Daniel Elkin, MD
Orthopedic Sports Medicine

GUIDELINES FOR REHABILITATION FOLLOWING
Knee Cartilage Procedures

□ Osteochondral autograft/allograft: medial/lateral femoral condyle/patella
□ Cartilage transplantation: patella/trochlea/medial femoral condyle/lateral femoral condyle
□ Open Reduction and Internal Fixation OCD: medial/lateral femoral condyle
□ Microfracture: medial/lateral femoral condyle
□ Retrograde/Anterograde drilling: OCD lesion medial/lateral femoral condyle or trochlea

GENERAL GUIDELINES

- Flat foot touch-down weight bearing for the first 6 weeks
- Progress to WBAT from 7-8 weeks
- Crutches are utilized for the first 8 weeks post-surgery

GENERAL PROGRESSION OF ACTIVITIES OF DAILY LIVING

Patients may begin the following activities at the dates indicated (unless otherwise specified by the physician):

- Bathing/showering without brace after suture removal
- Driving: 1 weeks for automatic cars, left leg surgery
  4-6 weeks for standard cars, right leg surgery

PHYSICAL THERAPY ATTENDANCE

The following is an approximate schedule for supervised physical therapy visits:

Phase I (0-6 weeks):	1-2 visit/week
Phase II (6-8 weeks):	1-2 visits/week
Phase III (2-6 months):	1-2 visits/week tapering to 1 visit every other week.
Phase IV (6 months+):	Discharge after completion of appropriate functional progression

REHABILITATION PROGRESSION

The following is a general guideline for progression of rehabilitation following ORIF OCD lesion of the femoral condyle. Progression through each phase should take into account patient status (e.g. healing, function) and physician advisement. Please consult the physician if there is any uncertainty concerning advancement of a patient to the next phase of rehabilitation.

PHASE I

Begins immediately post-op through approximately 6 weeks

Goals:

- At least 0-90 degrees in brace
- Work on ROM 2-4 hours a day
- Brace locked in extension when not doing ROM
- Control inflammation (ice, elevation, etc.)
- Quad sets and straight leg raises
- May ride stationary bike with seat elevated to prevent flexion past 90 degrees
- Educate patient on rehabilitation progression

Weight-Bearing Status:
Flat foot touch down partial weight bearing only for the first 6 weeks

Therapeutic Exercises:
- Heel slides
- Quad sets, hamstring sets (consider NMES for poor quad set)
- Patellar mobilization
- Non-weight-bearing gastroc/soles, hamstring stretches
- SLR, all planes, with brace in full extension until quadriceps strength in sufficient to prevent extension lag

Range of Motion:

- Full knee extension
  - Knee extension on a bolster - Prone hangs
- Passive Knee Flexion
  - Supine wall slides
  - Assisted heel slides
  - Continuous passive motion machine
- Week 1-3 = 0-90°
- Week 3-5 = 0-110°
- Week 5-6 = 0-125°
- Biking (week 4)– use contra-lateral leg to create ipsalateral passive range of motion

NOTE: range of motion exercises should be carried out frequently throughout the day with high repetitions to help remodel and contour the healing cartilage. The optimal goal during the first 6 weeks is to do 4-6 hours of range of motion exercises per day.

PHASE II

Begins approximately 7 weeks post-op and extends to approximately 12 weeks

Goals:
- Restore normal range of motion
- Progress weight bearing with crutches. Full non-impact weight bearing by 8 weeks.
- Single leg stand control
- Normalize gait
- Good control and no pain with functional movements, including step up/ down, squat, partial lunge (staying less than 60° of knee flexion and avoiding excessive weight bearing at position of the lesion)

Therapeutic Exercises:
- 4-way hip
- Stationary bike (begin with high seat, low tension to promote ROM. Progress to single leg)
- Closed chain terminal extension with resistive tubing or weight machine
- Toe raises
- Balance exercises (e.g. single-leg balance, KAT)
- Hamstring curls
- Aquatic therapy with emphasis on normalization of gait. Non-impact endurance training.
- Weight shifting
- proprioceptive drills
- Stationary bike
- Protected weight bearing hip and core strengthening

- Stretching for patient specific muscle imbalances
- Quadriceps strengthening – closed chain exercises short of 60° knee flex

PHASE III

Begins at approximately 13 weeks and extends through approximately 4 months

Goals:

- Full range of motion
- Improve strength, endurance and proprioception of the lower extremity to prepare for functional activities
- Eliminate swelling and pain
- Full weight bearing
- Regain normal gait pattern

Therapeutic Exercises:

- Continue and progress previous flexibility and strengthening activities
- Begin progressive resistance training
- Continue stationary bike
- Progress aquatic program to include pool running, swimming (no breaststroke) at 3 months
- Stairmaster and Nordic Track (begin with short steps and avoid hyperextension) at 4 months
- Advance closed kinetic chain activities (leg press, one-leg mini-squats 0-45˚ of flexion, step-ups beginning at 2" and progress to 8", etc.)
- Functional leg strengthening - Squats
- Lunges – all three planes - Step backs
- Retro step ups
- Single leg leg press
- Single leg balance and proprioception progression - Hip and core strengthening
- Mini band drills
- Physioball
- Stretching for patient specific muscle imbalances

PHASE III

Begins at approximately 4 months and extends through approximately 6 months

Goals:

• Good control and no pain with sport and work specific movements, including impact

Therapeutic Exercises:

• Impact control exercises beginning 2 feet to 2 feet, progressing from 1 foot to other and then foot to same foot
• Movement control exercise beginning with low velocity, single plane activities and progressing to higher velocity, multi-plane activities
• Sport/work specific balance and proprioceptive drills
• Hip and core strengthening
• Stretching for patient specific muscle imbalances
• Replicate sport or work specific energy demands

- Return to functional sporting activity at 6-9 months post-op when cleared by Physician and when effusion resolved, range of motion within normal limits, and strength has returned to at least 90% normal side.