

RJAH High Tibial Osteotomy (HTO) or Distal Femoral Osteotomy (DFO) Rehabilitation Guide

Patient Details:

Co-morbidity (if applicable follow the most conservative guide for the relevant phase):

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 their surgeon's recommendation (as applicable). This will be completed on discharge or follow-up clinic appointments.*

PHASE OF REHABILITATION	IDEAL CRITERIA	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. 	<ul style="list-style-type: none"> • Weight-bear as symptoms allow, elbow crutches for comfort. • ROM as symptoms allow. • Cryocuff/Ice. • Patella mobilisations. • H and calf stretches. • Ankle Exercises (e.g. heel raises). • SQ. • Weight transferring. 	<ol style="list-style-type: none"> 1. Reduce inflammation. 2. Promote distal circulation. 3. Gradually regain ROM. 4. Increase confidence. 5. Promote early mobility. 		

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<p>PHASE 2</p> <p>From Week 1</p>	<ul style="list-style-type: none"> ○ Adequate pain relief. ○ Mobilise independently +/- aids. 	<ul style="list-style-type: none"> • Static Bike or Turbotrainer no/low resistance as tolerated (part revolution → full revolution as symptoms dictate). • Rowing no/ low resistance for ROM (as symptoms dictate). • Anti-gravity treadmill, walk → jog, increase body weight and speed as symptoms dictate. • EOR E mobilisations. • SQ progressing to SLR. • Mini squats/ small knee bends. • Weight transferring exercises → gradually increase weight-bearing. • Independent gait re-education. • Early proprioception exercises, progressing to single leg stance as symptoms dictate. • Step-touch → step-up → step over. • Active CKC and OKC exercises. • Muscle balance exercises as appropriate. • Core stability exercises as appropriate. • Flexibility exercises as appropriate. • Other muscle groups not to be neglected. • Upper body active exercise → resis/reps/sets/speed. • Hydrotherapy (when wounds allow). 	<ol style="list-style-type: none"> 1. Promote early function. 2. Gain terminal E. 3. Increase ROM. 4. Encourage FWB. 5. Improve muscular control. 	<p>AROM</p> <p>PROM</p> <p>SLR</p> <p>Effusion</p> <p>Single Leg Stance</p> <p>Bridging</p> <p>Clams</p>	<p>Check X-Ray at 6 weeks post-op</p>

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PHASE 3 From Week 6	<ul style="list-style-type: none"> ○ X-Ray results are satisfactory. ○ Minimal discomfort. ○ Resolving effusion. ○ Independent mobility with no aids. ○ SLR with no lag. ○ AROM = Full E - $\geq 100^\circ$. ○ Single leg stance $\geq 80\%$ parity. ○ Clams 10 reps with 10 sec hold ideal control [L] & [R]. ○ Bridge 10 reps with 10 sec hold ideal control. 	<ul style="list-style-type: none"> ● Gait with predictable changes in direction. ● Step-ups (for/back/sideways/over) \rightarrow height/reps/speed. ● PWB (parallel bars) jumps, hops, leaps \rightarrow control technique/speed/reps. ● Leg Press/Squats \rightarrow resis/reps/sets/speed. ● Proprioception \rightarrow single leg stance/wobble boards/Trampoline/crash mats/etc. ● Gymball and Theraband work. ● Rowing \rightarrow dist./speed/resis. ● X-Trainer \rightarrow dist./speed/resis. 	<ol style="list-style-type: none"> 1. Progress functional activities. 2. Prevent AKP. 3. Prevent joint stiffness. 4. Restore normal gait pattern. 5. Promote appropriate muscle strength, power and endurance. 6. Improve neuromuscular/proprioception/sensorimotor performance. 7. Maintain cardiovascular fitness. 8. Encourage patient compliance. 	<p>Planks</p> <p>Hurdle Step</p>	

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<p>PHASE 3</p> <p>From Week 8</p>	<ul style="list-style-type: none"> ○ Normal symmetrical gait. ○ Full Active E - $\geq 120^\circ$F. ○ No/minimal effusion. ○ Directional Planks 30 sec hold ideal control. ○ Controlled hurdle step ≥ 5 reps. 	<ul style="list-style-type: none"> • Train strength and endurance up to 3 – 4 x per week. • Train strength and endurance on separate days. • Have a minimum of 24 hours between strength days • Strength: <ul style="list-style-type: none"> 10 – 20 min CV warm-up (exception of jogging/running, unless using anti-gravity treadmill). Choose a load 1 – 12 RM. Choose numbers of sets and rest time between sets. Alternate upper/lower body exercises within session. Moderate to fast speed under control. Vary load/set/rest between sessions. Adjust if necessary based on symptoms • Endurance: <ul style="list-style-type: none"> Gradually progress toward ≥ 45 min continuous CV exercise (exception of jogging/running, unless using anti-gravity treadmill). Choose a load 15 – 20 RM. Choose numbers of sets and rest time between sets. Alternate upper/lower body exercises within session. Moderate to fast speed under control. Vary load/set/rest between sessions. Adjust if necessary based on symptoms. 	<ol style="list-style-type: none"> 1. Promote appropriate strength, power and endurance based on individual's needs. 2. Improve neuromuscular performance. 3. Increase confidence. 	<p>Inner Range</p> <p>Squat/ Small</p> <p>Knee Bend</p> <p>Rotatory</p> <p>Stability</p> <p>Single Leg</p> <p>Bridge</p>	

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<p>PHASE 4</p> <p>From Week 12</p>	<ul style="list-style-type: none"> ○ Inner Range Squat/ Small Knee Bend = ideal biomechanical control. ○ [L] & [R] Rotational Stability $\geq 80\%$ parity. ○ Single Leg Bridge 10 reps with 10 sec hold ideal control. 	<ul style="list-style-type: none"> • Add FWB double footed plyometrics \rightarrow control technique/speed/reps. 	<ol style="list-style-type: none"> 1. Improve neuromuscular performance. 2. Improve biomechanical control. 3. Improve power. 4. Increase confidence. 	<p>Single Leg Squat 60°</p> <p>Vertical Jump</p>	
<p>PHASE 5</p> <p>From Week 16</p> <p>Dependent on the patient's activity and functional goals.</p>	<ul style="list-style-type: none"> ○ Single Leg Squat 60° 5 sec hold with good alignment. ○ Note Vertical Jump Height. 	<ul style="list-style-type: none"> • Progress to single footed plyometrics as dictated by control and symptoms. • Introduce jogging \rightarrow running when eccentric strength and control is adequate. • Advance dynamic proprioceptive exercises e.g. volleying football, throwing, catching, racket and ball while balancing on Trampoline. 	<ol style="list-style-type: none"> 1. Sport specific function. 	<p>Vertical Jump</p> <p>5 RM</p> <p>Hop for distance</p> <p>Deep Squat</p> <p>Inline Lunge</p>	

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<p>Phase 6 From Week 20</p> <p>Dependent on the patient's activity and functional goals.</p>	<ul style="list-style-type: none"> ○ Vertical Jump Height – shows improvement. ○ Deep Squat – ideal posture +/- heel raise. 	<ul style="list-style-type: none"> • Add agility drills [From Week 16] when sufficient control and confidence is achieved e.g. twist/ turn/ pivot/ cut/ accelerate/ decelerate/direction. • Progress from predictable agility to unpredictable. • Perturbation training e.g. therapist randomly nudges patient off balance during a single leg throw-catch drill. 	<p>1. As PHASE 5</p>	<p>As PHASE 5</p>	
<p>PHASE 7 From Week 24</p> <p>Dependent on the patient's activity and functional goals.</p>	<ul style="list-style-type: none"> ○ Vertical Jump Height – shows improvement. ○ 5 RM > 80% parity ○ Hop for distance >80% parity. ○ Inline Squat – ideal movement pattern >80% parity. 	<ul style="list-style-type: none"> • Non-contact sport specific training → terrain/volume/periodisation. 	<p>1. Prepare neuromuscular and psychological ability to return to unrestricted function.</p>	<p>As indicated for individuals goals.</p>	
<p>PHASE 8 From Week 28</p> <p>Dependent on the patient's activity and functional goals.</p>	<ul style="list-style-type: none"> ○ All Tests > 90% parity. 	<ul style="list-style-type: none"> • Contact sport specific training. • Earliest return to contact sport training. • Progress to full restriction free sports and activities [dependent on Consultant opinion]. 	<p>1. Unrestricted confident function</p> <p>2. Injury prevention</p>	<p>Full sporting Function.</p>	

Terminology Key:

CV	Cardiovascular	PWB	Partial Weight Bear
EOR	End of Range	FWB	Full Weight Bear
E	Extension	ROM	Range of Movement
F	Flexion	AROM	Active Range of Movement
SLR	Straight Leg Raise	PROM	Passive Range of Movement
Q	Quadriceps	OKC	Open Kinetic Chain
H	Hamstrings	resis	Resistance
AKP	Anterior Knee Pain	reps	Repetitions
[L]	Left	RM	Repetition Maximum
[R]	Right		