ORTHOPEDICS & SPORTS MEDICINE
BAYCARE CLINIC

DR. JONATHON HENRY
MENISCUS REPAIR POST-OP THERAPY PROTOCOL

The following document is an evidence-based rehabilitation protocol for knee arthroscopy with meniscus repair. The protocol is both chronologically and criterion based for advancement through four post-operative phases:

- Phase 1 : Maximum protection
- Phase 2 : Progressive stretching and early strengthening
- Phase 3 : Advanced strengthening and plyometrics
- Phase 4 : Return to sports functional program

Repair types:

- Body
  - Often concomitant with a ligament injury
- Root
  - Often isolated tear
  - Slower rehabilitation progression to minimize hoop stress on meniscus
- Transplant
  - Complete or near complete meniscus compromise

	Weight Bearing	Crutches or Assistive Device	Brace	ROM Limitations
Body	Toe touch weight bearing for 4 weeks	Wean over 1-2 weeks with progression to FWB at 5-6 weeks post- operative	0-30º, gradually open 10-20º as quad function improves	0 º-90º knee flexion until 4 weeks, then full ROM
Root	Toe touch weight bearing for 6 weeks	Wean over 1-2 weeks with progression to FWB at 7-8 weeks post- operative	0-30 º, gradually open 10-20º as quad function improves	0 º-90º knee flexion until 6 weeks, then full ROM
Transplant	Toe touch weight bearing for 6 weeks	Wean over 1-2 weeks with progression to FWB at 7-8 weeks post- operative	0-30 º, gradually open 10-20º as quad function improves	0 º-90º knee flexion until 6 weeks, then full ROM

Key factors in determining progression include:

- Anatomic site of tear
- Suture fixation – risk of failure if rehabilitation is too vigorous
- Location of tear – anterior vs posterior
- Other pathology such as ligamentous injury

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Phase 1 – Maximum Protection Phase
(0-4 weeks-body; 0-6 weeks-root, transplant)
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Goals for Phase 1	Criteria for Progression to Phase 2
• Protect surgical repair • Decrease inflammation and swelling • Restore normal knee extension • Educate patient on post-operative restrictions, gait, and tissue healing • Maintain tibiofemoral and patellofemoral joint mobility • Facilitate appropriate quadriceps activation	• Minimal pain with Phase 1 exercises • Knee ROM 0-90° • Perform straight leg raise without lag sign • Normal neuromuscular firing patterns of knee musculature

Brace
- Post-op hinged knee brace, unlocked 0-30°
- Gradually unlock in 10-20° increments as quad function improves
- Transition to recover knee brace as quadriceps function improves

Weight Bearing
- Toe-touch only (TTWB) for 4 weeks for body repair, 6 weeks for root repair
- Maximum of 20-25 lbs. through affected leg

Range of Motion
- Gentle active and passive ROM 0-90°
- Restrict hamstring activation for medial posterior horn repairs
- Progression managed by physician's office

Stretching
- Emphasis on terminal knee extension
- Heel prop for extension, calf stretch, prone hang

Manual Therapy
- Patellar mobilization – all directions
- Scar mobilization, soft tissue mobilization, lymphedema massage as needed

NMES
- Quadriceps re-education
- Consider home unit if insurance allows

Strengthening
- Ankle pumps, calf sets
- Quadriceps sets, prone terminal knee extension
- Open kinetic chain hip strength including straight leg raises – all planes with goal of no lag sign
- Gluteal and core strengthening

Phase 1 – Maximum Protection Phase
(0-4 weeks-body; 0-6 weeks-root, transplant)

Cardiovascular
- Upper body ergometer

Aquatics
- Initiate aquatic therapy when surgical incisions have healed
    - Focus on normalizing weight bearing and gait
    - Consider alternating between land and water-based sessions if available

Modalities
- Instruct on cryotherapy use – at least three times per day for 20-30 minutes with leg elevated above heart
- NMES unit at home if significant quadriceps lag present
- Compression to be worn during all waking hours
    - May remove to sleep

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Phase 2 – Moderate Protection Phase
(4-12 weeks-body; 6-12 weeks-root, transplant)

Goals for Phase 2	Criteria for Progression to Phase 3
• Minimize pain and inflammation • Introduce gentle strengthening • Restore full knee ROM • Progress weight bearing and ROM • Normalize gait pattern with proper lower extremity biomechanics OR ability to unilateral WB without pain	• Minimal pain with Phase 2 exercises • Normalized gait • Single leg balance > 15 seconds • Forward step down or SL squat to specific ROM • Full pain-free knee ROM • Descend 8” stair with proper knee • control/alignment

Brace
- Recover brace (neoprene sleeve with medial/lateral support) with knee sleeve
- Wear when up and active

Weight Bearing
- Progress to weight bearing as tolerated, if not already done
    - Increase by 25% body weight every 3-4 days until FWB

Strengthening
- Continue Phase 1 strengthening exercises
- Progress to closed kinetic chain as able (demonstrates strong quadriceps contraction, minimal swelling, able to bear at least 50% body weight)
    - Standing TKE, leg press, mini squats/weight shifts, forward step up program (8” stair goal), double leg bridging
- Progress closed kinetic chain quadriceps strength with progression from bilateral to unilateral
    - Leg press, squats, step-up/downs, lateral stepping, multi- directional lunges

Proprioception
- DL balance
    - Progress stable to unstable surfaces
    - Add perturbation and dual tasking as able

Cardiovascular
- Stationary bike, elliptical trainer, stair climber
- Retrograde treadmill walking

Aquatics
- Continue phase 1 aquatics, as needed

Modalities
- Utilize cryotherapy and other modalities, as needed

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Phase 3 – Advanced Strengthening, Proprioception and Plyometrics (12-20 weeks-body, root, transplant)
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Goals for Phase 3	Criteria for Progression to Phase 4
• Minimize pain and inflammation • Maintain full knee ROM • Improve muscle strength and endurance • Quad girth within 1 cm of contralateral • Improve neuromuscular control • Initiate return-to-running progression • Initiate plyometrics and agility training • Isokinetic test ≥ to 85% limb symmetry (or force plate/dynamometer)	• Minimal pain with Phase 3 exercises • Isokinetic test ≥ 85% limb symmetry • No apprehension with basic plyometric and agility activity • Initiated return-to-running progression with proper lower extremity biomechanics and without pain • Reports confidence in lower extremity with sport-specific activities

Stretching
- Continue stretching of all lower extremity musculature, as needed

Manual Therapy
- As needed to maintain range of motion and flexibility

Strengthening
- Continue Phase 2 strengthening exercises
- Introduce isokinetic knee extension (full arc, pain and crepitus free)
- Single leg exercise progressions (step-ups/downs, lunges, squats & RDLs)
    - Progress to multi-directional stepping patterns
    - Progress stable to unstable surfaces
    - Add perturbations
- Progressive hip and hamstring strengthening
    - Multi-directional band walks and stability training
    - Introduce eccentric hamstring strength training

Core Stabilization
- Focus on rotational patterns

Neuromuscular Control
- Incorporate unstable surfaces and dynamic movement patterns with functional strengthening progression
- Incorporate dual tasking and sport-specific progressions

Advanced Gait Re-Training & Agility
- Initiate return-to-running progression (12-14 weeks)
    - Utilize Alter-G treadmill or underwater treadmill if available
    - **14+ weeks**: sagittal plane jogging, sub-maximal ladder drills
    - **16+ weeks**: advance to multi-directional running, sub- maximal pivoting and cutting

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Phase 3 – Advanced Strengthening, Proprioception and Plyometrics (12-20 weeks-body, root, transplant)

Plyometrics

- Initiate and gradually progress return hopping activities
  - Sagittal → Frontal → Rotational
  - Double leg → Single leg
  - Ascending → Descending → Repetitive box jumps/hops

Aquatics

- Advanced gait re-training
- Plyometric drills

Athletic Republic

- Consider ACL Bridge as early as 12 weeks post-operatively if needed to enhance functional demands

Work Conditioning

- Consider at 12 weeks if physically demanding occupation

Modalities

- Utilize cryotherapy, thermotherapy, and electrical modalities as needed

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Phase 4 – Return-to-Sports Functional Program
(20+ weeks-body, root, transplant)
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Goals for Phase 4	Criteria for Return-to-Sport and Activity
• Minimize pain and inflammation • Restore muscle strength and endurance • Restore neuromuscular control • Safe and effective return to previous level of function for sport or activity • Forward step down or SL squat to 60°	• Full, pain free knee ROM • Normal lateral step-down test without compensation • Successful completion of return-to-sport testing • Lower Extremity Functional Scale score ≥ 80/80 (athletes) and 75/80 (sedentary) • Reports confidence in lower extremity with sport-specific activities (Tampa Scale)

Independent Gym Based Program (HEP)
- Stretching as needed
- Single leg strength stabilization, and power development with emphasis on dynamic knee control
- Continue incorporation of core integrated exercises with functional strengthening progression

Agility & Plyometrics
- Advanced agility and plyometric drills
    - Progress towards full speed with sudden changes in direction
    - Incorporate dual tasking and sport-specific progressions
    - Continue focus on proper lower extremity biomechanics

Sport-Specific Training
- Initiate sport-specific training programs
    - Interval sport programs for running, cycling, swimming, skating, throwing, golfing, etc.
    - Olympic/power weight-lifting exercises
- Transition to Athletic Republic program if competitive or recreational athlete with specific goals for return-to-sport
- Progress return-to-running program
    - Progress distances, speed intervals, surfaces, hill training, and sprint work if appropriate

Activity-Specific Training
- Transition to work re-conditioning program if physical laborer or if specific occupational demands

Modalities
- Utilize cryotherapy and other modalities as needed

Brace
- Custom fit functional brace to be utilized for contact or potential contact sports or activities for ~1 year post-op

Phase 4 – Return-to-Sports Functional Program
(20+ weeks-body, root, transplant)

Return to Sport Testing (6-12 months post-op per physician)

- Balance: Y-balance testing within 4 cm of uninvolved side
- Strength: Knee isokinetic test ≥ 90-95% of the uninvolved side, lateral step-down test without compensation
- Hop testing: ≥ 90-95% limb symmetry
- Agility: Full speed sport-specific drills without pain or compensation
- Tampa Scale to determine readiness to return-to-play