



## Rehab Practice Guidelines for: *ACL Reconstruction*

- Assumptions: 1. Isolated ACL injury  
 2. Autograft (See specific graft types for precautions)

Primary surgery: ACL reconstruction

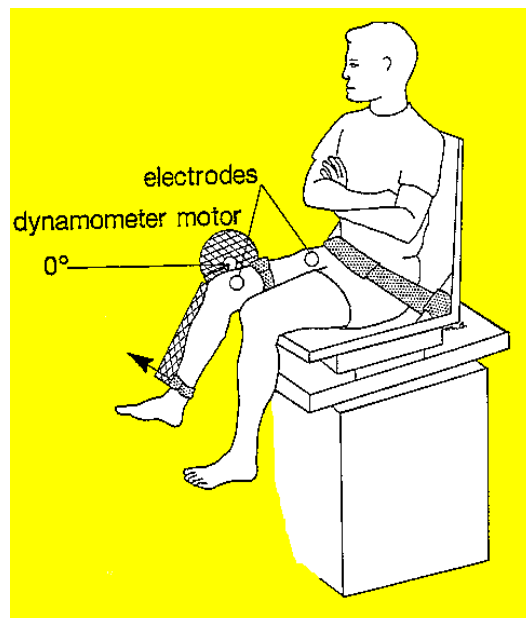
Secondary surgery (possible): Meniscal injury, Chondroplasty, Multiple ligament involvement

Precautions: **see note at end**

Expected # of visits: 24-30

### NMES Guideline:

1. Electrodes placed over proximal lateral quadriceps and distal medial quadriceps. (Modify distal electrode placement by not covering superior medial (VMO) arthroscopy portal until stitches removed)
2. Stimulation parameters: 2500Hz, 75 bursts, 2 sec. ramp, 12 sec. on, 50 sec. rest, intensity to max tolerable [at least 50% MVIC(see note at end)], 10 contractions per session. 3 sessions per week until quadriceps strength MVIC is 80% of uninjured.
3. Stimulation performed **isometrically** at **60°**



| <u>Week 1</u>       | <u>Treatment</u>   | <u>Milestones</u>   |
|---------------------|--|---|
|                     | Wall slides, patellar mobilization, gait training, NMES (see guidelines) Bike for ROM<br>HEP: supine wall slides, patellar mobs 30-50X per day, QS and SLR 3x10 (3X per day)                   | AROM/PROM = 0-90°<br>Active quadriceps contraction  |
| <u>Week 2</u>       | Step ups in pain free range<br>Portal/incision mobilization as needed<br>Stairmaster, Wall squats<br>Progress to functional brace as swelling permits<br>Prone hangs if lacking full extension | Flexion >110°<br>Walking without crutches<br>Use of cycle/stair climber without difficulty<br>Walking with full extension<br>Reciprocal stair climbing<br>KOS ADL > 85% |
| <b>TOTAL VISITS</b> | 4-6  |   |

|   |   |  |
|---|---|--|
| <p><b><u>Weeks 3-5</u></b></p> <p><b>TOTAL VISITS</b> 10-15</p> | <p>Tibiofemoral mobilization with rotation and PF mobilization in flexion(if flexion limited)<br/> Progress bike and Stair master duration (10 minute minimum)</p>  | <p>Flexion to within 10° of uninvolved side<br/> Quad strength &gt; 60%</p>  |
| <p><b><u>Weeks 6-8</u></b></p> <p><b>TOTAL VISITS</b> 16-20</p> | <p>Progress exercises in intensity and duration<br/> Begin running progression**: treadmill with functional brace (may vary with MD)*<br/> Transfer to fitness facility*<br/> * (If all milestones are met)<br/> <b>** (see running progression below)</b></p>  | <p>Quad strength &gt;80%<br/> Normal gait pattern<br/> Full ROM (compared to uninvolved)</p>   |
| <p><b><u>Week 12</u></b></p> <p><b>TOTAL VISITS</b> 24-30</p>   | <p>Sports specific activities<br/> Agility exercises<br/> Functional testing (see description below)</p> <p><b>Follow up Functional Testing:</b><br/> 4 month, 5 month, 6 month, 1 year post-op.<br/> Recommending changes in rehab PRN.<br/> Progression may include one-legged emphasis in gym, explosive types of activities (cutting, jumping, plyometrics)</p> | <p>ining or gaining quadriceps strength (&gt;80%)<br/> Hop tests &gt;85% (see attached)<br/> KOS Sports questionnaire &gt;70%</p> <p>Maintaining gains in strength (&gt;= 90% to 100%)<br/> Hop Test (&gt;= 90% to 100%)<br/> KOS Sports (&gt;= 80% to 100%)</p> |

**MVIC: Maximum Volitional Isometric Contraction**

Patient is asked to volitionally extend the involved leg as hard as possible while knee is maintained isometrically at 60° knee flexion. Side to side comparison: (involved/uninvolved X 100 = % MVC)

**Precautions:**

Patellar tendon graft technique

- Be aware of patellofemoral forces and possible irritation during PRE's.
- Treat patellofemoral pain if it arises with modalities, possible patellar taping.
- Consider alteration of knee flexion angle to most comfortable between 45°-60° for MVIC and NMES treatments.

Hamstring tendon graft technique

No resisted hamstring strengthening until week 12.

1. Partial meniscectomy

No modifications required, progress per patient tolerance and protocol.

2. Meniscal repair

- No weight-bearing flexion beyond 45° for 4 weeks.
- Weight bearing in full extension OK.
- Seated Kinetron and multi angle quadriceps isometric can substitute for weight-bearing exercises.

3. Chondroplasty

- Restricted weight-bearing for 4 weeks.
- No weight-bearing exercise for 4 weeks.
- Consider Tibiofemoral unloading brace to help facilitate earlier participation in functional

rehabilitation activities if limited by pain.

4. MCL injury

Restrict motion to sagittal plane until week 4-6 to allow healing of MCL.  
Perform PRE's with tibia in internal rotation during early post-op period to decrease MCL stress.  
Consider brace for exercise and periods of activity if severe sprain and/or patient has pain.

5. PCL injury

Follow PCL rehabilitation guidelines. (Not ACL protocol)

6. ACL Revision

Delay progression of running, hop testing, agility drills, and return to sport by 4 weeks. Otherwise follow same milestones

**Running Progression:**

1. Treadmill walking.
2. Treadmill walk/run intervals.
3. Treadmill running.
4. Track: run straights, walk turns
5. Track: run straights and turns
6. Run on road

Progress to next level when patient is able to perform activity for 2 miles without increased effusion or pain.  
Perform no more than 4 times in one week and no more frequently than every other day. Do not progress more than 2 levels in a 7 day period.

**Functional Testing  
(Week 12)**

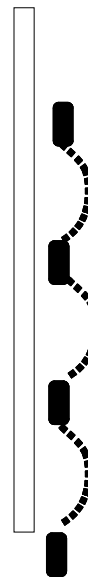
**Single  
Hop**



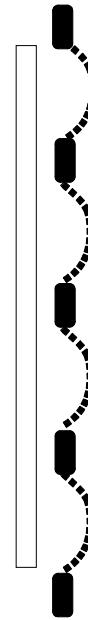
**X-Hop**



**Triple  
Hop**



**Timed  
Hop**



**Testing:** Patient performs one practice on each leg for each hop sequence. Patient performs 2 timed or measured trials on each leg for each hop sequence. Measured trials are averaged and compared involved to uninvolved for single, triple, crossover hop. Compared uninvolved to involved for timed hop.

**Passing Criteria for Return to Sport:** Greater than or equal to 90% on: quadriceps MVIC, hop testing, KOS

ADLS score, and global rating.