Injury Prevention and the FMS

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Are you wondering when it will happen to you? Not what , but when will you feel pain or develop an injury? Can you determine your injury risk? The answer is YES! There are screening tools that allow athletes to assess their injury risk. The Functional Movement Screen™ (FMS) is a valid indicator of injury risk among athletes. The FMS is a means of identifying your weak links and asymmetries in your basic functional movements.

As the triathlon season comes to a close, we finally have an opportunity to reflect on the season's successes and create opportunities for improvement. During the offseason, we you are able to plan and prepare for the upcoming season. Prior research reports 10,000 athletes seek treatment for sports and exercise related injuries each day and over 7 million athletes receive medical attention over any 2 year span[2,3]. In triathletes, up to 90% of individuals report at least one injury over the previous 1-2 seasons with the majority of these injuries occurring in the lower extremity[4]. Unfortunately, the nature of these injuries leads to an inability to complete triathlon training in up to 75% of athletes causing an average loss of 2-3 months of training[5]. Outside of traumatic events such as a bike collision, the vast majority of these injuries are diagnosed as overuse including achilles tendinopathy, medial tibial stress syndrome (shin splints), and plantar fasciitis, all which could have been prevented with a proper sport specific screening program and intervention.

Screening programs for triathletes should focus on known, modifiable intrinsic and extrinsic risk factors for injury. Intrinsic (individual) risk factors such as prior injury and supinated foot type, as well as, extrinsic (environment) risk factors including training volume (duration, intensity, frequency, and distance) and competition distance (Ironman) have been shown to increase the likelihood of future injury[6]. Conversely, this research has demonstrated the presence of strength training, coach/club participation and medical team support have reduced an triathlete's risk of future injury[7,8]. Expert opinion suggests athletes should consider cross training, equipment fitting, reasonable training schedules and techniques, and pre- participation screenings to reduce future risk.

In our clinic's experience, the utilization of The Functional Movement Screen™ (FMS) is an essential part of our pre-participation screening. The FMS™ consists of seven different functional movements that assess the following: trunk and core stability, neuromuscular coordination, asymmetry in movement, flexibility, acceleration, deceleration, and dynamic flexibility[10].

This component of our screen allows our Physical Therapists to objectively score and grade individuals for injury risk prior to participation as well as follow and reassess these at-risk individuals after Physical Therapy treatment is initiated.

1. Deep Squat

- Assesses bilateral, symmetrical stability of the hips, knees, ankles, shoulders, and thoracic spine.

Instructions:

- Stand tall with feet shoulder width apart and toes pointing forward.
- Grasp the dowel in both hands and place it horizontally on top of your head so your shoulders and elbows are at 90 degrees.
- Press the dowel so that it is directly above your head.
- While maintaining an upright torso, keep your heels and the dowel in position as you descend as deep as possible.
- Hold the position for a count of one and return to the initial position.

2. Hurdle Step

- Assesses bilateral single leg stance stability, open-kinetic chain hip and knee flexion, OKC dorsiflexion, and closed chain hip flexion.

Instructions:

- Align the hurdle with your feet together and toes touching the test kit.
- Stand tall and grasp the dowel with both hands and place it behind your neck and across the shoulders.
- While maintaining an upright posture, raise the right leg and step over the hurdle, making sure to raise the foot towards the shin while maintaining foot alignment with the ankle, knee, and hip.
- Touch the floor with the heel and return to the starting position, while keeping proper foot alignment with the ankle, knee, and hip.

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3. In-Line Lunge

- Assesses ankle and knee stability, hip abductor and adductor weakness, step leg mobility, and balance in a narrow base of support.

Instructions:

- Place the dowel along the spine so it touches the back of your head, your upper back, and the middle of your buttocks.
- While grasping the dowel, your right hand should be against the back of your neck, and the left hand should be against your lower back.
- Step onto the 2x6 with a flat right foot and the toe on the zero mark.
- The left heel should be placed at _____ mark. (the tibial measurement marker)
- Both toes must be pointing forward, with flat feet.
- Maintaining an upright posture so the dowel stays in contact with your head, upper back, and top of the buttock, descent into a lunge position so the right knee touches the 2x6 behind your left heel.
- Return to starting position.

4. Shoulder Mobility

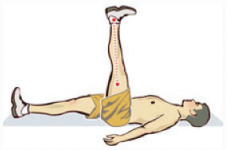
- Assesses bilateral shoulder flexion, abduction, adduction, internal rotation, and external rotation. Also assesses thoracic spine extension and rotation.

Instructions:

- Stand tall with your feet together and arms hanging comfortably.
- Make a fist so your fingers are around your thumbs.
- In one motion, place the right fist overhead and down your back as fast as possible while simultaneously taking your left fist up your back as far as possible.
- Do not "creep" your hands closer after their initial placement.

5. Active Straight Leg Raise

- Assesses functional hamstring flexibility, core stability, and hip extension mobility.

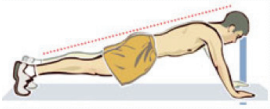


Instructions:

- Lay flat with the back of your knees against the 2x6 with your toes pointing up.
- Place both arms next to your body with the palms facing up.
- Pull the toes of your right foot toward your shin.
- With the right leg remaining straight and the back of your left knee maintaining contact with the 2x6, raise your right foot as high as possible.

6. Trunk Stability Push-Up

- Assesses symmetrical trunk stability, scapular stability, and upper extremity strength.

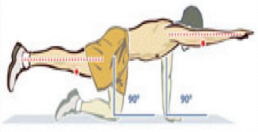


Instructions:

- Lie face down with your arms extended overhead and your hands shoulder width apart.
- Pull your thumbs down in line with the _____ (forehead for men, chin for women)
- With your legs together, pull your toes toward the shins and lift your knees and elbows off the ground.
- While maintaining a rigid torso push your body as one unit into a push-up position.

7. Rotational Stability

- Assesses asymmetrical trunk stability, scapular stability, and upper extremity strength.



Instructions:

- Get on your hands and knees over the 2x6 so your hands are under your shoulders and your knees are under your hips.
- The thumbs, knees, and toes must contact the sides of the 2x6, and the toes must be pulled to the shins.
- At the same time, reach your right hand forward and right leg backward, like you are flying.
- Then, without touching down, touch your right elbow to your knee directly over the 2x6.
- Return the extended positions
- Return to start.

Research has identified a score of 14/21 as an acceptable cut off for determining future injury risk. Athletes who score <14/21 are up to 11 times more likely to sustain an injury causing significant time away from training and competition[9]. Lower scores may either reflect a current injury or a compensatory movement pattern, which will lead to a future injury. This data is then analyzed by the treating Physical Therapist to implement an intervention program consisting of corrective exercises that restore muscle balance and movement patterns, improve FMS scores, improve performance and reduce time away from their sport. These corrective exercises have been shown to improve FMS scores reducing time away from training and future injury risk[9,10].

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Single plane exercises including running and cycling have been shown to develop asymmetry throughout the body and athletes with these imbalances often train around or neglect these weaknesses[11,12]. The results of the FMS™ can be used to identify injury risk and to guide training programs.

Off seasons are an excellent time to recover from the season and address both nagging injuries as well as prevent future injury. The FMS™ is an integral part of any pre-participation examination and can quickly and effectively identify modifiable risk factors in athletes. For more information on the FMS or how Physical Therapy can assist in your training and performance contact the experts at MEND PT.

Toe Touch Progression

http://www.functionalmovement.com/exercises/toe_touch_progression#ooid=5ycXdobjq9ltpwju3HkG7dC-Ggn6sm2o

½ Kneeling Dorsiflexion

http://www.functionalmovement.com/exercises/dorsiflexion_from_half_kneeling_with_dowel#ooid=Q1cXdobjpHl58cr-ZZq3owH42d6BOdgj

Squat With Support

http://www.functionalmovement.com/exercises/deep_squat_assisted_with_fmt#ooid=5rbGJlbjoX219tgGqkK5Z5ayAAYgJSVm

About the Author

Jeff Ryg's experience as an athletic trainer and a sports and conditioning specialist ignited his interest in orthopaedics and sports medicine. Since his time working with Division 1 athletes at the University of Iowa, Jeff has launched a career treating patients with a variety of orthopaedic and sports related injuries.

Footnotes

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