

Rehabilitation Protocol for Arthroscopic Meniscal Repair

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PHASE I: IMMEDIATE POST-OP (0-3 WEEKS AFTER SURGERY)

- Rehabilitation goals:
 - Protect repair
 - Reduce swelling, minimize pain
 - Restore patellar mobility
 - Restore full extension
 - **Flexion < 90 degrees**
 - Minimize arthrogenic muscle inhibition, re-establish quad control, regain full active extension
 - Patient education
 - Keep your knee straight and elevated when sitting or lying down. Do not rest with a towel placed under the knee.
 - Do not actively bend your knee; support your surgical side when performing transfers (i.e. sitting to laying down)
 - Do not pivot on your surgical side.
- Weight bearing:
 - **Brace locked, crutches**
 - **Non weight bearing**
 - When going up the stairs, make sure you are leading with the non-surgical side, when going down the stairs, make sure you are leading with the crutches and surgical side.
- Interventions:
 - Swelling management
 - Ice, compression, elevation
 - Retrograde massage
 - Ankle pumps
 - Range of motion/management
 - Patellar mobilizations: superior/inferior and medial/lateral
 - Seated assisted knee flexion extension and heel slides with towel
 - ****Avoid active knee flexion to prevent hamstring strain on the posteromedial joint*
 - Low intensity, long duration extension stretches: prone hang, heel prop
 - Seated hamstring stretch
 - Strengthening
 - Quad sets
 - NMES high intensity (2500 Hz, 75 bursts) supine knee extended 10 sec/50 sec, 10 contractions, 2x/week 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*

- Hip abduction: side lying or standing
 - Multi-angle isometrics 90 and 60 deg knee extension
- Criteria to progress:
 - Knee extension ROM 0 deg
 - Knee flexion ROM 90 degrees
 - 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
 - Continue to protect repair
 - Reduce pain, minimize swelling
 - Maintain full extension
 - Flexion < 90 degrees (unless otherwise told by Dr. Heikes)
- Weight Bearing
 - Walking
 - **Continue non weight bearing (unless directed otherwise by Dr. Heikes)**
 - **Consult with referring MD regarding unlocking brace**
- Additional Interventions
 - Range of motion/mobility
 - Stationary bicycle: gentle range of motion only (see phase III for conditioning)
 - Cardio
 - Upper body ergometer
 - Strengthening
 - Calf raises
 - Lumbopelvic strengthening: side lying hip external rotation clamshell in neutral, plank bridge with elevated feet
 - Balance/proprioception
 - Double limb standing balance utilizing uneven surface (wobble board)
 - Joint position re-training
- Criteria to progress
 - No swelling (Modified Stroke Test)
 - Flexion ROM 120 degrees
 - Extension ROM equal to contra lateral side

PHASE III: LATE POST-OP (6-9 WEEKS AFTER SURGERY)

- Rehabilitation goals
 - Continue to protect repair
 - Maintain full extension
 - Normalize gait
 - Flexion within 10 degrees of contralateral side
 - Safely progress strengthening
 - Promote proper movement patterns
 - Avoid post exercise pain/swelling

- Weight bearing
 - May discontinue use of brace/crutches after 6 weeks per MD and once adequate quad control is achieved and gait is normalized.
- Additional interventions
 - *Range of motion/Mobility*
 - Supine active hamstring stretch
 - Gentle stretching all muscle groups: prone quad stretch, standing quad stretch, kneeling hip flexor stretch, standing gastroc stretch and soleus stretch
 - Rotational tibial mobilizations if limited ROM
 - *Cardio*
 - Stationary bicycle, flutter kick swimming, pool jogging
 - *Strengthening*
 - Partial squat exercise 0-60 degrees
 - Ball squats, wall slides, mini squats from 0-60 deg
 - Hamstring strengthening: prone hamstring curls, standing hamstring curls
 - Lumbopelvic strengthening: bridges on physioball, bridge on physioball with roll-in, bridge on physioball alternating, hip hike
 - Gym equipment: leg press machine, standing hip abductor and adductor machine, hip extension machine, roman chair, seated calf machine
 - Progress intensity (strength) and duration (endurance) of exercises
 - *Balance/proprioception*
 - Single limb balance progress to uneven surface including perturbation training
- Criteria to progress
 - No swelling/pain after exercise
 - Normal gait
 - 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.
 - Safely progress strengthening.
 - Promote proper movement patterns.
 - Avoid post exercise pain/swelling.
- Additional interventions
 - *Cardio*
 - Elliptical, stair climber
 - *Strengthening* **The following exercises to focus on proper control with emphasis on good proximal stability
 - Squat to chair
 - 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
 - Knee Exercises for additional exercises and descriptions

- Gym equipment: seated hamstring curl machine and hamstring curl machine
 - Romanian deadlift
- Criteria to progress
 - No episodes of instability
 - 10 repetitions single leg squat proper form through at least 60 deg knee flexion
 - KOOS-sports questionnaire >70%
 - Functional assessment
 - Quadriceps index > 80%; HHD mean preferred (isokinetic testing if available)
 - Hamstring, glut med, glut max index > 80%; HHD mean preferred (isokinetic testing for HS if available)

PHASE V: EARLY RETURN TO SPORT (3-5 MONTHS AFTER SURGERY)

- Rehabilitation goals
 - Safely progress strengthening.
 - Safely initiate sport specific training program.
 - Promote proper movement patterns.
 - Avoid post exercise pain/swelling.
- Additional interventions
 - Interval running program
 - Return to Running Program
 - Progress to plyometric and agility program (with functional brace if prescribed).
 - Agility and Plyometric Program
- Criteria to progress
 - Clearance from MD and ALL milestone criteria below have been met
 - Completion of jog/run program without pain/swelling
 - Functional Assessment
 - Quad/HS/glute index > 90%
 - Hamstring/Quad ratio > 70%
 - Hop Testing > 90% compared to contralateral side
 - KOOS-sports questionnaire >90%
 - International Knee Committee Subjective Knee Evaluation >93

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

- Rehabilitation goals
 - Continue strengthening and proprioceptive exercises.
 - Symmetrical performance with sport specific drills.
 - Safely progress to full sport.
- Additional interventions
 - 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
- Criteria to discharge
 - Quad/HS/glut index > 90%; HHD mean preferred
 - Hop Testing > 90% compared to contra lateral side

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	<ul style="list-style-type: none"> • Safely recondition the knee • Provide a logical sequence of progressive drills for pre-sports conditioning
Agility	<ul style="list-style-type: none"> • Forward run • Backward run • Forward lean in to a run • Forward run with 3-step deceleration • Figure 8 run • Circle run • Ladder
Plyometrics	<ul style="list-style-type: none"> • 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): <ul style="list-style-type: none"> ○ Progressive single leg jump tasks ○ Bounding run ○ Scissor jumps ○ Backward/forward hops over line/cone
Criteria to Progress	<ul style="list-style-type: none"> • No increase in pain or swelling • Pain-free during loading activities • Demonstrates proper movement patterns

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PHASE II: LATERAL PROGRESSION

Rehabilitation Goals	<ul style="list-style-type: none"> • Safely recondition the knee • Provide a logical sequence of progressive drills for the Level 1 sport athlete
Agility <i>*Continue with Phase I interventions</i>	<ul style="list-style-type: none"> • Side shuffle • Carioca • Crossover steps • Shuttle run • Zig-zag run • Ladder
Plyometrics <i>*Continue with Phase I interventions</i>	<ul style="list-style-type: none"> • Double leg: <ul style="list-style-type: none"> ○ Lateral jumps over line/cone ○ Lateral tuck jumps over cone • Single leg (these exercises are challenging and should be considered for more advanced athletes): <ul style="list-style-type: none"> ○ Lateral jumps over line/cone ○ Lateral jumps with sport cord
Criteria to Progress	<ul style="list-style-type: none"> • No increase in pain or swelling • Pain-free during loading activities • Demonstrates proper movement patterns

PHASE III: MULTI-PLANAR PROGRESSION

Rehabilitation Goals	<ul style="list-style-type: none"> • Challenge the Level 1 sport athlete in preparation for final clearance for return to sport
Agility <i>*Continue with Phase I-II interventions</i>	<ul style="list-style-type: none"> • Box drill • Star drill • Side shuffle with hurdles
Plyometrics <i>*Continue with Phase I-II interventions</i>	<ul style="list-style-type: none"> • Box jumps with quick change of direction • 90 and 180 degree jumps
Criteria to Progress	<ul style="list-style-type: none"> • Clearance from MD • Functional Assessment <ul style="list-style-type: none"> • Quad/HS/glut index 290% contra lateral side (isokinetic testing if available) • Hamstring/Quad ratio 270% • Hop Testing 290% contralateral side • KOOS-sports questionnaire >90% • International Knee Committee Subjective Knee Evaluation >93 • Psych Readiness to Return to Sport (PRRS)