CAPE FEAR SPORTS MEDICINE

ACL Reconstruction Pre/Post Op Protocol
Patellar Tendon Autograft

Our objective is to restore the athlete to his/her pre-injury status while protecting both the graft and donor site. Protecting the donor site during rehabilitation is equally as important as protecting the graft itself. Proper exercise progression is essential. No resistive OKC quadriceps exercises are done. Post-op rehabilitation is 4 to 6 months. Functionally, we focus on improving neuromuscular control and proprioception throughout rehabilitation. Terminal knee extension (TKE) will be defined as part of this protocol as full knee extension as compared to the contra-lateral knee. Our goal during all phases of rehabilitation is to gain and maintain TKE unless otherwise noted by M.D. Proper manual stretching techniques are essential in meeting this goal. We only proceed with the progression of functional exercises as long as TKE is maintained. TKE must be achieved before we progress throughout the entire protocol.

PRE-OP

Experience has taught us that meeting these pre-op goals will optimize the athlete's functional outcome following ACL reconstruction. The initial inflammatory phase may last 1 to 3 weeks. Surgery is usually delayed during this phase. Patient education - Educate athlete, family, coaches, etc. about surgery, post-op care/rehabilitation – "what to expect".

Decrease effusion- *I*C*E*

I - (ice) ice pack 20 min on, 1-2 hours off, cryocuff or polar care- may use 1 hr on, 1 hr off.
C - (compression) may wear wrap or sleeve during the day but not to sleep – encourages venous return.
E – (elevation) during ice time, elevate leg above heart.

Increase ROM (emphasis extension). Have athlete avoid using pillows under knee and avoid hip external rotation in supine resting position. Alternate prone hangs and bump under heel for 10 min every 2 hours each day. Static hamstring stretching and CPM as tolerated. Active heel slides, stationary bike (little resistance) as tolerated (10 min per session).

Improve gait-Treadmill (flat) walking, use mirror when possible for visual feedback. Verbal cues- "heel/toe". Gait drills (no treadmill) - walk normal pace - toes, heels, marching, wide stance, long stride, backwards.

Increase motor control (quad function)- Prefer Closed Kinetic Chain (CKC) exercises to isolate and combine concentric/eccentric loading, neuromuscular electrical stimulation (NMES) with quad sets (QS), straight leg raises (SLR) and step-ups. Also step-ups, step-downs, shallow lunges, wall slides, ball slides, supine leg press and resistive terminal knee extensions (RTKE's). RTKE is defined as a closed chain exercise, performing a standing quad set with tubing as resistance.

POST-OP

SPECIAL CONSIDERATIONS

Meniscal Repair- Often times ACL injuries will involve menisci injuries as well. When a meniscal repair is done with an ACL reconstruction, the post-op protocol is augmented. Please note how the protocol may change. Always consult with M.D. to learn the size, location and extent of repair. Often, during the first 4 to 6 weeks, flexion may be limited to 60 degrees passively and/or as tolerated to 90 degrees actively. Achieving TKE is still our goal while flexion is not stressed. Weight bearing status will often remain as WBAT but may be toe touch depending upon repair. We try to avoid deep knee flexion and compressive forces to the knee. Impact loading and resistive CKC exercises, such as squats will be delayed until M.D. advises. While the standard ACL protocol incorporates impact loading no earlier than 8 weeks, a meniscal repair may begin no earlier than 10 weeks.

Articular Cartilage Repair- Weight bearing (WB) status will often be restricted or limited for 6 to 8 weeks with articular cartilage damage as well. Always consult with M.D. to learn the location, size and extent of repair. The earliest that impact loading may be incorporated with this repair is 12 weeks and consult M.D. before beginning.

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Combined Ligament Damage- When other ligaments are repaired or reconstructed in combination with the ACL, WB will often be restricted for 6 to 8 weeks but ROM may progress as tolerated, with TKE being stressed. Often, the athlete will be given a hinged knee sleeve to wear during WB activities when allowed to progress WB. At the earliest, impact loading may be incorporated at 12 weeks with the hinged sleeve. Again, consult with M.D. if there is any doubt.

POST-OP: STANDARD ACL PROTOCOL

0-7 Days ****R*I*C*E**** R(rest)- Other than ADL's, advise athlete to stay off of feet as much as possible and focus on rehabilitation exercises. This is a critical time to control effusion, focus on TKE and improve motor control. While the athlete will be WBAT with crutches and locked brace, it is important to restrict the time spent WB to help control swelling. *I*C*E*- Same as pre-op.

Wound care- DO NOT REMOVE THE DRESSING! Sterile dressing changes are done with each visit at M.D.'s office until sutures are removed. Keep incision sites dry. Allowed to shower and wash area only after sutures are removed by M.D. (approx 10-14 days).

ROM- Gentle patellar mobs and manual stretching for TKE (throughout protocol). Instruct athlete on proper method of alternating prone hangs and supine bump under heel (10 min every 2 hour throughout each day). While flexion is not forced, expect the athlete to comfortably have 60 to 90 degrees of flexion by day 7. We expect flexion to gradually increase each week but trying to gain "too much too soon" tends to cause capsular inflammation/pain.

Exercises to include: Quad sets (QS) and straight leg raises (SLR) with NMES and/or Biofeedback (these are performed to improve neuromuscular control and re-education) to facilitate quad firing no resistance is used, supine heel slides, supine hip ad/ab, pillow squeezes with knees in extension and flexion, hamstring sets, quarter squats no #, supine leg press, toe raises, stool walking, and RTKE's with theraband. Have athlete perform HS and QS every second, on the second for 20 reps. Progress as tolerated and perform at different knee angles. These exercises are to be done as HEP as well. Each exercise session ends with 20 min *I*C*E*.

During this first week, the brace may be unlocked as neuromuscular quad control and strength allows.

Weeks 2-3

Continue prior exercises. As quad control allows may add: NMES with 4-6 inch step ups (forward, lateral, backward), wall slides, ball slides (proper form), toe raises, hamstring curls, trampoline, tilt board and [stationary bike, stair master, elliptical trainer, treadmill(flat), UBE](exercises in brackets are to be done as circuit training as tolerated). Bike and treadmill only until the end of week three when able to progress WB.

WB progression- As quad control allows, unlock brace, DC one crutch, DC other crutch, DC brace. Goad at end of week 3: no assistive devices.

Continue manual stretching for TKE.

Begin HS PNF stretching, address any inflexibilities.

*I*C*E*

Weeks 4-8

Continue prior exercises. Progress to the following exercise: 4-6 inch step ups (forward, lateral, backward) on a mini-tramp and tilt board, squats on tramp, tilt, high dense foam pads (proper form), increase previous circuit training, single-leg proprioceptive exercise, isolated eccentric contractions with leg raise and wall slides. Single leg press may be done on a ball. Focus is on CKC exercises while isolating quad ecc and con contractions, ham ecc and con contractions, as well as co-contractions. The progression of proprioception exercises is stressed. May begin scar tissue massage as needed.

Weeks 8-10
Continue previous exercises. Progress to the following exercises: May begin low impact loading activities as tolerated (straight jogging, low impact step ups) perform previous gait drills at jogging pace. Focus is on "soft feet" with impact loading. Impact loading in therapy only. Progress impact loading only if no pain or joint effusion occurs. It is critical not to progress impact loading if it causes a persistent increase in joint effusion. Assess athlete before and after activities and get feedback from the athlete to determine if new activities affect his/her function or ADL's. Give feedback to encourage quad/ham co-contractions during loading activities. May begin step-downs, straight/lateral for eccentrics. Also, single leg eccentrics with wall/ball slides and supine leg press. This is a critical time for the athlete to gain confidence in progressing impact loading. Proper progression is essential in order to encourage this confidence. Progress as tolerated only, no increase in pain or joint effusion.

Weeks 10-12
Continue previous exercises, increase impact loading, begin functional testing activities, sports specific activities, begin impact loading as HEP as well. Supine leg press plyometrics, plyometrics with step, single leg loading (eccentrics), agility drills (jog, high knees, glute kicks, long strides, toes, wide stance, skip, skip long, skip wide, back peddle, single leg bounds, side shuffle (SS), (SS) long, (SS) alternate long/short, gallop, long and short gallops, alternate long/short gallops. This is a critical time to focus on proper landing techniques, (hips and knees move into flexion with "soft feet").

Weeks 12-16
Continue previous exercise, focus on sport specific activities. Isokinetic test if available to determine LE deficits. Address any deficits during the last stage of rehabilitation. Begin FKT activities with each visit. Also use this time to really focus on individual needs to insure a safe and comfortable transition back to sports. This is an important time to address all "return to sports issues" with athlete, coaches and family members.

Weeks 16-20
Perform function knee test (FKT) (see separate FKT protocol) as you, MD and athlete agree.

<u>Single leg proprioception</u>
Supine joint positioning through available ROM
single leg balance throwing a ball
single leg balance kicking a ball
single leg balance trampoline
single leg balance angled trampoline

<u>Bilateral proprioception</u>
trampoline squats
tilt-board squats

If you have any questions, please do not hesitate to call.

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