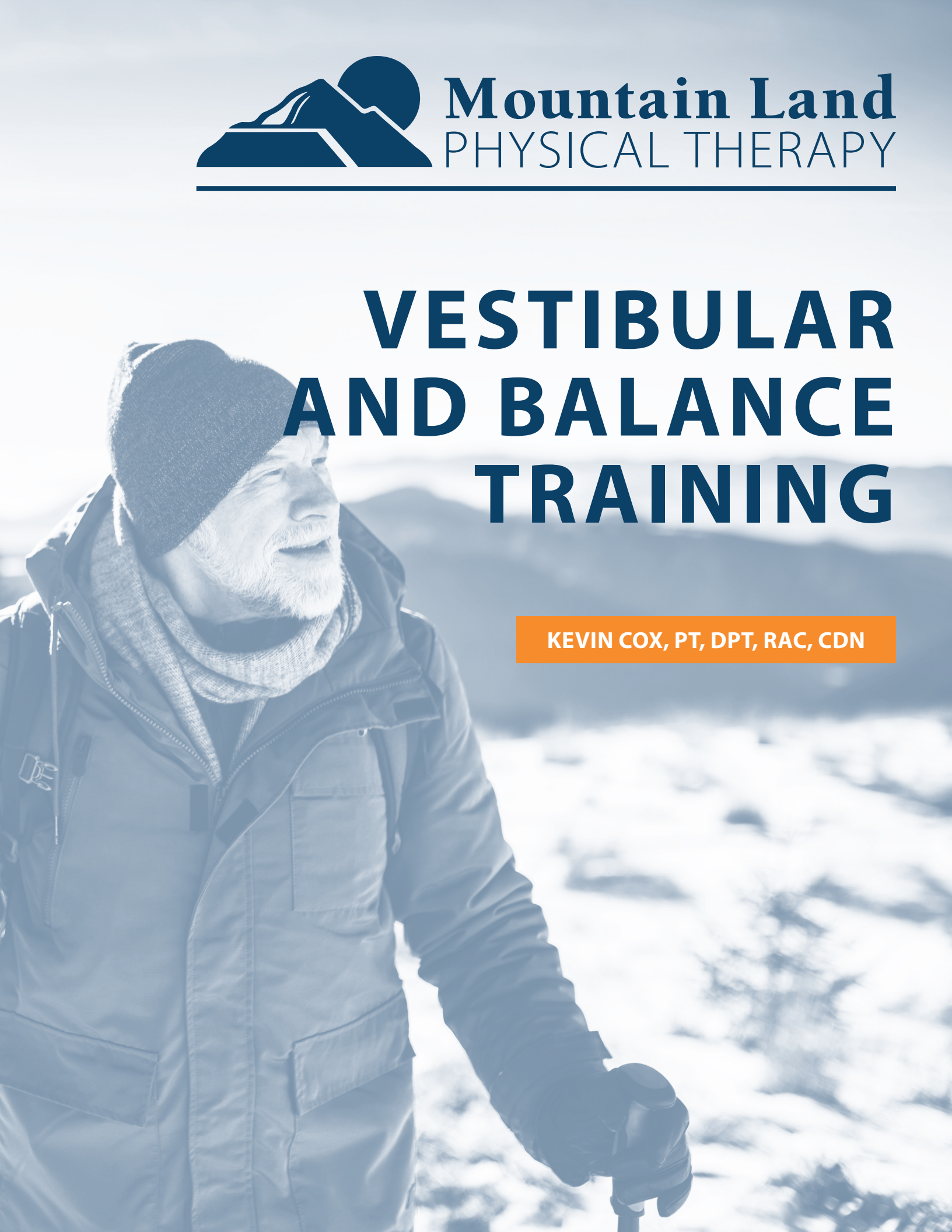
Mountain Land
PHYSICAL THERAPY

VESTIBULAR AND BALANCE TRAINING



KEVIN COX, PT, DPT, RAC, CDN

VESTIBULAR TRAINING

We have 3 systems within our body that help us achieve good balance: vision, somatosensory, and vestibular. Based on the patient's symptoms, presentation, and diagnosis, the therapist will create a comprehensive plan to focus on strengthening the weak systems, as well as the strong, to accommodate for systems in deficit. Balance and vestibular therapy can help reduce the risk of falls, re-hospitalization, injury, fear of falling, and overall dysfunction. Patients who will benefit from balance training include those who have fallen in the past, experience dizziness, neuropathy, poor vision, and/or use an assistive device.

WHY BALANCE TRAINING IS IMPORTANT

- CDC: "Annually falls are reported by 28% of US population"
- Falls are the leading cause of injury among adults over 65 years of age
- In 2018 there where 36,000,000 falls, 3,000,000 ER visits, 950,000 hospitalizations, 32,000 deaths, and 8.4 million injuries
- Falling is the primary lifestyle-altering event which precipitates the change from independent living to assisted care or nursing home
- Annually falls are reported by 1/3 of all people over the age of 65
- 2/3 of those who fall will do so again in 6 months
- Among people ages 65-69, 1/200 falls result in hip fracture and this number increases to 1/10 for those age 85 and older
- 250,000 older adults are hospitalized every yearwith a hip fracture
- ¼ of seniors who fracture a hip from a fall will die within 6 months of the injury
- 9500 deaths in older Americans are associate with falls each year
- More than half of fatal falls involve people 75 years and older

MEET OUR BALANCE THERAPIST

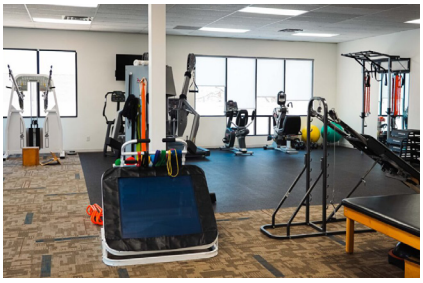
Kevin Cox, PT, DPT, RAC, CDN
Physical Therapist

Kevin earned his BSPT from Chicago Medical School and later completed his Doctorate in Physical Therapy at the University of Montana. Kevin also holds certifications in Rehabilitation Administration, Dry Needling, and is a retired Strength and Conditioning Specialist.

Kevin specializes in areas such as foot orthotics, work conditioning, and return-to-work functional training. He plans to expand his skills with training in vestibular therapy. Kevin's therapy philosophy revolves around teamwork. He believes that successful patient outcomes depend on collaboration between the patient, their support system, the physician's team, and the rehabilitation team, all acting as equal pillars of support.

Inspired to become physical therapist after injuries from running competitively. My loves: Triathlons, ice fishing, pickelball, travel. Kevin's treatment philosophy: utilize 25 years of experience in partnership with evidenced based practice and collaborate with patients to help them progress towards their goals.

WEST JORDAN CLINIC



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Mountain Land PHYSICAL THERAPY

3 SYSTEMS THAT MAINTAIN OUR BALANCE

Overall treatment approach begins with a thorough evaluation of all 3 of the following systems and identifying which system is deficient in the patient. Based on these findings an individualized treatment plan will be created with the patient and therapist to strengthen the weaker systems as well as the strong systems to help accommodate for the weaker systems.

VESTIBULAR

Our Vestibular system is in our inner ear and is responsible for proving information about motion, equilibrium and spatial orientation. This system works closely with our eyes and communicates with our brain in responses to head motion and not external influences. When this system gets impaired it can cause mixed messages to the brain about where the body is and can lead to dizziness, disorientation and imbalance.

Overall treatment approach begins with a thorough evaluation of all 3 of these systems including eyes movements and tracking of objects, cervical spine range of motion and past medical history. This evaluation will help to identifying which system is deficient in the patient. Based on these findings an individualized treatment plan will be created with the patient and therapist to strengthen the weaker systems as well as the strong systems to help accommodate for the weaker systems.

VISION

A good sense of balance depends on the body's ability to see where one is in relation to the surroundings as well as where certain key body parts are in relation to the rest of the body. The patient's ability to focus on a target and to use both of their eyes together to maximize their sense of depth is an important factor in maintaining balance.

SOMATOSENSORY

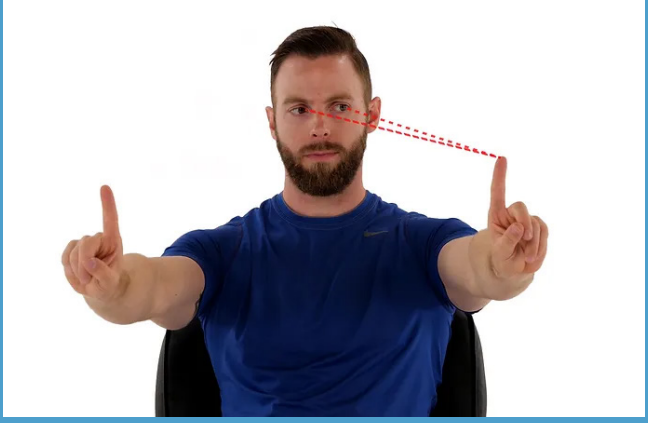
This is a complex system of sensory neurons and pathways that responds to changes at the surface or inside the body and provides proprioceptive and cutaneous input. It is involved in maintaining postural balance by relaying information about body position to the brain, allowing it to activate the appropriate motor response or movement. Proprioceptive information is perceived through our muscles and joints to tell us where we are in space.

TREATMENT INTERVENTIONS

VESTIBULAR TRAINING

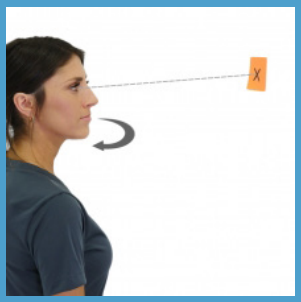
Head and Eye Movement Progression:

- Steady head with visual fixation
- Head nod or turns
- Eye movements up and down and side to side
- Saccades, vestibular ocular reflex x1
- Vestibular ocular reflex x2
- Eyes closed



SACCADES

Without moving your head quickly switch gaze between the targets.



VORX1

Keep your gaze on the target while moving your head.

VORX2

Keep your gaze on the target while the target and head move in the opposite directions.

STRENGTH TRAINING

Ankle:

Important for ankle strategies which are used greatest on uneven surfaces such as on grass or the grocery store parking lot.

STANDING TOE RAISE

STANDING HEEL RAISE

Hip:

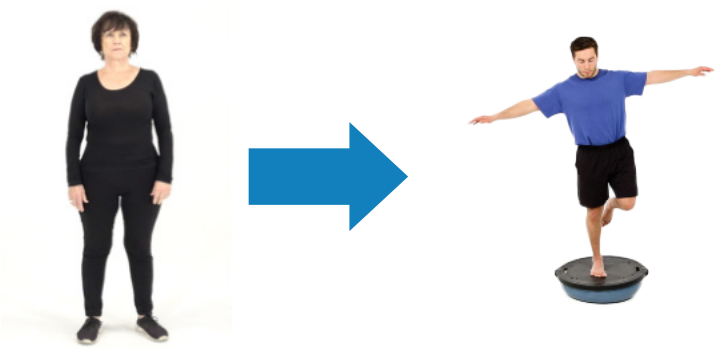
Important for hip strategies which are used more in situations with a narrow support base of support, such as turning, or stepping onto a curb.

STANDING HIP ABDUCTION

BALANCE AND MOBILITY TRAINING

SURFACES

Progress from firm surface to uneven surfaces.

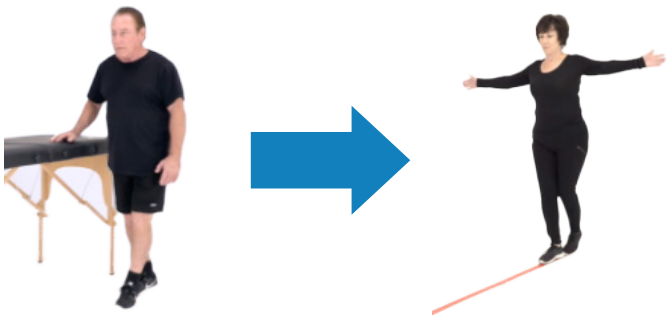


BASE OF SUPPORT

Begin with wide base of support, progress to narrow base of support and then single limb support.

MOVEMENT

Begin with static positions and progress to dynamic movements.



FALL RISK SCREENING

Instructions:
Please answer the following questions by marking "T" if the statement is true and, "F" if the statement is false. If you answer yes to any of these questions you may be at risk for falls and would benefit from balance physical therapy.

	T	F
Have you fallen in the past year?	☐	☐
Do you feel unsteady when standing or walking?	☐	☐
Are you worried about falling?	☐	☐
Do you experience dizziness or vertigo?	☐	☐
Do you feel less steady at night, or when lights are turned off?	☐	☐
Do you use a cane, walker, or hold on to furniture to steady you?	☐	☐
Do you have any loss of feeling in your feet?	☐	☐
Are you taking any of these types of medications: sedatives, anti-depressants, anti-Parkinson's, diuretics, anti-hypertensives)	☐	☐
Do you have nausea when move in bed or turn head driving or walking?	☐	☐
Do you feel more unbalanced in crowded places/places with more people like church or grocery stores?	☐	☐
Any dizziness after scuba diving/high altitude hiking	☐	☐
Do you have a history of or have ever been diagnosed with a concussions, MVA, ear infection, ear tubes, long Covid, Chron's, connective tissue disorders	☐	☐

FREQUENTLY ASKED QUESTIONS

Q: What can cause my dizziness?

A: Medication, change in barometric pressure, BPPV, vestibular hypofunction, blood pressure dysfunctions, infection, vestibular neuritis, certain medical conditions including multiple sclerosis, Meniere's disease, anxiety. Specific Medications include Psychoactive meds, anticonvulsants, Benzodiazepines, Opioids, Antidepressants, antipsychotics, sedatives/hypnotics, medications for overactive bladder, Anticholinergics, medications affecting blood pressure, sleep aids, antihistamines, muscle relaxants.

Q: What will physical therapy help with?

A: During the evaluation the PT will identify any areas of weakness in the lower limbs that may affect the ankle, hip and stepping balance strategy. The therapist will work on increasing strength in these muscles as needed. Assessment of BPPV will be provided followed by treatment if found positive. Vestibular training to follow which includes head and eyes movements while tracking an object. Your physical therapist will perform balance training in both static and dynamic positions, firm and uneven surfaces, eyes open and closed.

Q: What if I have good balance, but I am fearful of falling?

A: PT can be helpful in addressing confidence or self-efficacy surrounding balance as well. A recent study (Welmer, et al. 2023) demonstrated an association between concern about falling and an increased risk of injurious falls. This was most evident in middle age adults, who did not have objective balance impairments. Confidence, or lack thereof, can also be a risk factor for falls. This can be addressed through graded voluntary exposure in PT.

Q: Who would benefit the most from PT for balance?

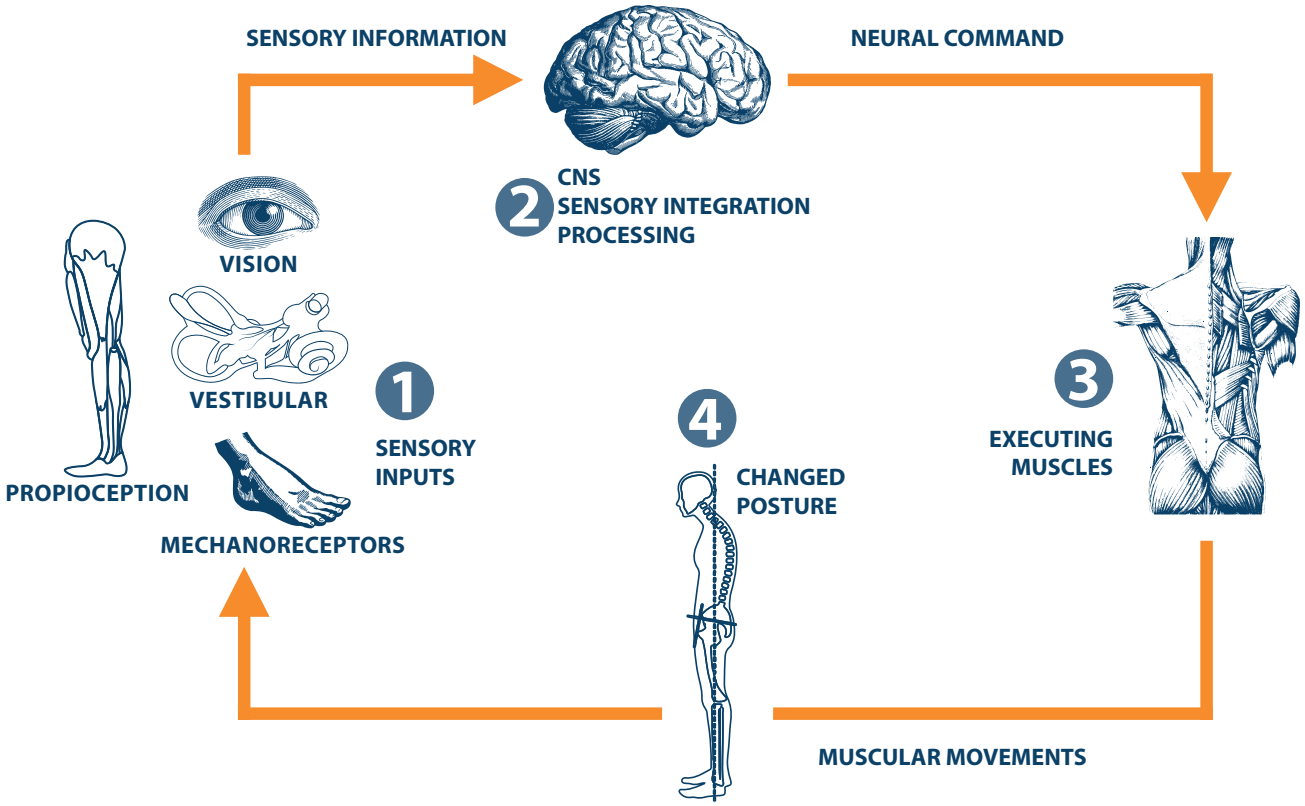
A: Those at risk for injurious falls would benefit the most. This may include those individuals who have a history of falls, or a fall would significantly impact their health and wellbeing. However, balance can be improved in almost any patient population and can improve anything from performance to confidence or fear.

SINGLE LEG STANCE MEAN HOLD TIME NORMATIVE VALUES BY AGES

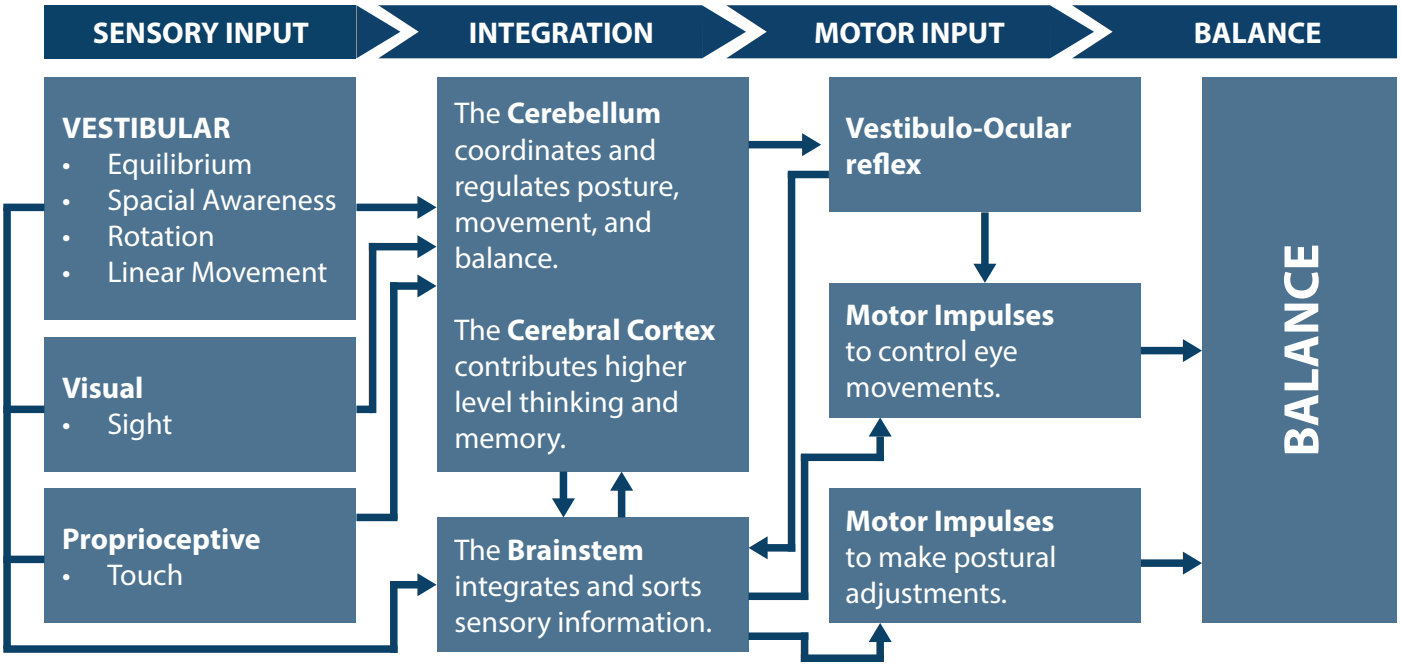
AGE	EYES OPEN IN SECONDS	EYES CLOSED IN SECONDS
18-39	43.3	9.4
40-49	40.3	7.3
50-59	37.0	4.8
60-69	26.9	2.8
70-79	6.2	2.0
80-99	6.2	1.3

BALANCE EDUCATION

BALANCE SYSTEM



SENSORY INPUT



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