

Post-Operative Rehabilitation Progression for Cell-Based Management of Articular Cartilage Lesions of the Knee

**Cell Based Management includes: Microfracture and autologous chondrocyte implantation.*

Patellofemoral Compartment

Acute Phase (0-6 wks)

Weight bearing guideline: NWB x 2 weeks; PWB x 2 weeks, then progress to FWB when the patient presents with:

- Full knee extension
- Sufficient knee flexion to demonstrate a normal gait pattern
- Minimal effusion and pain
- Sufficient quadriceps control to eccentrically control lowering the body's center of mass with knee flexion from 0-30 degrees

*** Recommendation to use ROM brace locked in full extension during WB progression.*

PO Bracing: PO ROM bracing recommended for use during WB progression. Open ROM during NWB activities

ROM Progression: Knee flexion limited to 0-90 degrees x 2 weeks, then incrementally progress 10 degrees per week until full ROM attained.

Continuous Passive Motion: Early ROM is advocated immediately following surgical intervention with a goal to progress to full ROM within 6 weeks post-operative. Repeated PROM early in rehabilitation is used to facilitate synovial fluid movement through the knee joint as a means to nourish the healing tissues. The use of mechanical CPM is recommended, but not required.

Strengthening:

- Early quadriceps and hamstrings muscle activation is initiated immediately after surgery with care to protect the PF joint.
- Early PF joint protection is recommended with restrictions on all squatting activities and activities which result in compression and shearing at the PF joint
- NWB lower extremity strengthening is initiated immediately following surgery and progressed to more closed kinetic chain activities as WB restrictions permit
- Core stability strengthening is initiated immediately following surgery as tolerated by pain

Balance/Proprioception Training:

- Initiate double leg balance weight shifting and proprioception activity once permitted to PWB
- Advance to single leg balance/proprioception exercises as permitted by WB status

Cardiovascular Conditioning:

- Initiation of PWB CV conditioning including biking and swimming
- No impact activities permitted at this time

Modalities:

- NMES (Neuromuscular electrical stimulation) to enhance recruitment of quadriceps musculature, post-operatively
- Cryotherapy/Vasopneumatic therapy to assist with maintenance of post-operative effusion

Sub-acute Phase (6-12 wks)

Weight Bearing Progression: FWB is permitted when above criteria met

PO Bracing: All bracing discontinued. Optional to use varus or valgus unloading brace with progression to return to activity

Strengthening:

- Progression of closed kinetic chain strengthening of the lower extremity consistent with WB status
- Continue to protect patellofemoral joint with limited squatting and repetitive shearing/compression loads on the PF joint
- Progression of hip and core stability strengthening
- Target on residual asymmetries in lower extremity strength

Balance/Proprioception:

- Progression to advanced single limb balance from stable to unstable surfaces
- Initiation of agility activities on stable surfaces

Cardiovascular Conditioning:

- Progression of PWB CV conditioning including biking and swimming
- No impact activities permitted at this time

Modalities:

- Continuation of NMES if limitations in quad activation persist
- Continuation of cryotherapy if residual effusion persists

Advanced Strengthening/Transition to Function (3-6 months)

The advanced strengthening/transition to function phase is designed to maximize return of lower extremity strength and to help transition the patient, once sufficient healing, progression of strength and functional mobility has occurred. The focus of this phase is two-fold. First, a progressive strengthening program is necessary to bring the patient to a level of strength, sufficient to support the knee during dynamic functional activities. Secondly, this phase is designed to progressively re-introduce pre-injury activity to the patient in a progressive systematic fashion. All impact activity is introduced after a minimum of 3-6 months PO, to insure sufficient healing. Once the patient completes a return to function/return to play progression, a consideration is made to release the patient to activity.

Return to Play (6+months)

Return to play following these procedures is typically restricted until 4-9 months post-operative for microfracture procedures and 12-18 months following ACI procedures to allow sufficient healing to occur. In addition to adequate healing, the patient must present with the following objective criteria:

1. No residual effusion
2. Full ROM and normal patellofemoral joint mobility
3. Strength of quadriceps and hamstring musculature >90% of the contralateral limb
4. Demonstration of performance on lower extremity functional performance testing >90% contralateral leg.
5. Completion of a return to play progression with no signs of pain, swelling or instability.