

RJAH Patella/Quadriceps Tendon Surgical Repair Rehabilitation Guide

Patient Details:

Co-morbidity:

Note to Therapist:

**This is a guide to progression, not an exhaustive list of rehabilitation and does not replace clinical reasoning.*

**Treat any soft tissue symptoms on their merit.*

**Objective Tests (not exhaustive) can be used as an indication for progression. The choice can be individualised for the patient.*

**** Special Instruction(s) includes specific post-operative advice for the individual patient based on the Consultant's recommendation(s). This will be completed on discharge or follow-up clinic appointments.***

PHASE OF REHAB	IDEAL CRITERIA	WEIGHT BEARING STATUS	RANGE OF MOVEMENT	REHABILITATION GUIDE	GOALS	OBJECTIVE TEST	SPECIAL INSTRUCTION
PHASE 1 From Day 1	<ul style="list-style-type: none"> Successful operative outcome. Adequate pain relief. Understands post-op instructions. Mobilise independently with aids. 	PWB with elbow crutches.	<ul style="list-style-type: none"> Knee locked in extension during mobilisation. Removed for passive ROM 0° - 30°. 	<ul style="list-style-type: none"> Cryocuff/Ice. EOR E mobilisations. H and calf stretches. Ankle Exercises (e.g. heel raises). Prone SLR. PWB gait education. 	<ol style="list-style-type: none"> Reduce inflammation. Gain terminal E. Promote distal circulation. Promote early mobility. 		BEFORE DISCHARGE check the op note for any specific post-op instructions and amend the guide accordingly.

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PHASE 2 From Week 2	<ul style="list-style-type: none"> Full active and passive E. 	PWB, gradually increasing to allow the use of one elbow crutch by Week 5.	<ul style="list-style-type: none"> ROM Knee brace in-situ when mobilising allowing 0° - 100°. Active Assisted ROM (limited by patient symptoms). 	<ul style="list-style-type: none"> Patella mobilisations. Soft tissue mobilisations. Static Quads. Active-assisted SLR → progressing to active by Week 5. Static Bike or Turbotrainer no/low resistance as tolerated [if unable to achieve full revolution pedal for/back within range]. Gradually increase weight-bearing gait. Low step-touch. Active heel slides. Active prone hamstrings. Contralateral limb strength training 3x per week (continue for 10 weeks) Leg Press, Leg Curl & Leg Ext 3 x 5RM. Other muscle groups not to be neglected. Upper body active exercise → resis/reps/sets/speed. 	<ol style="list-style-type: none"> Promote early function. Increase ROM. Improve muscular control. Prevent scar adherence. Limit Ipsilateral deconditioning of Q. 	AROM. PROM. SLR. Effusion.	

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PHASE 3 From Week 6	<ul style="list-style-type: none"> Minimal discomfort. FWB. AROM = Full E - $\geq 100^\circ$. SLR $\leq 5^\circ$ lag. 	Full weight bear.	<ul style="list-style-type: none"> Discard brace. No limit to active or passive ROM. 	<ul style="list-style-type: none"> Gait re-education Proprioception → single leg stance/wobble boards/Trampoline/crash mats/etc. Lower body active exercise [exception of resisted through range OKC Q] → resis/ reps/sets/speed. SLR & IRQ. Isometric Q at varying angles. Flexibility exercises as appropriate. Rowing → dist./speed/resis. X-Trainer → dist./speed/resis. Hydrotherapy (AVOID resisted leg kicks until Week 12). PWB low step offs (e.g. in parallel bars up to 80% body weight through arms, controlling eccentric Q) → progress body weight as symptoms and control allows. 	<ol style="list-style-type: none"> Progress functional activities. Prevent AKP. Prevent joint stiffness. Restore normal gait pattern. Promote appropriate muscle strength, power and endurance. Improve neuromuscular/ proprioception/ sensorimotor performance. Maintain cardiovascular fitness. Encourage patient compliance. 	AROM. PROM. Gait. SLR Single Leg Stance. Effusion.	

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PHASE 4 From Month 3	<ul style="list-style-type: none"> ○ Normal symmetrical gait. ○ Full AROM. ○ SLR no lag. ○ No/minimal effusion. ○ Single leg stance ≥80% parity. 	<ul style="list-style-type: none"> • Gait with predictable changes in direction. • AlterG Antigravity Treadmill if available (progressing duration and weight bearing independently based on ability, symptoms and clinical reasoning). • Add speed exercises, e.g. prone heel flicks, Trampette high knees, Trampette heel flicks. • Step-ups (for/back/sideways/over) → height/ reps/speed • PWB (parallel bars, deep water or AlterG) landing drills - jumps, hops, leaps → control technique/speed/ reps. • Leg Press/Squats → resis/ reps/sets/speed. • No restriction to swimming/hydrotherapy exercises. <p><i>Sequence Training:</i></p> <ul style="list-style-type: none"> • Train strength and endurance 3 – 4 x per week. • Train strength and endurance on separate days. • Have a minimum of 24 hours between strength days. • Strength: [OKC Q ≈ 50% Rep Max → ≈ 80% Rep Max] • Hypertrophy: [OKC Q ≈ 50% Rep Max → ≈ 80% Rep Max] • Endurance: [OKC Q ≈ 50% Rep Max → ≈ 80% Rep Max] • Gradually progress toward ≥45 min continuous CV exercise (exception of jogging/running). <p><i>Modify above based on symptoms.</i></p> <p><i>See appendix; Pages 9 – 10</i></p>	<ol style="list-style-type: none"> 1. Increase Q strength and associated biomechanical control. 2. Improve rate of force development. 	<p>Clams.</p> <p>Planks.</p> <p>Single Leg Squat 60°.</p> <p>Rotatory Stability.</p> <p>Single Leg Bench Bridge.</p> <p>Single Leg Sit → Stand.</p> <p>IKDC</p>	

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PHASE 5 From Month 4	<ul style="list-style-type: none"> ○ Clams 10 reps with 10 sec hold ideal control [L] & [R]. ○ Directional Planks 30 sec hold ideal control. ○ Single leg squat 60° 5 sec hold with good alignment. ○ [L] & [R] Rotational Stability ≥80% parity. ○ Single Leg Bench Bridge 20 reps with ideal control. ○ Single Leg Sit → Stand 10 reps. ○ IKDC score ≥ 64 prior to introducing running. 	<ul style="list-style-type: none"> • No limit to OKC Q resistance. Adjust if necessary based on symptoms. • Add FWB double footed landing drills and plyometrics → control technique/speed/reps • Box Jumps. • Jump rope skipping (30 sec on/ 30 sec off). • A-Skipping. • Ankling drills. • Progress to single footed landing drills and plyometrics as dictated by control. • Jogging/running only when sufficient Q strength control gradually progressing either duration, pace, gradient or terrain independently. • Add agility drills when sufficient control and confidence is achieved e.g. twist/turn/pivot/cut/accelerate/decelerate/direction Progress from predictable agility to unpredictable • Advance dynamic proprioceptive exercises e.g. volleying football, throwing, catching, racket and ball while balancing on trampette • Perturbation training e.g. therapist randomly nudges patient off balance during a single leg throw-catch drill. 	<ol style="list-style-type: none"> 1. Promote appropriate strength, power and endurance based on individual's needs. 2. Improve neuromuscular performance Increase confidence. 3. Sport specific function. 	5RM Tuck Jump. Vertical Jump. Hop for Distance. Deep Squat. Inline Lunge. Bulgarian Split Squat. Single Leg Romanian Deadlift. Vail Sports Test. IKDC	

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PHASE 6 From Month 5	<ul style="list-style-type: none"> ○ Tuck Jump $\geq 60\%$ quality. ○ Vertical Jump Height – shows improvement. ○ 5 RM $> 80\%$ parity. ○ Hop for distance $>80\%$ parity. ○ Inline Squat – ideal movement pattern $>80\%$ parity. ○ Bulgarian Split Squat – ideal movement pattern $>80\%$ parity. ○ Single Leg Romanian Deadlift – ideal movement pattern $>80\%$ parity. ○ Vail Sports Test $\geq 85\%$ 	<ul style="list-style-type: none"> ● Progress from predictable to unpredictable agility drills. ● Non-contact sport specific training \rightarrow terrain/volume/periodisation. 	1. Prepare neuromuscular and psychological ability to return to unrestricted function.	As indicated for individuals goals.	
Phase 7 From Month 6+	<ul style="list-style-type: none"> ○ All Tests $> 90\%$ parity. ○ IKDC score ≥ 88 ○ <i>Consider parity with normative population data. Consider parity with normative population data.</i> 	<ul style="list-style-type: none"> ● Check and discuss with patient's Consultant prior to RTS. ● Contact sport specific training. ● Earliest return to contact sport. 	1. Unrestricted confident function. 2. Injury prevention.		

Terminology Key:

EOR	End of Range	PWB	Partial Weight Bear
E	Extension	FWB	Full Weight Bear
F	Flexion	ROM	Range of Movement
SLR	Straight Leg Raise	AROM	Active Range of Movement
Q	Quadriceps	PROM	Passive Range of Movement
H	Hamstrings	OKC	Open Kinetic Chain
AKP	Anterior Knee Pain	resis	Resistance
[L]	Left	reps	Repetitions
[R]	Right	RM	Repetition Maximum
MDT	Multidisciplinary Team	CV	Cardiovascular
DL	Double Leg	RTS	Return to Sport
IKDC	International Knee Documentation Committee (patient reported outcome)	SL	Single Leg

Summary of Post-Operative Restrictions (unless stated otherwise):

Activity	Dictated by sufficient neuromuscular control and time from surgery.
Full Weight Bearing.	From 6 weeks.
Range of Movement.	Progressed in hinged brace (see guide), removed at week 6.
Resisted OKC Q.	Gradually progressed from Month 3 (see guide for specific loading), no limit from Month 4.
High Impact Activities, e.g. jumps, hops, running.	From month 4.
Return to full contact sport/ no restrictions.	From Month 6, if meets all specific RTS criteria and MDT approval.

Appendix:

Patient Education.

A **repetition maximum** (RM) is the most weight you **can** lift, push, press or curl for a defined number of exercise movements. For example, a 5RM would be the heaviest weight you could lift for 5 consecutive repetitions. What will dictate your RM is muscle fatigue/ weakness, or you are experiencing pain more than 2-3/10 above your normal baseline (10 = worst pain imaginable, 0 = no pain at all), or you are losing technique/ form.

1 – 5 RM will improve Muscle Strength

6 – 10 RM will improve Muscle Hypertrophy

11 – 15+ will improve Muscle Endurance

Sets are a series of reps of an exercise done in sequence (usually with a rest between). For example, 3 x 5 RM would be an exercise you can perform a maximum of 5 consecutive times (see **repetition maximum**), rest and then repeat twice more. Perform **a minimum of two sets** for each exercise.

Progress:

As you progress and the loads you are lifting are getting easier, but not easy enough to increase the weight, increase the volume. For example if you are lifting 5RM for 3 Sets, increase the number of sets. When this starts to feel easier reduce the number of sets and try increasing the weight to ensure you remain in the specific training zone for you.

Recommended Rest times between sets:

1 – 5 RM, 2 min. rest between sets.

6 – 10 RM, 1 min. rest between sets.

11 – 15 RM, 40 sec. rest between sets.

Particularly when you have 2 mins between sets, you might choose to save time and increase your workout intensity by performing a **Superset**. This can be a combination of two or three different exercises that work opposing muscle groups, or upper and lower body, or left and right limbs, and the exercises are done back to back with no rest in between. For example you may choose to switch between the leg press and the chest press. Working on the chest press during the 2 min. rest on the leg press and vice versa.

Single Leg and or Arm exercises will give you an indication of the strength differences between your limbs. It also means the weaker limb cannot be assisted by the stronger limb. If you are performing single limb exercises, make sure the RM is specific for each limb. Remember strengthening your non-injured side will limit the deconditioning of your injured side.

Circuits are a collection of exercise sets you repeat without a rest. A rest will be recommended between circuits rounds.

CV Endurance and Strength training don't mix. If you want to progress your CV work to more than a 20 min moderate session, don't do this in the same session that you strength train. The benefits of the two exercises counteract with each other, meaning you will not strengthen as quickly. If you want to progress your CV do so on a separate day.