



## **Return to Sport Meniscal Repair Protocol**

### **General guidelines to consider with return to sport after Meniscal Repair:**

- Optimum return to sport does not mean to return as fast as possible. An athlete who returns to sport without functional stability being restored, is at a higher risk of failure and poor outcomes
- Once patient is able to perform CKC exercises, focus of rehabilitation is on core stabilization, return of single-leg strength, and reestablishing aerobic fitness and neuromuscular control.
- Intermediate and Late Post-Op Phases: strength and balance training: Exercises across a continuum
  - o Low to high loads
  - o Slow to fast motions
  - o Stable to unstable platforms
  - o Uni-planar to multi-planar motions
  - o Concentrating to distracted performances
- Weak core/postural stabilizing muscle groups are magnified in the extremities. Core strengthening gives patient a strong, stable musculoskeletal platform to transfer power to the extremities during sport
  - o Example of Core Strengthening Progression: 1. Double Leg Gluteal Bridge, 2. Single-Leg Gluteal Bridge, 3. Double Leg prone bridge, 4. Side Bridge.
  - o Once patient is confident and is maintaining stable position on flat ground, progress any exercise above, or other core exercises to a ball, or foam pad as the platform
- Patient needs to continue to train the non-operated leg to decrease risk of diminished strength. Return to sport phase exercises on non-operated leg are begun 2 weeks prior to operated leg. This will return the non-injured leg to full strength and familiarized the patient with the program for the injured leg.
- Next stage is single-leg squat and lunges, forward, backward, and to the side- patient must be able to achieve 60° of knee flexion and maintain for 5 seconds without quivering to continue progression.
- Progress balance by changing surface, incline, and add distracting techniques such as catching a ball while performing the single-leg squats and lunges.
- Advanced Activity Phase: Jumping and Landing: 2 feet to single foot; unidirectional to multi-directional (vertical to horizontal to zigzag to jumps from a height)
- Return to Sporting Activity Phase: sport specific, on the field training maneuvers in a controlled environment, ex basketball: rebounding from squatted position.
- Return to play: Supervised practice situations to simulated game situations to full return.

# Return-to-Sport Meniscal Rehabilitation Protocol

## Immediately Post-Operative Phase (1-14 days): Maximum Protection

### Goals of this phase:

- **Restore full passive knee extension**, and gradually ↑ knee flexion to 90°
- Diminish joint swelling and pain
- Restore patellar mobility
- Re-establish quadriceps control- active quadriceps contraction with superior patellar glide
- Safe environment to allow for early tissue healing

### Treatments:

- Patient Education: What to expect, Goals of the phases, contraindicated movements/activities, etc.- **Continued throughout all phases of the protocol**
- Modalities:
  - Swelling/Edema Control: Ice, compression, elevation of the knee multiple times per day. CP with full Extension
  - Kinesio® Tape (basket weave technique), massage, or dry needling technique, can also be used to control swelling/edema
  - NMES: Can and should be used, if contraction deficit is present, during active muscle exercises
- Gait Training:
  - Patient wears brace locked at 0° for ambulation and sleeping only- can be unlocked for sitting and exercises.
  - Weight Bearing: **MD will specify if different**- 25-50%weight bearing as tolerated with bilateral crutches. (**Complex Tears: Toe Touch weight-bearing with bilateral crutches**)
- Exercises:
  - Ankle Pumps to ↓ swelling/edema
  - Ankle resistance band open chain exercises- all 4 directions
  - Patellar mobilization in all directions
  - Quadriceps isometric setting, Gluteal Sets- (1 set, 10 reps every hour)
  - Hamstring & Gastrocnemius/heel cord Stretches for re-lengthening
  - Straight Leg Raises (flexion, Hip abduction & adduction)- (3 sets, 10 reps)
  - Passive knee flexion exercises to tolerance, (0-90°), Gentle overpressure into full extension (PT or pt. actively)- **Avoid active knee flexion**
  - Seated heel slides PROM to help increase Knee Flexion- **Avoid if posterior horn repair was performed**
  - Knee Extension Active-Assisted Exercises 60°-0°- (up to 3 sets, 10 reps)
  - Seated upper body exercises & Upper Body Ergometer (UBE) can be performed
- Criteria to progress to Early Post-Operative Phase:
  - ≥ 50% PWB with crutches
  - 90° of passive knee flexion

## Early Post-Operative Phase (~ 2-4 Weeks Post-Op)

### Goals of this Phase:

- Continue to control Swelling/Edema
- Adequate Quadriceps/VMO contraction
- Knee PROM 0°- ≥125° for peripheral tears, (120° for complex tears)

- Discontinue Crutches- when safe and can demo proper gait
- Get Baseline IDKC or KOOS Subjective Form

### **Treatments:**

- Patient Education: What to expect, Goals of the phases, contraindicated movements/activities, etc.
- Modalities: Continue all below:
  - o Ice, compression, elevation, CP with full Extension
  - o Kinesio® Tape (basket weave technique), massage, or dry needling
  - o NMES: Can and should be used, if contraction deficit is present, during active muscle exercises
- Gait Training:
  - o Continue to ambulate (and sleep for complex tears) with brace locked at 0° of extension
  - o Discontinue crutches when safe and can demo proper gait- see below
  - o Weight Bearing Guidelines: with brace locked in 0° extension
    - Week 2: 50% weight bearing, (25%-50% for complex tears)
    - Week 3: 75%-FWB, (50%-75% for complex tears)
    - Week 4: FWB as tolerated for both types of tears
- Exercises:
  - o Gradually increase PROM:
    - Week 2: 0°- 100/105° (100° for complex tears)
    - Week 3: 0°-155/120° (110° for complex tears)
    - Week 4: 0°-125-135° (120° for complex tears)
  - o Continue all exercises needed from previous phase, add core training
  - o Multi-angle isometric Quad Setting (0° and 60°)- (1 set, 10 reps)
  - o SLR all 4-Planes- (up to 3 sets, 10 reps)
  - o Knee Extension exercise (90°-0°)- (up to 3 sets, 10 reps)
  - o **For Peripheral Tears Only**:
    - CKC Mini Squats (0°- 45°)- (up to 3 sets)
    - CKC Wall Squat (to fatigue)- (up to 3 sets)
    - CKC Weight Shifts- diagonals
    - DL Toe Raises (not heel raises)- (up to 3 sets, 20 reps)
    - Stationary Bicycle once adequate ROM is achieved
  - o **For Complex Tears**: CKC weight shifts only- Avoid twisting, deep squatting, and hamstring strengthening.
- Criteria for Progression to Intermediate Post-Operative Phase:
  - o Met PROM goals set for this phase
  - o FWB with proper gait

### **Intermediate Post-Operative Phase (~ 5-7 Weeks Post-Operative)**

#### **Goals of this Phase:**

- Continue to control Swelling/Edema
- Discontinues Brace ~ week 4-6 Post-op- **MD will decide this timing**
- ROM 0°-135°
- Normalized gait
- No extension lag with SLR exercises, and re-established muscle control
- Get baseline SFMA & give corrective exercises for dysfunctional movement patterns

### Treatments:

- Patient Education: What to expect, Goals of the phases, contraindicated movements/activities, etc.
  - o Avoid twisting, hamstring curls, deep squatting and stooping
- Modalities: Only as needed, Dry Needling can also be used for Trigger Point and tissue tension release
- Gait Training:
  - o Assist with achieving proper gait with, and once out of, the brace.
- Exercises:
  - o Continue all exercises from previous phase, progressing with ankle weights, reps, sets, etc.
  - o Leg press 70°-0° (up to 3 sets, 10-15 reps) **(Peripheral Tears)**
  - o 4-way Hip exercises with hip machine
  - o Active Knee Extension 90°-40° (up to 3 sets, 10 reps)
  - o Wall Squats 0°-70° (to fatigue), vertical squats 0°-60° (up to 3 sets)
  - o Dynamic Stretches: Pre-activity/Injury Prevention **(See Sheets)**
  - o Lateral Step Ups, Front Step Downs **(Peripheral Tears only)**
  - o **Initiate CKC exercises for Complex Tears:**
    - ½ squats (0°-45°)
    - Leg press (0°-60°)
    - Wall Squats (0°-60°)
    - Standing Toe Raises (up to 3 sets, 20 reps)
  - o DL Heel Raises- (3 sets, 10-15 reps) **(Peripheral Tears only)**
  - o Balance and Proprioceptive Training
    - Wobble/Tilt Board- balance, squats (0°-60°)
    - Cone Stepping
    - SLS Light Exercises
  - o Stationary Bicycle (once ROM Permits)
- Criteria to progress to Late Post-Operative Phase:
  - o ROM ≥135°/ Full ROM
  - o Full weight bearing and able to tolerate the CKC exercises allowed in intermediate phase without pain
  - o Normal gait pattern with ambulation

### Late Post-Operative Phase (~8-12 Weeks Post- Operative)

#### Goals:

- Improve strength and endurance
- Maintain knee & total body flexibility & motion
- Increase core and balance exercises to prepare for more advanced activity
- Re-test with SFMA and continue corrective exercises
- Get Baseline KOS-Sport Score Subjective Form

#### Treatments:

- Patient Education: What to expect, Goals of the phases, contraindicated movements/activities, etc.
- Modalities:
  - o Continue any modalities appropriately

- Exercises:
  - Continue all previous phase exercises that are appropriate progressing as athlete tolerates
  - Progress Flexibility and Strengthening exercises
  - Continue Dynamic Stretches
  - Progress Core and add Scapular Stabilization exercises
  - Initiate Front Lunges (**Peripheral Tears Only**)
  - Initiate light hamstring curls (**Peripheral**), (**10-12 weeks for Complex**)
  - Progress Balance/Proprioceptive training
  - DL Heel Raises (**Complex Tears**), SL Heel Raises (**Peripheral Tears**)

### Functional Assessments:

- Retest SFMA end of treatment to assess progression of corrective exercises
- Core Testing: See Testing Sheets)
  - Segmental Multifidus Test
  - Trunk Curl Up Test
  - Double-Leg Lowering Test
  - Side Bridge Test
  - Prone Bridge Test
  - Supine Single-Leg Bridge Test
  - Extensor Endurance Test
- Criteria for Progression to Controlled Activity Phase:
  - No/Minimal Pain & Swelling/Edema
  - Full ROM
  - No pain with any of the current exercises

### Controlled Activity Phase

**(~13-16 Weeks for Peripheral Tears) (~13-24 Weeks for Complex Tears)**

#### Goals:

- Maintain Knee and Total Body Flexibility and ROM
- Get a Baseline FMS and Y-Balance Test ~ 14-16 weeks post-op- (**peripheral**), ~16-18 weeks (**complex**)
- Restore as close to symmetrical hip and LE strength with non-op LE as possible
- KOS-sports score of >70%

#### Treatments:

- Patient Education: What to expect, Goals of the phases, contraindicated movements/activities, etc.
- Exercises:
  - Dynamic Stretches: Begin Sports and Advanced Performance Dynamic Stretches **(See Sheets)**
  - **Peripheral Tears:**
    - Continue to progress all stretching, strengthening, balance, Core/Scapular Stabilization exercises
  - **Complex Tears:**
    - Continue all previous phase exercises and progress as appropriate
    - Initiate Front lunges
    - Initiate a walking program (gradually increasing distance .2-.5 mile per week)

### Functional Assessments:

- FMS® and Y-Balance Assessment™ **at mid-end of this phase**
- Core Testing: at end of phase- (See Test Sheets)
  - o Segmental Multifidus Test
  - o Trunk Curl Up Test
  - o Double-Leg Lowering Test
  - o Side Bridge Test
  - o Prone Bridge Test
  - o Supine Single-Leg Bridge Test
  - o Extensor Endurance Test
- Criteria to Progress to Advanced Activity Phase:
  - o Demo good performance, posture and balance with all current exercises; with no pain or swelling
  - o Full ROM
  - o Able to walk  $\geq 2$  miles without ~~bad~~ symptoms
  - o Clearance from MD to begin Squatting, Cutting, and Running

### Advanced Activity Phase

**(~16-24 Weeks Peripheral Tears, ~24- 36 Weeks Complex Tears)**

#### Goals for this phase:

- Normalize lower extremity strength, and increase muscle power and endurance
- Maintain/Gain Hamstring & Quadriceps Strength and Girth of 80% or greater
- Continue to improve neuromuscular control
- Initiate and Complete Walk-to-Run Protocol
- Initiate and Complete Plyometric Protocol
- Prepare and Assess athlete for Return to Specific Sporting Activity Phase- **(See Functional Testing List on next page)**
- KOS-sports score of  $>70\%$
- Patient is tested with the Landing Error Scoring System (LESS): **(See Sheets) - Test at Patient's individual max vertical jump height, not standard measure on the LESS- Test placement may be too high /too low for accurate individual jump assessment score, no sooner than 10-12 weeks post-op**
  - o Excellent Score is  $\leq 4$
  - o Good Score is  $>4$  and  $\leq 5$
  - o Moderate Score is  $>5$  and  $\leq 6$
  - o Poor Score is  $>6$
- FMS® (goal of  $\geq 14/21$  points with no 0/3, 1/3, or asymmetries) and Y-Balance Test™ score (goal statistically symmetrical to non-injured leg)
- Perform hop testing no sooner than **20 weeks (Peripheral), and 30 (Complex) weeks post-op: (See Sheets)**
  - o 2 practice trials, 2 timed/measured trials; average injured to non-injured
  - o 1- Single-leg hop for distance
  - o 2- Triple hop for distance
  - o 3- Single-Leg Crossover triple hop
  - o 4- 6-Metered timed hop
  - o DL Jump Test
  - o Tuck Jump Test

## Treatments:

- Patient Education: What to expect, goals of the phases, contraindicated movements/activities, etc.
- Exercises:
  - Continue to progress all Strengthening, Stretching, Stabilization, Balance/Proprioception, and Endurance exercises
  - Begin Sport Specific Dynamic Stretches for sport athletes participates- **(See Sheets)**
  - Deep Squatting is permitted at 16 weeks- (Peripheral Tears), 24 weeks- (Complex Tears)
  - Walk-to-Run Protocol and straight Agility Ladder Drills at 16 weeks- (Peripheral Tears), 24 weeks- (Complex Tears)
  - LE Plyometric Protocol is permitted at 20 weeks- (Peripheral Tears), and 30 weeks- (Complex Tears)
  - Begin Interval Running Protocol- 20-22 weeks **(Peripheral Tears)**, 28-30 weeks **(Complex Tears)**
  - Begin Interval Sport-Specific Protocol: (ex. Return to Kicking, Swinging, etc.)
  - Agility Drills
    - Begin Pivoting, Cariocas, Zigzags, Side-Shuffling, Sudden Start and Stops, Figure-8's, 45° and 90° Cutting drills, box jumps (progressing & varying heights up to 20cm), & Lateral and Rotational Agility Ladder Drills at 20 weeks- (Peripheral Tears), 28 weeks- (Complex Tears)
- Criteria for progression to Sport-Specific Training:
  - No Pain or Swelling with any activities currently performing
  - Full ROM and Strength  $\geq 90\%$  of the non-injured LE
  - A score of  $\geq 14/21$  on the FMS® Assessment Screen, with **No 0/3=** pain on any of the 7 fundamental movement patterns
  - No statistical asymmetries and on the Y-Balance Test™ with composite score  $\geq 95/100$
  - Hop Tests (90% or higher compared to non-injured leg)
  - Limb Symmetry Index (LSI) of 90% or greater on hop tests
  - IKDC Score  $\geq 85\%$ , or the KOOS score of  $\geq 85$
  - KOS-Sports Score 90% or greater
  - Isokinetic testing: (if available), or Dynamometry
    - Quadriceps (90% or greater) compared to non-injured leg
    - Hamstring (85%-100%) compared to non-injured leg
    - Hamstring-Quadriceps Ratio (80% or greater)

**Functional Testing: for progression to sport-specific training- (No sooner than 24 Weeks- Peripheral Tears, and 36 Weeks- Complex Tears) -\*Can be perform over multiple days- See Attached Sheets**

### Strength and Power Testing:

- Single-Leg Squat test/ Single-Leg Squat test
- Vertical Jump test
- Figure-8 Hop test
- Up-Down test
- Hexagon test (DL), Modified Hexagon Hop test (SL)

### Speed, Agility, and Quickness Testing:

- T-Test, or Modified Agility T-Test (MAT)

- Three-Cone Drill Test
- Slalom Test
- Backward Movement Agility Test
- Zigzag Run Test
- Lower Extremity Functional Test (LEFT)

Core Testing:

- Segmental Multifidus Test
- Trunk Curl Up Test
- Double-Leg Lowering Test
- Side Bridge Test
- Prone Bridge Test
- Supine Single-Leg Bridge Test
- Extensor Endurance Test

Function and Balance Testing:

- FMS® Assessment Screen
- Y-Balance Test™
- Vail Sports Test™

## **Sport Specific Training Phase**

**Goals of this Phase:**

- Return to sport participation- **Final Decision from MD**

**Treatments:**

- Continue Sport Specific Dynamic Stretches, and Interval Running, and Interval Sport-Specific Sport protocols
- Supervised sport specific training by clinician, athletic trainer, and/or coaches



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