

Hamstring Repair Protocol



Sports Medicine
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Procedure and Protocol Overview Procedure

The following is an overview of the surgical repair process, restrictions and post op management of complete avulsion or partial tears of the hamstring tendons.

Surgical repair of the hamstring is performed under general anesthesia, and involves an open incision to identify and suture the retracted hamstring tendons to their anatomical origin using 2-4 suture anchors. After surgery a brace is applied to protect the newly repaired tendons. Patients are to remain non-weight bearing in the locked brace during the tissue healing and protection phase of the protocol. This phase usually is 6 weeks in length, but may be extended or shortened depending on the number of tendons involved, the degree of retraction, and the quality of the tissue involved in the repair. Always follow the specific directions of the surgeon.

Formal physical therapy will start at the beginning of post op week 3. Strengthening exercises during this phase must be performed while in the brace. Aggressive mobilization of the scar should be avoided during this time.

After the initial 6 weeks of healing, and under the guidance of the physical therapist or athletic trainer, the functional restoration phase of rehabilitation may begin. During this phase the brace may be discontinued as per MD, and weight bearing is initiated and progressed. Basic strength and ROM is gradually progressed and restored. Progression criteria must be met before progressing to the next phase of rehabilitation.

The advanced functional training phase begins at week 12. During this phase exercises are progressed through full ROM, with increased resistance, in multiple planes of movement, and with emphasis on eccentric control. The return to running program can be started, and sport specific training can be initiated as allowed by MD.

A final functional sports test is performed and based on these results, clearance is then provided by the surgeon.

Rehabilitation Guidelines: 0-6weeks

Tissue Healing and Protection


Rehabilitation Weeks 0-3

Precautions	<ul style="list-style-type: none"> Knee locked in brace, no hip flexion past 45 deg CPM to 90 degrees (knee) Avoid icy, wet, slippery surfaces
Incision/wound care:	<ul style="list-style-type: none"> Shower allowed at 3 days post-op. Avoid pools and hot tubs Post-op follow appointment: 2 weeks following surgery to remove sutures and replace steri-strips. Steri-strips remain in place up to 4 weeks post-op
Brace	The angle at which brace is locked is dependent on size of the tear, degree of retraction, and whether it is a primary repair or revision. Please refer to the post-op management page for specific instruction for each patient
Weight Bearing	Non-weight bearing with crutches
Rehabilitation	Ankle pumps, abdominal, gluteal, and quadricep isometrics

Rehabilitation Weeks 3-6








Knee brace	Angle may be changed at 1st post-op visit as determined by surgeon.
Weight bearing	Continue non-weight bearing with crutches or as instructed by surgeon at 2 week visit


Mobility

Soft Tissue Mobilization	Can be initiated after scar is fully healed at 3-4 weeks. Avoid instrumented or aggressive mobilization of the surgical repair site.	
Prone Knee Flexion	Therapist/partner slowly bends knee into flexion until a moderate stretch is felt on the front of the thigh. Hold 1min. Repeat 3 times.	





Strength


All Exercise Are Performed in the Brace

4 way ankle with Theraband	   	<p>Point down Pull up Pull out Pull in</p>
Side Lying Hip Abduction	<ul style="list-style-type: none"> Lie on the non-surgical side Slowly lift surgical leg up and down 	
Side Lying Hip Adduction	<ul style="list-style-type: none"> Lie on surgical side Slowly lift surgical leg up and down 	
Core: Crunches, Cross Crunches, Side Crunches	Keep a bolster under knees during these exercises	

Sub-Maximal Isometric Hamstring Holds	<ul style="list-style-type: none"> • Bolster under knees • Push heel into the floor and hold 10 sec, repeat x 10 	
Criteria for advancement is based on time required for tissue healing. Progression to next phase is allowed at 6 weeks post-op or as indicated by the surgeon.		

Rehabilitation Progression Guidelines: Weeks 6-12 Functional Restoration		
Precautions	1. No running, jumping 2. No squatting past 90 degrees with load 3. No ballistic stretching	
Brace	Use as instructed by MD	
Weight Bearing	Begin to transition to weight bearing at 6 weeks, and progress to full weight bearing. under supervision of PT. Can walk without an assistive device when able to stand on one leg x 10 sec with pelvis level, and walk for 50 ft without a limp.	
Exercise Timelines (under guidance of Physical Therapist)	Bike: Stationary bike at 7 weeks-No resistance until week 9; Outdoors on flats at 10 weeks, can start standing and easy climbing at 12 weeks Elliptical: Start between 8-10 weeks Pool: Need to be very careful of slipping on pool deck! Water Walking at 6 weeks chest depth; Swimming with pull buoy at 6 weeks, Water Jogging at 10 weeks Yoga: 12 weeks. Initiate balance work first, slowly progressing towards stretching and poses that require full range of motion.	
Rehabilitation Progressions	Progression through this phase is based on ability to meet the criteria in each phase before progressing to the next phase. Suggested exercises are demonstrated for each phase, but not limited to those shown.	
Functional Restoration Level 1: Starting at Week 6 continuing through Week 8-10 Muscle Activation and Un-resisted Hamstring Strengthening, Single Leg Balance, Core Strength/Endurance		
Mobility: Restore Knee and Hip ROM		
Soft Tissue Mobilization	<ul style="list-style-type: none">• Massage and instrumented soft tissue release to hamstring and surrounding musculature. Avoid aggressive mobilization of scar tissue and repair site.• Trigger point needling of hamstring and surrounding musculature away from incision and surgical sites can begin at 6 weeks.	
<div>Mobility Week 6-</div> https://youtu.be/8BJGtqpHr8U	Initiate passive stretching of either isolated knee extension, or isolated hip flexion. Do not stretch across both joints simultaneously.	
	Supine Knee Extension Stretch <ul style="list-style-type: none">• Lie on back while therapist applies overpressure to knee extension• Maintain neutral hip position	

	Knee to Chest Stretch: <ul style="list-style-type: none">Hug knee to chest											
	Supine Knee Extension: <ul style="list-style-type: none">Lie flat on table or benchStraighten Knee											
Exercise Progressions: Muscle Activation, Un-Resisted Hamstring Strengthening, Single Leg Balance, Core Strength/Endurance												
Stationary Bike	Start 10 min no resistance and progress time as tolerated. If using spin bike or trainer, remain upright.											
<div>Level 1 Strength</div> https://youtu.be/coEQ5Bep6SM	Strength Progressions <table><tr><td>Heel Slides</td><td>Prone Hip Extension</td></tr><tr><td>Straight Leg raises</td><td>Rhythmic Stabilization</td></tr><tr><td>Prone Knee Flexion</td><td>Clamshells</td></tr><tr><td>Standing Knee Flexion</td><td>Supine Bridges</td></tr><tr><td>Multi-angle Ham Isometrics</td><td>Calf Raises</td></tr></table>		Heel Slides	Prone Hip Extension	Straight Leg raises	Rhythmic Stabilization	Prone Knee Flexion	Clamshells	Standing Knee Flexion	Supine Bridges	Multi-angle Ham Isometrics	Calf Raises
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<div>Level 1 Balance</div> https://youtu.be/sGyDJJmRbsA	Balance Progressions <table><tr><td>Single Leg Stance</td><td>2 Leg Balance Board</td></tr><tr><td>Single Leg Stance with Leg Movements</td><td></td></tr><tr><td>Single Leg Stance with Arm Movements</td><td></td></tr></table>		Single Leg Stance	2 Leg Balance Board	Single Leg Stance with Leg Movements		Single Leg Stance with Arm Movements					
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Criteria for Advancement to Level 2: <ul style="list-style-type: none">No sooner than Week 8Full knee extension, ability to perform given ROM exercises without painSingle leg stance x 10secWalk without a limp for at least 100 ftFront plank x 30 sec												
Functional Restoration Level 2: Weeks 8-12+												
Mobility: Initiate active stretching of hip flexion/knee extension Normalize muscle tone												
<div>Mobility Week 8-</div> https://youtu.be/qOp5ILWkonM	Foam roller <ul style="list-style-type: none">Roll muscle bellyRoll forward and backRock side to side											
	Active Seated Knee Extension: <ul style="list-style-type: none">In seated position slowly straighten knee until a stretch is felt on the back of the leg											

Progress to:	Active Knee Extension Hip 90 deg <ul style="list-style-type: none">• Hold Thigh Hip Flexed at 90 deg• Slowly straighten knee until a stretch is felt on the back of the leg																			
<div>Dynamic</div> https://youtu.be/h48VP-pChFE	Dynamic Drills: <table><tr><td>Frankensteins</td><td>Marches</td></tr><tr><td>Side Steps</td><td>Knee Hugs</td></tr><tr><td>Cariocca</td><td>Side Sliders</td></tr><tr><td>Backward steps</td><td></td></tr></table>	Frankensteins	Marches	Side Steps	Knee Hugs	Cariocca	Side Sliders	Backward steps												
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Passive Stretching	Passive hamstring stretching can be initiated at 8 weeks with patient self stretches only. No partner or overstretching!																			
Exercise Bike	No resistance until 9 weeks post-op. If using spin bike or trainer, remain upright.																			
Strength Progressions																				
Glute/Hamstring Strengthening Progressions: Start with isometric hamstring activation exercises and glute/hamstring co-contraction exercises. Progress difficulty of co-contraction exercises before introducing isolated resisted hamstring exercises																				
<div>Level 2 Strength</div> <div>Bridge Progressions</div> https://youtu.be/cCjAlnctq6g	Functional Strength Progressions *focus on movement patterns and quality <table><tr><td>Matrix Slides</td><td>Leg Press 0-60 deg</td></tr><tr><td>Step up/downs</td><td>Wall Squats</td></tr><tr><td>Band Walks</td><td>Cable Walkouts:Forward/Backward/Lateral</td></tr></table> Bridge Progressions: <table><tr><td>2 Leg Bridge</td><td>Long Bridge Hold</td></tr><tr><td>Bridge Walkout Hold</td><td>Long Bridge Tapdowns</td></tr><tr><td>Bridge Band Rotation</td><td>No Hold Walkouts</td></tr><tr><td>Single Side Rotation</td><td>1 Leg Bridge Hold</td></tr><tr><td>Ball Hip Bridge</td><td>Bridge Abduction</td></tr><tr><td>Ball Bridge Tapdowns</td><td></td></tr></table>	Matrix Slides	Leg Press 0-60 deg	Step up/downs	Wall Squats	Band Walks	Cable Walkouts:Forward/Backward/Lateral	2 Leg Bridge	Long Bridge Hold	Bridge Walkout Hold	Long Bridge Tapdowns	Bridge Band Rotation	No Hold Walkouts	Single Side Rotation	1 Leg Bridge Hold	Ball Hip Bridge	Bridge Abduction	Ball Bridge Tapdowns		
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<div>Level 2 Balance</div>	Balance Progressions Add balance activities on unstable surfaces: Bosu, balance board, airex. Start with 2 leg, progress to single leg.																			
<div>Level 2 Core</div>	Core Progressions <table><tr><td>Front Plank Slides</td><td>Supine Leg Lowers</td></tr><tr><td>Side Plank Raises</td><td>Front Plank Tapouts</td></tr><tr><td>Birddogs on Roller</td><td>Ball Walkouts</td></tr></table>	Front Plank Slides	Supine Leg Lowers	Side Plank Raises	Front Plank Tapouts	Birddogs on Roller	Ball Walkouts													
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Level 2 Walking Program Initiated	Start on a treadmill before progressing to outdoor surfaces. Progressive training to meet goal of walking 30 minutes pain free at a fairly aggressive pace (3.5 miles per hour or higher).																			
Criteria for Progression to Advanced Functional Training <ul style="list-style-type: none">• No sooner than 12 weeks• Completion of phase 2 progressions• ROM within 10% of uninjured side• Walk pain free at a fairly aggressive pace (3.5 miles per hour or higher) for 30 min.• Single leg balance 30 sec foot flat• 4+ to 5/5 strength of hip adduction,abduction, extension, flexion; Knee flexion at 90 and 20 degrees																				

Advanced Functional Training (12 weeks +)

Rehabilitation Guidelines

Exercise Progressions	Advance multi-planar functional exercises Initiate eccentric hamstring exercises with progressive load Balance/Proprioception as tolerated and instructed by physical therapist.
Return to Running	Running progression program (see handout) initiated at 12 weeks or as determined by physical therapist/MD
Sport Specific Training	Sport specific training can be initiated per MD clearance after completing the running progression program, and return to sport testing. This may include advanced weight training, plyometrics, sprinting, and sport specific conditioning.

Exercise Progressions

Focus on adding hamstring eccentrics, progressive resistance, and activation throughout full ROM

Level 3 Strength	Strength Progressions Ball Hamstring curls Leg press Single Leg Deadlift Ham curls Matrix Lunges Walking Lunges Split Squat Dumbbell Windmills HS Sliders Single Leg Pickups Bench Bridges Sport Cord Skaters, Diagonals Cable Reach/Row Eccentric Treadmill
Level 3 Dynamics	Dynamic Progressions: Lunge Twist Sumos Windmill Lunge Reach/Rotate
Level 3 Core	Core Progressions Side Plank Ball Walkouts Side Plank Drivers Ball Tucks Cable or Dumbbell Rotations/Chops
Level 3 Mobility	Passive Stretches: Hamstrings Quadriceps Straddle stretch Supine Figure 4

Return to Sport Test (single leg functional tests):

Y Balance Test	Y-Balance test	< 10% deficit
1 Leg Squat to 90	1 Leg Squat to 90 deg	
Timed Single Leg	Timed Single leg Squat	<10% deficit
Single Leg 1 Hop	Single Leg 1 Hop Test	<10% deficit
Single Leg 3 Hop	Single Leg 3 Hop Test	<10% deficit
Concentric: 60 deg/s x 5 reps 180 deg/sec x 15 reps	Isokinetic Testing	<15% deficit

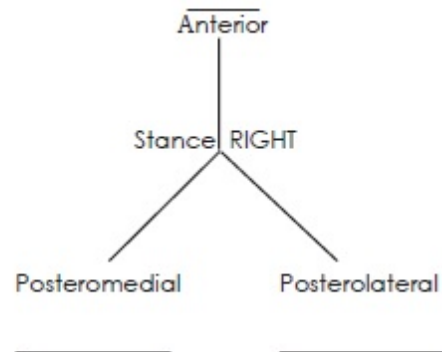
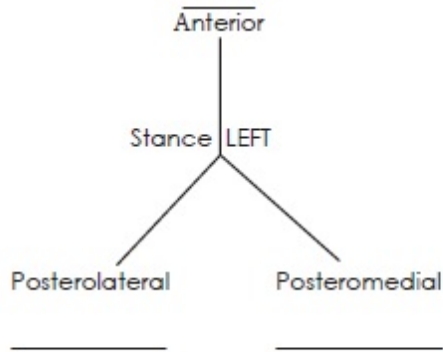
Y Balance Test Score Sheet

Name: _____

Date: _____

Surgical Date: _____

Involved Limb: R L



	Left	Right	Difference
Anterior			
Posteromedial			
Posterolateral			

*** Difference should be less than 4 cm. for return to sport and preparticipation screening ***

$$\text{Composite Score} = \frac{(\text{Anterior} + \text{Posteromedial} + \text{Posterolateral})}{(3 \times \text{Limb Length})} \times 100$$

Composite	
Right	
Left	

Return to Sport Tests Score Sheet

Single Leg Hop x1				
Lower Extremity	Trial 1	Trial 2	Trial 3	Best
Injured (R L)				
Uninjured (R L)				
UI/I x100				%

Single Leg Hop x3				
Lower Extremity	Trial 1	Trial 2	Trial 3	Best
Injured (R L)				
Uninjured (R L)				
			UI/I x100	%

Timed Single Leg Squat				
Lower Extremity	Trial 1	Trial 2	Trial 3	Best
Injured (R L)				
Uninjured (R L)				
			UI/I x100	%

Single Leg Squat to 90 deg		
Lower Extremity	Valgus Control	Squat Angle
Injured (R L)		
Uninjured (R L)		
UI/I x100		%

[illegible]