

Meniscal Root Repair Protocol

PHASE 1

NB: this protocol is NOT appropriate for the repair of vertical, longitudinal tears.

Monitor for evidence of:

- Infection: if patient develops a temperature $>38^{\circ}$, refer urgently to the operating surgeon. If the surgeon is unavailable, advise patient to attend A&E to exclude wound infection or septic arthritis
- Distal neurovascular deficit (including deep vein thrombosis)

Goals:

- **Protect meniscal root repair**
- **Control pain and swelling/effusion**
- **Preserve/restore ROM; a brace will be provided to limit knee ROM**
- **Muscle activation**

Initial precautions:

- NWB for **6 weeks**, WBAT thereafter
- Brace locked at 0° when walking
- Avoid knee flexion $>90^{\circ}$ until **2 weeks**
- Avoid isolated hamstrings contractions until **6 weeks**

Pain, effusion and ROM:

- *PEACE* protocol for the management of pain and swelling/effusion
NB: cryotherapy only influences pain, not drainage
- Terminal extension **ASAP**, patella mobilisation if required
- Non-weight bearing, passive knee flexion $\leq 90^{\circ}$ for **2 weeks**, full passive ROM thereafter
- Ankle and hip ROM ex's if required (e.g. calf stretches, Thomas test stretch)

Muscle activation and strength:

- SQ's, IRQ's, SLR in brace until able to perform without extension lag
Consider electrostimulation if unable to voluntarily contract quadriceps
- Open chain hip maintenance ex's (e.g. side lying abduction, prone extension)

Criteria for progressing to Phase 2:

- Closed wound
- No/minimal pain with phase 1 exercises
- No/minimal synovitis/effusion
- Normal patellofemoral mobility, full/symmetrical tibiofemoral ROM
- Able to SLR without extension lag
- Minimum **6 weeks** since surgery

**PEACE:* Protection, Elevation, Avoid anti-inflammatories, Compression, Education.

MENISCAL ROOT REPAIR PROTOCOL – PHASE 2

Goals:

- **Protect meniscal root repair**
- **Maintain full patellofemoral and tibiofemoral ROM**
- **Initiate weight bearing and encourage normal gait pattern**
- **Initiate weight bearing strengthening exercises**
- **Initiate hamstrings exercises**

Precautions:

- PWB (25% body weight) with brace unlocked, WBAT thereafter if normal gait
- Avoid weight bearing knee flexion $>40^\circ$ until **9 weeks** and deep squatting until **6 months**

Pain, effusion and ROM:

- Monitor for increasing pain, effusion or localised temperature and modify rehabilitation accordingly
If required, consider NSAIDs or hydrotherapy
- Maintain full extension, patella mobility and full/symmetrical active flexion

Strength:

- Once able to FWB, double leg CKC ex's $\leq 30^\circ$ (e.g. leg press, squats)
- If no increase in pain/effusion, initiate single-leg press with light weight/resistance
- If no increase in pain/effusion, progress CKC ex's $\leq 40^\circ$
- Add weight/resistance to CKC ex's with caution
- Initiate isometric hamstring contractions
- Gluteal and calf muscle strengthening ex's

Neuromuscular training:

- Proprioceptive ex's (e.g. Bosu balance trainer)
- Correct alignment of trunk and lower limb during exercises and gait

Cycling:

- Static bike with no resistance if sufficient ROM, increasing time as able

Criteria for progressing to Phase 3:

- Trace/no effusion
- FWB with normal gait pattern on even surfaces
- Able to tolerate 25 minutes standing/walking
- Minimum **9 weeks** since surgery

MENISCAL ROOT REPAIR PROTOCOL – PHASE 3

Goals:

- **Protect meniscal root repair**
- **Develop muscular endurance**

Precautions:

- Avoid weight bearing knee flexion $>70^\circ$ until **4 months** and deep squatting until **6 months**

Pain, effusion and ROM:

- Monitor for increasing pain, effusion or localised temperature and modify rehabilitation accordingly
- If required, consider NSAIDs or hydrotherapy
- Maintain full extension, patella mobility and full/symmetrical flexion

Strength:

- Double and single leg CKC ex's $\leq 70^\circ$ using endurance parameters
See ACSM resistance training guidelines
- Continue isometric hamstrings contractions
- Gluteal and calf muscle strengthening

Neuromuscular training:

- Increase difficulty of double leg proprioceptive ex's (e.g. perturbations, two motoric tasks)
- Increase intensity of perturbation, progressing to single leg once able
- Correct alignment of trunk and lower limb during exercises and walking

Cycling and other cardiovascular exercise

- Static bike with resistance from **week 12**
- Elliptical trainer
- Treadmill walking
- Freestyle swimming.

Criteria for progressing to Phase 4:

- Able to hold single leg squat at 45° knee flexion for 90 seconds
- Minimum **16 weeks** since surgery

MENISCAL ROOT REPAIR PROTOCOL – PHASE 4

Goals:

- **Protect meniscal root repair**
- **Develop muscular strength**

Precautions:

- Avoid weight bearing knee flexion $>90^\circ$ until **5 months** and deep squatting until **6 months**

Pain, effusion and ROM:

- Monitor for increasing pain, effusion or localised temperature and modify rehabilitation accordingly
- If required, consider NSAIDs or hydrotherapy
- Maintain full extension, patella mobility and full/symmetrical flexion

Strength:

- Double and single leg CKC ex's $\leq 90^\circ$ using strength parameters
See ACSM resistance training guidelines
- Initiate isotonic hamstrings ex's
- OKC quadriceps, gluteal and calf muscle strengthening

Neuromuscular training:

- Increase difficulty of double leg proprioceptive ex's (e.g. perturbations, two motoric tasks)
- Increase intensity of perturbation, progressing to single leg once able
- Correct alignment of trunk and lower limb during exercises and walking

Cycling and other cardiovascular exercise

- Increase cycling and cardiovascular exercise duration and intensity

Criteria for progressing to Phase 5:

- Limb symmetry index (LSI) $\geq 80\%$ for quadriceps strength
- Y balance test LSI $< 8\text{cm}$ on anterior reach
- Minimum **22 weeks** since surgery

MENISCAL ROOT REPAIR PROTOCOL – PHASE 5

Goals:

- **Protect meniscal root repair**
- **Develop muscular power**
- Return to running, sport or physically demanding work

Precautions:

- Avoid deep squatting until **6 months**
- Do not commence running until patient has fulfilled return to running criteria

ROM:

- Deep squatting from **6 months**

Running:

- Start running if:
 - full ROM
 - pain ≤ 2 VAS and no effusion despite adequate loading
 - limb symmetry index (LSI) $\geq 70\%$ for quadriceps and hamstrings strength
- Graduated running programme: start with 4-minute walk, 1-minute run (4:1) for 20 minutes
Decrease walking time and increase running time by 1 minute each week (3:2, 2:3, 1:4, 0:5)
Patient should be able to run for 20 minutes after 5 weeks.
- Once running programme complete, introduce backwards and sideways running
- Progress running from single to multi-plane specific agility drills

Strength/power:

- Continue progressive loading for strengthening exercises
- Sports-specific progressions e.g. power development, jumping/landing

Neuromuscular training:

- Increase difficulty of neuromuscular and perturbation training (e.g. jumping and landing)
- Introduce reactive/unanticipated movements

Sports specific training:

- Increase intensity of agility training (e.g. cutting, pivoting)
- Build sports specific load regarding energy expenditure (aerobic, anaerobic)
- Build sports specific load regarding surface (grass, court etc.)
- Restart training with patient's team

Criteria for returning to play:

- Limb symmetry index (LSI) $>90\%$ for quads and hamstrings strength
- LSI $>90\%$ for hop battery tests
- Y balance test LSI $<5\text{cm}$ on anterior reach
- Y balance composite score LSI $>94\%$
- T-test agility LSI $>90\%$
- Patient psychologically ready/confident to return to sports
- Minimum **6 months** since surgery

Originator: Richard Norris, Orthopaedic Physiotherapy Specialist.

Ratified by: Mr M McNicholas, Consultant Orthopaedic Surgeon.

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References:

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2. Imoto AM, Peccin S, Almeida GJ, Saconato H, Atallah Á. Effectiveness of electrical stimulation on rehabilitation after ligament and meniscal injuries: a systematic review. *Sao Paulo Med J.* 2011;129(6):414-23.
3. Mueller BT, Moulton SG, O'Brien L, LaPrade RF. Rehabilitation Following Meniscal Root Repair: A Clinical Commentary. [J Orthop Sports Phys Ther.](#) 2016;46(2):104-13.