

KNEE MICROFRACTURE CLINICAL PRACTICE GUIDELINE

Progression is time and criterion-based, dependent on soft tissue healing, patient demographics and clinician evaluation. Contact Ohio State Sports Medicine at 614-293-2385 if questions arise.

Rehabilitation Precautions

General	- WB status varies based on lesion location, size and physician - It is very important to know the location and size of the lesion - Small lesion <2cm² - Large lesion >2cm² - All progression is based on soft tissue healing	
Brace	Femoral condyle (FC): No brace, may use elastic wrap to control swelling Patellofemoral (PF): Brace locked in 0o extension; may progress opening of brace Weeks 6-8	
Weight-bearing	Femoral Condyle - Small FC lesions (<2.0 cm²): - Weeks 1-4: NWB - Weeks 4-6: Wean off crutches to FWB - Large FC lesions (>2.0 cm²): - Weeks 1-6: NWB - Weeks 6-8: Wean off crutches to FWB	Patellofemoral lesions - Immediate TTWB of approximately 25% body weight with brace locked in full extension; - Week 2: progress to 50% WB - brace locked in full extension - Week 3: progress to 75% WB - brace locked in full extension, - Week 4: progress to full WB - brace locked in full extension - Weeks 6-8: progress opening of brace to D/C of brace
Range of Motion (ROM)	- Immediate motion exercise Day 1 - Full passive knee extension immediately - CPM 6 weeks for large FC & PF lesions; 3 weeks for small FC lesions - Initiate CPM day 1 for total of 8-12 hours/day (0°-60°; if PF >6.0 cm, 0°-40°) - Progress CPM ROM as tolerated 5°-10° per day - CPM for total of 6-8 hours/day for up to 6 weeks - Patellar mobilization (4-6 times per day) - Range of motion exercises throughout the day - Passive knee flexion ROM at least 2-3 times daily - Progress passive knee ROM as tolerated, NO FORCED FLEXION BEYOND 90° - ROM goals: (<i>PF lesions may be limited due to location and size</i>) - Week 1: 0°-90° - Week 2: 0°-105° - Week 3: 0°-115° - Week 4: 0°-125° - Week 8: Full (equal) ROM - Stretch hamstrings and calf	



Phase I: Proliferation (Weeks 0-6)

Goals	1. Protect healing tissue from load and shear forces 2. Decrease pain and effusion 3. Restoration of full passive knee extension 4. Gradually restore knee flexion 5. Regain quadriceps control
Brace	• See above guidelines
Weightbearing	• See above guidelines
ROM	• See above guidelines
Strengthening Program	• Ankle pumps • Quadriceps setting • Multi-angle isometrics • Active knee extension 90°-40° for FC lesions (no resistance) • <u>NO</u> active NWB knee extension exercises for PF lesions • Straight leg raises (4 directions) • Initiate weight shifting exercises with knee in extension Week 1-2 for PF lesions, Week 4 for small • FC lesions, Week 6-8 for larger FC lesions • Partial weight bearing leg press 0°-60° Weeks 4-6 for small FC lesions and PF lesions, progress to 0°-90° Weeks 6-8 • Toe calf raises week 4-6 for small FC and PF lesions • May begin use of pool for gait training and exercises Week 3-4 (when incisions fully healed) • May begin stationary bike week 4, low resistance with appropriate seat height
Functional Activities	• Gradual return to daily activities • If symptoms occur, reduce activities to reduce pain and inflammation • Swelling control: Ice, elevation, compression, and modalities as needed
Criteria to Progress to Next Phase	1. Full passive knee extension 2. Knee flexion to 125° 3. Minimal pain and swelling 4. Voluntary quadriceps activity



Phase I: Transition Phase (Weeks 6-12)

Goals	1. Gradually improve quadriceps strength/endurance 2. Gradual increase in functional activities
Weightbearing	• Refer to above WB guidelines
ROM	• Gradual increase in ROM • Maintain full passive knee extension • Progress to full knee flexion by week 8 (refer to above ROM guidelines) • Continue patellar mobilization and soft tissue mobilization as needed • Continue stretching program
Strengthening Exercises	• Progress WB exercises • Initiate partial weight bearing leg press for large FC lesions Week 8 • Mini-squats 0°-45° Week 8-10 • Toe-calf raises week 6-8 for FC lesions • Progress balance and proprioception drills • Initiate front lunges, wall squats, front and lateral step-ups Week 6-8 for small FC and PF lesions, Week 8-10 for large FC lesions • For FC lesions, progress non-WB knee extension, 1lb/wk • Continue stationary bicycle, low resistance (gradually increase time) • Continue use of pool for gait training and exercise
Functional Activities	• As pain and swelling diminish, the patient may gradually increase functional activities • Gradually increase standing and walking
Criteria to Progress to Next Phase	1. Full ROM 2. SLR with no extensor lag 3. 10 repeated single leg step downs with good form and no reactive effusion or exacerbation of symptoms 4. 10 repeated single leg knee bends with good form and no reactive effusion or exacerbation of symptoms 5. Star Excursion Balance Test 20-30% of contralateral extremity with good form and no reactive effusion or exacerbation of symptoms (see references) 6. Timed balance testing within 30% of contralateral extremity 7. Able to bike for 30 minutes without exacerbation of symptoms or reactive effusion



Phase III: Remodeling (Weeks 12-16)

Goals	1. Improve muscular strength and endurance 2. Increase functional activities
ROM	• Patient should exhibit full flexion
Exercise Program	• Leg press (0°-90°) • Bilateral squats (0°-60°) • Unilateral step-ups progressing from 5 to 20 cm • Forward lunges • Walking program week 10-12 • NWB extension ○ FC lesions: Progress NWB extension (0°-90°) ○ PF lesions: Begin NWB extension (90°-40°) or avoid lesion articulation • Continue progressing balance and proprioception • Bicycle • Stairmaster • Swimming • Nordic-Track/elliptical
Functional Activities	• Increase walking (distance, cadence, incline, etc.)
Conditioning program	• Initiate at weeks 12-16 • Bicycle: low resistance, increase time • Progressive walking program • Pool exercises for entire lower extremity • Leg press • Wall squats • Hip strengthening (abduction/adduction) • Front lunges • Step-ups • Stretch quadriceps, hamstrings, calf
Criteria to Progress to Next Phase	1. Full non-painful ROM 2. 20 repeated single leg step downs with good form and no reactive effusion or exacerbation of symptoms 3. 20 repeated single leg knee partial squat with good form and no reactive effusion or exacerbation of symptoms 4. Star Excursion Balance Test 85-90% of contralateral extremity 5. Timed balance and/or stability within 85%-90% of contralateral extremity 6. No reactive pain, inflammation, or swelling with activities



Phase IV: Maturation Phase (Weeks 16-26)

Goals	1. Gradual return to full unrestricted functional activities 2. Single leg hop test within 75%-80% of contralateral extremity in order to progress to jogging activities 3. 10 single leg hops with good form 4. All activities should be with good form and have no reactive pain, inflammation, or effusion with exercises
Exercise Program	• Impact loading program should be individualized to the patient's needs • Continue conditioning program progression 3-4 times per wk • Progress resistance as tolerated • NWB extension ○ PF lesions: Add 1lb every 2 weeks beginning Week 20 if no pain or crepitus. Perform from 90°-40° or avoid angle where lesion articulates. Must monitor symptoms! • Emphasis on entire lower extremity strength and flexibility • Weeks 16-18 initiate PWB/aquatic plyometric and hopping activities • Weeks 18-20 progress double and single leg hopping (e.g., hop downs from a small step, double and single leg hops in place, quick hops front/back/side, etc.) as long as there is no reactive pain, inflammation, or effusion – see impact guidelines below for progression of activities • Progress agility and balance drills
Functional Activities	• Patient may return to various sport activities as progression in rehabilitation and cartilage healing allows. (Be sure to communicate with surgeon.) • Low-impact sports, such as swimming, skating, rollerblading, and cycling, are permitted at ○ <u>2 months</u> - small FC and PF lesions ○ <u>3 months</u> - large FC lesions • Higher-impact sports such as jogging, running, and aerobics may be performed at: ○ <u>4-5 months</u> - small lesions ○ <u>6 months</u> - large lesions • High-impact sports such as tennis, basketball, football and baseball are allowed at: ○ <u>6-8 months</u> - small lesions ○ <u>9-12 months</u> - large lesions
Goals to Return to Sport	1. Physician clearance 2. Symmetry with functional testing (3 single-leg cross-over hopping, etc.) 3. No reactive pain, inflammation, effusion, or instability with sport-specific activity



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