

Note: This protocol is designed to serve as a guide to rehabilitation, indications for progression should be based on patient's complete operative procedure, functional capacity, and response to treatment.

General Rehabilitation Goals/Guidelines

- Full passive extension immediately following surgery; consider ancillary procedures such as meniscectomy, meniscal repair, and collateral ligament injuries
- Flexion Range of Motion (ROM) to patient pain tolerance to facilitate graft protection
- Progression from early OKC exercises to CKC exercises
- Significant emphasis on return of proprioception and neuromuscular control to enhance proximal stability for return to functional activity
- Return to sport as indicated

Program Rationale

The program is based on the known information regarding anterior cruciate ligament reconstructive surgery.

- Early mobilization to prevent arthrofibrosis (maintenance of articular cartilage nutrition, retention of bone mineralization)
- Progressive controlled loading of graft to stimulate collagen healing and regeneration.
- Progression to full weight bearing as quickly as allowed/as pain permits (exception example is meniscus repair, collateral injuries, comorbidities, etc.)
- Care taken to keep open chain extension non-resisted/very light to avoid significant anterior tibial displacement
- Loss of mechanoreceptors of joint with loss of original ACL's function. Train proprioception and return to activity specifics before full return to unrestricted activities.

Possible problems

- Infection. Watch for illness, tense effusion.
- Hamstring pain/strain. Gentle early with hamstring activation. Stretching initiated immediately to minimize adhesions. "Pop" in posterior-medial thigh common between two weeks and six weeks.
- DVT.
- Stiffness secondary to arthrofibrosis or RSD/CRPS.

Phase One: Immediate Postoperative Phase (0 to 2 weeks)

Goals

- Protect graft site/fixation
- Minimize deleterious effects of immobilization
- Control pain/inflammation
- Educate patient re: rehabilitation progression
- Begin to restore normalized gait pattern

Weight Bearing Status

PWB with axillary crutches to be discarded after week two if no meniscal repair, remain PWB and increase to three weeks before DC of axillary crutches if meniscal repair performed.

Modalities

Modalities as needed for VMO re-ed, pain modulation and control of inflammation.

Range of Motion

Patellofemoral mobilizations, gentle PROM into full extension and to patient tolerance in flexion (goal: 0 to 90 degrees).

Therapeutic Exercises

Therex: Stationary bike, AAROM flexion exs, emphasize quad/hamstring co-contraction, HS/Gastroc-soleus stretches, extension ROM exs, SLR's in flexion initially until no extensor lag present moving to all planes, hooklying hip abd/add exs, low grade CKC balance/proprioception activity, CKC gait activity to emphasize heel-toe WBAT gait progression.

**Dr. Lyman patients: to be discontinued from assistive device/full weight bearing as quickly as possible, as appropriate.

Phase Two: Protective Phase (2 to 4 weeks)

Goals

- Restore normal gait pattern
- Restore full AROM
- Protect graft site/fixation
- Improve kinetic chain strength, endurance, and proprioception for return to functional activity

Weight Bearing Status

WBAT with axillary crutches with emphasis on weaning from crutches at two weeks postoperative.

Modalities

PRN for pain modulation/control of inflammation
Continue with mobilizations/PROM as needed.

Therapeutic Exercises

Therex: Stationary bike, retro treadmill walking, shallow squats, leg press, heel raises, continue with HS/G-S stretches, continue with extension-biased stretches, balance/KP board, step ups, progression to CKC bias and include proximal stabilization and strengthening in sagittal plane.

- If patient is an athlete and with MD clearance, may initiate low-level sport-specific functional training
- Functional Testing: 10 foot by 10 foot box walk to assess dynamic control in frontal/sagittal planes

Open chain hamstring contractions also progressed at week three to four to low resistance and high repetition. If appropriate, at six weeks eccentric hamstring strengthening can be progressed and hamstring curl equipment can be introduced. Consider all surrounding joints for deficits. As patient approaches six weeks, confidence will increase. It must be stressed that the graft is not mature and the patient must be aware of functional restrictions to avoid the risk of graft failure.

Phase Three: Return to Function (4 to 16 weeks)

Goals

- Protect PF joint if patellar autograft
- Maintain full AROM
- Maintain normalized gait pattern
- Facilitate return to functional activity
- If athlete, continue with sport-specific functional training

Weight Bearing Status

FWB with normalized gait pattern

Modalities

Modalities on PRN basis to control pain/inflammation

Range of Motion

Mobilizations/PROM as indicated

Therapeutic Exercises

Therex: progress stretching/flexibility exercises, advance CKC/functional progression to include increased SL strengthening and proximal stabilization exercises in sagittal/frontal planes, no transverse plane activity, progress from bike to elliptical cross trainer.

Phase Four: Return to Sport (16 to 24 weeks)

The patient may progress to this phase with physician clearance, full and painless AROM, no PF joint pain, gross MMT 100% of contralateral side and patient can pass single leg hop for distance, single leg squat test, and figure of eight hop test. Educate patient as to limitations with RTS and use of functional brace if prescribed by physician.