

Lower Extremity Functional/Return to Sport Testing Protocol

1. 5 min Warmup on Bike

2. Strength Testing:

- Biodex (see Biodex protocol) **OR**
- Dynamometer Strength Testing:
 - Sitting in chair elevated so feet are off the ground slightly
 - QUAD: Thigh strapped down, cuff at ankle and knee at 90 degrees
 - HAMSTRING: Thigh strapped down, sitting in 90 deg of knee flexion
 - 2 warm up tests – one at 50%, one at 75%
 - 2 100% efforts for 3 seconds and take best score

Interpretation of Results^{3,5}:

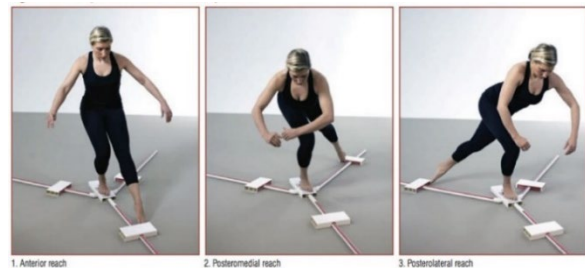
- *Limb Symmetry Index $\geq 95\%$ (most literature states 90%)*
- *Hamstring to Quad ratio $\geq 67\%$*
- *Quad Torque $\geq 3\text{Nm/Kg}$*
 - **This measure is well documented to reduce the risk of reinjury, but is very difficult to attain.*

3. Fatigue Protocol:

- 2 min lateral stepdowns (each leg) off of 12 inch box

4. Lower Extremity Y Balance Testing:

- No shoes
- Heel does not have to stay down
- Can use arms for counterbalance
- Stance leg is being measured. Reach is named in terms of directional relationship to the stance leg.
- Start with uninvolved leg and do 3 trials of each direction sequentially
- Take the best number for each direction out of 3 attempts



Interpretation of Results^{9,10}:

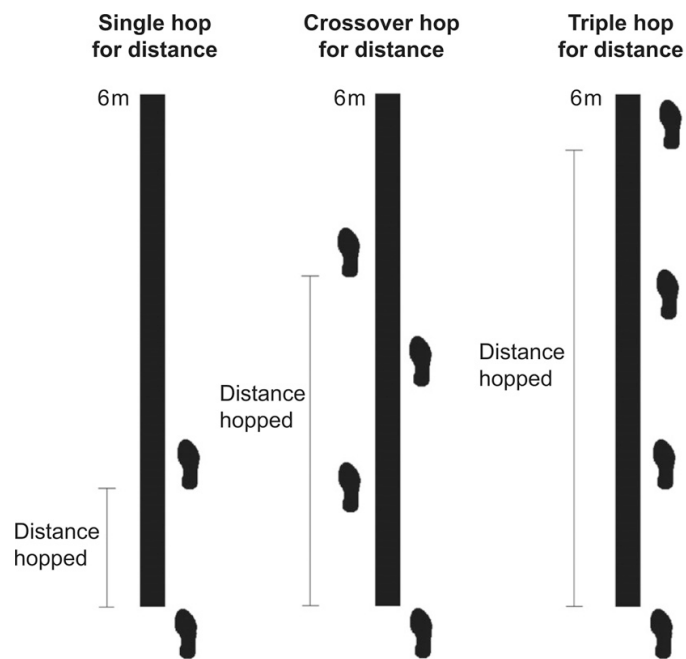
- Anterior Reach difference $< 4\text{ cm}$*
- Limb Symmetry Index $\geq 95\%$ (most literature states $\geq 90\%$)*
- Composite score $\geq 95\%$ (*most literature states $\geq 90\%$)*

5. **Hop Testing:**

- a. Single Leg Hop: Stand on one leg and hop as far as possible
- b. Triple Hop: 3 consecutive hops as a far as possible
- c. Triple Crossover Hop: 3 consecutive hops as far as possible alternating over line
- d. Principles throughout:
 - i. Start with toe behind the line and measure distance from start line to great toe of landing leg
 - ii. 2 practice trials: 50% and 75%, emphasis on landing mechanics and “sticking the landing”
 - iii. Allow 5 attempts, MUST stick 3. Failure if unable to stick 3
 - iv. Measure the average of the 3 best attempts

Interpretation of Results⁶:

- *Limb Symmetry Index $\geq 95\%$ (*most literature states $\geq 90\%$)*



6. **ACL-RSI:**

- a. <https://orthotoolkit.com/acl-rsi/>

Interpretation of Results⁷:

- *Score ≥ 77*

7. **Misc Tests As Determined by PT:**

a. Single Leg Side Hop Test:

- i. Place tape lines 40 cm apart
- ii. Count the number of reps completed in 30 seconds
- iii. Rep does not count if:
 1. Hopping limb touches the tape
 2. Non hopping limb touches the floor
 3. There is a double hop

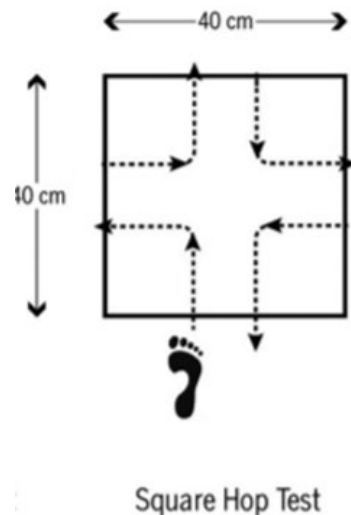
Interpretation of Results²:

- *Limb Symmetry Index $\geq 90\%$*



b. Square Hop Test:

- i. 40×40-cm square marked on the floor
- ii. Starting outside of the square, hop in and out of the square as fast as possible for 5 repetitions. One repetition constituted hopping in and out of the tape outline completely around the square back to the starting point.
- iii. With the right limb, participants hopped in a clockwise direction and with the left limb, they hopped in a counterclockwise direction.
- iv. Failed test if: fall, contralateral foot touches ground, did not completely clear the outline of tap (for top and bottom only the ball of foot must clear; for left and right entire foot must clear).
- v. The best time of 3 trials is recorded

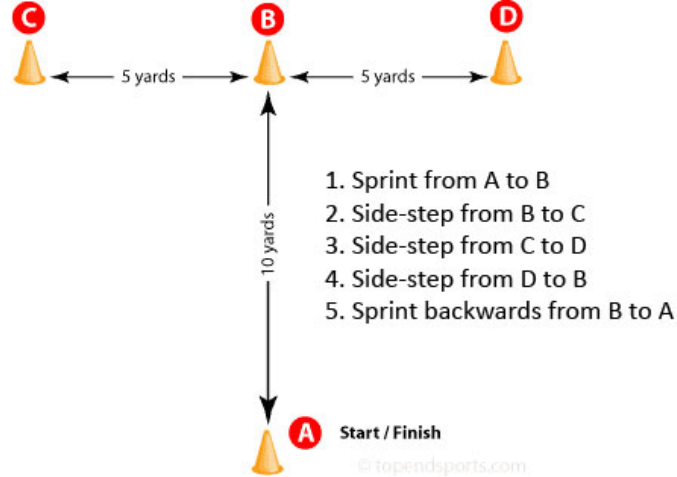


Interpretation of Results¹:

- *Limb Symmetry Index $\geq 90\%$*

c. T-Test:

i.



- ii. The trial will not be counted if the subject crosses one foot in front of the other while shuffling, fails to touch the base of the cones, or fails to face forward throughout the test. Take the best time of three successful trials to the nearest 0.1 seconds.

Interpretation of Results⁴:

Ranking	Males (seconds)	Females (seconds)
Excellent	<9.50	<10/50
Good	9.51-10.50	10.51-11.50
Average	10.51-11.50	11.51-12.50
Poor	>11.50	>12.50

Rankings from excellent to poor of the time taken for adult team sport athletes to complete the t-test

References:

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