

# Lower Extremity Functional Testing Protocol

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	%
<b>Y-Balance (Anterior only)</b>				
<b>Leg Press</b> Percentage of Body Weight:    Body weight: _____ <input type="checkbox"/> 50% ___ <input type="checkbox"/> 75% ___        Seat setting: _____				

## Return to sport test Weeks 20-24 (Prior to 6-month follow-up appointment)

Test	Dynamic Valgus * (Y/N)	R	L	%
<b>Y-Balance</b>  Anterior:  Posterolateral:  Posteromedial:  Leg length (ASIS to medial malleolus): _____ cm  Composite:				
	N/A			N/A
<b>Single-leg vertical</b>				
<b>Single-leg hop</b>				
<b>Crossover hop</b>				
<b>Drop landing knee excursion</b>				
<b>Modified T-test</b>				
<b>Single-Leg 90-degree spins</b>				
<b>Leg Press</b> Percentage of Body Weight:        Body weight: _____ <input type="checkbox"/> 75% _____ <input type="checkbox"/> 100% _____        Seat setting: _____ other % _____				
<b>Additional comments:</b>				

\*Dynamic valgus is defined as the kneecap being medial to the great toe during the test.

## 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.

### 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 he/she 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 his/her 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. Further, the involved limb must be within 90% of uninvolved limb on all Y-balance tests to pass the return-to-sport 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. Involved limb must be within 90% of uninvolved limb to pass return-to-sport test.

### Single-leg vertical leap

The subject is to jump off of one leg without an approach step, but may land on two legs. The objective 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 of the three trials for comparison. Involved limb must be within 90% of uninvolved limb to pass.

### Hop testing x 3

Perform tests in the order they appear. Begin with uninvolved limb. Two alternating trials on both limbs are measured and **best** for each are 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 jump consists of loss of balance, touching the floor with arms or opposite leg, an additional short hop on landing, or presence of dynamic valgus. Involved limb must be within 90% of uninvolved limb distance to pass. Do not perform the crossover hop if dynamic valgus is present in the single-hop test.

1. **Single-leg hop.** Standing on one leg, hop as far forward as possible landing on the same limb.
2. **Crossover hop.** Standing on one leg, perform three successive hops crossing over a 15cm 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.

### 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.**

Subject stands on 16-inch 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). Involved limb must be within 90% of uninvolved limb to pass.



$$180 - 165 = \underline{15}$$

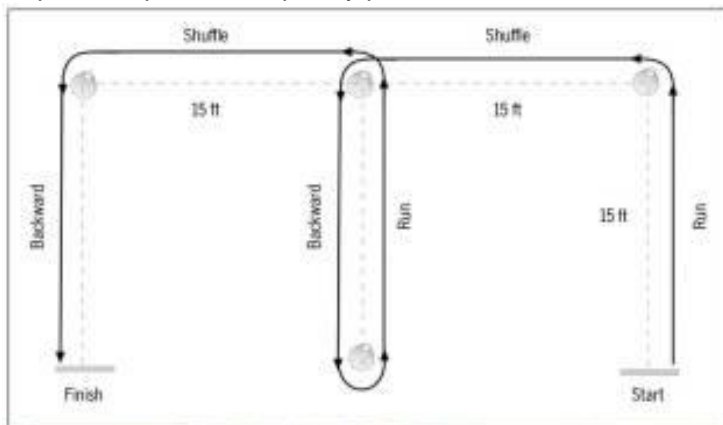
**degrees at initial contact**

$$180 - 110 = \underline{70}$$

**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 crossover 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.



\*Adapted from Myer et al, 2011

### Single-leg 90-degree spins

Beginning with the uninvolved limb, the subject is given 30 seconds to perform as many 90-degree jump spins as possible. Subject begins, facing the evaluator, standing on one limb. When timing begins, the subject jumps as high as possible and performs a 90-degree turn to the direction of his/her choice, landing on the same limb. He/she immediately repeats the max jump spin, until he/she is facing the evaluator; then, the direction is reversed and jump spins are counted in the opposite direction. Alternating directions occur every 4<sup>th</sup> jump until time expires. Discounted repetitions include if the subject uses the contralateral limb to assist with landing or balance, or if he/she demonstrates dynamic valgus or fails to clear the ground on the jump (pivoting is not allowed.) After the uninvolved limb, allow 30-second rest break and repeat with involved limb. Perform three trials, allowing 60-second rest break between trials. The score compared is the **median** number of jumps. Involved limb must be within 90% of uninvolved limb to pass.

### References

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