II-V interventions</i>	<ul style="list-style-type: none"> <li>Interval running program</li> <li><a href="#">Return to Running Program</a></li> <li><a href="#">Agility and Plyometric Program</a></li> </ul>
<b>Criteria to Progress</b>	<ul style="list-style-type: none"> <li>Clearance from MD and ALL milestone criteria below have been met</li> <li>Completion jog/run program without pain/swelling</li> <li><a href="#">Functional Assessment</a> <ul style="list-style-type: none"> <li>Standing Heel Rise test</li> <li>≥90% compared to contra lateral side</li> </ul> </li> <li>Return-to-sport testing can be performed at MGH Sports Physical Therapy, if necessary</li> </ul>

This protocol has been adopted from the Department of Sports Medicine at Massachusetts General Hospital. Dr. Mc Millan has made minor changes to reflect his preferences however credit for creation of the document lies within their Sports Medicine Department.

## Functional Assessment

Patient Name: \_\_\_\_\_

MRN: \_\_\_\_\_

Date of Surgery: \_\_\_\_\_

Surgeon: \_\_\_\_\_

Concomitant Injuries/Procedures: \_\_\_\_\_

	Operative Limb	Non-operative Limb	Limb Symmetry Index
Range of motion (X-0-X)			-
Pain (0-10)			-
Standing Heel Rise test			
Hop Testing			
Single-leg Hop for Distance			
Triple Hop for Distance			
Crossover Hop for Distance			
Vertical Jump			
Y-Balance Test			
Calculated 1 RM (single leg press)			
Psych. Readiness to Return to Sport (PRRS)			

Ready to jog?                      YES                      NO

Ready to return to sport?      YES                      NO

Recommendations: \_\_\_\_\_

Examiner: \_\_\_\_\_

**Range of motion** is recorded in X-0-X format: for example, if a patient has 6 degrees of hyperextension and 135 degrees of flexion, ROM would read: 6-0-135. If the patient does not achieve hyperextension, and is lacking full extension by 5 degrees, the ROM would simply read: 5-135.

**Pain** is recorded as an average value over the past 2 weeks, from 0-10. 0 is absolutely no pain, and 10 is the worst pain ever experienced.

**Standing Heel Rise test** is performed starting on a box with a 10 degree incline. Patient performs as many single leg heel raises as possible to a 30 beat per minute metronome. The test is terminated if the patient leans or pushes down on the table surface they are using to balance, the knee flexes, the plantar-flexion range of motion decreases by more than 50% of the starting range of motion, or the patient cannot keep up with the metronome/fatigues.

**Hop testing** is performed per standardized testing guidelines. The average of 3 trials is recorded to the nearest centimeter for each limb.

## 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

Day	1	2	3	4	5	6	7
Week 1	W5/J1x5		W5/J1x5		W4/J2x5		W4/J2x5
Week 2		W3/J3x5		W3/J3x5		W2/J4x5	
Week 3	W2/J4x5		W1/J5x5		W1/J5x5		<b>Return to Run</b>

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

Week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	20 min		20 min		20 min		25 min
2		25 min		25 min		30 min	
3	30 min		30 min		35 min		35 min
4		35 min		40 min		40 min	
5	40 min		45 min		45 min		45 min
6		50 min		50 min		50 min	
7	55 min		55 min		55 min		60 min
8		60 min		60 min			

#### 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

<b>Rehabilitation Goals</b>	<ul style="list-style-type: none"> <li>• Safely recondition the knee</li> <li>• Provide a logical sequence of progressive drills for pre-sports conditioning</li> </ul>
<b>Agility</b>	<ul style="list-style-type: none"> <li>• Forward run</li> <li>• Backward run</li> <li>• Forward lean in to a run</li> <li>• Forward run with 3-step deceleration</li> <li>• Figure 8 run</li> <li>• Circle run</li> <li>• Ladder</li> </ul>
<b>Plyometrics</b>	<ul style="list-style-type: none"> <li>• Shuttle press: Double leg↻alternating leg↻single leg jumps</li> <li>• Double leg:             <ul style="list-style-type: none"> <li>○ Jumps on to a box↻ jump off of a box↻ jumps on/off box</li> <li>○ Forward jumps, forward jump to broad jump</li> <li>○ Tuck jumps</li> <li>○ Backward/forward hops over line/cone</li> </ul> </li> <li>• Single leg (these exercises are challenging and should be considered for more advanced athletes):             <ul style="list-style-type: none"> <li>○ Progressive single leg jump tasks</li> <li>○ Bounding run</li> <li>○ Scissor jumps</li> <li>○ Backward/forward hops over line/cone</li> </ul> </li> </ul>
<b>Criteria to Progress</b>	<ul style="list-style-type: none"> <li>• No increase in pain or swelling</li> <li>• Pain-free during loading activities</li> <li>• Demonstrates proper movement patterns</li> </ul>

### PHASE II: LATERAL PROGRESSION

<b>Rehabilitation Goals</b>	<ul style="list-style-type: none"> <li>• Safely recondition the knee</li> <li>• Provide a logical sequence of progressive drills for the Level 1 sport athlete</li> </ul>
<b>Agility</b> <i>*Continue with Phase I interventions</i>	<ul style="list-style-type: none"> <li>• Side shuffle</li> <li>• Carioca</li> <li>• Crossover steps</li> <li>• Shuttle run</li> <li>• Zig-zag run</li> <li>• Ladder</li> </ul>
<b>Plyometrics</b> <i>*Continue with Phase I interventions</i>	<ul style="list-style-type: none"> <li>• Double leg:             <ul style="list-style-type: none"> <li>○ Lateral jumps over line/cone</li> <li>○ Lateral tuck jumps over cone</li> </ul> </li> <li>• Single leg (these exercises are challenging and should be considered for more advanced athletes):             <ul style="list-style-type: none"> <li>○ Lateral jumps over line/cone</li> <li>○ Lateral jumps with sport cord</li> </ul> </li> </ul>
<b>Criteria to Progress</b>	<ul style="list-style-type: none"> <li>• No increase in pain or swelling</li> <li>• Pain-free during loading activities</li> <li>• Demonstrates proper movement patterns</li> </ul>

### **PHASE III: MULTI-PLANAR PROGRESSION**

<b>Rehabilitation Goals</b>	<ul style="list-style-type: none"><li>• Challenge the Level 1 sport athlete in preparation for final clearance for return to sport</li></ul>
<b>Agility</b> <i>*Continue with Phase I-II interventions</i>	<ul style="list-style-type: none"><li>• Box drill</li><li>• Star drill</li><li>• Side shuffle with hurdles</li></ul>
<b>Plyometrics</b> <i>*Continue with Phase I-II interventions</i>	<ul style="list-style-type: none"><li>• Box jumps with quick change of direction</li><li>• 90 and 180 degree jumps</li></ul>
<b>Criteria to Progress</b>	<ul style="list-style-type: none"><li>• Clearance from MD</li><li>• <u>Functional Assessment</u><ul style="list-style-type: none"><li>○ ≥90% contralateral side</li></ul></li><li>• <u>Achilles Tendon Rupture Score (ATRS)</u></li><li>• <u>Psych Readiness to Return to Sport (PRRS)</u></li></ul>



**ATRS**  
(Achilles Tendon Total Rupture Score)

All questions refer to your limitations/difficulties related  
to your injured Achilles tendon.

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Mark with an X in the box which matches your level of limitation!

1. Are you limited due to decreased strength in the calf/Achilles tendon/foot?

0   1   2   3   4   5   6   7   8   9   10

2. Are you limited due to fatigue in the calf/Achilles tendon/foot?

0   1   2   3   4   5   6   7   8   9   10

3. Are you limited due to stiffness in the calf/Achilles tendon/foot?

0   1   2   3   4   5   6   7   8   9   10

4. Are you limited due to pain in the calf/Achilles tendon/foot?

0   1   2   3   4   5   6   7   8   9   10

5. Are you limited during activities of daily living?

0   1   2   3   4   5   6   7   8   9   10

All questions refer to your limitations/difficulties  
related to your injured Achilles tendon

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Mark with an X in the box which matches your level of limitation!

6. Are you limited when walking on uneven surfaces?

0   1   2   3   4   5   6   7   8   9   10

7. Are you limited when walking quickly up the stairs or up a hill?

0   1   2   3   4   5   6   7   8   9   10

8. Are you limited during activities that include running?

0   1   2   3   4   5   6   7   8   9   10

9. Are you limited during activities that include jumping?

0   1   2   3   4   5   6   7   8   9   10

10. Are you limited in performing hard physical labor?

0   1   2   3   4   5   6   7   8   9   10

**Total Score:**

## Psychological Readiness to Return to Sport

Patient Name: \_\_\_\_\_

MRN: \_\_\_\_\_

Surgery: \_\_\_\_\_

Date of Surgery: \_\_\_\_\_

Surgeon: \_\_\_\_\_

Please rate your confidence to return to your sport on a scale from 0 – 100

Example:     0 = No confidence at all  
              50 = Moderate confidence  
              100 = Complete confidence

1. My overall confidence to play is \_\_\_\_\_
2. My confidence to play without pain is \_\_\_\_\_
3. My confidence to give 100% effort is \_\_\_\_\_
4. My confidence to not concentrate on the injury is \_\_\_\_\_
5. My confidence in the injured body part to handle demands of the situation is \_\_\_\_\_
6. My confidence in my skill level/ability is \_\_\_\_\_

Total: \_\_\_\_\_

Score: \_\_\_\_\_

Examiner: \_\_\_\_\_