



## Functional Testing Protocol – HIP and Core Muscle

NAME: \_\_\_\_\_ DOB: \_\_\_\_\_ MRN: \_\_\_\_\_ DATE: \_\_\_\_\_

Involved: R or L DATE OF SURGERY: \_\_\_\_\_ PHYSICIAN: \_\_\_\_\_

### Return to Sport Test

Test		Dynamic Valgus * (Y/N)	R	L	%
<b>Hand-Held Dynamometer</b>	Hip Abduction	N/A			
	Hip Extension	N/A			
	Hip ER	N/A			
<b>Y-Balance</b>	Anterior:				
	Posterolateral:				
	Posteromedial:				
	Composite:	N/A			N/A
Leg Length (ASIS to medial malleolus): _____ cm					
<b>Single Leg Vertical</b>					
<b>Single Leg Hop with Fatigue Protocol</b>					
<b>Cross-Over Hop</b>					
<b>Medial Triple Hop</b>					
<b>Figure 8 Hop</b>					
<b>Leg Press</b>	Body weight: _____ Seat setting: _____				
Percentage of Body Weight: <input type="checkbox"/> 75% _____ <input type="checkbox"/> 100% _____ 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.

### 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.

## Hand-Held Dynamometry

Place HHD in mobilization belt with proper stabilization as shown in pictures below. The best of 2 trial should be recorded.

### 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 table



### Hip extension

**Patient Position:** prone

**Limb Position:** 90 degrees knee flexion

**HHD position:** distal posterior thigh with strap stabilized underneath table



### Hip External Rotation

**Patient Position:** seated

**Limb Position:** 90 degrees hip and knee flexion, trunk upright, foot not in contact with ground

**HHD position:** medial ankle with strap stabilized with table from lateral side





## 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.

## 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 of the three trials 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 3 repetitions. The best score is recorded. This same protocol is then repeated on the opposite limb.

### 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.

### **Medial Triple Hop**

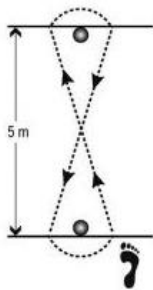
Standing on one leg perpendicular to the measuring tape, hop as far as possible in the medial direction with 3 successive hops on the same limb. There should be no pause between hops.



Dingenen B, Truijien J, Bellemans J, Gokeler A. Test–retest reliability and discriminative ability of forward, medial and rotational single-leg hop tests. *Knee*. 2019;26(5):978-987. doi:10.1016/j.knee.2019.06.010

### **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 inability to maintain figure 8 course path or touching down with opposite limb. The best time from **two** trials is recorded. (*\*\*See below for calculation instructions for timed values.*)



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

### **\*\*Timed calculation instructions**

First: work out the **difference (decrease)** between the two values. Then: divide the **decrease** by the non-operative and multiply the answer by 100. This gives you the percentage difference. Then subtract the percentage difference from 100.

For example:

Non-operative leg: 8 seconds

Operative leg: 10 seconds

10-8= **2 (difference)** divided by **8 (original value)** = **.25 x 100 = 25% (percentage difference)**

100 – 25= **75 % (final value)**

## References

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### Hip and Core Muscle-RSI Scale

**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
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2. Do you think you are likely to reinjure your hip or core muscle by participating in your sport?

Extremely likely	0	10	20	30	40	50	60	70	80	90	100	Not likely at all
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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
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4. Are you confident that you could play your sport without concern for your hip or core muscle?

Not at all confident	0	10	20	30	40	50	60	70	80	90	100	Fully confident
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5. Do you find it frustrating to have to consider your hip or core muscle with respect to your sport?

Extremely frustrating	0	10	20	30	40	50	60	70	80	90	100	Not at all frustrating
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6. Are you fearful of reinjuring your hip or core muscle by playing your sport?

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