Guards: New Approach to Treatment of Knee Injuries

PHASE I - PROTECTION PHASE (WEEKS 0-6)
Goals:
- Protect healing tissue from load and shear forces
- Restore full passive knee extension
- Regain quadriceps control
- Decrease pain and effusion
- Gradually improve knee flexion
- Focus on scar tissue modalities and patellar mobilizations

Brace:
- Locked at 0° during ambulation and weight-bearing activities
- Sleep in locked straight brace for 4 weeks

Weight Bearing:
- Protected weightbearing with crutches with brace in extension 0-2 weeks
- Weightbearing as tolerated with brace locked in extension 2-6 weeks

Range of Motion
- Immediate motion exercise days 1-2
- Full passive knee extension immediately
- Initiate CPM on day 1 for total of 8-12 hours/day
  - 0-60° 0-2 weeks
  - Progress CPM ROM as tolerated 5°-10° per day

Follow us on Twitter and Facebook: @VanThielMD & Facebook.com/VanThielMD
Cutting edge information on the arthroscopic treatment of the hip, knee and shoulder
• May continue use of CPM for total of 6-8 hours per day for 6 weeks
• Knee flexion ROM goal is 90° by 2-3 weeks
• Knee flexion ROM goal is 105° by 3-4 weeks, and 120° by week 6
• Stretch hamstrings, calf

**Strengthening Program:**
• Ankle pump using rubber tubing
• Quad setting
• Toe-calf raises by week 2
• Straight leg raises (4 directions)
• Stationary bicycle when ROM allows
• Biofeedback and electrical muscle stimulation, as needed
• May begin pool therapy for gait training and exercise by week 4
• Patellar mobilization (4-6 times per day)
• Motion exercises throughout the day
• Passive knee flexion ROM 2-3 times daily
• Isometric leg press by week 4 (multi-angle)
• Initiate weight shifts by weeks 2-3

**Functional Activities:**
• Gradual return to daily activities. If symptoms occur, reduce activities to reduce pain and inflammation
• Extended standing should be avoided
• Use caution with stair climbing

**Swelling Control:**
• Ice, elevation, compression, and edema modalities as needed to decrease swelling

**PHASE II - TRANSITION PHASE (WEEKS 6-12)**

**Goals:**
• Gradually increase ROM
• Gradually improve quadriceps strength/endurance
• Gradually increase functional activities

**Brace:**
• Discontinue brace by 6 weeks

**Weight-Bearing:**
• Progress weight-bearing as tolerated

**Range of Motion:**
• Gradually increase ROM
• Maintain full passive knee extension
• Progress knee flexion to 120°-125° by week 8
• Continue patellar mobilization and soft tissue mobilization, as needed
• Continue stretching program

**Strengthening Exercises:**
• Closed kinetic chain exercises (leg press 0'-60') by week 8
• Initiate mini-squats 0'-45° by week 8
• Toe-calf raises at week 6
• Open kinetic chain knee extension without resistance
• Begin knee extension 0'-30° then progress to deeper angles
• Stationary bicycle (gradually increase time)
• Stair machine by week 12
• Balance and proprioception drills
• Initiate front and lateral step-ups by weeks 8-10

Functional Activities:
• As pain and swelling (symptoms) diminish, the patient may gradually increase functional activities
• Gradually increase standing and walking

Criteria to Progress To Phase III:
• Full range of motion
• Acceptable strength level
  o Hamstrings within 20% of contralateral leg
  o Quadriceps within 30% of contralateral leg
• Balance testing within 30% of contralateral leg
• Able to walk 1-2 miles or bike for 30 minutes

PHASE III: REMODELING PHASE (WEEKS 12-32)

Goals:
• Improve muscular strength and endurance
• Increase functional activities

Range of Motion:
• Patient should exhibit 125°-135° flexion

Exercise Program:
• Leg press (0°-60°; progress to 0°-90°)
• Bilateral squats (0°-60°)
• Unilateral step-ups progressing from 2" to 6"
• Forward lunges
• Walking program on treadmill

Functional Activities:
• As patient improves, you may increase walking (distance, cadence, incline, etc.)
• Light running can be initiated toward end of phase based on physician evaluation

Maintenance Program:
• Initiate by weeks 16-20
• Bicycle – low resistance, increase time
• Progressive walking program
• Pool exercises for entire lower extremity
• Straight leg raises
• Leg press

Criteria to Progress to Phase IV:
• Full non-painful ROM

• Continue use of biofeedback and electrical muscle stimulation, as needed

• Open kinetic chain knee extension (90°-40°) – progress 1 lb every 2 weeks beginning week 20 if no pain or crepitation – must monitor symptoms
• Bicycle
• Stair machine
• Swimming
• Ski machine/Elliptical trainer

• Wall squats
• Hip abduction / adduction
• Front lunges
• Step-ups
• Stretch quadriceps, hamstrings, calf
• Strength within 80%-90% of contralateral extremity
• Balance and/or stability within 75%-80% of contralateral extremity
• Rehabilitation of functional activities causes no or minimal pain, inflammation or swelling.

**PHASE IV - MATURATION PHASE (8-15 MONTHS)**

**Goals:**
• Gradually return to full unrestricted functional activities

**Exercises:**
• Continue maintenance program progression 3-4 times/week
• Progress resistance as tolerated
• Emphasis on entire lower extremity strength & flexibility
• Progress agility and balance drills
• Progress walking program as tolerated
• Impact loading program should be specialized to the patient's demands
• No jumping or plyometric exercise until 12 months
• Progress sport programs depending on patient variables

**Functional Activities:**
• Patient may return to various sport activities as progression in rehabilitation and cartilage healing allows. Generally, low-impact sports such as swimming, skating, in-line skating, and cycling are permitted at about 6 months. High impact sports such as jogging, running, and aerobics may be performed at 8-9 months for small lesions or 9-12 months for larger lesions. High impact pivoting sports such as tennis, basketball, football, and baseball may be allowed at 12-18 months. Individual results may vary. Many patients are able to participate in sports with some limitations.