ACL Reconstruction with Meniscal Repair
Patellar Tendon or Hamstring

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Dr, Makhni: No WB or ROM restrictions, please follow traditional ACL protocol

Phase I: Weeks 0-4:

Weight Bearing Status:

TTWB X 2 weeks in brace.
3-6 weeks: FWB with brace locked in extension
D/C crutches when FWB pain free

Brace:

- Remove to sleep and shower at 3 weeks
- Remove brace for rehab or as directed by physician
- D/C brace after 6 weeks when SLR with no to minimal lag

Gait:

Goals:
FWB with locked brace for 3-6 weeks or as directed by physician with assistive device as needed,

Range of Motion:

Goals:

0-6 wks:	6-10 wks:	12 wks:
<90º flex	NWB flex > 90º WB flex < 90º	WB flex > 90º

Control effusion
Monitor Knee Extension ROM throughout this stage.
Begin **immediate intervention** program if **any lack of knee extension past week 1**.
(See attached solutions page)

Exercises: A/AA/PROM, stationary bicycle/Nu-Step(follow ROM guidelines), quad sets, heel sags, patellar mobilizations and scar tissue mobilizations,

patient needs to avoid prolonged standing or sitting (as in class or the office) with involved knee flexed or prolonged standing with weight shifted to uninvolved LE

Strength:

Goal: Quad activation SLR without quad lag
Exercises: Quad sets, SLR x 4, calf raises, 4 way hip T-band, single leg balance, weight shifting, core exercises, rocker or tilt board with both legs with upper extremity support

Electrical stimulation for quad activation as needed
Suggested Parameters:
2 large electrodes placed over distal VMO and Proximal VL
Medium frequency NMES at 2500 Hz (Russian)
75 burst frequency
10sec on, 50 sec off
2 sec ramp times for 10-15 minutes,
Intensity to full tetanic contraction

Effusion:

Ice, elevation, electrical stimulation, ankle pumps
Joint effusion can impact firing of the quadriceps.

Driving: Surgery to **Right** knee: Begin driving when adequate quad control and when brace is D/C'd or unlocked. Study indicates delayed reaction time with drivers for 6 weeks (Nguyen, Knee Surg, Sports Trauma, Arthrosc 2000). Young drivers are cautioned against driving for 6 weeks.

Surgery to **Left** knee: Begin driving when patient is on little to no pain medication and car is an automatic

Reminders:

- *Avoid rotation*
- *watch for patellar tendonitis symptoms*
- *Notify Physician if ROM loss is severe*

Red Flags:

Cellulitis, drainage 2° possible infection, calf pain could indicate DVT (Call doctor ASAP)

Pink Flags:

Lacks more than 5° of knee extension by week 3, lack of quadriceps firing, unsure of HMP, not weight bearing on leg when using crutches (email doctor if concerns and how it will be handled)

Phase II: Weeks 4-8:

Range of Motion:

Goals: obtain up to 0-125 º after week 6, knee extension symmetrical to uninvolved side
Unlock brace for rehab at 6 weeks, D/C brace after 6 weeks when SLR with minimal to no lag
Exercises: extension and patellar mobilizations, general LE flexibility

Gait Re-Education:

Begin FWB with no assistive device **at 6 weeks**, goal to normalize gait which includes full knee extension at initial contact and terminal stance, with 10-15 ^{0} knee flexion after initial contact.

Watch for tendency of patient to keep knee locked in mild flexion (peg legged) during gait.

Strength:

Goals: Good quad control

Exercises to add: WB ex's: Begin at 6 wks (<90º),
Step-ups, step-downs (2"-4"), SLB, wall slides, assisted squats,
Watch for compensations/quad avoidance strategies by the patient.

Reminders:

- *Make exercises functional while protecting the ACL graft*
- *Avoid patellofemoral pain or patellar/hamstring tendonitis symptoms*
- *Avoid rotation*

▪*HFHS Staff can refer to ACL manual or intranet for exercise ideas*

Phase III: Weeks 8-12

Range of Motion:

Goals: Full pain-free ROM, no effusion

Strength:

Goals: Controlled single leg balance in all planes, Single leg squat ROM ≥80% of uninvolved side, add transverse plane activities slowly,

Exercises to add: Stairmaster, elliptical, knee extension with low resistance (90-30°), progressive single leg balance activities including changes in surface, single leg squats, LE reaches, anterior and lateral lunges, single leg tilt or rocker board, roller board with both legs

Begin transverse plane activities slowly. Rotational lunges, lunges with upper body rotations, rotational step downs, rotational step ups, transverse plane balance exercises, perturbation training, and roller board single leg.

Reminders:

▪*Good pelvic, hip, quadriceps control with all exercises*
▪*Advance exercises when appropriate to patient's required level of function*
▪*Avoid patellofemoral pain or patellar/hamstring tendonitis symptoms*
▪*HFHS Staff can refer to ACL manual and intranet for exercise ideas*

At 12 weeks:

Progress to independent strengthening program with monthly rechecks if good ROM and muscle control.

In the non-athletic population more visits may not be necessary if all functional goals are met.

Phase IV: 3-6 Months

Strength:

Goals: Good pelvic, hip, quad control with progressive multi-planar sport specific activities, begin plyometric exercises (supervised) if criteria are met (start with low intensity and progress to medium and high intensity), begin agility and early sport-specific activities. Return to sports at 6+ months when **cleared by physician**.

Exercises to add: Agility exercises (speed and agility exercise ideas can be found in HFHS ACL manual and intranet), plyometric exercises- 2 feet first than progress to 1 foot (jumping/hopping progression ideas can be found in HFHS ACL manual and intranet), sport-specific training

Return to jog, pre-jump and agility criteria:

▪full knee extension
▪no joint effusion
▪normal gait
▪good single limb control all planes
▪adequate strength to perform run without a limp and without pain
▪good control with early functional tests (i.e. 6-8 inch medial steps downs and/or single leg squat at 80% of uninvolved leg)

Pre-Jump & early agility activities:

Calf jumps at edge of table, jumping on leg press, skipping, shuffle, carioca, jumping rope, back pedal, ice skaters to single leg balance

Running Programs: Beginning a running program and return to sport running program can be found in the HFHS ACL manual and intranet site.

Return to plyometric program criteria:

- Full knee extension
- Good single limb control in all planes (watch for knee valgus and femoral internal rotation and hip adduction)
- No pain or effusion
- Normal gait
- Good control with early functional tests

Plyometric Guidelines:

- Maximum 3 days per week
- Limit foot contacts to 100 in early sessions
- Form is crucial
- Begin with double leg take offs and landings
- Progress to single leg take offs with double leg landings
- Progress to single leg take offs with single leg landings
- Begin with jumps in place, progress to all other planes

Reminders:

- *Good pelvic, hip, quadriceps control with all exercises*
- *Advance exercises when appropriate to patient's required level of function*
- *Good take off and landing techniques*
- *Avoid patellofemoral pain or patellar/hamstring tendonitis symptoms*
- *HFHS Staff can refer to ACL manual for exercise ideas*

Discharge Criteria

- *Pass appropriate functional tests within 85% (Functional Assessment Tests ideas can be found in HFHS ACL manual)*
- *Independent with written progressive HMP*

ACL PROBLEM/SOLUTION LIST

LACKS EXTENSION-bent knee gait, decreased quad firing
-electrical stimulation for muscle re-education and/or reduce knee effusion
-quads sets with or without overpressure
-extension mobilization
-patellar mobilizations and scar tissue mobilizations
-prone hangs with or without weight
-heel sags with or without weight
-Straight leg raises with quads sets each repetition
-dynasplint
-active/active assistive/passive ROM
-gait training
-patients needs to avoid prolonged standing with knee flexed and weight on uninvolved
-anterior step up with opposite hip flexion (train knee to flex upon loading and then drive from flexion to extension)
-weight shifts, step ups and step downs (load through knee and not hips)
-TKE with T-band
-walk backwards on treadmill or stairmaster
-proper fit of brace

SWELLING-stiffness, decreased quad firing
-ice
-elevation
-electrical stimulation (IFC or pre-mod 0-10 Hz) with or without ice
-ankle pumps
-retro-grade massage
-stocking
-normalize gait

LACKS FLEXION-impacts gait, decreased function
-bike
-nustep
-patellar and scar tissue mobilizations
-active/active assistive/passive ROM supine and prone
-heel slides
-wall slides
-chair slides
-knee to chest
-4 point rock back (late phase)
-gait training

QUAD ACTIVATION-slows healing time, poor strength
-quads sets
-electrical stimulation for muscle re-education
-closed kinetic chain exercises/functional exercises
-make functional exercises easier to avoid compensations and bad movement patterns
-TKE with t-band
-watch for gluts/hamstring compensation with exercises