

Functional Testing Protocol - KNEE

NAME: _____ DOB: _____ MRN: _____ DATE: _____

Involved: R or L DATE OF SURGERY: _____ PHYSICIAN: _____

Preliminary Functional Test *Week 12 (Prior to 12-week follow-up appointment)*

Test	Dynamic Valgus * (Y/N)	R	L	%
Y-Balance (Anterior only)				
Leg Press Percentage of Body Weight: <input type="checkbox"/> 50% _____ <input type="checkbox"/> 75% _____ Body weight: _____ Seat setting: _____				



Functional Testing Protocol - KNEE

NAME: _____ DOB: _____ MRN: _____ DATE: _____

Involved: R or L DATE OF SURGERY: _____ PHYSICIAN: _____

Return to Sport Test Weeks 20-24 (Prior to 6-month follow-up appointment)

Table with 5 columns: Test, Dynamic Valgus * (Y/N), R, L, %. Rows include Hand-Held Dynamometer (Quadriceps, Hamstrings, Hip Abduction, Hip ER), Y-Balance (Anterior, Posterolateral, Posteromedial, Composite), Single Leg Vertical, Single Leg Hop with Fatigue Protocol, Cross-Over Hop, Figure 8 Hop, Drop Landing Knee Excursion**, Modified T-Test, Leg Press (Body weight, Seat setting, Percentage of Body Weight), and Additional Comments.

* Dynamic Valgus is defined as the kneecap being medial to the great toe during the test
** Only perform Drop Landing if patient passes both the Single Leg AND Crossover hops

Functional Testing Instructions

Warm-up

Allow 5-minute bike or elliptical warm-up with moderate resistance.

Demonstration and practice trials

The examiner may demonstrate each test. A maximum of two practice trials will be allowed for each test.

Scoring

Limb symmetry index (LSI) greater than or equal to 90% (involved vs. uninvolved limb) is required for each test, except for Composite Y-balance scoring, which is based on limb length norms.

Y-balance

Standing with one leg on the center platform with toes behind the red line and hands placed firmly on hips, the subject is instructed to push the indicator with the toes in the desired direction as far as they can while maintaining balance and return to starting position under control. The heel must stay in contact with the platform during the test. The subject may not touch the free leg to the ground during the movement to keep balance or put their foot on the top of the reach indicator to gain support. Once the subject has completed three successful trials with the uninvolved leg they will repeat the process with the involved leg before moving on to the next direction. The **best** of the three reaches is recorded as the patient's reach distance. Reach distances should be recorded to the nearest centimeter. For the Y-balance anterior, a difference of >4cm between limbs constitutes a failed test. Composite score is determined by the following equation: Anterior + Posterolateral + Posteromedial divided by (3 x leg length) multiplied by 100

Leg Press

Choose appropriate percentage of body weight based on current strength of the involved limb. Subject will perform a single-leg leg press for 60 seconds, trying for as many repetitions as possible. Repetitions will not be counted if the subject uses the opposite limb for support or loses proper form including dynamic valgus. Each repetition must be performed from 0-90 degrees.

Hand-Held Dynamometry

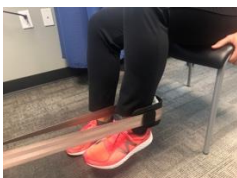


Knee extension

Patient position: seated

Limb position: 90 degrees hip and knee flexion, trunk upright

HHD position: anterior ankle with strap stabilized from posterior side



Knee flexion

Patient position: seated

Limb position: 90 degrees hip and knee flexion, trunk upright

HHD position: posterior ankle with strap stabilized from anterior side

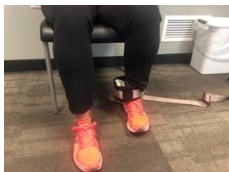


Hip Abduction

Patient position: sidelying, testing limb up

Limb position: hip and knee 0 degrees, contralateral hip and knee slightly flexed

HHD position: distal lateral thigh with strap stabilized underneath patient



Hip External Rotation

Patient position: seated

Limb position: 90 degrees hip and knee flexion, trunk upright

HHD position: medial ankle with strap stabilized from lateral side

Single Leg Vertical Leap

The subject is to jump off one leg without an approach step but may land on two legs. The object is to measure the maximal vertical jump, comparing uninvolved to involved. Devices such as the Vertec or the Just Jump (<https://www.power-systems.com>), or best methods available, should be used to objectify vertical leap. Three trials are performed on each side, accepting the **best** score from each limb for comparison.

Hop Tests

Three trials are performed on each limb, and the best score for each limb is recorded. Start with lead toe behind marked line and measure to the nearest centimeter or ½ inch. Landing must be maintained for a minimum of two seconds while the toe measurement is being recorded. A failed attempt consists of loss of balance, touching the floor with arms or opposite leg, an additional short hop on landing, or presence of dynamic valgus.

Single Leg Hop after fatigue protocol

Prior to performing the single leg hop test, participants perform a unilateral step-down from a 12-inch box, tapping their heel to the floor each time, and completing this as many times as possible on a single limb for two minutes.

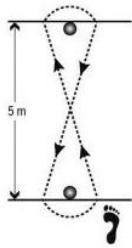
After performing the 2-minute fatigue protocol, single leg hop for distance is performed on the same limb for three repetitions. The best score is recorded. This same protocol is then repeated on the other limb and the best of three hop trials is recorded.

Cross-Over Hop

Standing on one leg, perform three successive hops crossing over a 15-cm wide strip or marker, landing on the same limb. The first hop should be lateral in respect to the direction of the crossover. There should be no pauses between hops.

Figure 8 Hop

With two cones placed 5 meters (16 ft., 5 in.) apart, the participant will hop as fast as possible on one limb twice around the cones in a figure 8 pattern, with time being recorded. Failed test consists of: unable to maintain figure 8 course path or touching down with opposite limb. The best time from three trials is recorded.



Caffrey E, Docherty CL, Schrader J, Klossner J. The Ability of 4 Single-Limb Hopping Tests to Detect Functional Performance Deficits in Individuals With Functional Ankle Instability. *J Orthop Sport Phys Ther.* 2009;39(11):799-806. doi:10.2519/jospt.2009.3042

Drop Landing Knee Excursion

The following testing protocol relies on video analysis capability. If no video analysis is available, skip this test and move on. Mobile device apps are sufficient.

**** Only perform Drop Landing if patient passes both the Single Leg AND Crossover hops ****

Subject stands on 16" box. Therapist stands to the side of the patient with motion capture device prepared to capture video of the drop landing maneuver. The device capturing video should be positioned at the same height as the subject's knee when the patient is standing on the ground. The operator of the motion capture device should be directly lateral from the area where the subject will land so that the video can capture sagittal plane motion of the knee. Upon the examiner's cue (when the video is in place and recording), the subject positions self on single limb then jumps off of the box (anterior direction) and lands on the same limb. The subject must remain on the test limb for two seconds in order for the trial to be counted and may not use the other limb or upper extremities to balance him/herself. The video recording is stopped. Then, using frame-by-frame assessment, the therapist measures knee flexion (in degrees) at two separate points in the drop landing task: at first point of contact to the ground and at greatest depth of knee flexion. The recorded measurement is the difference between knee flexion at greatest depth and knee flexion at initial contact. In the example below, the recorded knee flexion excursion would be 55 degrees (70 degrees minus 15 degrees).

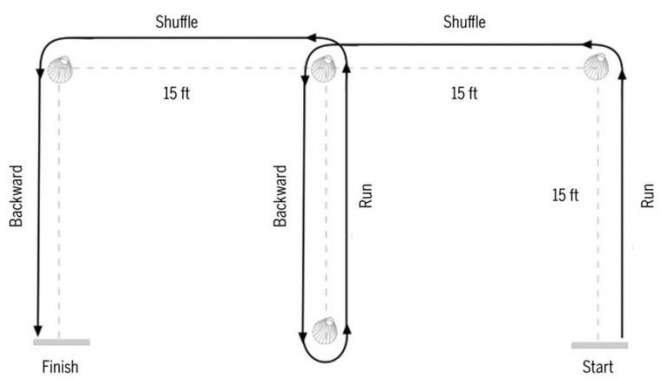


$180 - 165 = 15$
**degrees at
initial contact**

$180 - 110 = 70$
**degrees at
greatest depth**

Modified T-test

Test administrator walks subject through the test, emphasizing that lateral segments of the test should be performed with a lateral shuffle, not cross-over movements of the legs. Initial push-off is performed with the lateral limb relative to the subject's starting position. The lateral limb is considered the test limb, since it will be the push-off limb during lateral shuffling. Using the diagram below for reference, if the patient is at the start line, he/she should push-off initially with the right leg. When testing the left limb, begin the test at the finish line as shown below. Uninvolved limb is tested first. One trial is performed for each limb and the time, in seconds, is recorded. Timing is started when any part of the subject's body crosses the start line. Timing stops when patient completely passes the finish line.



Myer GD, Schmitt LC, Brent JL, Ford KR, Barber Foss KD, Scherer BJ, Heidt RS Jr, Divine JG, Hewett TE. Utilization of Modified NFL Combine Testing to Identify Functional Deficits in Athletes Following ACL Reconstruction. *J Orthop Sports Phys Ther.* 2011; 41(6):377-387.

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ACL-RSI Scale (Short Version)

Instructions: Please answer the following questions referring to your main sport prior to injury. For each question, circle the number between the two descriptions to indicate how you currently feel relative to the two extremes.

1. Are you confident that you can perform at your previous level of sport participation?

Not at all confident 0 10 20 30 40 50 60 70 80 90 100 Fully confident

2. Do you think you are likely to reinjure your knee by participating in your sport?

Extremely likely 0 10 20 30 40 50 60 70 80 90 100 Not likely at all

3. Are you nervous about playing your sport?

Extremely nervous 0 10 20 30 40 50 60 70 80 90 100 Not nervous at all

4. Are you confident that you could play your sport without concern for your knee?

Not at all confident 0 10 20 30 40 50 60 70 80 90 100 Fully confident

5. Do you find it frustrating to have to consider your knee with respect to your sport?

Extremely frustrating 0 10 20 30 40 50 60 70 80 90 100 Not at all frustrating

6. Are you fearful of reinjuring your knee by playing your sport?

Extremely fearful 0 10 20 30 40 50 60 70 80 90 100 Not fearful at all
