

**Dr. Larry “Chip” Bankston**

**Microfracture, Mosaicplasty and Osteochondral Autograft Transplant (OATS)  
Protocol**

There are various treatment options for the treatment of osteochondral injuries to the knee. The primary objective of any treatment protocol is to protect the repair/graft site and promote optimum conditions for healing to occur. Progression is based upon the understanding of surgical techniques, location of defect and/or graft site, tissue quality, healing restraints and their ability to tolerate load.

**Microfracture:** is a marrow stimulation technique with subchondral penetration which promotes a fibrin clot and the replacement of fibrocartilage into the defect.

**Mosaicplasty:** osteochondral transfer procedure in which numerous small “dowels” (4-6 mm plugs) of autologous bone and articular cartilage are transplanted from minimal weight bearing regions to the defect site.

**OATS:** osteochondral transfer procedure in which one or two larger (5-10 mm) plugs of autologous bone and articular cartilage are transplanted from a minimal weight bearing region to the defect site.

This protocol is a general guideline and may be altered to accommodate specific surgical techniques, complications and/or tissue quality. Progression is based upon healing times as well as functional progression. In advancing treatment variables the patient is closely monitored for increase pain and effusion which may indicate the repair site is unable to tolerate the stress loads placed upon it.

**Recommendations: (4-6 weeks)**

NWB 4-6 weeks

TDWB progressing to WBAT as normal gait pattern is achieved (6 weeks).

ROM to tolerance

Per physician preference, either home use of CPM or the patient performs a minimum of 500 cycles of ROM per day.

Although hyaline/fibro cartilage requires movement to promote healing, care is taken to avoid the detrimental shear/rotational stresses with weight-bearing until 6-8 weeks.

**Program:**

**Weeks 1-6:** NWB with progression to TDWB (4-6 weeks) with maintaining 2 crutches  
Hold on progressing to WBAT until 6 weeks and patient must demonstrate a normal gait pattern, minimal effusion (1-1.5 cm) and demonstration of adequate quad control.  
AROM to tolerance

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Ice and Elevation, 3-4 times a day  
 Biofeedback or Electrical stimulation for muscle re-education  
 Patella mobilization  
 Isometrics for Quads, hip abductors and adductors  
 Straight leg raises (SLR) adding weight as able (absence of SLR lag)  
     Hip Flexion, Abduction, Adduction and Extension  
 Lower extremity flexibility program  
 Control knee effusion as needed  
 Active Knee extension in painfree range (monitor patellofemoral complaints).  
 If patella/trochlea involved hold on **resistive** knee extension until 8 weeks.  
 Hamstring curls in pain free range  
 Progression to multi-hip machine

**Weeks 6-8:** ROM - Achieve full ROM by 6 weeks  
     Bike, pool, wall slides  
 Balance training on involved leg  
     Eyes open, eyes closed  
     Rocker board; progress to BAPS (PWB initially then FWB standing at 8 weeks)  
     Single leg balance, balance reach, etc. when allowed  
     Ball throws  
 Endurance training  
     Light bike work as ROM allows  
     Re-evaluate patello-femoral complex and address any dysfunctions  
     Closed chain strengthening exercises (PWB to FWB)  
         Squats, lunges, calf raises, leg press, step downs, sports cord, etc.

**Weeks 8-12:** Progressive resistance on Isotonic machines  
 Isokinetics  
     High speeds 150-300 degrees/second  
 Increase endurance activities  
     Increase resistance on the bike, pool, Elliptical, Versaclimber, walking,  
     **No Running until 4-6 months**  
 Advance closed chain exercises to unsteady surfaces (pillow, half foam roll, BAPS board) as lower extremity muscle control allows

**12 weeks:** Full lower extremity biomechanical evaluation to address influence and/or “weak links” from hip and foot/ankle.  
 Continue strengthening exercises three times per week  
 Continue flexibility exercises daily

**4-6 Months:** Jogging (begin with 1 mile jog/walk and increase in 1/4 mile increments, based upon pain and effusion)

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Once patient is able to jog 20 minutes (2-3 miles) with no discomfort or swelling may progress functional activities to include figure 8's, cutting, jumping, etc..  
Sport specific activities (progressing as tolerated)  
Backward running, carioca, ball drills & other sport skills

**Criteria For Return to Sports:**

Adequate healing time  
Full pain free ROM  
No effusion  
Normal isokinetic evaluation and function tests  
Satisfactory performance of sport specific activities without swelling

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