



Bradley Smith, MD
5316 S. Woodrow St. #200
Murray, UT 84107
 Office: (801) 747-1020
 Fax: (801) 747-1023
bradleysmithmd.com



Rehabilitation Protocol for Medial Patellofemoral Ligament Reconstruction

PHASE I: Immediate Post-Op (0-2 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Protect surgical site • Reduce swelling, minimize pain • Restore full extension, gradually improve flexion ≥ 90 deg • Minimize arthrogenic muscle inhibition, re-establish quad control, regain full active extension • Patient education <ul style="list-style-type: none"> ◦ Keep your knee straight and elevated when sitting or laying down. Do not rest with a towel placed under the knee
Weight Bearing	<p><i>Walking</i></p> <ul style="list-style-type: none"> • Initially brace locked • WBAT with crutches • May start walking without crutches as long as there is no increased pain, effusion, and proper gait • 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
Interventions	<p><i>Swelling Management</i></p> <ul style="list-style-type: none"> • Ice/cryotherapy • Compression, elevation • Retrograde massage • Ankle pumps <p><i>Range of motion/Mobility</i></p> <ul style="list-style-type: none"> • PROM • Heel slides with towel • Low intensity, long duration extension stretches: prone hang, heel prop • Seated hamstring/calf stretch <p><i>Strengthening</i></p> <ul style="list-style-type: none"> • Calf raises • Quad sets <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ *Do not perform straight leg raise if you have a knee extension lag*

	<ul style="list-style-type: none"> • Hip abduction: side-lying or standing • Standing hamstring curl
Criteria to Progress	<ul style="list-style-type: none"> • Knee extension ROM 0 deg • Quad contraction with superior patella glide and full active extension • Able to perform straight leg raise without lag

PHASE II: *Intermediate Post-Op* (3-6 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Continue to protect surgical site • Reduce pain, minimize swelling • Maintain full extension, restore full flexion • Normalize gait
Weight-bearing	<ul style="list-style-type: none"> • WBAT: May unlock brace when able to perform straight leg raise without lag • Discontinue use of brace after 6 wks (or per surgeon) and when gait is normalized
Interventions -Continue with Phase I interventions	<p><i>Range of motion/Mobility</i></p> <ul style="list-style-type: none"> • Stationary bicycle • Gentle patellar mobilizations: superior/inferior and medial/lateral *Not necessary unless stiffness present <p><i>Strengthening</i></p> <ul style="list-style-type: none"> • Adductor strengthening: hook lying ball squeezes, SLR adduction, bridging with ball squeeze • Ball squats, wall slides, mini squats from 0-60 <p><i>Balance/proprioception</i></p> <ul style="list-style-type: none"> • Single leg standing balance (knee slightly flexed) static progressed to dynamic and level progressed to unsteady surface
Criteria to Progress	<ul style="list-style-type: none"> • No swelling (Modified Stroke Test) • Flexion ROM > 90 deg • Extension ROM equal to contralateral side

PHASE III: *Late Post-Op* (7-12 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Continue to protect repair • Obtain/maintain full ROM • Safely progress strengthening • Promote proper movement patterns • Avoid post exercise pain/swelling • Avoid activities that produce pain at repair site
Weight-bearing	<ul style="list-style-type: none"> • FWB without assistive device
Interventions -Continue with Phase	<p><i>Range of motion/Mobility</i></p> <ul style="list-style-type: none"> • Gentle stretching all muscle groups: prone quad stretch, standing quad stretch, standing

<i>I-II interventions</i>	<p>hip flexor stretch</p> <p><i>Cardio</i></p> <ul style="list-style-type: none"> • ~8 weeks: Elliptical, stair climber, flutter kick swimming, pool jogging <p><i>Strengthening</i></p> <ul style="list-style-type: none"> • Gym equipment: leg press machine, seated hamstring curl machine and hamstring curl machine, hip abductor and adductor machine, hip extension machine, roman chair, seated calf machine <p>**The following exercises to focus on proper control with emphasis on good proximal stability</p> <ul style="list-style-type: none"> • Proximal Strengthening: Double leg bridge, bridge with feet on physioball, single leg bridge, lateral band walk, standing clamshell/fire hydrant, hamstring walkout, TA brace with UE and LE progression • Squat to chair • Lateral lunges • Romanian deadlift (single and double leg) • Single leg progression: single leg press, slide board lunges: retro and lateral, split squats, step ups and step ups with march, lateral step-ups, step downs, single leg squats, single leg wall slides/sit • Lateral band walks <p><i>Balance/proprioception</i></p> <ul style="list-style-type: none"> • Progress single limb balance including perturbation training
Criteria to Progress	<ul style="list-style-type: none"> • No effusion/swelling/pain after exercise • Normal gait • ROM equal to contralateral side • Quad/HS/glut index $\geq 70\%$; HHD mean or isokinetic testing @ 60d/s

PHASE IV: *Transitional* (13-16 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Maintain full ROM • Safely progress strengthening • Promote proper movement patterns • Avoid post exercise pain/swelling • Avoid activities that produce pain
Interventions <i>-Continue with Phase II-III interventions as indicated</i>	<p><i>Strengthening</i></p> <ul style="list-style-type: none"> • Progress intensity (weight) and volume (repetitions) of exercises <p><i>Plyometric Activities</i></p> <ul style="list-style-type: none"> • Bilateral FWB plyometrics progressed to single leg plyometrics <p><i>Balance/proprioception</i></p> <ul style="list-style-type: none"> • Progress single limb balance including perturbation training
Criteria to Progress	<ul style="list-style-type: none"> • Functional Assessment <ul style="list-style-type: none"> ◦ Quad/HS/glut index $\geq 80\%$; HHD mean or isokinetic testing @ 60d/s ◦ Hamstring/Quad ratio $\geq 66\%$

	<ul style="list-style-type: none"> ○ Hop Testing $\geq 80\%$ compared to contralateral side, demonstrating good landing mechanics
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PHASE V: Early Return to Sport (3-5 MONTHS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> ● Safely progress strengthening ● Safely initiate sport specific training program ● Promote proper movement patterns ● Avoid post exercise pain/swelling ● Avoid activities that produce pain
Interventions -Continue with Phase II-IV interventions	<p><i>Strengthening</i></p> <ul style="list-style-type: none"> ● Progress intensity (weight) and volume (repetitions) of exercises <p><i>Interval running program</i></p> <ul style="list-style-type: none"> ● Return to Running Program <p><i>Progress to plyometric and agility program (with functional brace if prescribed)</i></p>
Criteria to Progress	<ul style="list-style-type: none"> ● Clearance from MD and ALL milestone criteria below have been met ● Completion jog/run program without pain/effusion/swelling ● Functional Assessment <ul style="list-style-type: none"> ○ Quad/HS/glut index $\geq 95\%$; HHD mean or isokinetic testing @ 60d/s ○ Hamstring/Quad ratio $\geq 66\%$ ○ Hop Testing $\geq 95\%$ compared to contralateral side, demonstrating good landing mechanics ● Lysholm $>90\%$ ● KOOS-sports questionnaire $>90\%$ ● International Knee Committee Subjective Knee Evaluation >93 ● Psych Readiness to Return to Sport (PRRS) ● Kujala > 90

PHASE VI: Unrestricted Return to Sport (6+ MONTHS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> ● Continue strengthening and proprioceptive exercises ● Symmetrical performance with sport specific drills ● Safely progress to full sport
Brace	<ul style="list-style-type: none"> ● Functional PTO brace for returning to pivoting/high intensity sport
Interventions -Continue with Phase II-V interventions	<ul style="list-style-type: none"> ● Multi-plane sport specific plyometrics program ● Multi-plane sport specific agility program ● Include hard cutting and pivoting depending on the individuals' goals ● Non-contact practice → Full practice → Full play

Protocol adapted from Mass General Sports Medicine Physical Therapy Rehabilitation Protocols. See <https://www.massgeneral.org/orthopaedics/sports-medicine/physical-therapy/sports-rehab-protocols>

