



Meniscal Allograft Transplant (MAT)

Rehabilitation following surgery for meniscal allograft transplantation (MAT) is an essential element of the treatment to achieve a full recovery. This protocol is intended to provide the user with instruction, direction, rehabilitative guidelines and functional goals. **It is not meant as a home program.** The physiotherapist must exercise their best professional judgment to determine how to integrate this protocol into an appropriate treatment plan. Some exercises may be adapted depending on the equipment availability at each facility. As an individual's progress is variable and each will possess various pre-operative deficiencies, this protocol must be individualized for optimal return to activity. There may be slight variations in this protocol if there are limitations imposed from the surgery and quality of individuals healing. Complete recovery after MAT ranges from 6-9 months or longer, depending upon whether other procedures such as osteotomy or ligament reconstruction, is also performed.

KEY POINTS

The main indications for MAT include:

- I. Unicompartamental pain in the presence of total or subtotal "functional" meniscectomy
- II. As a concomitant procedure to revision ACL reconstruction to aid in joint stability when meniscal deficiency is believed to be a contributing factor to failure
- III. As a concomitant procedure with articular cartilage repair in a meniscal deficient compartment

The goal of surgery is to relieve pain, increase stability of the joint and protect the joint surface. It is not a procedure that aims to get patients back to high intensity, pivoting or impact sport. It is also common that other procedures are performed simultaneously, such as ACL reconstruction or realignment osteotomy; therefore rehabilitation may be tailored to the combination of procedures that are performed.

ROM, WEIGHT BEARING AND BRACING

Post-operative instructions will vary based on the specific procedures performed. Generally bracing is required and weight bearing is delayed for 6 weeks to allow for meniscal healing to the tibial plateau. Also, ROM for flexion and active extension will be slower to protect the healing meniscus, so that undue strains are not placed at the meniscal root insertions.

Phase 1: Protection & ROM (0-6 Weeks)

Brace and Weight Bearing:

- Tracker brace 0-90 degrees; worn 24 hours per day
- Flat foot feather touch weight bearing with crutches

ROM:

- 0-90 degrees

Exercise Suggestions:0-2 weeks:

- Patellar mobilizations
- Heel slides (+/- slider board), calf & hamstring stretches
- Quad/ham co-contraction, gluteal activation (supine or standing), isometric hip adduction/abduction, ankle pumping, sitting passive leg extension with roll under heel for extension if needed

2-6 weeks add:

- Supine legs up wall: heels slides (knee flexion); supine legs on swiss ball: knee flexion
- Bike pendulums: ½ circles forward/backward – lower seat as tolerated
- Quadriceps isometrics in long sitting, standing (+/- muscle stimulation)
- Non-weight bearing hip stability exercises: abduction, extension, external rotation, clam shells, supine bridging on swiss ball
- Ankle theraband plantar flexion, sitting calf raises

Modalities: Ice and IFC as needed to reduce pain

Phase II: Weight Bearing & Strengthening (6-12 Weeks)

If concomitant ACL, can move to ACL rehabilitation protocol.

Brace and Weight Bearing:

- Advance to WBAT, wean off tracker brace
- Wean off crutches, ensuring normal heel toe gait
- Transfer to Ossur Cartilage Rebound 'unloading' brace

ROM:

- Progress to full ROM as tolerated (flexion and extension)

Exercise Suggestions:

- Continue with patellar mobilizations
- Low resistance stationary bike, progressing to full rotations
- Weight shifting: 2 weigh scales → 50-50WB → progress to mini squats
- Leg extension (or quad over roll), active terminal knee extension with theraband
- Initiate abdominal and core strengthening (i.e. curl-ups, transversus abdominis with SLR x4)
- Standing hip flexion/extension, abduction/adduction → weights/pulleys/bands (watch for excessive trunk shift/sway)
- Supine bridging: 2→1 leg →swiss ball→ bridge + knee flexion
- Shuttle™/leg press: 2 leg squat/calf raises, progress 2-1 leg; increase ROM & resistance
- Mini wall squats (30-60°) → 60°-90°; sit to stand
- Hamstring curls: prone, sitting→progress 1-2 lb weights
- Calf raises 2→1 foot, up on toes walking (when full weight bearing)

- Wobble boards with support: side-to-side, forward/backward
- Single leg stance 30-60 seconds (when full WB)

Phase III: Strength and conditioning (3-6 Months)

- Ossur Cartilage Rebound 'unloading' brace until 6 months for activity

Exercise Suggestions: (dependent on patient goals)

- Continue with bike, add elliptical
- Stairmaster™ if adequate strength (must not hip hike when pressing down on step)
- Continue core strengthening functionally (i.e. obliques, planks, Pilates)
- Progress leg extensions with weight as tolerated (pain free arc)
- Sit to stand → lower bed height (watch mechanics) → single leg
- Progress resistance of Shuttle™ working on strength & endurance, 2→1 leg
- Static Lunge → dynamic lunge (with proper alignment: shoulders over knees over toes) → lunge walking as pain free range tolerates
- Bungee™ cord walking: forward, backward, side step, lunging → add speed/direction change as tolerated
- Forward and lateral step-ups 2-4-6" and eccentric lateral step down on 2-4-6" step with control (watch for hip hike or excessive ankle dorsiflexion)
- Squats, Lunges on Dynadisc, Airex, Bosu... as range tolerates
- Continue hip strengthening: weights, pulleys, tubing
- Tubing kickbacks (mule kicks)
- Pro-Fitter™: hip abduction and extension → progress side-to-side
- Shuttle™ standing kick backs (hip/knee extension)
- Supine swiss ball → bridge + knee flexion → 1 leg
- Chair walking/stool pulls
- Hamstring curls: standing & sitting-weights/pulleys/Bungee™
- Eccentric heel drops off step or Shuttle™ 2→1 leg
- Continue wobble boards and add basic upper body skills (i.e. throwing, catching)
- Single leg stance on unstable surface i.e. pillow, mini-tramp, BOSU™, Airex™, Dynadisc™
- Single leg stance performing upper body patterning specific to patient goal(s)
- Standing 747s: eyes open/closed → progress to mini trampoline

Other Instructions:

Phase IV: Advanced Strengthening & Return to Activity/Light sport (6+ Months)

Can start impact activities such as jogging/running from 6 months onwards.

Exercise Suggestions:

- May begin jogging / running program once regained full range of motion with a quiet knee and appropriate neuromuscular control

- Agility: Cariocas/grapevine, Figure 8's around cones, ladder drills, lateral shuffle cone-cone
- Side to side steps → jumps on the BOSU
- Line jumping, backward/forward/side-to-side → progress to diagonals / combined patterns; 2 → 1 leg
- Jumping: tuck jumps, box jumps, long jumps
- Skipping rope double and single leg
- Hopping: single-leg (distance), 6m timed, triple hop (distance), cross-over: 2 → 1 leg
- May implement sport-specific multi-directional drills/contact when adequate core/lower extremity patterning (stop and go drills, sideways and backwards drills, sprinting with cutting and pivoting)