WHY WAS THE COMMUNITY BALANCE SCREENING PROGRAM INITIATED?

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RESEARCH

- Per information provided by the CDC, 3 million older people are treated in emergency departments for injuries related to falls.
- Fall death rates in the US increased 30% from 2007-2016 for older adults
- In 2015, the total medical costs for falls totaled more than $50 billion with Medicare/Medicaid shouldered 75% of the costs.
- 40% of older adults who are hospitalized due to fall related injuries are unable to return home.
- Most common injuries from falling are head injury and hip fractures.
- Most falls occur at home. In Alaska, those falls are usually due to slipping, tripping, stumbling and stairs.

OUR COMMUNITY

- Per Alaska Trauma Registry, in 2015, 164 falls that required hospitalization in Fairbanks area
- Most falls occur at home and 47% of those from a slip, trip or stumble
- Some of these hospitalizations led to extended care stays in skilled nursing or assisted living units
- For those that cannot return home, limited housing options available
- Medical costs for injuries related to falls is extreme
- Alaska projection studies indicate increase in population of those 65 and older, 86% by the year 2045

BALANCE

Even distribution of weight that enables someone to remain upright and steady

Center of Gravity:

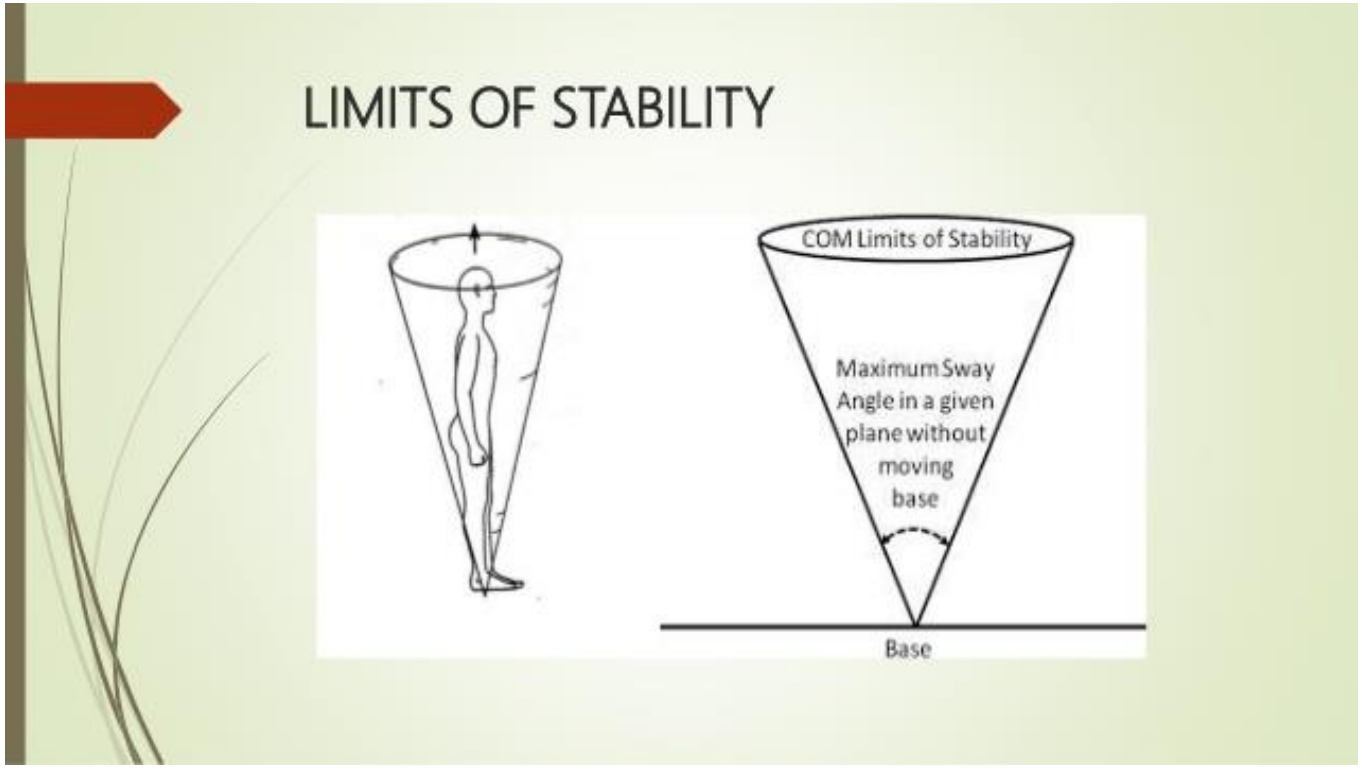
- Balance point of a body in which the sum of all torques is zero

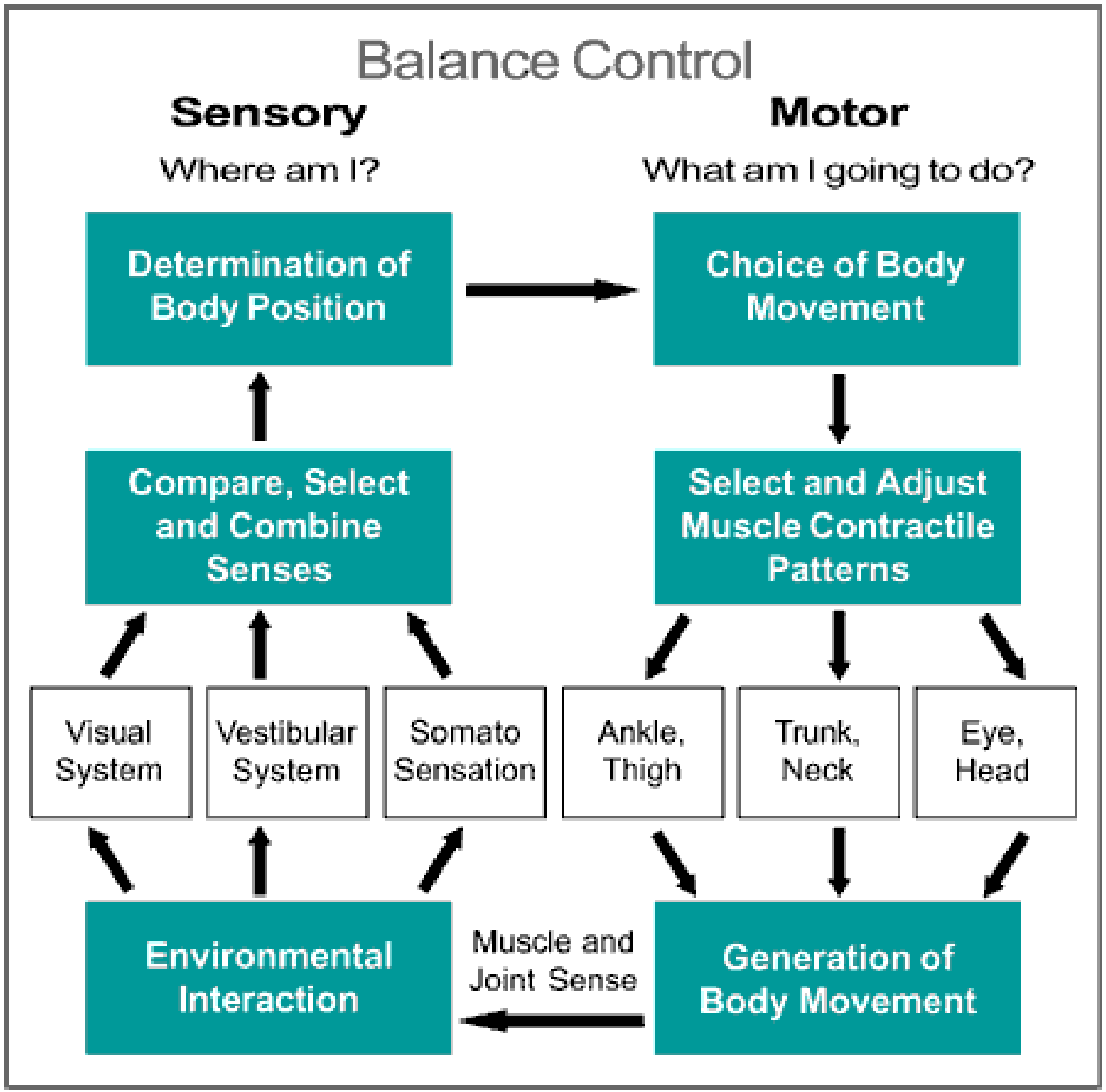
Base of support:

- The parts of the body in contact with the ground and the area between the supporting parts.

LIMITS OF STABILITY

- The greatest distance in any direction a person can lean away from midline vertical position without falling.





Dynamic Equilibrium Chart, courtesy of NeuroCom® International, Inc., and Teresa England, PT, MPT

SENSORY ORGANIZATION

- Vestibular System:
  - Central Component
    - Integrates information from vestibular, visual and somatosensory inputs to maintain balance, head control and gaze stabilization during movement.
  - Peripheral Component
    - Senses linear movement
    - Senses static tilt in respect to gravity
    - Senses change in angular velocity
    - Can be affected environmentally by frequent changes in movement such as being on a boat

SENSORY ORGANIZATION (cont'd)

- Vision:
  - Provides information regarding horizontal and vertical orientation in space
  - Identifies continuous movement
  - Can be affected by environmental factors such as dusk/dawn, darkness, glasses/bifocals, mirrors

- Somatosensory:
  - Joint receptors
  - Skin stretch receptors
  - Can be affected by environmental factors such as uneven or compliant surfaces

SENSORY ORGANIZATION (cont'd)

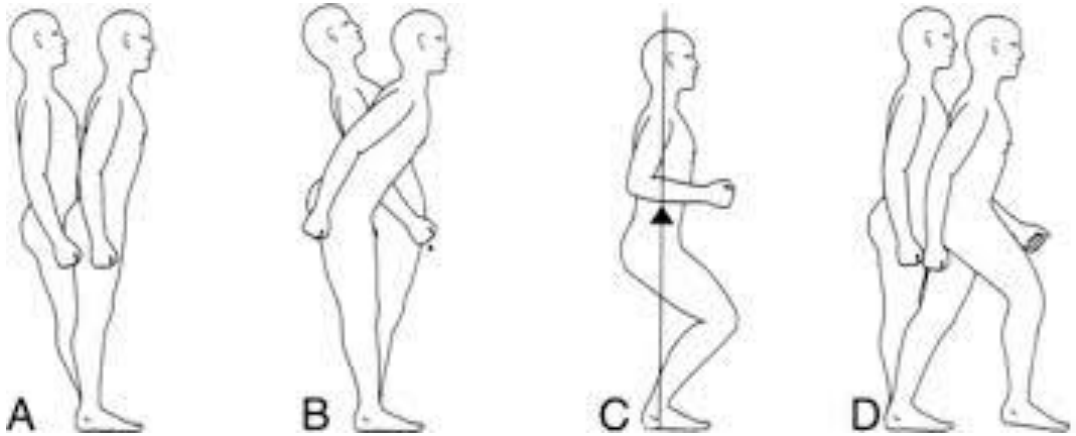
Conditions that affect sensory input:

- Neuropathy
- Pain
- Joint injury
- Arthritis
- Joint Replacement
- Glaucoma
- Cataracts
- Visual Decline
- Vestibular dysfunction

SENSORY ORGANIZATION TO MOTOR RESPONSE

- All of this sensory information is then processed in the brainstem and cerebellum and integrated with cognitive and psychological inputs, including memory, beliefs, expectations and emotions.
- Based on acquired sensory input, a motor response is then generated.
- Motor Response – lead to balance Strategies

BALANCE STRATEGIES



- Required when COG is outside of the BOS
- Automatic response
- Occurs 85-90 msecs after perception of instability

BALANCE STRATEGIES (cont'd)

- Ankle strategy
  - Used when perturbance is slow, of low amplitude, surface is firm or surface is wide and longer than feet
  - If forward, gastrocnemius first responder, followed by hamstrings and paraspinals
  - If backward, tibialis anterior first responder, followed by quadriceps and abdominals
  - Head movement is phase with hips

BALANCE STRATEGIES (cont'd)

- Hip strategy
  - Used when perturbance is fast, of large amplitude, surface is unstable or surface is shorter than your feet
  - If forward, abdominals first, then quadriceps leading to bend forward of trunk with hip/knee flexion which may lead to a squatting position making COG lowered
  - If backward, paraspinals first, then hamstrings

BALANCE STRATEGIES (cont'd)

- Stepping Strategy:
  - Used when perturbance is fast, of large amplitude, is a new experience or other strategies fail
  - BOS moves to "catch up" with your COG
  - This strategy can be forward, backward, sidestepping or cross over stepping

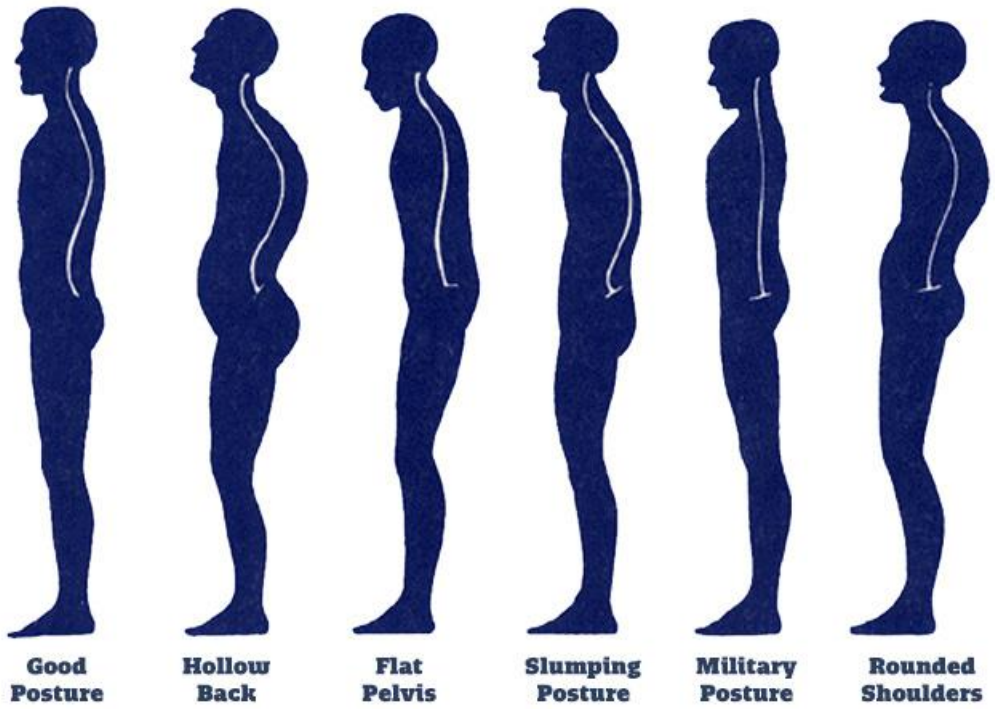
CHANGES WITH AGE

- Decrease in tactile sensitivity decreases with age.
- Loss of visual contrast sensitivity, visual threshold, visual field or visual acuity
- Loss of vestibular hair and nerve cells
- Changes in sensory adaptation
- Muscle strength deficits, sarcopenia
- Range of motion deficits
  - In spine, leading to changes in postural alignment
  - In neck, decreased input from visual and vestibular systems
  - In joints, especially ankles

ABNORMAL BALANCE RESPONSE

- Delayed muscle response to perturbance
- Inability to modulate amplitude of response in relation to stimulus size
- Inappropriate muscle response/action to compensate for environment
- Increased response to visual flow
- Decreased amplitude of postural response
- Potential for dizziness or vertigo
- Difficulty making anticipatory postural adjustments quickly and efficiently
- Often fall with first trial of new condition

POSTURE


Good Posture
Hollow Back
Flat Pelvis
Slumping Posture
Military Posture
Rounded Shoulders

WHY PREVENT A FALL?

- Increased risk of falling again is 5 times greater
- Falling can increase anxiety about falling
- Increased anxiety about falling encourages limiting mobility
- Limitation of mobility encourages decline of muscle strength and joint flexibility
- Decline of muscle strength and joint flexibility reduces ability to respond appropriately to a balance perturbance
- Inability to appropriately respond to a balance perturbance can lead to another fall

OUR ROLE

Early identification of fall risk factors for early intervention to PREVENT falls and fall related injuries.

Fairbanks Memorial Hospital Rehabilitation Services

Community Balance Screening Program

Free for anyone age 55+

Stay Healthy

Stay Balanced

Stay Independent

- Are you at risk of falling?
- Are you restricting your activities due to fear of falling?
- Are you concerned about losing your independence?

We can help identify your mobility and balance risk factors!

Call 458-5670 to register

FOUNDATION HEALTH PARTNERS
REHABILITATION SERVICES

Conclusion

- Balance control is multi-factorial, many systems involved
- Age related changes can affect ability to maintain balance
- Exercise can reduce risk of falling
- Preventing falls is key in preventing falls
- The Community Balance Screening Program is FREE to you!

Thank you for your time and participation in this presentation!

REFERENCES

- State of Alaska Trauma Registry website: http://www.hss.state.ak.us/dph/emergency/trauma
- Centers for Disease Control and Prevention: http://www.cdc.gov/injiry/wisqars/fatal.html