

The Sole of the Matter
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Does anybody else find it amazing that athletic testing is usually performed EYES open only. This might sound normal, but let's think about it for a moment. Muscle testing, Gait, ROM, Jumps, Reaction, Accelerations, TRUE Agility, etc. are all done with eyes open. However, when you play- Your eyes are on the game not on the ground. You read the ground through your proprioceptive ability (feet reading the ground-knowing where your body is in space). If your proprioception is weak, then you do not read the ground as effectively as you should.

A simple test to understand this is stand on one leg with your eyes open. Typically, an athlete can do this easily for 15 seconds without shaking. Now perform the same test with your EYES CLOSED. This may show a dramatic effect on your ability to stand, causing a shake or sway to the athlete. Everyone balances from their eyes, vestibular and proprioceptive ability. The vestibular is constant in this example. By closing the athlete's eyes, more demand is placed on proprioceptive ability. If the proprioception cannot meet this added demand, a loss in stability will result. Decreased proprioception will increase ground contact time thus SLOWING all performance.

All movement is touch and go. Forward, backward, side to side, it is all basically touch and go. As your foot touches the ground all eccentric movement happens. Eventually when fully loaded you will stabilize and then all concentric movement happens. This is the preverbal, "load and explode!" It is the stabilization period that is most affected by proprioception.

Instead of touch and go, the athlete might touch, shake and then go due to lack of proprioceptive ability. The increased time need for stabilization increases ground contact time. This is the hidden SOLE (Sensation of Lower Extremity) of an athlete's movement pattern. The good news is, no matter what the proprioceptive ability of the athlete is, it can be trained and improved. In many cases, the test, (eyes closed) also becomes the training. Repeating this test for 3 min in the morning and 3 minutes in the evening improves proprioceptive ability tremendously, in a very short time.

We have learned that barefoot walking in sand improves proprioception due to mid arch stimulation. However not everyone has the opportunity to walk in the sand barefoot 24/7. Luckily, there are products that claim to help this fact. Barefoot Science out of Toronto Canada, is one such product that should be looked into. For more information go to BarefootScience.com. www.4yourgait.com The Barefoot Science has patents registered in 27 countries based on its insoles bringing progressive proprioceptive/neuromuscular stimulation (exercise) into the shoe.

Here a non-orthotic, mid arch stimulation system, is showing profound results by the users.

What is the sense of having a "perfect movement screen" if the SOLE of the matter is causing you to be slow? Do that same forward lunge with your eyes closed. See how well you perform this test. Does the athlete still step and move gracefully, or is there now added sway and contact time to the movement. All athletes must realize that not everything controlling movement is physical. To understand the role that brain has in movement, will be addressed in a different article. For this example, it is about time that all of us understand that there is a SOLE to our physical ability. Let's do a simple test. Have the athlete perform a multi joint overhead squat, and record the results. Now have the athlete sit on one foot until it "falls asleep". It sounds crazy, but now perform the same overhead squat. As expected, the test is not performed as well. This lack of performance is obviously not caused by any joint change in the athlete but is caused by the athletes diminished proprioceptive ability. This example was extreme but it does show the point, that lack of proprioception will negatively affect movement. The examiner has to be very careful in making movement decisions and recommendations. Many times, the joint (knee, ankle, hip) are blamed. When actually they are healthy, and are made unstable through proprioceptive difficulty.

Many times, the proprioceptive deficit is minor, and a closer look is needed. The sway of the athlete can be measured on a force plate, or out in the field using a GYKO system (<http://www.gyko.it>) made by Microgate. The point is to measure the athlete precisely with eyes open and closed. Remember all athletes have the Capacity to compensate. Visual dominance can mask a proprioceptive deficit, and must be evaluated for ***

Please note there are times when the athlete performs better with eyes closed than they do eyes open. This is a special situation that requires follow up and understanding. Note, when the visual field gets disturbed, say from head trauma, this scenario could exist and must be evaluated for. Your visual field is your body's RADAR and when it gives false information, it will adversely affect the body's movement and coordination patterns.

A very nice test to perform on our athletes, is looking at balance while on a slant board. The different positions of the foot, **dorsiflexion**, **plantarflexion**, **supination**, and **pronation** can be studied. Using the board have the athlete balance in each position and record the results for each leg. If using a GYKO for precise understanding perform each test for 10 seconds in each position. Then repeat the procedure having the athlete close their eyes. Not only will the examiner get an understanding on proprioception, but will also get to understand which moment of the foot strike is strong or weak for the athlete. Remember the Kinematic chain starts here at the foot strike. Once this is understood corrections can easily be made.

Want to perform Optimally???? Make sure you get to the SOLE of the matter.

In the next article, we will explore the development of and look at better understanding CTE (Chronic Traumatic Encephalopathy).