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REHABILITATION FOLLOWING ACL RECONSTRUCTION

□ ACL Reconstruction (BTB / Quad tendon / Hamstrings)

□ Meniscus repair (medial/lateral)

□ Partial meniscectomy (medial/lateral)

□ Microfracture/chondroplasty/OAT's procedure: (medial/lateral) compartment

GENERAL GUIDELINES

- **Isolated ACL reconstruction:** utilizes knee immobilizer during the day for WBAT ambulation for 1 week and at night for 4 weeks following surgery. Knee immobilizer discontinued for ambulation at one week post-surgery if able to perform a straight leg raise. Crutches are utilized for WBAT ambulation for 4 weeks following surgery until gait normalizes. If gait pattern remains abnormal at 4 weeks post-op may wean to one crutch and continue until gait training becomes normal.
- **ACL reconstruction with meniscus repair and/or microfracture/OAT's:** utilizes a hinged knee brace for 4 weeks following surgery with Flat-foot Weight Bearing (FFWB). The hinged-brace remains locked at night for 4 weeks following surgery. While awake during the day and seated the hinged knee brace can be removed with the knee maintained in full extension. The brace is discontinued (both during the day and at night) at 4 weeks after surgery. The patient can be weaned from the crutches by week 6 when the gait pattern is normalized. No Flexion past 90 degrees for 4 weeks.
- ******Focus on regaining full extension immediately following surgery, with full extension achieved no later than 2 weeks following surgery.* ***** Elevate the foot with pillows during the day and at night to achieve this. In physical therapy utilized quad sets and prone heel hangs to achieve full extension. If unable to achieve full extension by 2 weeks post-op may use 5-10 lbs. with prone heel hangs to gain full extension.

GENERAL PROGRESSION OF ACTIVITIES OF DAILY LIVING

Patients may begin the following activities at the dates indicated (unless otherwise specified by the physician):

- **Bathing/showering** without brace after suture removal at 1 week post-op
- **Sleep** with knee immobilizer for first 1 week for isolated ACL reconstruction and the knee immobilizer locked in extension for 4 weeks following ACL reconstruction with meniscus repair.
- **Driving:** 1 weeks for automatic cars, left leg surgery (when no longer taking narcotic pain meds). 4 weeks for standard cars, right leg surgery (when no longer taking narcotic pain meds)
- **Weight bearing**: as tolerated immediately post-op for isolated ACL reconstruction and flat-foot weight bearing for 4 weeks following surgery for ACL reconstruction with meniscus repair.

PHYSICAL THERAPY ATTENDANCE

The following is an approximate schedule for supervised physical therapy visits:

Phase I (0-6 weeks): 1-2 visit/week
Phase II (6-8 weeks): 2-3 visits/week

Phase III (2-6 months):	2 visits/week
Phase IV (6 months+):	Discharge after completion of appropriate functional progression

REHABILITATION PROGRESSION

The following is a general guideline for progression of rehabilitation following ACL allograft reconstruction. Progression through each phase should take into account patient status (e.g. healing, function) and physician advisement. Please consult the physician if there is any uncertainty concerning advancement of a patient to the next phase of rehabilitation.

PHASE I (0-4 weeks)

Goals:

- Protect graft fixation
- Minimize effects of immobilization
- Control inflammation
- ***Full extension range of motion*****
- Educate patient on rehabilitation progression

Brace:

0 – 1 week: Knee immobilizer in full extension for ambulation and sleeping
1 – 4 weeks: Knee immobilizer in full extension while sleeping with a pillow under the leg/foot to bring the knee into full extension. No pillows under the knee.
1 week: discontinue knee immobilizer for ambulation during the day

Weight-Bearing Status:

- Isolated ACL reconstruction: weight bearing to tolerance immediately
- ACL reconstruction with meniscus repair and/or cartilage restoration: flat-foot weight bearing with brace locked in extension for 4 weeks following surgery. Progress to weight bearing as tolerated beginning week 5.

Therapeutic Exercises:

- Heel slides
- Calf pumps
- Quad sets, hamstring sets (consider NMES for poor quad set) (consider BFR)
- Patellar mobilization
- Non-weight-bearing gastroc/soles, hamstring stretches
- SLR, all planes, with brace in full extension until quadriceps strength in sufficient to prevent extension lag
- Quadriceps isometrics at 60° and 90°. Avoid active terminal extension (30-0°) for the first 6 weeks post-operatively

PHASE II (4-8 weeks)

Criteria for advancement to Phase II:

- Good quad set, SLR without extension lag
- Approximately 110˚ of flexion
- Full extension
- No signs of active inflammation

Goals:

- Initiate closed kinetic chain exercises
- Restore normal gait

- Protect graft fixation

Brace/Weight-Bearing Status:
Patient must exhibit non-antalgic gait pattern. Consider using single crutch or cane until gait is normalized.

Therapeutic Exercises:
- Wall slides 0-45˚, progressing to mini-squats
- 4-way hip
- Progress with isometric strength training
- Wall squats, vertical squats, lunges
- Stationary bike (begin with high seat, low tension to promote ROM. Progress to single leg)
- Closed chain terminal extension with resistive tubing or weight machine
- Toe raises
- Balance exercises (e.g. single-leg balance, KAT)
- Perturbation training
- Front and lateral step-ups
- Hamstring curls
- Aquatic therapy with emphasis on normalization of gait
- Continue hamstring stretches. Progress to weight-bearing gastroc/soleus stretches.
- Stationary bike starting at 4 weeks – low resistance.

PHASE III (8 weeks – 4 months)

Goals:
- Full range of motion
- Improve strength, endurance and proprioception of the lower extremity to prepare for functional activities
- Avoid overstressing the graft
- Protect the patellofemoral joint

Therapeutic Exercises:
- May begin use of the elliptical trainer at 8 weeks post-op if minimal swelling and at >110° flexion
- May begin jogging at 12 weeks post-op if normal range of motion and no/limited swelling
- If meniscus repair performed, elliptical delayed until 3 months and jogging until 4 months
- Continue and progress previous flexibility and strengthening activities
- Knee extensions 90-45˚and progress to eccentrics
- Advance closed kinetic chain activities (leg press, one-leg mini-squats 0-45˚of flexion, step-ups beginning at 2” and progress to 8”, etc.)
- Progress proprioception activities (slide board, use of ball, racquet with balance activities, etc.)
- Progress perturbation training
- Initiate plyometric exercises
- Progress isometric strengthening
- Progress aquatic program to include pool running, swimming (no breaststroke)

PHASE IV (4 to 6 months)

Criteria for advancement to Phase IV:
- Full, pain-free ROM
- No evidence of patellofemoral joint irritation
- Strength and proprioception approximately 70% of uninvolved side
- Physician clearance to initiate advanced closed kinetic chain exercises and functional progression

Goals:
- Continue and progress previous flexibility and strengthening activities
- Functional progression and return to full strength

Therapeutic Exercises:
- jog/run progression
- Progress endurance work
- Progress proprioception and balance activities (slide board, tilt board, etc.)
- Progress perturbation training (single leg)
- Advance plyometric exercises
- Initiate Sport specific exercises (cone drills, side shuffles, cariocas)
- Initiate plyometric leg press and jumping exercises (observe and correct landing)
- Progress isometric strengthening
- Forward/backward running at ½, ¾ and full speed

PHASE V (Begins at approximately 6-9 months post-op)

Criteria for advancement to Phase V:
- No patellofemoral or soft tissue complaint
- Necessary joint ROM, strength, endurance and proprioception to safely return to work or athletics
- Physician clearance to resume partial or full activity

Goals:
- Initiate cutting and jumping activities
- Completion of appropriate functional progression
- Maintenance of strength, endurance and proprioception
- Patient education with regards to any possible limitations
- Prepare for return to sport

Therapeutic Exercises:
Functional progression, including but not limited to:
- Walk/jog progression
- Forward/backward running at ½, ¾, and full speed
- Cutting, cross-over carioca, etc.
- Plyometric activities as appropriate to patient's goals
- Sport-specific drills
- Safe, gradual return to sports after successful completion of functional progression
- Maintenance program for strength and endurance
- Return to sport functional assessment.

Return to Sport:
This phase is individualized based on the athlete's sport and continued physical impairment/performance needs. During this phase athletes will be allowed to return to team practices with criteria and limitations from the physical therapist.

Practice Continuum:
1. Movement Patterns: a. sprinting b. shuffle c. carioca d. zig-zag cutting and e. shuttle change of direction
2. Closed Drills – sport-specific drills without opposition in a controlled speed environment
3. One-on-one Drills (no-contact) – sport-specific drills/ activities where the athlete is expected to react to his/ her opponent without compensation
4. One-on-one Drills – full speed 1 on 1 drills with game necessary contact
5. Team Scrimmage (no-contact) – patients are asked to wear a different colored jersey to indicate their contact restrictions during team scrimmaging when appropriate

6. Team Scrimmage – full scrimmaging
7. Restricted Play – progressing time and situational play as appropriate.
8. Full return to play

Patient may return to sport after receiving clearance from the orthopedic surgeon and the physical therapist/athletic trainer. Progressive testing will be completed. Patient should have less than 15% difference in Biodex strength test, force plate jump and hop tests and functional hop tests.

Functional Knee Brace:

Some studies have shown a protective effect for functional knee bracing following ACL reconstruction while other studies have shown no benefit. A functional knee brace may be recommended by Dr. Elkin for athletic activity for 1-2 years following ACL reconstruction. Please discuss this further with Dr. Elkin if you are interested.