Mark D. Scholl, M.D., P.C.
ORTHOPEDIC SPORTS MEDICINE SURGEON

ACL REHABILITATION PROTOCOL

PHASE I

Estimated surgery through week 2-4

Objectives

- Protect graft fixation through early phase of healing
- Comfort
- Neuromuscular activation
- Range of motion with full extension and flexion to minimum 90-100 degrees. Hamstring graft do not work passive flexion beyond 100 degrees in first 4 weeks.
- Educate patient about rehabilitation progression

Restrictions

- Foot-Flat, Touchdown Weight-Bearing (reciprocal gait, only touch weight) x 2 weeks, advance to WBAT only when quadriceps control adequate.

**If MENISCAL REPAIR performed

- Hinged brace locked 0-30 for weight bear first 6 wks
- No flexion beyond 90 first six weeks

Modalities

- Ice
- If quad activation progressing slowly: NMES-in clinic. Consider home unit.

Therapeutic Exercises

- Heel slides, standing leg curls, ankle PRE including standing heel raises
- Quad sets, hamstring sets
- Patellar mobilization
- PROM to tolerance (within above limits) / (wallslides, bike for motion, rowing machine)
- Gastoc/soleus, hip flexor stretches. Avoid hamstring stretch x 4 weeks for hamstring graft.
- BAPS (seated or on total gym) PWB
- SLR, all planes, until quad strength is sufficient to prevent extension lag (hip PREs)
- Quadriceps isometrics at 60 degrees and 90 degrees
- Open chain knee extension 0-90 degrees OK with no resistance (begin at 4 weeks for hamstrings graft)
- Total gym leg press
- Aerobic exercise-airdyne or stationary bike with surgical leg supported/braced until flexion sufficient for crank cycle.
- Aquatic therapy when wounds are well-healed (minimum 2 weeks). OK to swim freestyle/crawl with flutter kicks. No fins. No breaststroke kick. No butterfly kick (dolphin kick).

Functional Milestones during Phase 1

- Normal walking pattern without crutches on level surfaces

PHASE II

Estimated week 2-4 through week 6-8

Criteria for advancement to phase II

- Good quad set, SLR without extension lag
- At least 90-100 degrees of flexion
- Full extension

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- 3 weeks post-op for hamstring auto graft

Objectives
- Restore normal gait
- Maintain full extension, progress flexion range of motion.
- Protect graft fixation
- Control swelling

Weight bearing
- Discontinue use of crutches when the patient has full extension, can SLR without extension lag and has normal gait.

Modalities
- NMES - if necessary
- Ice

Therapeutic exercises
- Mini-squats
- Stationary bike (minimum to moderate resistance). Begin with high seat/low tension to promote ROM. Progress resistance and/or RPM to increase quadriceps challenge.
- Closed chain terminal extension (0-90 degrees) with resistive tubing or weight machine.
- FWB balance exercises (e.g. ingle leg balance, BAPS)
- Resisted hamstring exercise for patella tendon grafts (May begin with hamstring grafts or allografts at 6-8 weeks)
- Aquatic therapy when wound are well-healed (minimum 2 weeks). OK to swim freestyle/crawl with flutter kick. No fins. No breaststroke kick. No butterfly kick (dolphin kick).
- Continue hamstring stretches, progress to weight-bearing gastroc/soleus stretches.
- Stairmaster
- Sport cord home program instruction

Functional Milestones during phase II
- Normal walking pattern without crutches
- Spin on a bike. Consider progression to outside, on level roads, when patient has adequate ROM and no balance or safety issues. Clipless pedals. No trail biking.

PHASE III

Estimated week 6-8 through week 10-12

Criteria for advancement to Phase III
- Normal gait level surfaces. Reciprocal stairs.
- Active ROM: 0 degrees to 120 degrees flexion

Objectives
- Full range of motion
- Improve STRENGTH, endurance and proprioception the lower extremity to prepare for functional activities
- Avoid overstressing graft during ligamentization.
- Protect the patellofemoral joint

Therapeutic Exercises
- Continue flexibility exercises as appropriate for patient
- Stationary cycle-intervals

- Advance closed kinetic chain strengthening (one-leg squats, leg press 0-45 degrees, step ups and step downs begin at 2", progress to 8", etc)
- Progress proprioception activities (slide board, fitter, use of ball, racquet with balance activities, etc.)
- Progress aquatic program to include pool running in vest. Swimming-all strokes and kicks OK after 8 weeks.
- Walk/jog progression. Straight ahead, beginning after 8 weeks post-op, at therapist discretion-no evidence of patellofemoral irritation.
- Jump progression on low impact surface after 8 weeks.

Functional milestones during phase III
- Running after 8-12 weeks
- Golf (for TRAIL leg) chipping and putting after 8 weeks. Swinging 50% power 10-12 weeks (add 4 weeks if LEAD leg)
- Road biking, with hills

PHASE IV

Estimated week 10-12 through month 4-6

Criteria for advancement to Phase IV
- Full, painfree ROM
- Normal gait on stairs (ascending and descending)
- No evidence of patellofemoral joint irritation
- Sufficient strength (75% RM leg press/hamstring curl) and control to initiate functional activities

Objectives
- Strengthen, strengthen, strengthen!!!
- Neuromuscular control in functional situations
- Patient education of gradual return to activities

Therapeutic Exercises
- Continue to progress flexibility and strengthening program
- Initiate plyometric program as appropriate for patient's functional goals
- Functional progression including, but not limited to:
  Forward running, backward running, 1/2, 3/4, full speed: cutting, cross-over, carioca, agility drills etc.
- Initiate sport-specific drills as appropriate for patient
- Advance proprioceptive balance exercises

Functional Milestones during Phase IV
- Swimming
- Golfing-progress to full swing. More cautiously if operative leg is pivot/lead leg.
- Hiking without pack (hydration pack OK)
- Racquet and field sport drills when approved by physician and therapist - end of phase if strength appropriate
- Trail and road biking

PHASE V

Estimated beyond 4-6 month

Criteria for advancement to phase V
- No patellofemoral or soft tissue complaints
- Adequate performance on strength and performance tests
- Physician clearance to resume partial or full activity

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Objectives
- Safe return to athletics
- Transition from anticipatory drills (athlete knows what is coming) to reactive competitive situations
- Maintenance of strength, endurance, proprioception
- Patient education with regards to any possible limitations

Therapeutic Exercises
- Gradual return to sports participation
- Maintenance program for strength, endurance, proprioception

Functional Milestones
- Sport activities/return to play
- Skiing or other strenuous recreational activities

Bracing
- Functional brace is occasionally recommended by the physician for use during sports for the first one to two years after surgery. Not standard protocol to brace for return to sport.

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