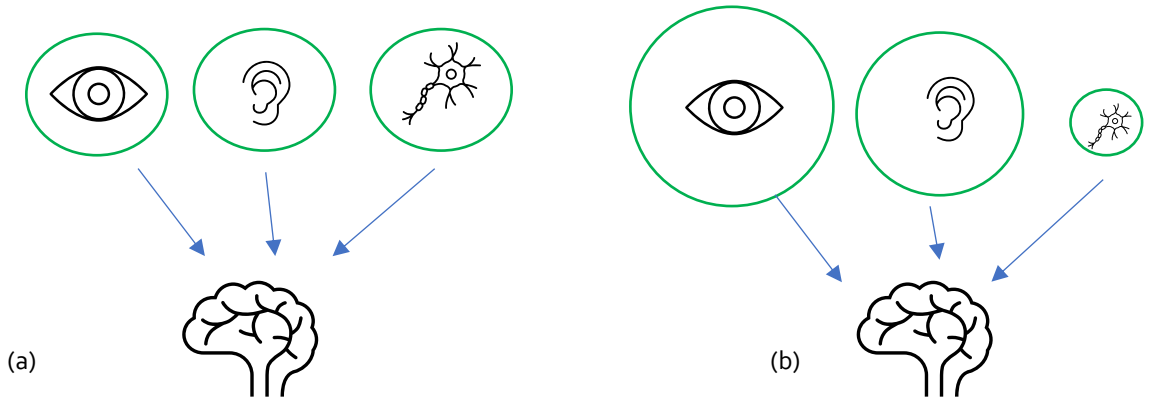
ANKLE & PROPRIOCEPTIVE TRAINING

The term "proprioception" is derived from the latin word *proprius* meaning "one's own" and the word *perception*. Therefore, proprioception refers to how the body perceives and maintains itself in space. Specialized receptors (called "proprioceptors" within the joints ligaments, tendon and muscle tissue provide feedback to the central nervous system (brain and spinal cord) which constantly provides information concerning joint position, motion, vibration and pressure. This is especially important at the ankle joints that are commonly injured and re-injured because of poor proprioception.
In acute and overuse soft tissue injuries, delay in proprioceptive feedback at the joint may lead to altered or inadequate information being passed to the central nervous system. Ultimately this leads to reduced postural control, reduced strength and altered muscle reaction time in response to external stimuli such as running on uneven ground.

Balance and proprioception rely on three main strategies: (1) visual input, (2) vestibular input (inner ear apparatus) and (3) proprioceptors discussed above (see fig 25a). Injury to a joint (i.e. the ankle) will disturb and reduce proprioceptive input to the central nervous system and we then become more reliant on the visual and vestibular cues to maintain balance and function Fig 25b). This explains why it is harder to balance on one leg with your eyes closed. Re-injury rates are much higher if you do not rehabilitation proprioceptive function as there is a delay in the reaction time of the ankle stabilizing muscles in response to sudden inversion (ankle rolling) forces.



(a) proprioceptive input from eyes, ears and receptors, and (b) increased dependency upon visual input as a result of reduced proprioceptive input

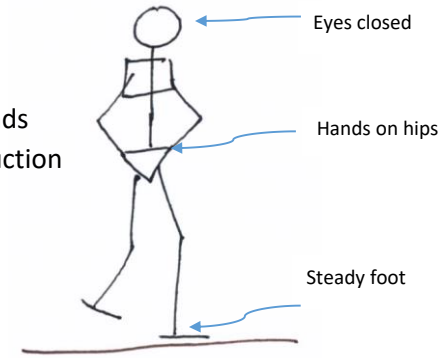
Proprioceptive and balance training progressing towards plyometric training has shown to significantly increase the recovery pathway of ankle injuries and reduce the likelihood of injury and re-injury and is therefore an extremely important part of your individual performance programme. The Balance Error Scoring System (BESS) eliminates visual contributions to maintaining stability at the ankle and focusses upon the proprioceptive element. This provides a score of your proprioceptive ability and benchmark to achieve prior to more demanding activities.

Balance Error Score System (BESS)

This is a simple test to assess and monitor progression in single leg standing. Adopt the stance shown in the pictures below. Hands on hips and close your eyes. Hold this position for 20 seconds and count the amount of errors made in that period. Balance errors for each testing condition are determined as follows:

- Lifting hands off the hip
- Opening eyes
- Stepping, stumbling or falling
- Remaining out of the test position for longer than 5 seconds
- Moving the hip into more than 30 degrees flexion or abduction
- Lifting the forefoot or heel off the floor

1 error point for each of the above.



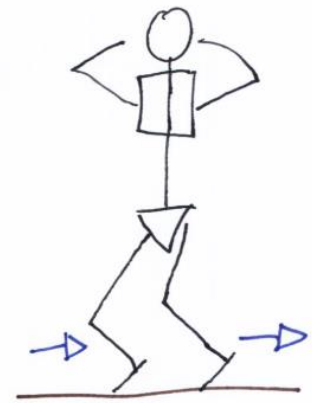
Exercises to improve on BESS

Reaching out of your base of support

Standing single leg on uneven or unstable surfaces. (Ensure the environment is safe)

Performing tasks to prevent your eyes from fixing on one object – throwing-catching a ball, juggling whilst on one leg

Ankle strength exercises

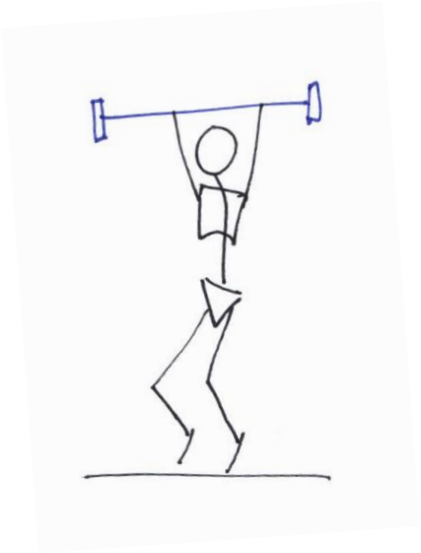


Inversion – eversion

Rock from the inside of left leg and outside of right leg to the outside of left leg and inside of right leg repeatedly

Skiers squat

Perform a squat movement on an incline. Progress with resistance



Cocky walk

Hold a light bar above your head and perform a walking bounce on tip toes.

Move forwards, side and backwards. Progress with increased resistance

ALWAYS CONSULT YOUR PHYSIO PRIOR TO COMMENCING THESE EXERCISES