

# Dynamic Balance & Mobility



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## Terms To Know

- Joint Stability
  - *the ability to maintain or control joint movement or position. **Stability** is achieved by the coordinating actions of surrounding tissues and the neuromuscular system (ACE 2011)*
- Proprioception
  - *is the sense of the relative position of neighboring parts of the body and strength of effort being employed in movement (Wikipedia)*
- Balance
  - *is the ability to maintain center of mass over its base of support.*
- Perturbation
  - *A deviation of a system, moving object, or process from its regular or normal state of path, caused by an outside influence.*

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## Why Train For Balance?

- Balance training is crucial for fall prevention, but is not limited to senior exercise.
- Balance training should be incorporated to improve fitness in any population:
  - Improves neuromuscular coordination
  - Reduces ankle sprains and improves knee stability
  - Improving athletic performance



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### Reducing Injuries



- According to the AJSM (2016) balance training significantly reduced athletes' ankle sprains.
- 6% ankle injuries vs 9%
- For those without balance training with a previous ankle injury, their risk increased two-fold.
- Dynamic balance training improved landing forces, reducing knee injuries, as significantly as plyometric training (JSCR 2016)

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### Improving Performance



- Balance in conjunction with other performance training techniques enhances athletic skill
- Proposed mechanism by improving motor skills is through increasing rate of force development
- Balance training has shown to increase vertical jump, agility, shuttle run time, and speed.
- Correlation between balance and higher level athletes in certain sports.

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### Improving Neuromuscular Control

- Balance training improves functional performance.
- Improvements in postural sway and intermuscular coordination
- Improvements in lower body strength
- Effective for improving jumping, sprinting, and agility
- Improves response of mechanoreceptors and CNS reflexes.




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### Where Balance Comes From

- Three systems responsible for balance:
  - Visual System
  - Vestibular System
  - Somatosensory System
- A disruption in any or all will impair balance.
- Training programs should alter different systems to enhance balance completely.




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### The Visual System



- Visual signals sent to the brain about body's position in relation to surroundings.
- Compared to information from the vestibular and somatosensory systems.
- Vestibulo-ocular reflex
  - Vestibular sends signals to the muscles of the eyes to stabilize gaze when head is moving.

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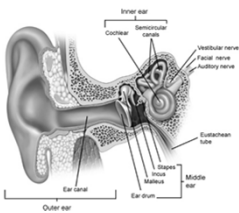
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### The Vestibular System



- The vestibular apparatus is an organ located in the inner ear.
- Responsible for maintaining equilibrium.
- Receptors detect head movement and direction changes.
- Sends information to the brain to correct position or posture.

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### Somatosensory System

- Receptors in the skin, muscles, and joints provide information about stretch or pressure to the nervous system.
- Helps our brain determine where our body is in space.
- Skin sensitivity is reduced with increasing age leading to lack of input from tactile, pressure and vibration receptors.




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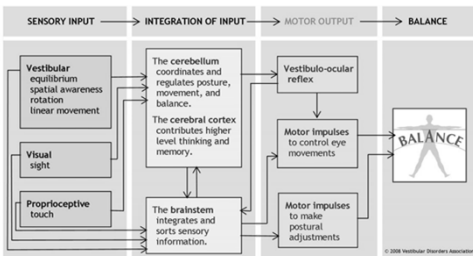
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### Our Balance Systems At Work




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### Balance Progressions

- Progress from more points of ground contact to less.
- Progress from stable to unstable surfaces.
- Once drills have been mastered, add visual and vestibular challenges.
- Goal is to find your tipping point and challenge it.




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### Floor Based Balance Challenge

- Not all balance drills need to be standing
- These can be an option for those who cannot balance standing.
- Also, helps improve core stability necessary for higher level drills.



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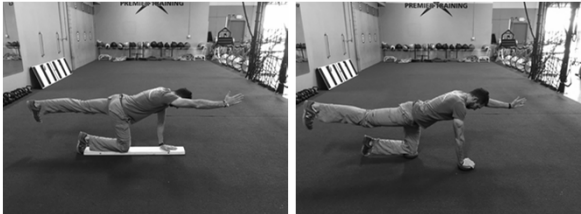
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### Bird Dog Balance Challenges

*Try this concept with planks & bridges too!*



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### In Line Kneeling Challenges



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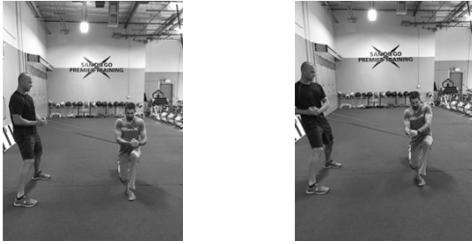
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### Kneeling Monster band Balance



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### Standing In Place Drills

- Static balance drills are great for assessing and introducing balance challenges.
- Once adequate static balance is demonstrated, progress to more dynamic balance challenges
- Dynamic = Functional Balance



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### Single Leg Sagittal Plane Challenge



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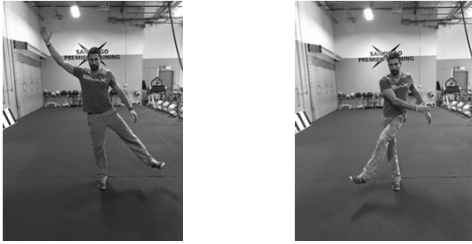
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Single Leg Frontal Plane Challenge



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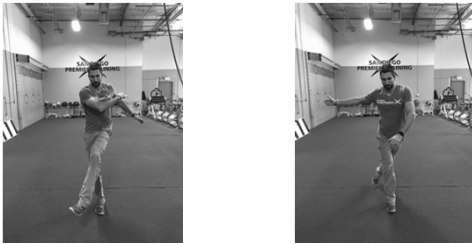
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Single Leg Transverse Plane Challenge



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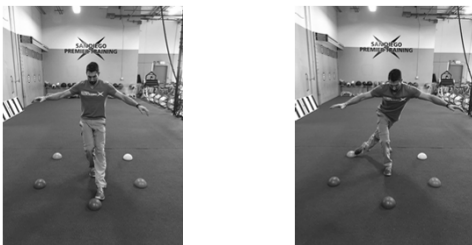
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Star Excursion



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### Monster Band Battles



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### BOSU MB Toss

*Can be done on any unstable surface*



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### Perturbation Drills



- Thomas et. al. (1998) found greater core activation with perturbation vs. constant external load.
- Challenge different postures and positions by placing random external loading with a partner.
- Eyes close prevents clients from seeing where the disturbance is coming from.

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### Dynamic Balance Challenges



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### Walk The Line *Try this with a kettlebell too!*



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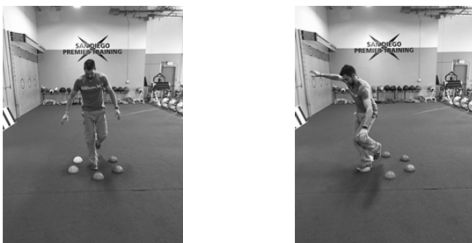
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### Circle Hops



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### In and Out Hops To Balance



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### Jump To Single Leg Balance



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### Squat On Yoga Mat Challenge



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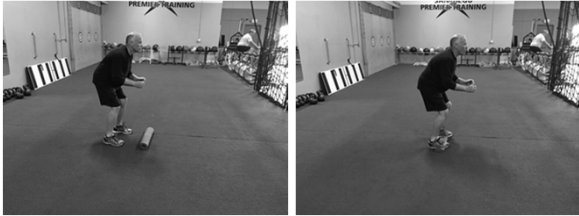
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### Jump To Yoga Mat Balance



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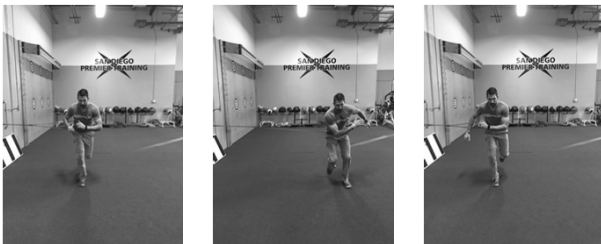
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### Monster band Lateral Hop and Stick



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### Monster band Speed Hops



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### Monster band Walking Drills



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### Monster Band Lunge Drills



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### The Mine Field



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