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ACL RECONSTRUCTION PHYSICAL THERAPY PRESCRIPTION

Diagnosis: s/p ACL Reconstruction

General Information:

The following ACL rehabilitation guidelines are based on a review of the randomized controlled trials related to ACL rehabilitation. For many aspects of ACL rehabilitation there are either no studies that qualify as best evidence or the number of studies is too few for conclusions to be drawn with confidence. In these circumstances, certain aspects of this protocol are based upon the guidance of the Multi-center Orthopaedic Outcome Network panel (MOON).

The guidelines have been developed to service the spectrum of ACL injured individuals (from non-athlete to elite athlete). For this reason, example exercises are provided instead of a highly structured rehabilitation program. **Attending rehabilitation specialists should tailor the program to each patient's specific needs.**

Some treatment methods with supporting evidence (e.g. using a high intensity electric stimulation training program for strength, aqua-therapy, etc.) are not included in the program because not all therapy sites may have this available.

Progression from one phase to the next is based on the patient demonstrating readiness by achieving **functional criteria rather than the time elapsed since surgery**. The time frames identified in parentheses after each Phase are approximate times for the average patient, NOT guidelines for progression. Some patients will be ready to progress sooner than the time frame identified, where others will take longer.

Phase 0: Pre-Operative Recommendations

GOALS:

- Normal gait
- AROM 0-120°
- Strength: 20 SLR with no lag
- Minimal effusion
- Education on post-op exercises & need for compliance
- Educate in ambulation with crutches
- Educate in follow-up expectations
- Wound care instructions

Phase 1: Immediate Post-Operative Phase (Approx. timeframe Surgery -2 weeks)

GOALS:

- Full knee extension ROM
- Good quadriceps control (≥ 20 no lag SLR)
- Normal gait pattern
- Minimize pain
- Minimize swelling

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Walker use:

- WBAT with Walker (beginning the day of surgery)
- If meniscal repair:**
NWB with brace locked in extension for weeks 0-2, advance to PWB at 2 weeks

Walker d/c criteria:

- Normal gait pattern (Walker until 4-6 weeks if meniscal repair)
- Ability to safely ascend/descend stairs w/o pain/instability
- Reciprocal stair climbing

Knee Immobilizer:

- Brace locked in extension until able to perform SLR independently (1st visit)

Cryotherapy:

- Cold with compression/elevation (e.g. Cryocuff, ice w/ compressive stocking)
- 1st 24 hours or until acute inflammation is controlled: every hour for 15 minutes
- After acute inflammation is controlled: 3x per day for 15 minutes
- Crushed ice in the clinic (post-acute stage until D/C)

EXERCISE SUGGESTIONS

ROM:

Extension: Low-load, long duration (5 minutes) stretching E.g. heel prop, prone hang minimizing co-contraction & nociceptor response

- Flexion: wall slides, heel slides, seated assisted knee flexion
Flexion limited to 90° to protect meniscal repair if performed
- Bike: Rocking for range (no resistance, motion-focused)
- Patellar mobilization: medial/lateral mobilization initially followed by superior/inferior direction while monitoring reaction to effusion & ROM

Muscle Activation/Strength:

- Quadriceps sets emphasizing vastus lateralis and vastus medialis activation
- SLR emphasizing no lag
- Electric Stimulation: Optional if unable to perform no lag SLR
D/C use when able to perform 20 no lag SLR
- Double leg quarter squats
- Standing theraband resisted terminal knee extension (TKE)
- Hamstring sets & Hamstring curls
- Side lying hip adduction/abduction (Avoid adduction moment in this Phase with concomitant grade II-III MCL injury)
- Quad/ham co-contraction supine
- Prone hip extension
- Ankle pumps with theraband
- Heel raises (calf press)

Cardiopulmonary:

- UBE or similar exercise is recommended
- Scar Massage** (only when incision is fully healed)

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CRITERIA FOR PROGRESSION TO PHASE 2:

No lag SLR Crutch/immobilizer/ D/C
Normal gait
ROM: no greater than 5° active
extension lag, 110° active flexion

Phase 2: Early Rehabilitation Phase (Approx. timeframe: 2-6 weeks)

GOALS:

- Full ROM
- Improve muscle strength
- Progress neuromuscular retraining

EXERCISE SUGGESTIONS

___ **ROM:**

- ___ Low load, long duration (assisted prn)
- ___ Heel slides/wall slides
- ___ Heel prop/prone hang (minimize co-contraction/nociceptor response)
- ___ Bike (rocking-for-range riding with low seat height)
- ___ Flexibility stretching all major groups

___ **Strengthening:**

___ **Quadriceps:**

- Quad sets
- Step ups
- Leg press

Mini squats/wall squats
Knee extension from 90° to 40°
Shuttle Press *without jumping action*

___ **Hamstrings:**

Hamstring Curls
Resistive SLR with sports cord

- ___ Hip Musculature: Hip adduction/abduction: SLR or with equipment
- ___ Standing heel raises: progress from double to single leg support
- ___ Seated calf press against resistance
- ___ *Multi hip machine in all directions with proximal pad placement*

___ **Neuromuscular training:**

- ___ Wobble board
- ___ Rocker board
- ___ Slide board
- ___ Fitter
- ___ Single leg stance with or without equipment (e.g. instrumented balance System)
- ___ **Cardiopulmonary:** ___ Bike ___ Elliptical Trainer ___ Stairmaster
- ___ UBE or similar exercise is recommended

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CRITERIA FOR PROGRESSION TO PHASE 3:

Full ROM
Minimal effusion/pain
Functional strength and control in daily activities

PHASE 3: Strengthening & Control Phase (Approx. timeframe: 7-12 weeks)

GOALS:

- - Maintain full ROM
 - Running without pain or swelling
 - Hopping without pain, swelling, or giving way

EXERCISE SUGGESTIONS

___ **Strengthening:**

- - Squats
 - Hamstring curl
 - Shuttle

Leg press
Knee extension 90° to 0°
Sports cord

Step ups/down
Lunges
Wall squats

___ **Neuromuscular training:**

Wobble board/rocker
board/roller board
Instrumented testing systems

Perturbation training
Varied surface

___ **Cardiopulmonary:**

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- ___ Straight line running on treadmill or in a protected environment (No cutting or pivoting)
- ___ All other cardiopulmonary equipment

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CRITERIA FOR PROGRESSION TO PHASE 4:

Running without pain or swelling
Hopping without pain or swelling (bilateral and unilateral)
Neuromuscular training and strength exercises without difficulty

PHASE 4: Advanced Training Phase (Approx. timeframe: 13-16 weeks)

GOALS:

- Running patterns (Figure-8, pivot drills, etc.) at 75% speed w/o difficulty
Jumping w/o difficulty
Hop tests at 75% contra-lateral values (Cincinnati hop tests: single leg hop for distance, triple hop for distance, crossover hop for distance, 6 meter timed hop)

EXERCISE SUGGESTIONS

___ **Aggressive Strengthening:**

- Squats
Lunges Plyometrics

___ **Agility Drills:**

- Shuffling
Vertical jumps
Hopping
Carioca

___ Running patterns at 50-75% speed (e.g. Figure 8)

___ Initial sports specific drill pattern at 50-75% effort

___ **Neuromuscular training:**

- Wobble board/rocker
board/roller board
Instrumented testing systems
Perturbation training
Varied surface

___ **Cardiopulmonary:**

Running / Swimming / Elliptical / Biking / Upper Extremity CV Workout

CRITERIA FOR PROGRESSION TO PHASE 5:

Maximum vertical jump without pain or instability
75% of contra-lateral on hop tests
Figure 8 run at 75% speed without difficulty

PHASE 5: Return to Sport Phase (Approx. timeframe: 17-20 weeks)

GOALS:

- 85% contra-lateral strength
85% contra-lateral on hop tests
Sport-specific training without pain, swelling, or difficulty

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EXERCISE SUGGESTIONS

___ Aggressive Strengthening:

Lunges Squats
 Plyometrics

Sports Specific Activities:

- Interval training programs
- Sprinting
- Pivot and drive in basketball
- Spiking in volleyball

Skill/biomechanical analysis with coaches &
sports medicine team
Running patterns in football
Change in direction
Kicking in soccer

RETURN TO SPORT EVALUATION RECOMMENDATIONS:

- ___ Hop tests: single leg hop, triple hop, cross over hop, 6 meters timed hop
- ___ Isokinetic strength test (60°/second)
- ___ Deceleration shuttle test

RETURN TO SPORT CRITERIA:

- ___ No functional complaints
- ___ Confidence when running, cutting, jumping at full speed
- ___ 85% contra-lateral values on hop tests