

Supplementary Material S1: Usual Care Protocol

PHYSIOTHERAPY ACL PROTOCOL

This protocol is intended as an overview of the functional goals provided to those in the usual care group of the trial (full protocol can be found here). The physiotherapist must exercise their best professional judgment to determine how to integrate this protocol into an appropriate treatment plan. Some exercises may be adapted depending on the equipment availability at each facility. As an individual's progress is variable and each will possess various pre-operative deficiencies, this protocol must be individualized for optimal return to activity. There may be slight variations in this protocol if there are limitations imposed from additional associated injuries such as meniscal tears, articular cartilage trauma, bone bruising or other ligamentous injuries.

This rehabilitation protocol spans over a 6 month period and is divided into 7 timelines. Each timeline has goals and exercise suggestions for several domains: range of motion and flexibility, strength and endurance, proprioception, gait, and cardiovascular fitness. Criteria for progression within each timeline are based on the attainment of specific goals and on their Lower Extremity Functional Scale (LEFS) score. The focus in early rehabilitation is on regaining ROM, normalizing gait and activation of the quadriceps muscle. To ensure the best possible outcome for a safe return to the same level of activity prior to the injury, the client should be followed for the entire 6 months. The emphasis of rehabilitation should be focused at the 4-6 month mark. In these later stages, crucial skills such as plyometric training, agility drills, instructions on take-off and landing mechanics, patterning drills, and functional testing suggestions are given to determine the client's readiness for return to sport/activity.

RETURN TO SPORT

Gradual return to sport is initiated at the 6-9 month mark *only* if the individual's knee does *not* present with pain or effusion, during or after functional sport specific training drills. LEFS scores should be 76 points or greater at this point in rehabilitation. The individual must also be able to demonstrate the appropriate strength and endurance needed for their specific sport. This recommendation is based on the evidence that knee cartilage and subchondral bone are damaged during the initial ACL trauma and may need additional time to recover in order to minimize the predisposition for future joint arthrosis. A further consideration when returning the patient to sport is that a cautionary approach should be taken with the use of the uninjured limb as a comparison for a rehabilitation endpoint.

BRACING

Bracing should be discussed with the physiotherapist and surgeon prior to return to sport or strenuous activities post ACLR. The decision will be dependent on a number of factors including: type of sport, position, activity level and complexity of the initial injury. Some surgeons may recommend a rigid, functional knee brace or a neoprene sleeve.

0-2 WEEKS

LEFS range: 14-24

➤ GOALS

- Patient education re: weight-bearing status; changes to rehab guidelines with any concurrent pathologies (i.e. PF pain, MCL injury, meniscal repair vs debridement, etc.)
- Decrease pain and swelling
- Increase range of motion & restore full extension*
- Maintain flexibility of hamstrings, calves

- Quadriceps activation
- Proprioceptive/balance re-education
- Maintain cardiovascular fitness

3-6 WEEKS

LEFS range: 32-50

➤ **GOALS**

- Achieve near or full ROM in knee flexion and extension
- Continue flexibility exercises of other joints
- Continue strengthening exercises with control: hip, hamstrings, quadriceps, calves
- Strengthen non injured leg (documented strength losses in unaffected limb)⁽²²⁾
- Progress proprioception
- Normal WB gait
- Maintain cardiovascular fitness

6-9 WEEKS

LEFS range: 45-59

➤ **GOALS**

- Full and pain free knee range of motion
- Functional quadriceps strength
- Initiate isokinetic quadriceps strengthening in a **specific & limited range**⁽³⁷⁾
***only if*: ROM is full, no swelling, adequate muscle control, and no meniscal or patellofemoral pathology
- Address documented quadriceps strength deficits (high and low velocity, concentric and eccentric, 0-95°)⁽²³⁾
- Continue strengthening lower extremity muscle groups, specifically through full range hamstrings/quadriceps (without pain at donor site)
- Advance proprioception exercises
- Increase cardiovascular fitness

9-12 WEEKS

LEFS range: 55-66

➤ **GOALS**

- Continue flexibility exercises
- Quadriceps strength progression
- Address documented hamstring strength deficits (high speed, eccentric 95-60°)⁽²³⁾
- Continue lower chain concentric/eccentric strengthening of quadriceps & hamstrings, both inner range (60-95°) & full range
- Proprioceptive progression
- Sport specific cardiovascular fitness

12-16 WEEKS

LEFS range: 55-66

➤ **GOALS**

- Continue with flexibility exercises for the lower chain
- Continue strengthening of the lower chain
- Sport specific quadriceps & hamstrings strengthening
- Sport specific proprioception training
- Sport specific cardiovascular fitness

16-20 WEEKS

LEFS range: 61-76

➤ **GOALS**

- Sport specific quadriceps, hamstrings and lower chain strengthening progressing to plyometrics
- Proprioception training
- Sport specific cardiovascular fitness

20-24 WEEKS

LEFS range: 61-76

➤ **GOALS**

- Adequate cardiovascular fitness, strength, power, agility neuromuscular control, symmetry and stability
- Continue with upper body strengthening
- Back to sport practice for upper skills (as able)
- Return to sport skills on own at practice with minimal risk of re-injury