Patellofemoral Microfracture Protocol

The microfracture technique is used in knees where there is a defect in the articular cartilage. These chondral injuries may promote arthritic changes if left unaddressed.

During the operation the full thickness articular cartilage defect is identified and the exposed bone debrided. Multiple holes or 'micro fractures' are made in the subchondral bone plate. A blood clot, rich in marrow contents (termed a super clot), forms over the lesion. This clot provides a rich medium in which cells can divide. These eventually form a repair cartilage that fills the original defect.

Patients should have CPM immediately after surgery set at 0-50º and progressed as tolerated by 10-20º. Comfort is the guiding factor limiting ROM. CPM should be used for 8 hours per day, but if the patient is unable to tolerate the machine they should perform 500 passive flexion/extension exercises, 3 times per day.

The patients should be placed in a long lever brace locked at 0º for 8 weeks. The patient should PWB (30% body weight) immediately and weight bear as tolerated after 2 weeks. For larger lesions (>4cm^2) weight bearing is protected for 4-6 weeks.

Cold therapy and elevation should be used to help reduce pain and swelling.

Use post-op notes to document the size of the lesion and the knee angle at which the defect is engaged. For patients with previous meniscectomies, the total rehab time is increased by 2-3 months.

All exercises should be comfortable to perform especially when moving on to weight bearing exercises. Use symptoms of pain, swelling and giving way to indicate when exercises can be progressed to the next stage.

0-8 weeks: Protective/healing phase.

- Passive flexion and extension exercises including knee extension in prone.
- Static quads and straight leg raise (supine and prone).
- Hip extension/Abd. Add resistance as tolerated.
- Patella mobilisation (medial-lateral, superior-inferior) plus mobilisation of the quads and patellar tendon (medial-lateral).
- Static bike at 1 week, no resistance for small lesions. Larger lesions (>4cm^2) do not start until 2-4 weeks post-op.
- Deep water running with floatation vest at 2 weeks (feet not to touch the floor). Larger lesions (>4cm^2) do not start until 4 weeks post-op.
- Add proprioception once FWB, as comfort allows.

Goals

- **FROM as soon as possible.**
- **Aim for 45 mins pain free cycling, 5-7 days per week by 8 weeks.**

From 8 weeks: Restoration of normal muscle function.

- Open brace intermittently over following weeks as tolerated.
- Theraband resistance exercises.
- Start double legged weight bearing exercises **within the range that does not engage the lesion.**
- Add resistance to bike if patient can cycle pain-free for 45 mins without resistance. Decrease cycling time as resistance increases.

12-16 weeks

- Treadmill 7% incline walking at 12 weeks for 5-10 mins, increase by 5 mins increments as tolerated. Can use elliptical trainer with same guidelines.
- Single leg exercises **within the range that does not engage the lesion.**
- Open chain quads and hamstrings. Add resistance as tolerated.

4-6 months: Strength training

- For larger lesions (>4cm^2) continue with low impact exercises.
- Machine weights can be commenced.
- Graduated running program from 4 months onwards – start with 1 minute run, 4 minutes walk (1:4) for 20 minutes. Increase running time by 1 minute each week with subsequent reduction of walk by 1 minute (2:3) so that the patient should be able to run for 20 minutes at the 5 week stage.
- Single plane agility runs (forwards, backwards, side stepping) at 25% of maximal speed, increase by 25% weekly.
- Add multi-plane exercises (figure of 8's, carioca, cutting, twisting) once the running program has been completed.

6-9 months

- Earliest return to sports that involve pivoting, cutting and jumping. Persistent effusion, return of localised pain, or loss of ROM indicate that the patient is not ready to return and should continue with rehabilitation

References

Steadman, JR, MD, Rodkey, WG, DVM, Singleton, SB, MD, Briggs, KK, MBA: Microfracture Technique for Full-Thickness Chondral Defects: Technique and Clinical Results: Operative Techniques in Orthopaedics. Vol 7, No.4 (October), 1997: pp300-304

Hurst, J.M., Steadman, J.R., O'Brien, L., Rodkey, W.G. & Briggs, K.K. (2010) Rehabilitation following microfracture for chondral injury of the knee, Clinical Sports Medicine. Vol: 29, pp 257-265.

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