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ACL Reconstruction Rehabilitation Protocol

The goals of this protocol are to protect the reconstructions while preventing knee stiffness, so early passive ROM exercises are very important. In addition, preventing excessive anterior and/or posterior tibia translation is also very important.

PHASE I – IMMEDIATE POST-SURGICAL PHASE (WEEK 0-2):

- Goals:
 - Maintain integrity of reconstructed tissue
 - Gradually increase PROM
 - Decrease pain and inflammation
 - Prevent muscular inhibition

- Cryotherapy for pain/inflammation:
 - Ice 20-30 minute intervals day and night for first 48 hours then 20 minutes every hour when able

- Sleeping:
 - Sleep in brace/knee immobilizer

- Weight Bearing:
 - As tolerated in hinged brace (unless meniscus repair, then defer to ROM/WB restrictions in appropriate meniscus repair protocol as directed in op note)
 - Brace locked in extension for ambulation until return of quadriceps control
 - Pt usually instructed to be 50% WB until PT begins
 - Crutches as needed
 - Crutch D/C Criteria:
 - Normal gait pattern
 - Ability to safely ascend/descend stairs without noteworthy pain or instability (reciprocal stair climbing)

- Brace:
 - Hinged brace locked in extension for ambulation until good quad control
 - Once good quad control, may unlock brace for ambulation

- ROM:
 - As tolerated (unless meniscus repair, then defer to ROM/WB restrictions in appropriate meniscus repair protocol as directed in op note)
 - Goal full extension, at least 90 degrees flexion by 2 weeks post op

- Muscle Retraining:
 - Quadriceps isometrics, SLR
 - Heel slides

- Patellar Mobilizations

- Exercise suggestions:
 - ROM
 - Extension: Low load, long duration (~5 minutes) stretching (e.g., heel prop, prone hang minimizing co-contraction and nociceptor response)
 - Flexion: Wall slides, heel slides, seated assisted knee flexion, bike: rocking-for-range
 - Patellar mobilization (medial/lateral mobilization initially followed by superior/inferior direction while monitoring reaction to effusion and 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
 - Discontinue 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 (when incision is fully healed)
- CRITERIA FOR PROGRESSION TO PHASE 2:
 - SLR without quad lag
 - Normal gait
 - Crutch/Immobilizer D/C
 - ROM: no greater than 5° active extension lag, 90° active flexion

PHASE II – EARLY REHABILITATION (WEEK 2-6):

- Goals:
 - Allow healing of soft tissue
 - Do not overstress healing tissue
 - Gradually increase to full ROM
 - Progression based on swelling/inflammation
 - Decrease pain and inflammation
 - Good patellar mobility
- Week 2-4:
 - Continue use of ice as needed
 - Continue ROM progression
 - Weight bearing
 - May discontinue crutches when appropriate
 - Brace

- Worn during ambulatory activities. May remove at night and for sleep
 - Unlocked with no ROM restrictions (unless meniscus repair)
 - Core strengthening, Quad activation, Glute/Hip Strengthening
- Week 4-6:
 - May use heat prior to exercises
 - Gradually increase ROM
 - Wean from brace at home and with therapy. Continue use outside of the home
 - Muscle retraining
 - Stationary bicycle if pain permits (in brace)
 - Proprioception training
 - Core strengthening
- 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
 - Mini-squats/wall-squats
 - Steps-ups 4
 - Knee extension from 90° to 40°
 - Leg press
 - Shuttle Press without jumping action
 - Hamstrings
 - Hamstring curls
 - Resistive SLR with sports cord
 - Other 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
 - Single-leg stance with or without equipment (e.g. instrumented balance system)
 - Slide board
 - Fitter
 - Cardiopulmonary
 - Bike
 - Elliptical trainer
 - Stairmaster
- CRITERIA FOR PROGRESSION TO PHASE 3:
 - Full ROM
 - Minimal effusion/pain
 - Functional strength and control in daily activities
 - Normal gait pattern

PHASE III – INTERMEDIATE PHASE (WEEK 7-12):

- Goals:
 - Maintain Full ROM
 - Eliminate swelling
 - Hopping without pain, swelling or giving-way
 - Quad strength 70% of uninjured side
- Discontinue hinged knee brace
 - Optional: fitting and use of ACL sport brace
- Exercise Suggestions:
 - Strengthening
 - Squats
 - Leg press
 - Hamstring curl
 - Knee extension 90° to 0°
 - Step-ups/down
 - Lunges
 - Shuttle
 - Sports cord
 - Wall squats
 - Neuromuscular Training
 - Wobble board / rocker board / roller board
 - Perturbation training
 - Instrumented testing systems
 - Varied surfaces Cardiopulmonary
 - Straight line running on treadmill or in a protected environment (NO cutting or pivoting)
 - All other cardiopulmonary equipment
 - Initiate two leg hopping and landing progression at 10-12 weeks

****Strength and biomechanical testing with PT or Training Haus (TRAC ACL)****

- CRITERIA FOR PROGRESSION TO PHASE 4:
 - Full knee ROM during functional movement and exercise
 - Quad strength 70% of uninjured side
 - Neuromuscular and strength training exercises without difficulty
 - No knee effusion lasting >24 hours

PHASE IV – ADVANCED TRAINING (WEEK 13-18):

- Goals:
 - Running without pain
 - Jumping without difficulty
 - Hop tests at 75% contralateral values (Cincinnati hop tests: single-leg hop for distance, triple-hop for distance, crossover hop for distance, 6-meter timed hop)
 - Begin ACE Strength program for preparation of return to sport

- Return to Running
 - Straight running/jogging progression at 14-16 weeks depending on patient readiness
 - Equal stride length and heel strike without pelvic drop
- Exercise Suggestions:
 - Aggressive Strengthening
 - Squats
 - Lunges
 - Plyometrics
 - Dynamic Control
 - Advance hopping and landing progression with one leg
 - Shuffling
 - Carioca
 - Vertical jumps
 - Running patterns at 50 to 75% speed (e.g. Figure-8)
 - Initial sports specific drill patterns at 50 – 75% effort
 - Neuromuscular Training
 - Wobble board / rocker board / roller board
 - Perturbation training
 - Instrumented testing systems
 - Varied surfaces
 - Cardiopulmonary
 - Running
 - Other cardiopulmonary exercises
- Functional Testing
 - Single leg reach or Y-Balance testing
 - Single leg hop tests (triple and crossover hops if appropriate)
- CRITERIA FOR PROGRESSION TO PHASE 5:
 - Maximum vertical jump without pain or instability
 - 75% of contralateral on hop tests
 - Pain free running with symmetrical heel strike and stride length

PHASE V –RETURN TO SPORT PHASE (WEEK 19-24+):

- Goals:
 - 90% contralateral strength
 - 90% contralateral on hop tests
 - Running patterns (Figure-8, pivot drills, etc.) at 75% speed without difficulty
 - Sport specific training without pain, swelling or difficulty
 - Strength/Biomechanical testing at 6 and 9 months
 - Begin ACE Sport testing at 6 months for return to sport
- Exercise Suggestions:
 - Aggressive Strengthening
 - Squats
 - Lunges
 - Plyometrics
 - Sport Specific Activities
 - Interval training programs
 - Running patterns in football
 - Sprinting
 - Change of directions/agility
 - Continued neuromuscular training
 - Pivot and drive in basketball

- Kicking in soccer
- Spiking in volleyball
- Skill / biomechanical analysis with coaches and sports medicine team
- Return-To-Sport Evaluation Recommendations:
 - Hop tests (single-leg hop, triple hop, cross-over hop, 6 meter timed-hop)
 - Isokinetic strength test (60°/second)
 - Vertical jump
 - Deceleration shuttle test
 - Y-balance

****Strength and biomechanical testing with PT or Training Haus (TRAC ACL)****

RETURN-TO-SPORT CRITERIA:

Full return to all sports and games

- Atleast 9 months from surgery
 - No functional complaints, full range of motion & no effusion
 - Confidence when running, cutting, jumping at full speed
 - >90% isometric quadriceps strength
 - >90% contralateral values on hop tests
 - >90% Quad Index LSI with Biodex or HHD
 - >90% Quad peak torque/body weight on Biodex (if applicable)
 - Excellent ACL-RSI
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RETURN TO SPORT PLAN AND TIMELINE



ACE STRENGTH

- Small group training sessions 2-3 times per week with ATC
- In coordination with formal rehabilitation, ACE Strength will assist athletes with regaining appropriate muscle strength and movement control, aiding with the transition into the next phase of rehabilitation regardless of injury
- Focuses: muscular strength, fundamental movement mechanics, conditioning
- Approximate duration: 12-16 weeks

ACE SPORT

- Small group training sessions 2-3 times per week with PT/PTA/ATC
- Late phase return to performance program allowing for increased intensity in strength, power, speed, agility and overall conditioning
- Focuses: acceleration, deceleration, jumping, landing, sprinting, agility, reactive decision making, conditioning
- Approximate duration: 12 weeks

Price per month for all ACE programs (Sport and Strength)

1x/week = \$125 (4 wks)

2x/week = \$200 (4 wks)

3x/week = \$285 (4 wks)

4x/week = \$375 (4 wks)

5x/week = \$465 (4 wks)