



Biomechanics of Sports

FMS Lesson 3 and Follow-Up Questions

April 14, 2020



Lesson: April 14, 2020

Objective/Learning Target:

The student will be able demonstrate knowledge of the the In-Line lunge screen.



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Instructions

Review the following passage and then respond to the questions over section 3 of the FMS.



WHY THE SPLIT STANCE PATTERN?

The lunge is our ability to lower our center of mass in a stride or asymmetrical foot position that is most used in times of deceleration and direction change. This pattern requires us to lower our center of mass like we do in the squat pattern, but in a more dynamic way. The lunge is a natural extension of developmental patterns and the developmental posture called the half kneel position.

We witness lunging in sport when a sprinting football player needs to quickly decelerate and change direction. The player uses this asymmetrical position to lower their center of mass and control changes in their base of support while in motion. We also see lunging used to lengthen the base of support and create a stronger base along the sagittal plane. The complementary and contrasting upper and lower body movements serve to push the limits of mobility, stability, motor control and dynamic balance. We get a glimpse of this when watching a rugby player sprinting to tackle the opponent. The half kneeling pattern was a developmental pattern used when transitioning from the ground to standing to explore our environment. In everyday life, we can choose the lunge or half kneeling pattern to lower ourselves to pull weeds from our garden or pick up a ball on the golf course. We use the long base of the lunge to brace ourselves in order to push a heavy sofa across the floor or to push a broken-down car off the road. A soldier must maintain a motionless long base when shooting a gun.

Without access to an efficient lunging ability we begin compensating with poor deceleration mechanics. This is one of the known causes of non-contact injuries in many field and court sports. In everyday life lunging and half kneeling are movement strategies for lowering ourselves safely to the ground as well as getting up from the ground. It is obvious that the inability to lunge could impact us in different stages of life and truly affect our quality of life.



WHY THE INLINE LUNGE SCREEN?

The Inline Lunge Screen (IL) places the lower extremities in an inline split-stance position while the upper extremities are in an opposite or complementary reciprocal pattern. This replicates the natural counterbalance the upper and lower extremities use to complement each other, as it uniquely demands spine stabilization. This test also challenges hip, knee, ankle and foot mobility and stability, while at the same time simultaneously challenging flexibility of multi-articular muscles such as the latissimus dorsi and the rectus femoris. A true lunge requires a step and descent. The inline lunge test only provides observation of the descent and return; the step would present too many variables and inconsistencies for a simple movement screen. The split-stance narrow base and opposite shoulder position provide enough opportunity to uncover mobility and stability compensations within the lunging pattern.

We do not exercise in a position this extreme, but in the screen we are only asking for an In-line Lunge (IL) using body weight.



DESCRIPTION

Attain the client's tibia length by either measuring it from the floor to the top center of the tibial tuberosity, or acquiring it from the height of the cord during the hurdle step test. Tell the client to place the toe of the back foot at the start line on the kit. Using the tibia measurement, have the client put the heel of the front foot at the appropriate mark on the kit. In most cases, it's easier to establish proper foot position before introducing the dowel.

Place the dowel behind the back, touching the head, thoracic spine and sacrum. The client's hand opposite the front foot should be the hand grasping the dowel at the cervical spine. The other hand grasps the dowel at the lumbar spine. The dowel must maintain its vertical position throughout both the downward and upward movements of the lunge test. Do not manually manipulate set up positions, but absolutely spot for safety and be aware of possible balance issues that could put the person being screened at risk.

To perform the inline lunge pattern, the client lowers the back knee to touch the board behind the heel of the front foot and returns to the starting position. The knee must touch down on either the test kit or the ground and then return to standing position on the test kit to complete the movement.

If any of the criteria for a score of three are not achieved, the client receives a score of two. If any criteria for the score of two are not achieved, the client receives a score of one.



Shoulder Mobility

DESCRIPTION

First, measure the client's right hand from the distal crease to the longest digit to determine the hand length. The client will stand with the feet together and make a fist with each hand, thumbs inside the fingers. The client then simultaneously reaches one fist behind the neck and the other behind the back, assuming a maximally adducted, extended and internally rotated position with one shoulder and a maximally abducted and externally rotated position with the other.

During the test, the hands should move in one smooth motion and should remain fist. Measure the distance between the two closest points of the hands to determine the client's symmetrical reach. If there is loss of cervical spine position, Repeat the verbal instruction to "Stand tall...".

Have the client perform the shoulder mobility test a maximum of three times bilaterally. If any of the criteria for a score of three are not achieved, the client receives a score of two. If any of the criteria for the score of two are not achieved, score this a one.



Discussion Questions - Section 3

Suggested Discussion and Lab Questions:

- What is the reasoning behind the suggested order of performing the screen?
- What characteristics of the Inline Lunge do you find in other areas of life and sport?
- How would you describe the key components for both mobility and motor control?
- Explain the purpose behind why FMS performs the Shoulder Mobility Test as described?
- Explain how the setup position for the Inline Lunge targets movement patterns seen in real life?



Email your discussion questions to the following instructors:

jay_kolster@idschools.org

Tyler_rathke@idschools.org

Marcus_Summers@idschools.org