

PROPRIOCEPTIVE AND NEUROMUSCULAR EXERCISES



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Proprioception is a sense of body position whereas kinaesthetic awareness is a sense of body movement. Proprioception is a combination of balance, a sense of joint position and body awareness. Proprioception is an internal subconscious process with the Central Nervous System (CNS) playing a key role in the reestablishment of proprioception following injury. Kinaesthetic awareness requires a conscious effort to react to a situation that often relies on good proprioception but is a distinct process.

Athletes are reliant on both proprioception and kinaesthesia in sports performance. For example, in making a football tackle the player needs to be able to sense the position of their limbs relative to the rest of their body, the position of their body relative to the pitch surface and to the ball and the player they are tackling. In addition, they need to assess the speed, acceleration and deceleration components of the tackle and to use these stimuli to make the appropriate muscular responses.

To optimise neuromuscular rehabilitation the athlete needs to be engaged in a programme that retrains motor skills in a changing cognitive environment. It is the adaptation to this changing environment of cognitive stimuli that facilitates a training response and improvement in neuromuscular control. The motor skills are sports specific and therefore the rehabilitation programme needs to be as sports specific as possible.

Deficits in proprioception are found following common lower limb football injuries including lateral ankle sprain and anterior cruciate ligament tear. Rehabilitation programmes frequently include exercises using wobble boards, foam rollers, trampolines and similar devices that create an unstable base.

However, the view that exercising on an unstable surface targets peripheral ankle proprioception has recently been challenged (2) and it has been suggested that an overemphasis on proprioception may ignore the role of the CNS (Kim et al, Clin Kinesiology 2011; 65: 18-28). In addition, the clinical relevance of proprioceptive deficits found after injury has not been established (1, 3).

What is the most effective way of training proprioception and kinaesthesia for optimal sport performance? Can proprioception and kinaesthesia be improved in the absence of injury and does this reduce future injury risk for the athlete? What is the best way to introduce a changing cognitive environment into a sport specific rehabilitation programme? These are all key questions that need to be considered when targeting proprioception and kinaesthesia rehabilitation goals.

References

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