Stuart Goldsmith, MD Scott Goldsmith, MD Jeffrey Watson, MD Edward Becker, MD Edward Smith, PA

Dx: ☐ Right ☐ Left NON-OPERATIVE PCL REHABILITATION PROGRAM

Date of Surgery: _____ Patient Name: _____

PT/OT: Please evaluate and treat. Follow attached protocol. 2-3 x per week x 6 weeks.

Signature/Date: _____

Phase I
0–6 weeks after injury

- Precautions
  - PRICE (Protect, Rest, Ice, Compress, Elevate) protocol
  - Avoid hyperextension (12 weeks)
  - Prevent posterior tibial translation (12 weeks)
  - *Isolated hamstring exercises should be avoided until week 12*
  - Weight bearing
    - Partial weight bearing with crutches (2 weeks)
  - Range of motion (ROM)
    - Prone passive ROM from 0° to 90° (Fig. 1) for the first 2 weeks, and then progress to full ROM
  - Brace
    - PCL Jack brace to be worn at all times, including rehabilitation and sleep (minimum of 12 weeks)
- Goals
  - PCL ligament protection
  - Oedema reduction to improve passive ROM and quadriceps activation
  - Address gait mechanics
  - Patient education
- Therapeutic exercise
  - Patellar mobilizations
  - Prone passive ROM (Fig. 1)
  - Quadriceps activation
    - Quadriceps sets
    - Straight leg raises (SLR) once the quadriceps are able to lock joint in terminal extension and no lag is present
  - Gastrocnemius stretching
  - Hip abduction/adduction
  - Stationary bike with zero resistance when ROM > 115°
  - Weight shifts to prepare for crutch weaning
  - Pool walking to assist with crutch weaning
  - Calf raises and single leg balance when weaned from crutches
  - Upper body and core strength as appropriate

Phase II 6–12 weeks after injury	Precautions Continued avoidance of hyperextension Prevent posterior tibial translation Limit double leg strengthening exercises to no more than 70° of knee flexion Weight bearing Weight bearing as tolerated (WBAT) Range of motion Full ROM, supine and prone ROM after 6 weeks Brace PCL Jack brace to be worn at all times Goals PCL ligament protection Full ROM Address gait mechanics during crutch weaning Double leg strength through ROM (no greater than 70° knee flexion) and single leg static strength exercises Reps and set structure to emphasize muscular endurance development (3 sets of 20 reps) Therapeutic exercise Continue PRICE protocol Continue exercises as weeks 1–4 Gastrocnemius and light hamstring stretching Leg press limited to 0–70° of knee flexion (Fig. 2) Squat progression (squat → squat with calf raise → squat with weight shift) Static lunge (Fig. 3) Hamstring bridges on ball with the knees extended (Fig. 4) Progressive resistance stationary bike Light kicking in pool Incline treadmill walking (7–12% incline) Single leg dead lift with the knee extended (Fig. 5) Proprioceptive and balance exercises
Phase III 13–18 weeks after injury	Brace Discontinue PCL Jack brace Goals Reps and set structure to emphasize muscular strength development Progress ROM strength to beyond 70° knee flexion *Isolated hamstring exercises may begin after week 12* Prepare athlete for sport-specific activity Therapeutic exercise Double leg press with progression to single leg (Fig. 2) Single leg knee bends Balance squats (Fig. 6) Single leg dead lift (Fig. 5) Single leg bridges starting during week 16 (Fig. 7) Continue bike and treadmill walking Running Running is allowed once the patient has demonstrated sufficient strength and stability with functional exercise and quadriceps girth is greater than or equal to 90% compared to the contralateral normal side. Outline: Week 1: 4 min walk; 1 min jog for 15–20 min Week 2: 3 min walk; 2 min jog for 20 min Week 3: 2 min walk; 3 min jog for 20 min Week 4: 1 min walk; 4 min jog for 20 min Once running progression is completed, continue single plane agility with progression to multi-planar agility Clinical examination and/or PCL stress radiographs to objectively verify healing of PCL after week 15

Phase IV	Continue exercises and protocol from weeks 13–18
19 + weeks after injury	Set and reps structure to emphasize muscular power development (3 sets of 4–8 reps)
	Sport-specific agility exercises
	Non-contact return to play following clearance by the operating physician
	Full contact return to play when specific return to sports criterion met:
	Full active ROM
	Greater than 85–90 % normal quadriceps strength
	No evidence of instability or giving way
	Greater than 90 % function on return to sports testing
	Athlete is mentally ready to return to sport and not timid or fearful of re-injury

Fig. 1 Prone passive knee range of motion with the PCL Jack brace in place

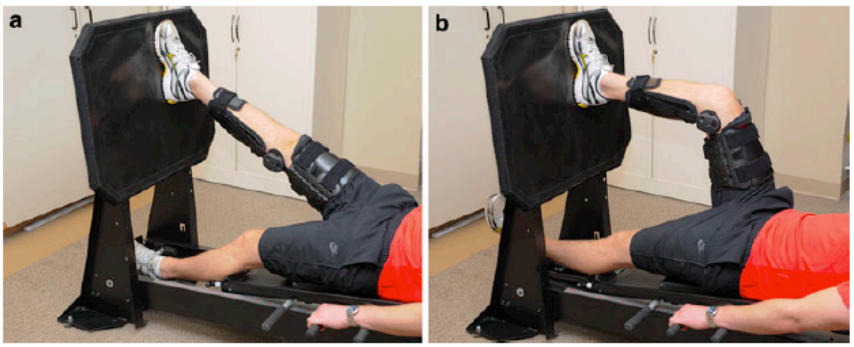

Fig. 2 Single leg presses at 70° demonstrating the starting position (**a**) and finishing position (**b**); align the feet, knees and hips and push through the foot to straighten the leg while avoiding hyperextension of the knee

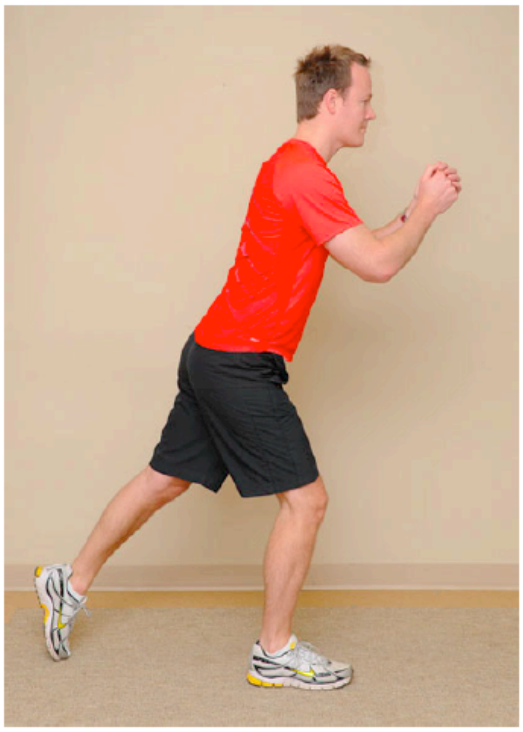

Fig. 3 Static lunge demonstrating the finishing position; step into lunge position with the involved leg forward and bend the involved knee to approximately 45° and hold that position while allowing the toe of the uninvolved leg to touch the ground for assisted balance

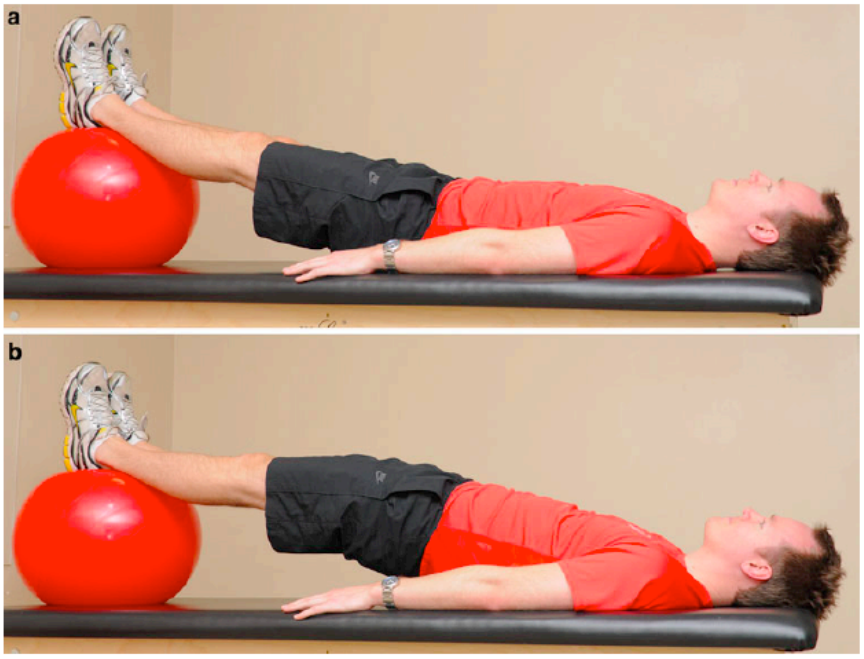

Fig. 4 Ball bridge demonstrating the starting position (**a**) and finishing position (**b**); lie supine with legs straight on the ball, press heels into ball while lifting the hips off table and hold for a count of 5 s

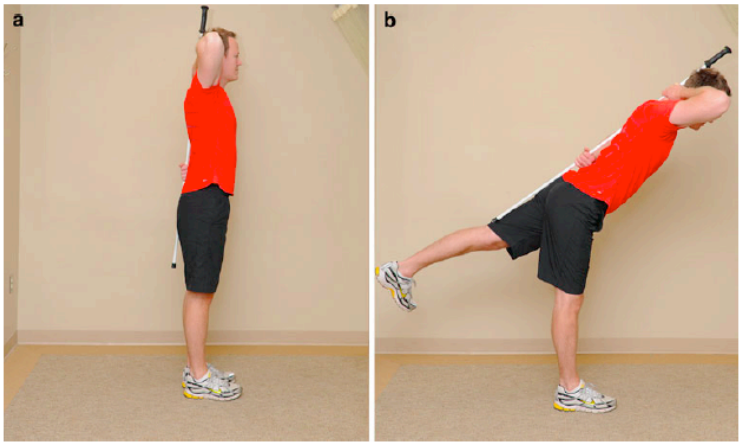

Fig. 5 Single leg deadlift demonstrating the starting position (**a**) and finishing position (**b**); stand on the involved leg keeping the back and uninvolved leg straight, hinge forward at the hip, pull through the gluteals and hamstrings to return to the start position

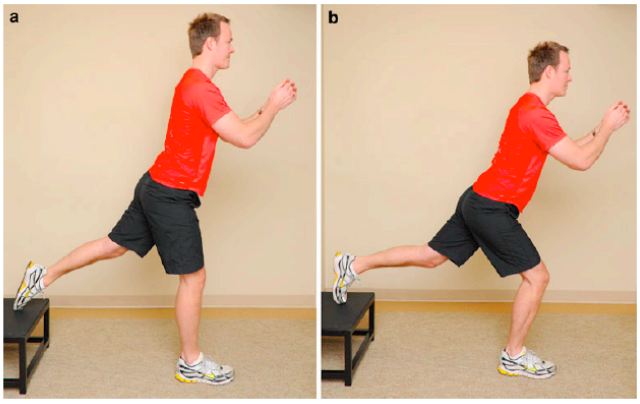

Fig. 6 Single leg balance squat demonstrating the starting position (**a**) and finishing position (**b**); allow the toe of the uninvolved leg to touch the chair and squat with involved leg to 70° keeping the hips level and the knees behind the toes while avoiding full extension of the leg upon returning to start position

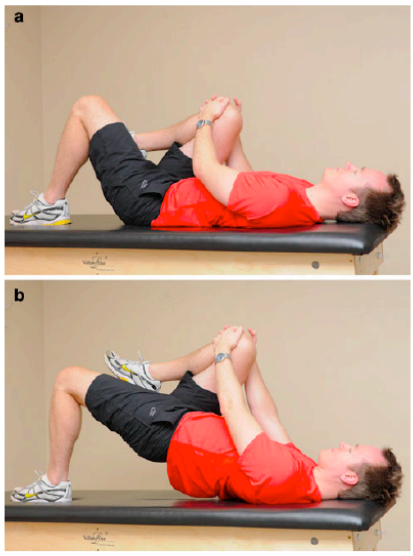

Fig. 7 Single leg bridge demonstrating the starting position (**a**) and finishing position (**b**); lie supine with the knees bent and feet shoulder width apart, grasp the uninvolved knee to chest and contract the gluteal muscles of the involved side to raise the hips off the mat to form a straight line with the shoulders, hips, and knee

Reference: Pierce CM, O'Brien L, Griffin LW, Laprade RF. Posterior cruciate ligament tears: functional and postoperative rehabilitation. Knee Surg Sports Traumatol Arthrosc. 2012 Apr 8.