

Documento de lectura

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Proprioception/Balance in football

Before I start to elaborate on this topic it seems warrant to give some clarification about proprioception which will then forms the base for balance.

Proprioception from Latin "proprius" meaning "one's own", "individual" and perception, is the sense of the relative position of neighboring parts of the body and strength of effort being employed in movement (1 - *see references below*). The brain integrates information from Proprioceptors (like muscle spindles and the Golgi tendon organ) in addition to the vestibular system into an overall sense of joint position and movement (acceleration/deceleration).

How is proprioception measured

As proprioception is practically hard to measure (some sort of) Balance was used to measure proprioception (18).

The most common test is the single leg stance (23) and most common parameter measured is the sway path (in mm) and the sway index (the area formed by the sway path in cm²), which is equal to one standard deviation from the mean center of pressure (COP) (17). The sway path describes the way of the COP (13). Basically, the proprioception/balance is better if the movement around/away from the COP is less (and therefore the red circle in the left figure smaller).. A bipedal form (basically standing normally) was also used to measure postural control whilst the players had to close their eyes (26).



What is the importance of Proprioception/Balance in football

A decreased proprioception was seen as a risk factor for injuries (3) and seen as an indication of non-contact ankle sprain (24) in high-school soccer athletes.

Therefore it played a role in injury prevention (12, 19, 23) and rehabilitation from injuries (5, 8, 20, 25).

As ankle sprains and knee injuries are very common in football players (2, 30) proprioceptive/balance training was used in rehabilitation of these body sites (8, 25).

Furthermore, the training was shown to reduce knee injuries (8, 22), ankle sprains (22, 23) (of players who already suffered from ankle sprains) (25) and reduced non-contact hamstring injuries (19) and in general was protective of all injuries (12, 21).

However, there was no effect of training (29) and furthermore proprioceptive/balance training was shown to increase knee injuries (4, 29).

Other investigations in Football

With regards to asymmetries (and possible further injury risks), there was no difference between the preferred vs. the non-preferred kicking leg (16).

It seems that proprioception/balance is affected by fatigue in youth (6, 7) and adult footballers (15). However, was also shown to be unaffected by fatigue in semi-professional football players (15). Training for proprioception/balance (using balance/wobble boards or inflatable disks (9, 12, 29) AFTER the normal training experienced greater gains compared to a group that placed the proprioception/balance training BEFORE the normal training (14). Therefore, the results are in contrast to aforementioned references.

It seems that there are gender differences with female football players are inherent superior balance ability over their male counterparts (28).

Additional thoughts

Whether proprioception can really be improved by exercise has been questioned and it is speculated that athletes might just become more skilled at focusing on and attending to important sensory cues with training and producing refined motor responses (18). However, it seems that training can improve proprioception/balance as the ability differ between athletes from different sports (11) and higher level players showed superior proprioception/balance skills over lower level players (17, 26, 27).

In contrast, proprioception/Balance training seemed not to be more effective as strength training or orthotic treatment (9, 24) and there is no evidence if it enhances performance in football (18).

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