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Rehabilitation Protocol for Achilles Tendon Repair

This protocol is intended to guide clinicians and patients through the post-operative course for an Achilles tendon repair. Specific intervention should be based on the needs of the individual and should consider exam findings and clinical decision making. If you have questions, contact the referring physician.

Considerations for the Post-operative Achilles tendon repair program
Many different factors influence the post-operative Achilles tendon rehabilitation outcomes, including type and location of the Achilles tear and repair. Consider taking a more conservative approach to range of motion, weight bearing, and rehab progression with tendon augmentation, re-rupture after non-surgical management, revision, chronic tendinosis, and co-morbidities, for example, obesity, older age, and steroid use. It is recommended that clinicians collaborate closely with the referring physician regarding intra-operative findings and satisfaction with the strength of the repair.

Post-operative considerations
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	• Protect repair • Minimize muscle atrophy in the quads, hamstrings, and glutes
Weight Bearing	*Walking* • Non-weight bearing on crutches • 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
Intervention	*Range of motion/Mobility* • Supine passive hamstring stretch *Strengthening* • Quad sets • 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 • Straight leg raise ○ **Do not perform straight leg raise if you have a knee extension lag (with brace/cast removed) • Hip abduction • Prone hamstring curls
Criteria to Progress	• Pain < 5/10

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

Rehabilitation Goals	• Continue to protect repair • Avoid over-elongation of the Achilles • Reduce pain, minimize swelling • Improve scar mobility • Restore ankle plantar flexion, inversion, and eversion • Dorsiflexion to neutral
Weight Bearing	*Walking* • Partial-weight bearing on crutches in a boot

	• Gradually wean heel lift: start with 3 wedges, removing one per week
Additional Intervention **Continue with Phase I interventions*	*Range of motion/Mobility* • PROM/AAROM/AROM: ankle dorsiflexion**, plantar flexion, inversion, eversion, ankle circles ○ **do not dorsiflex ankle beyond neutral/0 degrees *Cardio* • Upper body ergometer *Strengthening* • Lumbopelvic strengthening: sidelying hip external rotation-clamshell, plank *Balance/proprioception* • Joint position re-training
Criteria to Progress	• Pain < 3/10 • Minimal swelling (recommend water displacement volumetry or circumference measures like Figure 8) • Full ROM PF, eversion, inversion • DF to neutral

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

Rehabilitation Goals	• Continue to protect repair • Avoid over-elongation of the Achilles • Normalize gait • Restore full range of motion • Safely progress strengthening • Promote proper movement patterns • Avoid post exercise pain/swelling
Weight Bearing	• Weight bearing as tolerated in boot without lift
Additional Intervention **Continue with Phase I-II Interventions*	*Range of motion/Mobility* • Gentle long-sitting gastroc stretch as indicated • Gentle stretching all muscle groups: prone quad stretch, standing quad stretch, kneeling hip flexor stretch • Ankle/foot mobilizations (talocrural, subtalar, and midfoot) as indicated *Cardio* • Stationary bicycle, flutter kick swimming/pool jogging (with full healing of incision) *Strengthening* • 4 way ankle • Short foot • Lumbopelvic strengthening: bridges on physioball, bridge on physioball with roll-in, bridge on physioball alternating • Gym equipment: hip abductor and adductor machine, hip extension machine, roman chair • Progress intensity (strength) and duration (endurance) of exercises *Balance/proprioception* • Double limb standing balance utilizing uneven surface (wobble board) • Single limb balance progress to uneven surface including perturbation training
Criteria to Progress	• No swelling/pain after exercise • Normal gait in a standard shoe • ROM equal to contra lateral side • Joint position sense symmetrical (<5 degree margin of error)

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

Rehabilitation Goals	• Maintain full ROM • Normalize gait • Avoid over-elongation of the Achilles • Safely progress strengthening • Promote proper movement patterns • Avoid post exercise pain/swelling

Weight Bearing	• Weight bearing as tolerated
Additional Intervention **Continue with Phase I-III interventions*	*Range of motion/Mobility* • Gentle standing gastroc stretch and soleus stretch as indicated *Strengthening* • Calf raises concentric • Knee Exercises for additional exercises and descriptions • Gym equipment: seated hamstring curl machine and hamstring curl machine, leg press machine • Romanian deadlift
Criteria to Progress	• No swelling/pain after exercise • Full ROM during concentric calf raise • Normal gait

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

Rehabilitation Goals	• Safely progress strengthening • Promote proper movement patterns • Avoid post exercise pain/swelling
Additional Intervention **Continue with Phase II-IV interventions*	*Cardio* • Elliptical, stair climber *Range of motion/Mobility* • Standing gastroc stretch and soleus stretch as indicated *Strengthening* • Calf raises eccentric • Seated calf machine ○ **The following exercises to focus on proper control with emphasis on good proximal stability • Squat to chair • Hip hike • Lateral lunges • Single leg progression: partial weight bearing single leg press, slide board lunges: retro and lateral, step ups and step ups with march, lateral step-ups, step downs, single leg squats, single leg wall slides
Criteria to Progress	• No swelling/pain after exercise • Standing Heel Rise test • No swelling/pain with 30 minutes of fast pace walking • Achilles Tendon Rupture Score (ATRS) • Psych Readiness to Return to Sport (PRRS)

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

Rehabilitation Goals	• Continue strengthening and proprioceptive exercises • Safely initiate sport specific training program • Symmetrical performance with sport specific drills • Safely progress to full sport
Additional Intervention **Continue with Phase II-V interventions*	• Interval running program • Return to Running Program • Agility and Plyometric Program

Criteria to Progress	• Clearance from MD and ALL milestone criteria below have been met
	• Completion jog/run program without pain/swelling
	• Functional Assessment
	  ○ Standing Heel Rise test
	  ○ ≥90% compared to contra lateral side
	• Return-to-sport testing can be performed at MGH Sports Physical Therapy, if necessary

Contact	Please email wecare@drnasef.com with questions specific to this protocol

References

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٢٨ ب شارع الكومى – ميدان السيدة زينب – وسط البلد
للحجز: ٠١٢١٢٢٨٣٣٨٣
الحضور للكشف و الاستشارة بموعد مسبق

ت: ٢٣٥٩٢٣١٧
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ت: ٢٣٦٨٢٠٦٦
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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		**Return to Run**

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

Rehabilitation Goals	• Safely recondition the knee • Provide a logical sequence of progressive drills for pre-sports conditioning
Agility	• Forward run • Backward run • Forward lean in to a run • Forward run with 3-step deceleration • Figure 8 run • Circle run • Ladder

Plyometrics	• Shuttle press: Double leg→alternating leg→single leg jumps
	• Double leg:
	  ○ Jumps on to a box→ jump off of a box→ jumps on/off box
	  ○ Forward jumps, forward jump to broad jump
	  ○ Tuck jumps
	  ○ Backward/forward hops over line/cone
	• Single leg (these exercises are challenging and should be considered for more advanced athletes):
	  ○ Progressive single leg jump tasks
	  ○ Bounding run
	  ○ Scissor jumps
	  ○ Backward/forward hops over line/cone

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

PHASE II: LATERAL PROGRESSION

Rehabilitation Goals	• Safely recondition the knee • Provide a logical sequence of progressive drills for the Level 1 sport athlete
Agility **Continue with Phase I interventions*	• Side shuffle • Carioca • Crossover steps • Shuttle run • Zig-zag run • Ladder

Plyometrics
**Continue with Phase I interventions*
	• Double leg:
	  ○ Lateral jumps over line/cone
	  ○ Lateral tuck jumps over cone
	• Single leg(these exercises are challenging and should be considered for more advanced athletes):
	  ○ Lateral jumps over line/cone
	  ○ Lateral jumps with sport cord

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

PHASE III: MULTI-PLANAR PROGRESSION

Rehabilitation Goals	• Challenge the Level 1 sport athlete in preparation for final clearance for return to sport
Agility **Continue with Phase I-II interventions*	• Box drill • Star drill • Side shuffle with hurdles
Plyometrics **Continue with Phase I-II interventions*	• Box jumps with quick change of direction • 90 and 180 degree jumps
Criteria to Progress	• Clearance from MD • Functional Assessment ○ ≥90% contralateral side • Achilles Tendon Rupture Score (ATRS) • Psych Readiness to Return to Sport (PRRS)

ATRS
(Achilles Tendon Total Rupture Score)

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

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:

Nilsson-Helander K, Thomee R, et al. The Achilles Tendon Total Rupture Score (ATRS): Development and Validation. *AJSM.* 2007. 35 (3): 421-426.

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: _____

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