Regain your balance: Therapy and exercise for neuropathy patients

featuring **Mark Fasick & Dr. LeeAnn Manoni**

Wednesday, October 22, 2025

Today’s moderator:

Amanda Homscheid
Program Manager
the Foundation *for* Peripheral Neuropathy

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We will answer as many as we can.

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Check your email for how-to.

Today’s experts:

Mark Fasick
PT, MS,
NeuroBalance Center

Dr. LeeAnn Manoni
PT, DACNB
NeuroBalance Center

FoundationForPN.org

Regain Your Balance: Therapy & Exercise for Neuropathy Patients

Mark Fasick PT, MS, NCS

Is there a problem?

- Patient Report
- History of Falls
- Standardized Tests

What is causing the problem?

- Systems Evaluation

What can we do about it?

- Treat the right condition(s)

Is there a problem?

Standardized Functional Tests

- Berg Balance Scale
- Tinetti POMA
- Functional Reach
- Timed-Up and Go
- Dynamic Gait Index / Functional Gait Assessment
- Gait Speed (5^{th} Vital Sign)
- History of Falling

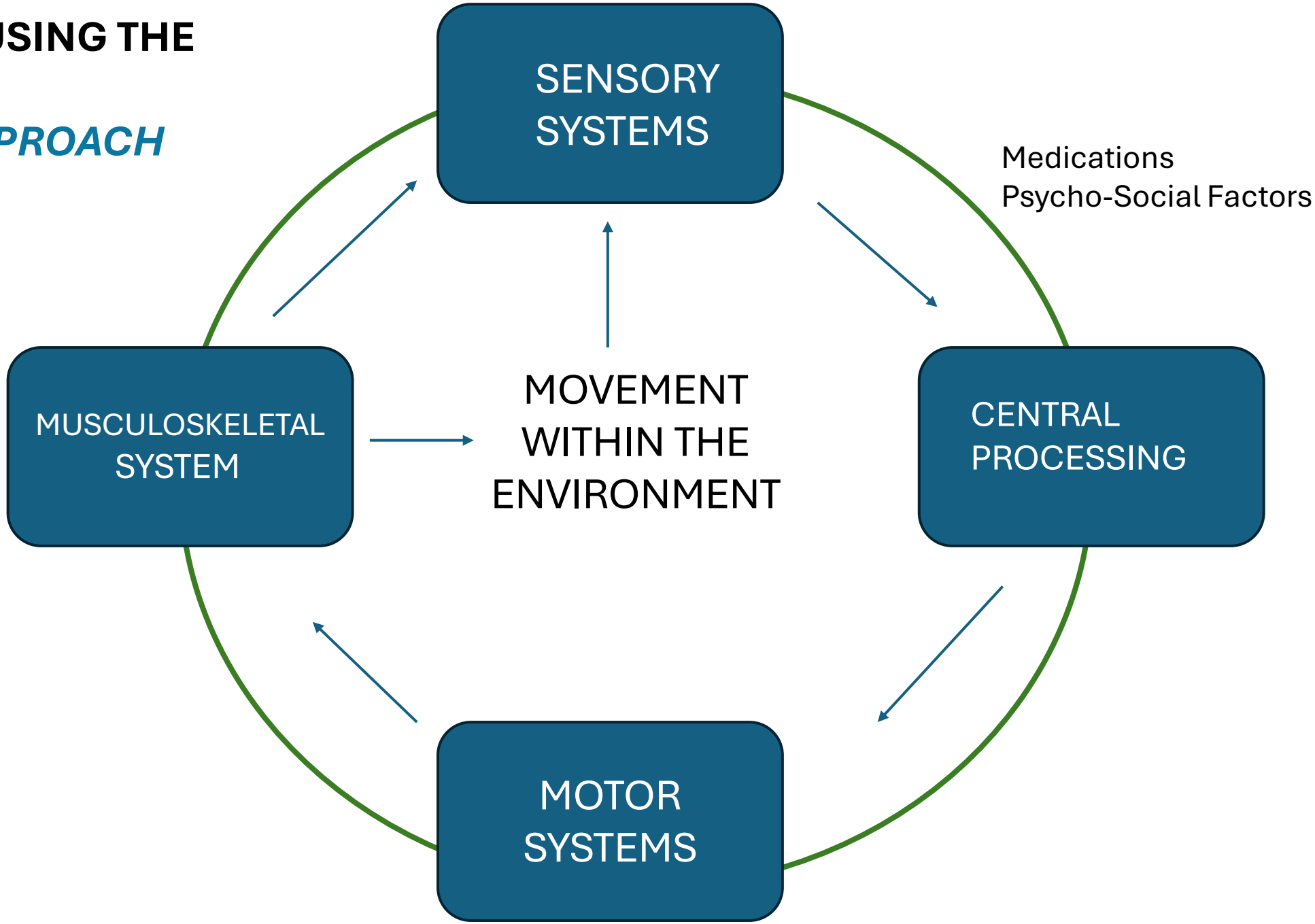
Quality of Life Questionnaires

- Activity-Specific Balance Confidence Scale
- Falls Efficacy Scale

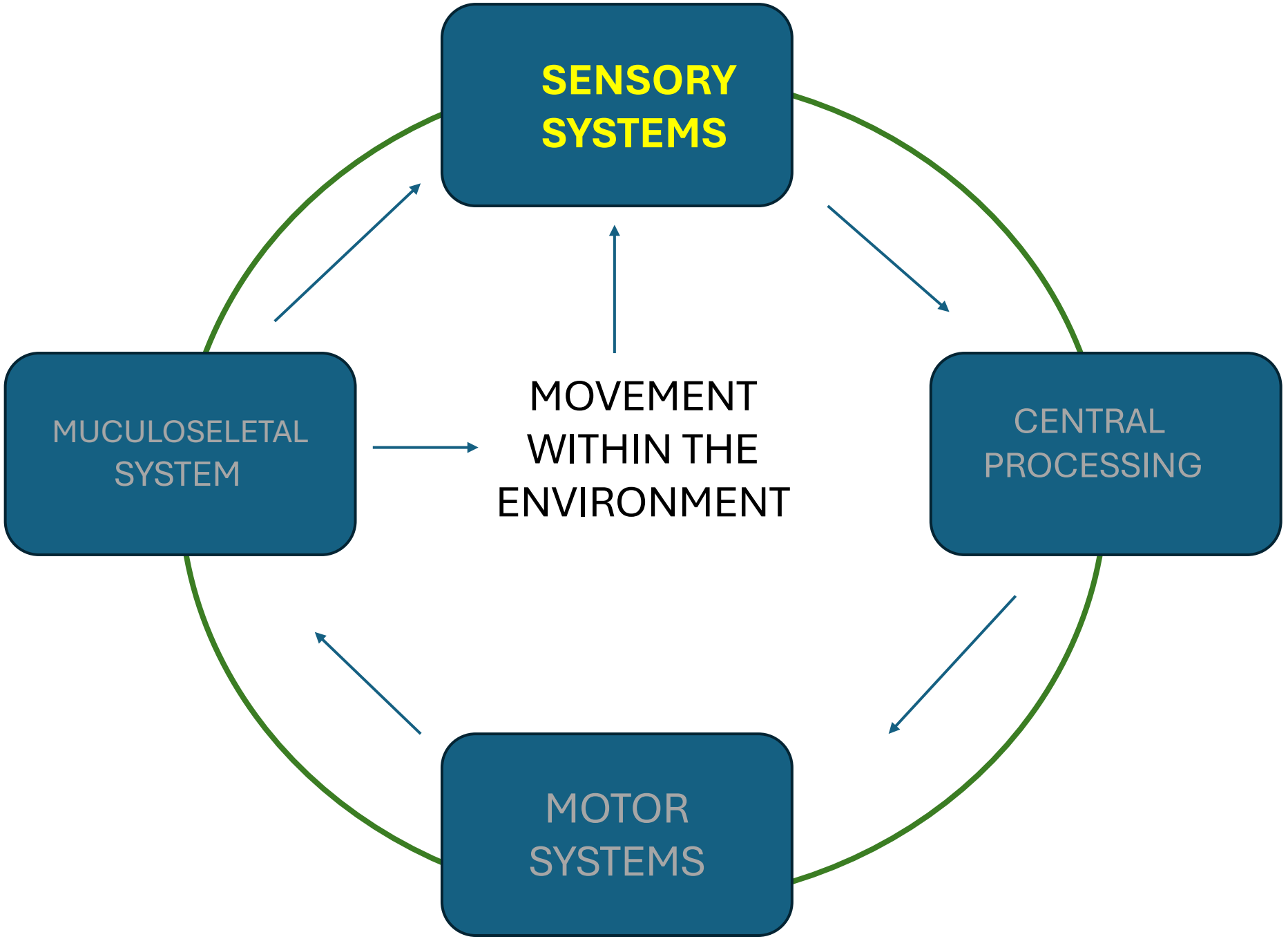
Provides percent confidence in functional balance

WHAT IS CAUSING THE PROBLEM?

SYSTEMS APPROACH

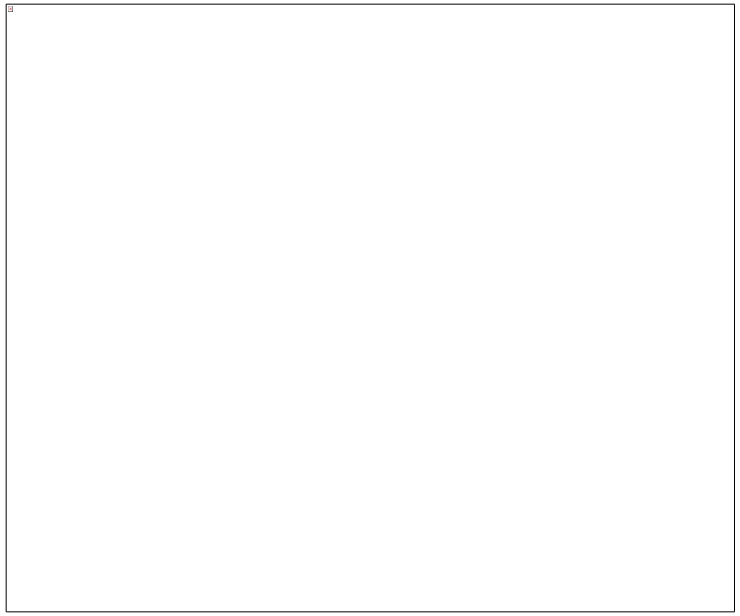


Medications
Psycho-Social Factors


SENSORY SYSTEMS
CENTRAL PROCESSING
MOTOR SYSTEMS
MUCULOSELETAL SYSTEM
MOVEMENT WITHIN THE ENVIRONMENT

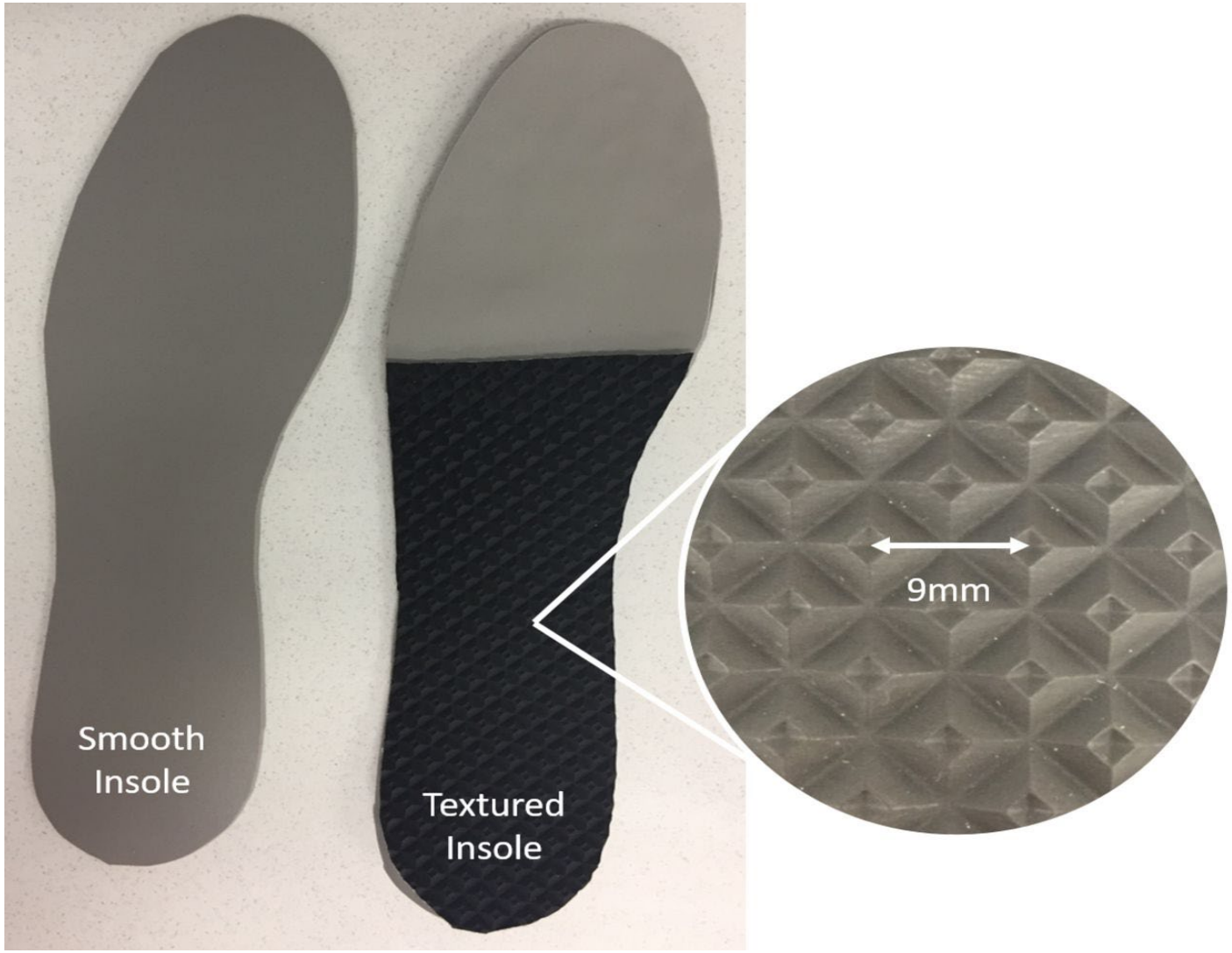
WHAT IS CAUSING THE PROBLEM?

SENSORY SYSTEMS

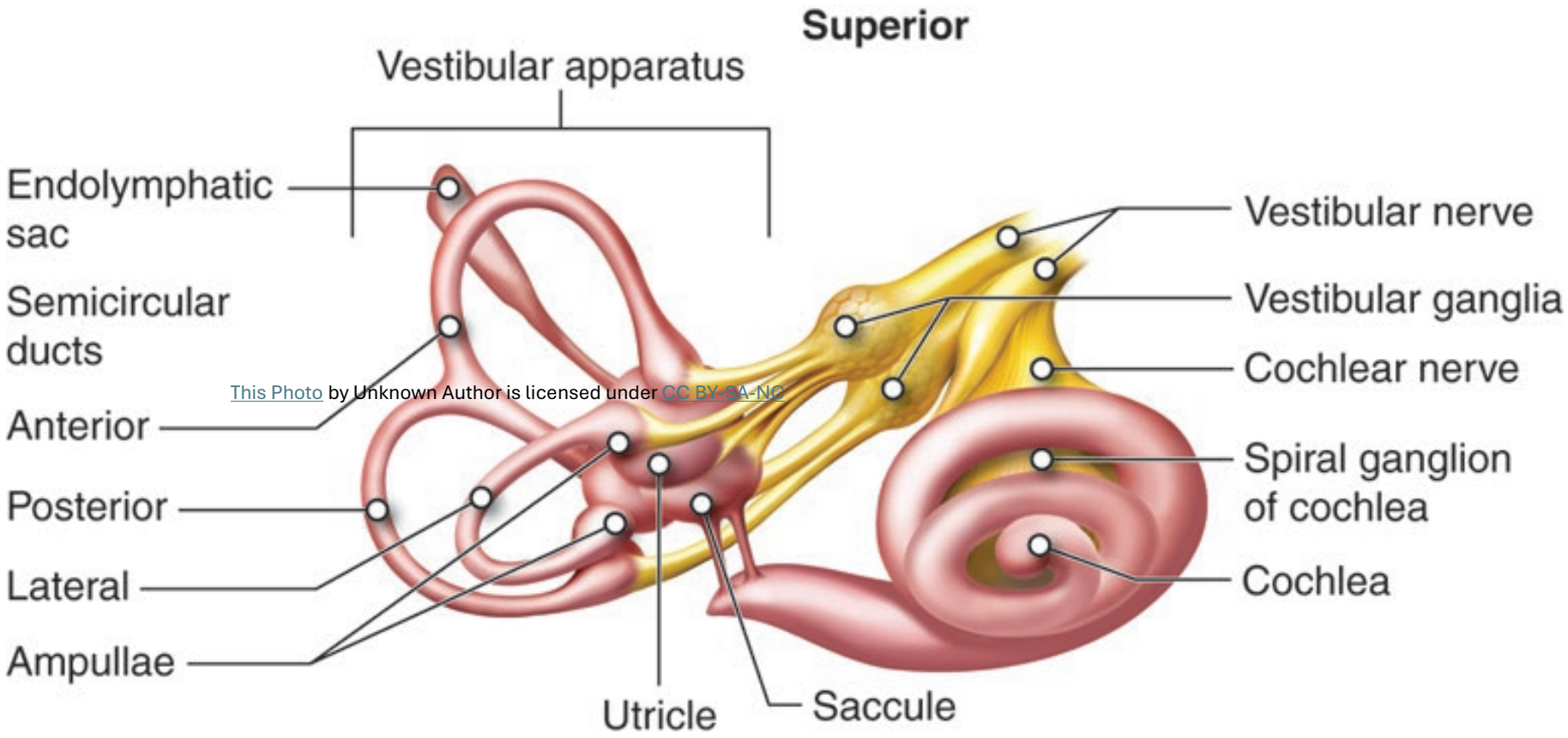


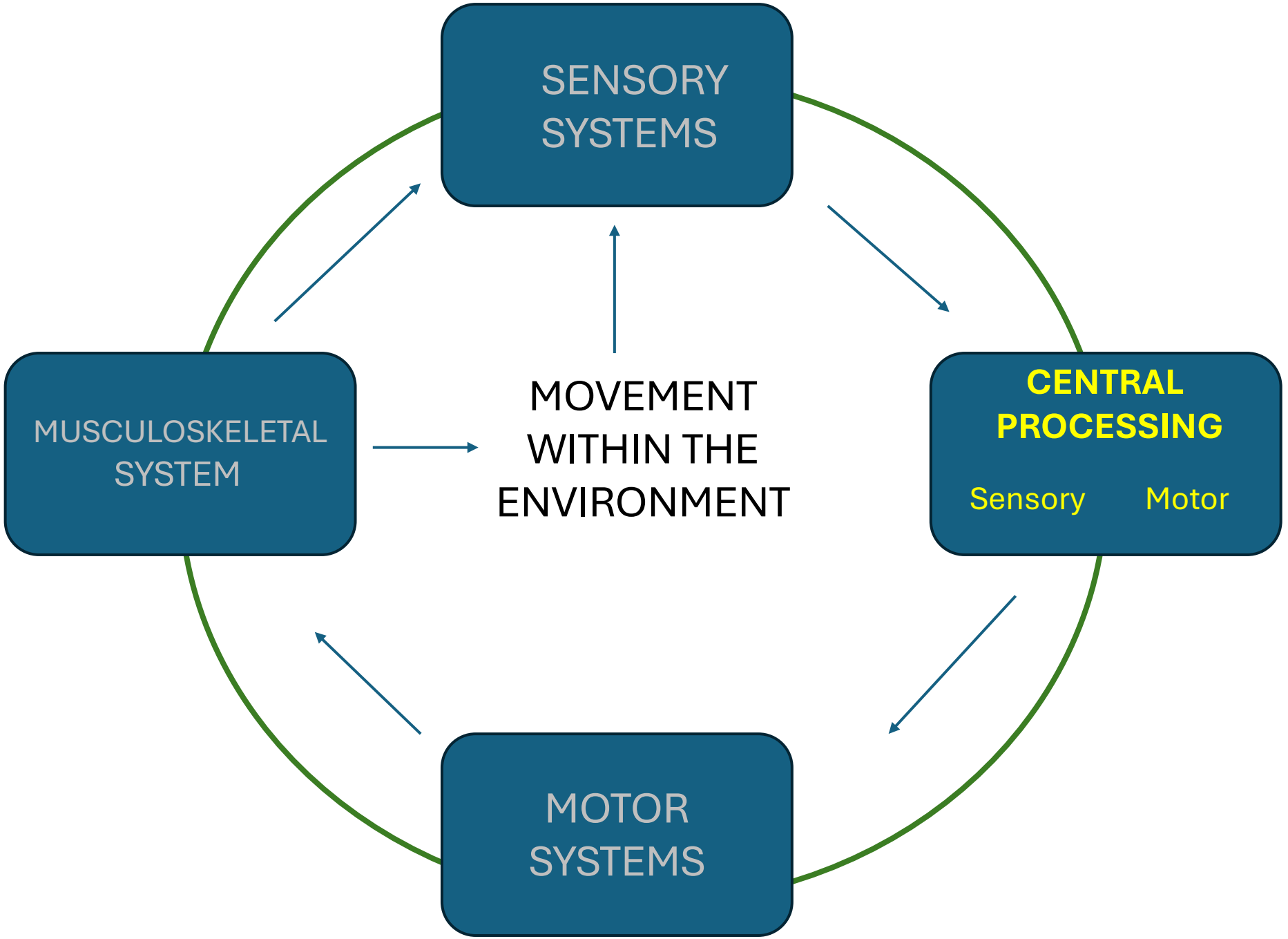
- Vision
- Somatosensation
  - Tactile (monofilament testing)
  - Proprioception/Kinesthesia
- Vestibular System / Graviception

Texturized Insole



Vestibular System



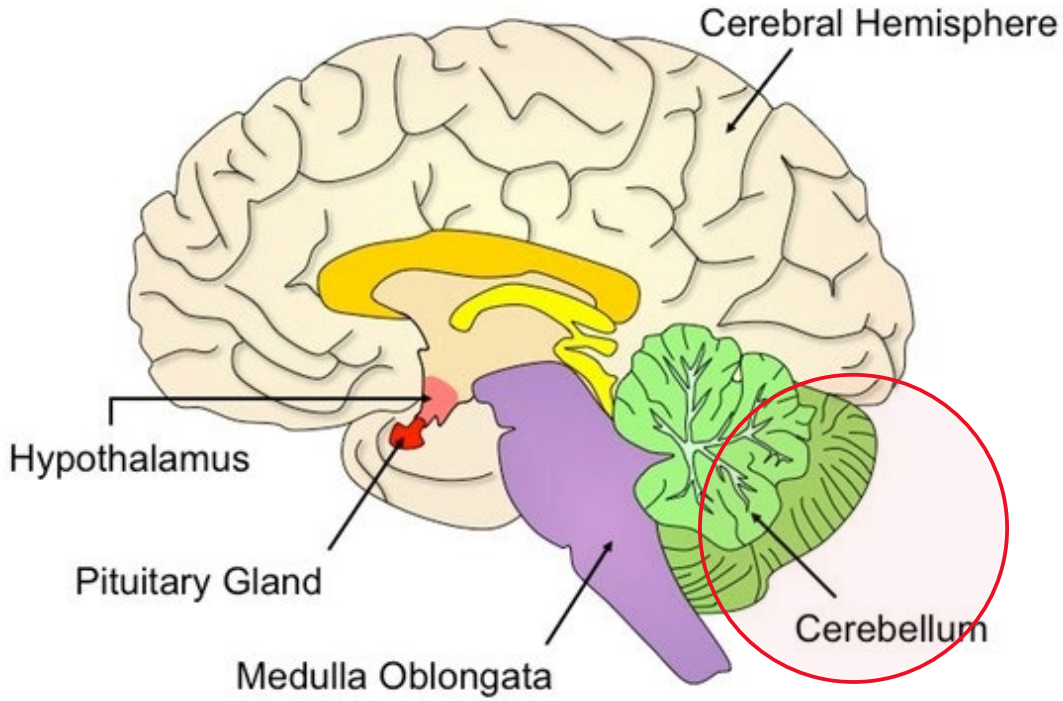

SENSORY SYSTEMS
CENTRAL PROCESSING
Sensory
Motor
MOTOR SYSTEMS
MUSCULOSKELETAL SYSTEM
MOVEMENT WITHIN THE ENVIRONMENT

WHAT IS CAUSING THE PROBLEM?

CENTRAL PROCESSING

Anatomical Regions

- Cerebellum
- Cortex
- Vestibular Nuclei
- Basal Ganglia



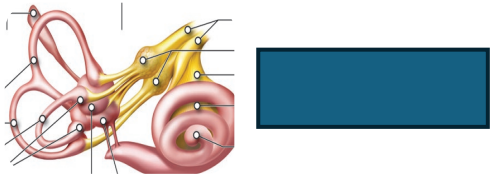
WHAT IS CAUSING THE PROBLEM?
CENTRAL PROCESSING

Weighting sensory information

- Somatosenory (dominates, normally)

- Visual

- Vestibular (least weighted, normally)



WHAT IS CAUSING THE PROBLEM?
CENTRAL PROCESSING

Weighting sensory information

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Weighting Sensory Information

Sensory Organization Test (SOT)

Firm v. Foam surface
Eyes Open v. Eyes Closed

- Loss of somatosensation
  - ➢Visual Dependence
- Loss of vision
  - ➢Somatosensory dependent.

WHAT IS CAUSING THE PROBLEM?
CENTRAL PROCESSING

Weighting sensory information

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- Visual

- Vestibular (least weighted, normally)

To *Enhance* Somatosensory Use

- Reduce visual cues
  - Eyes closed; dimmed room; scanning; moving visual environment
- Add challenge w/ varied foot positions or movement

To *Compensate* for Poor Somatosensation

- Good lighting
- Ensure proper vision correction (glasses)
- Use of assistive device, if needed
- Use of visual targets…

WHAT IS CAUSING THE PROBLEM?
CENTRAL PROCESSING

Developing Coordinated Motor Responses

- Choosing appropriate muscle responses
  - Sequence of muscle responses
    - Timing of muscle responses
      - Grading muscle responses

Coordinated *Motor* Responses

- **Ankle** - first response for mild -mod perturbation.
  - *Requires good nerve conduction velocity/ROM*.
- **Hip** - responds w/ greater perturbation or with foot instability (I.e. balance beam/foam)
  - *Requires motor planning - flexible motor system*.
- **Stepping** – w/ greater balance challenge. Typically the second strategy among elderly.
  - Requires proximal stability.

To Augment Ankle Strategies

To Augment Hip Strategies

Exercises depicted are not intended for use without the guidance of a qualified clinician

To Augment Stepping Strategies

Exercises depicted are not intended for use without the guidance of a qualified clinician

Single Limb Stance Stability

- Requires hip & core stability, and good foot ankle sensory & motor function.

- Inability to stand 10 sec correlated with reduced lifespan.

In-Clinic Interventions

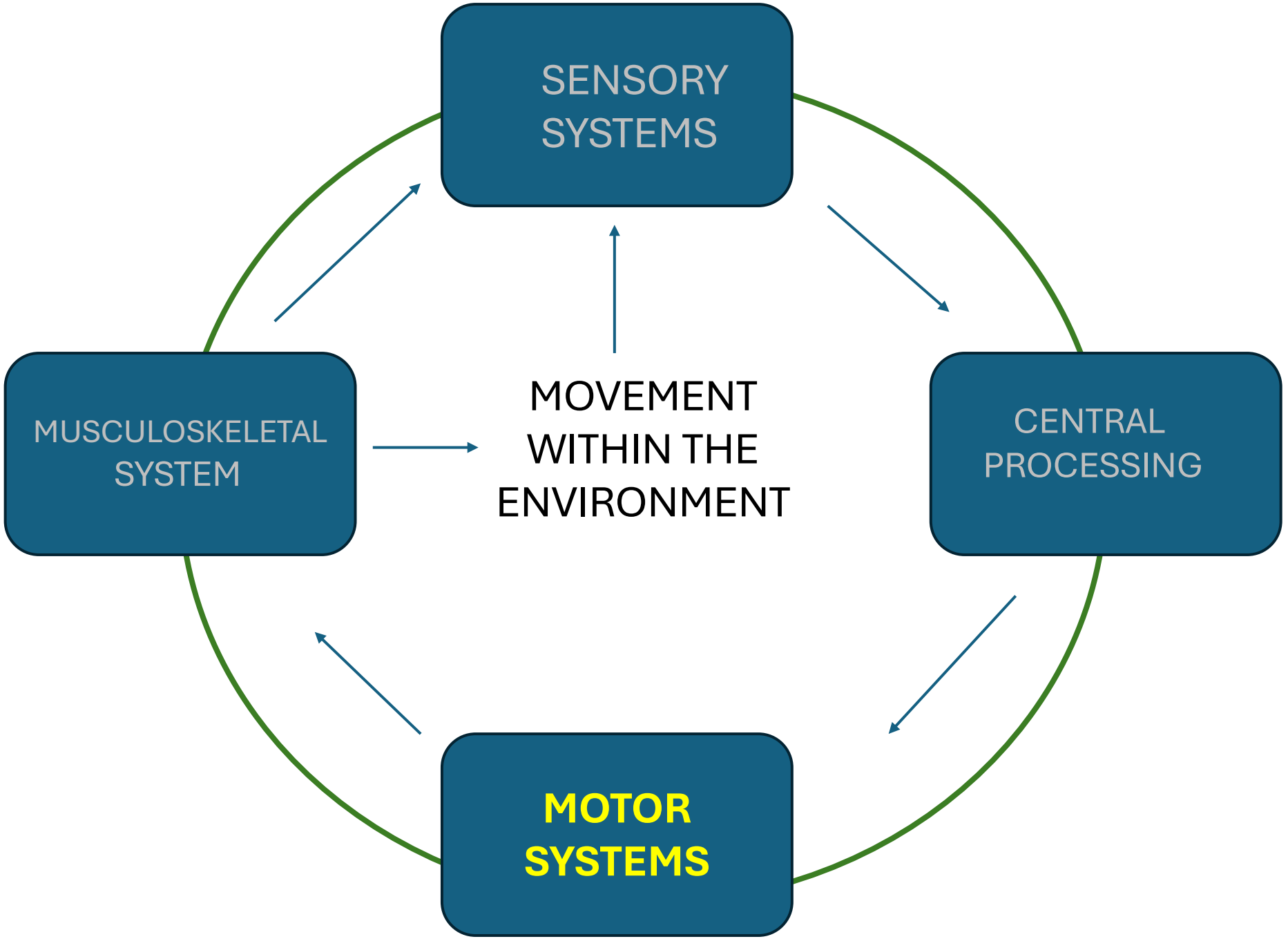
- **Perturbation Training**: *providing a safe environment to practice reactive responses*
  - Translating Platform
  - Nudge
  - Trips / Slips
  - Moving Obstacles

- Various Surfaces: foam, rocker board, grass, balance beam, etc

- Dynamic Functional Balance Training

- Virtual Reality


MULTNOMAH FALLS
USA
ALTER G
Anti-Gravity Treadmill


SENSORY SYSTEMS
CENTRAL PROCESSING
MOTOR SYSTEMS
MUSCULOSKELETAL SYSTEM
MOVEMENT WITHIN THE ENVIRONMENT

Motor Systems (Still in the Nervous System)

- Primary Motor Cortex
- Pyramidal system:
  PMC→corona radiata→Internal capsule→pyramidal decussation →cortico- spinal tract
- Other Motor Tracts: vestibulo-spinal tract / recticulo-spinal tract
- Spinal cord
- Peripheral Nervous System
- Neuro-muscular junction

“The State of the Motor Pool"

- Strength (force-generating capacity)
- Tone – is there spasticity or low tone?

FOOTDROP…

Use of AFOs

PROS

- Reduce foot drop / tripping
- Assist in knee stability
- Aid in mid-late stance ankle stability
- Provide lateral ankle stability
- Improve overall gait kinematics

CONS

- Limit muscle activity
- Limit movement (i.e for sit to stand, stairs)
- Alter normal gait kiniematics

Dorsi-Assist Devices

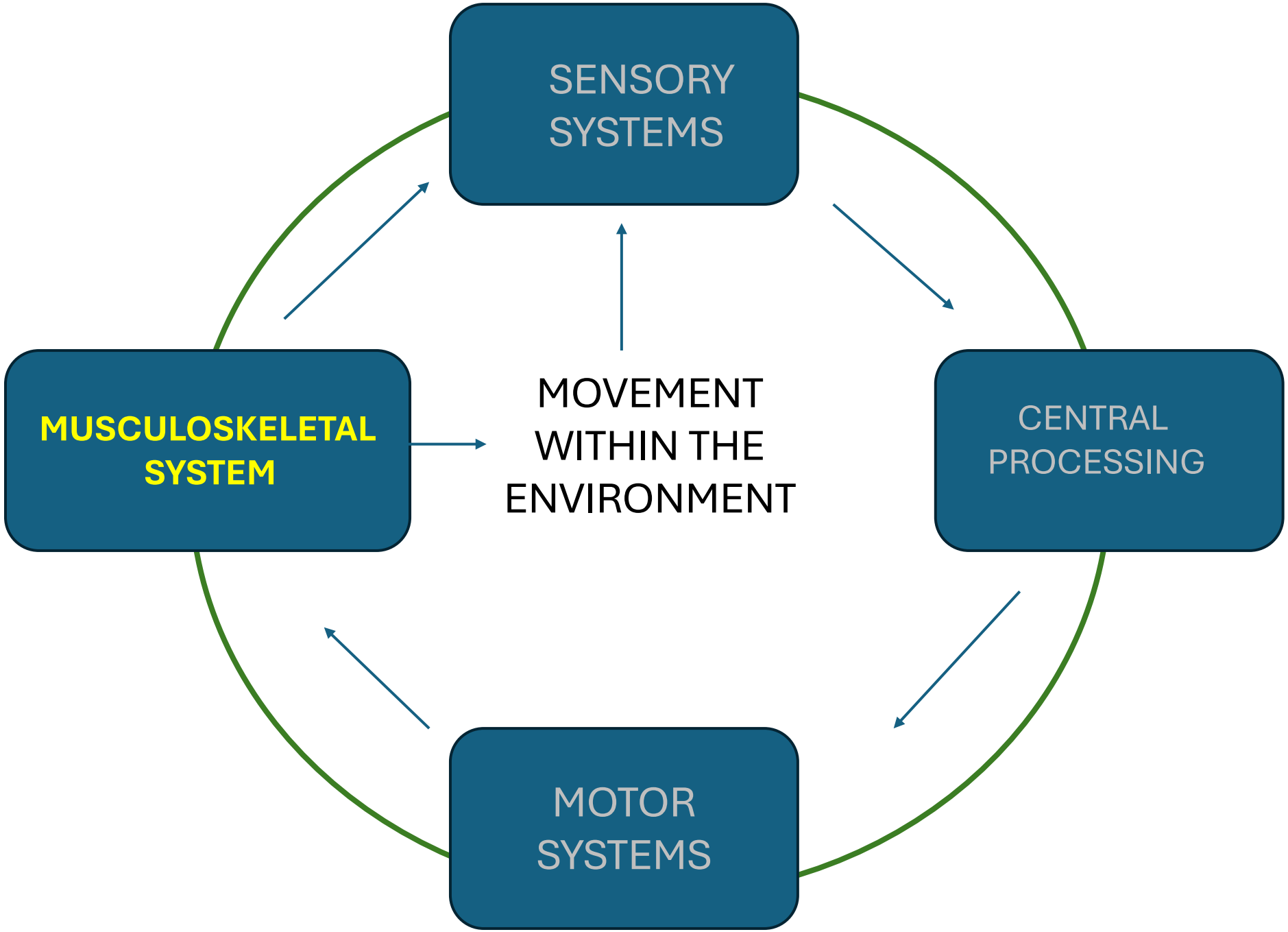
SaeboStep®

Conventional Plastic

Carbon Fiber

Functional Electrical Stimulation

Bioness L300®


SENSORY SYSTEMS
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Range of Motion / Muscle Strength / Muscle Flexibility
ANKLES

Exercises depicted are not intended for use without the guidance of a qualified clinician

Range of Motion / Muscle Strength / Muscle Flexibility

HIPS

Exercises depicted are not intended for use without the guidance of a qualified clinician

Balance exercises that will impact Neuropathy

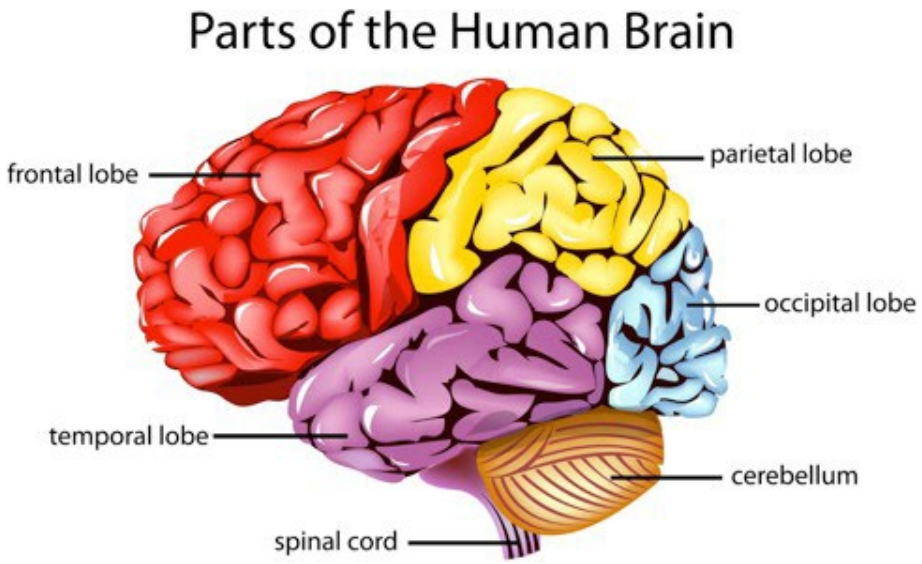
Dr. LeeAnn Manoni DACNB

Brain therapy

- Exercises to areas of the brain that impact the body
- Therapy carried out directly to the body talks to the brain
- Everything above our neck impacts everything below our neck

Cerebellum

- Most powerful area of the brain
- Controls: balance, posture, gait
- Also helps control eye movements



Cerebellum

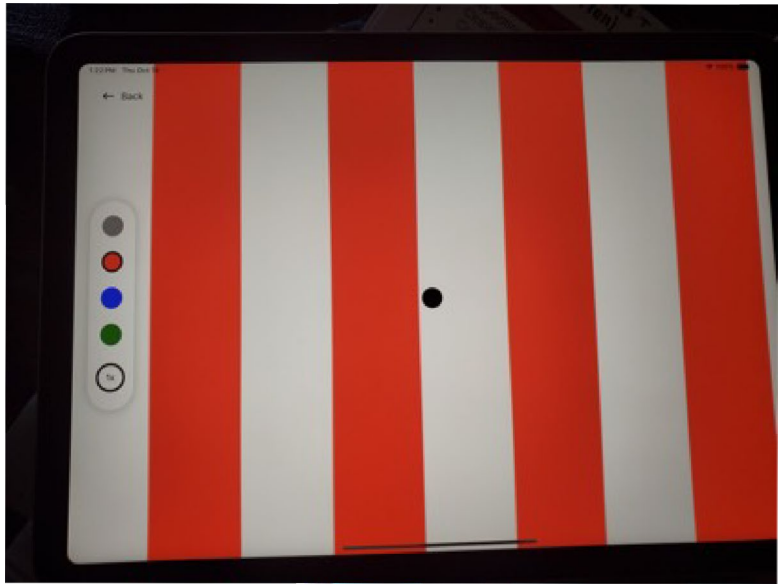
- Different parts of the cerebellum
  - Cerebro-cerebellum: Exercises with cognitive tasks
  - Spino-cerebellum: Sensory
  - Vestibulo-cerebellum: Balance

Cerebellum therapy

- Complex movements: Figure eights
- Metronome based therapy hand flipping with timing
- Exercising with a metronome
- Sustained weight challenge at a joint: tennis ball sock 30 sec

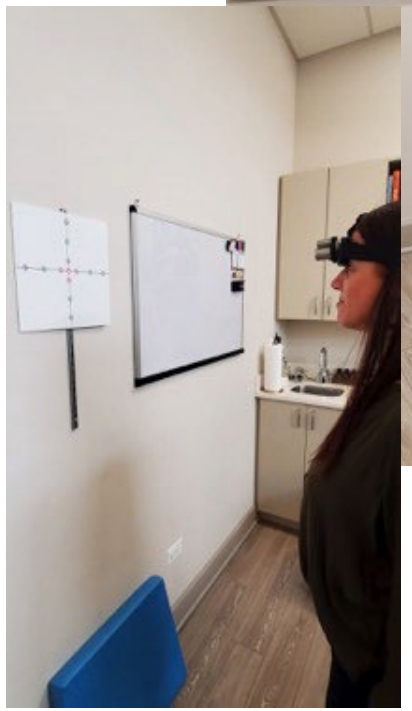
Vision

- Brain tool kit
  - pursuits, saccades, gaze fixation
  - OPK
  - VOR



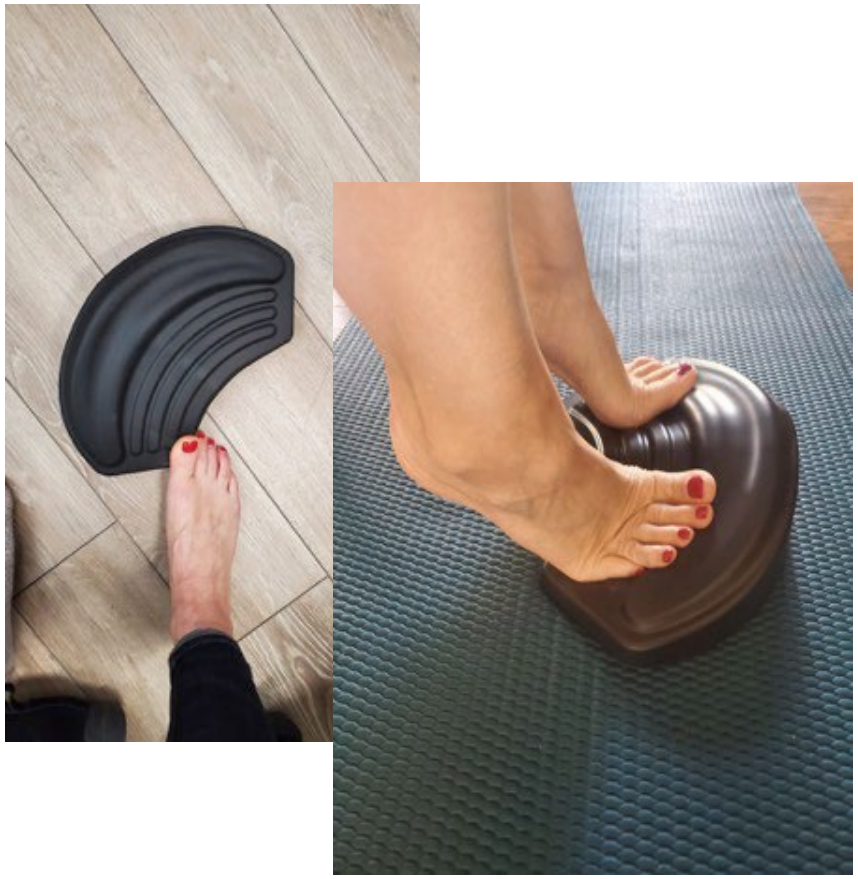
Vision Therapy

- Glasses with laser give feedback
- Metronome added to balance or vision
- Fixation
- Pursuits
- Saccades



Toe strength and dexterity

- Toe pro
- Band therapy
- Big toe flexion
- movements
- Isometrics



Sensory impact to the brain

- Poor movement in our neck affects balance
- Better maps impacts balance

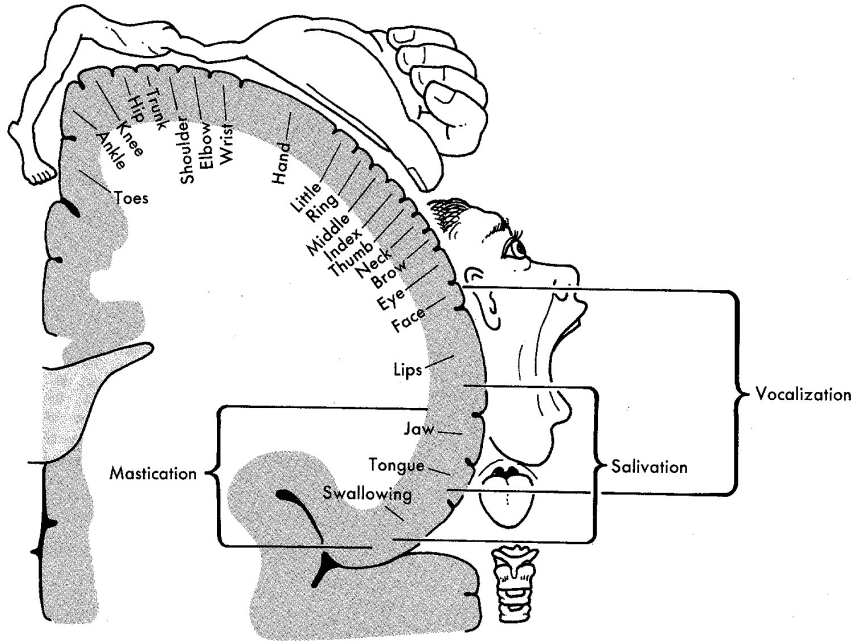


Image therapy

- Recognise app :hand or foot options (build your own)
- Neuropathy can alter maps in the brain for the hand and feet
- Restoring maps helps improve movement

Sensory

- Impacts proprioception which is our body awareness
- Vibration sends signals to be reconnect with the body and brain (Powerplate, rezzimax)
- Experience dependent neuroplasticity can rewire the brain based on quality and frequency it receives
- Vibration sensory feedback affect messages to the brain, brainstem and cerebellum and impacts awareness at the joints and muscles

Instructions for Using the Toe Strength Dynamometer

Your toe strength dynamometer has been sent to you tested and ready-to-go. After a few months of regular use, you need to replace the CR-2032 battery, which is located on the underside of the handle. Occasionally, you have to rese device so that "peak hold" appears. This allows the device to retain the highest measurement, which is essential when ta strength measurements. To reset to peak hold, press the power button, then repeatedly press the unit button, until yo peak hold appear on the left side of the screen. It is also possible to choose between pounds and kilograms when pre the unit button. Once the device is turned off, it will retain the applied settings.

Measuring toe strength:

1. The patient should be seated comfortably with their legs tilted back about 5° from vertical (Fig. 1).

Fig. 1

2. Place the card under the lesser toes so that the longest part of the card is positioned beneath the fifth toe (Fig. 2). It is important the card not contact the forefoot, as it should be placed beneath the toes only.

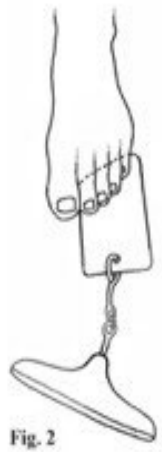


Fig. 2

3. The practitioner then places their hand on top of the patient's foot to keep it stable and detect if the patient attempts to lift their heel from the ground.

4. To perform the test, say "Keep your heel on the ground, keep your forefoot on the ground, and try to stop me from pulling this card out." The patient is then instructed to grip the card as firmly as possible while you slowly pull the card out from beneath their toes. If the patient lifts his or her heel, the test must be repeated.

5. Repeat the test until a consistent measurement is achieved, usually 2 to 3 times. Pressing the power button resets the peak score to zero after each measurement.

6. Flip the card over and place the long end of the card beneath the big toe of the same foot (Fig. 3). Record the measurement and repeat the strength test on the patient's other foot.

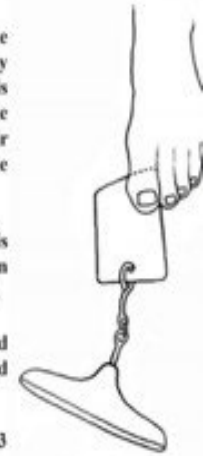
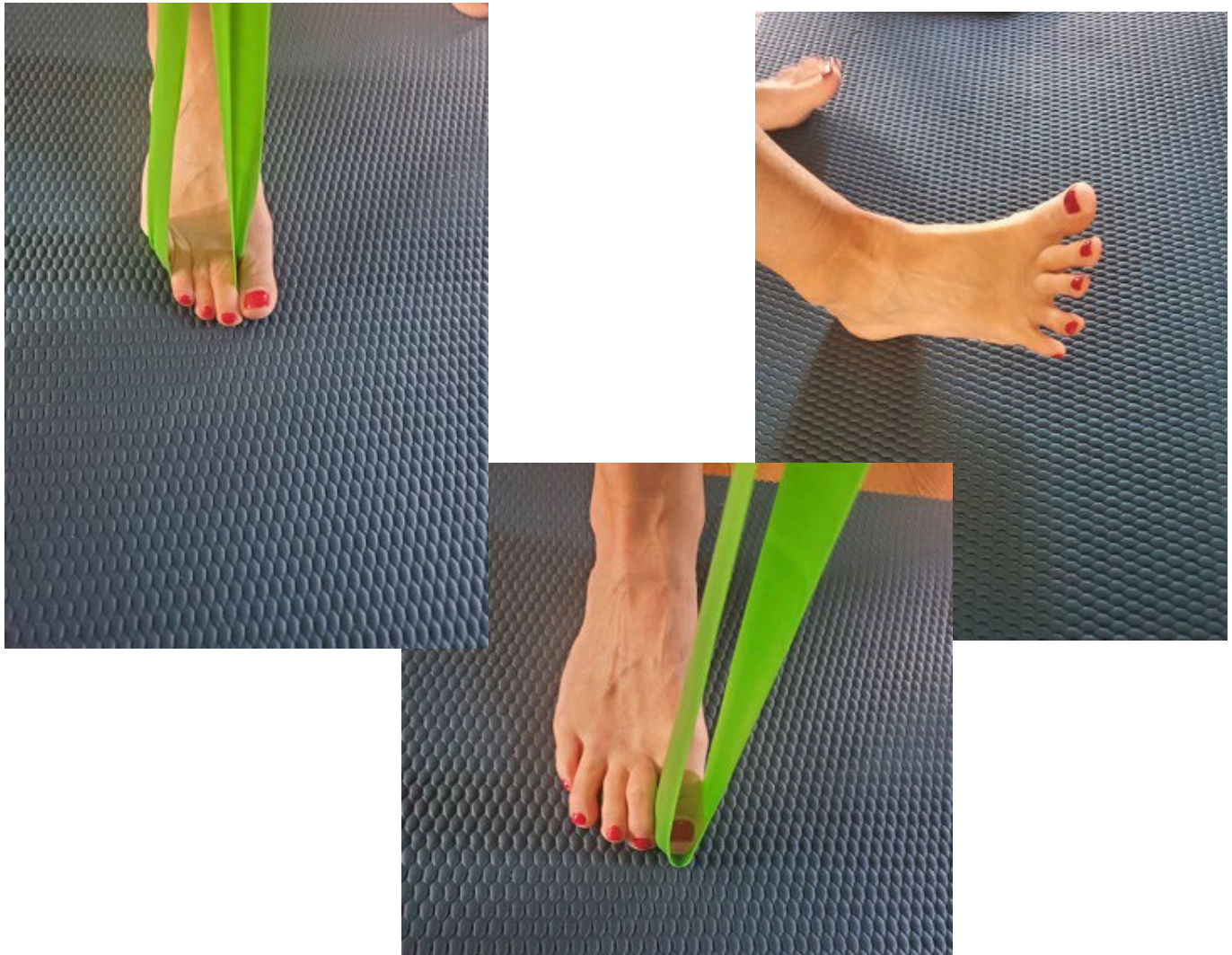


Fig. 3

Normal and abnormal results for the toe strength dynamometer:

As a general rule, adults can produce about 10% of their body weight in force with their great toe, and 7% of their weight in force beneath the lesser toes. Athletes should be able to achieve 15 to 20% of their body weight beneath th toe, and 10 to 15% of their body weight beneath the lesser toes. Repeat measurements should be performed on the surface as the initial test. Go to **HumanLocomotion.com** to watch the video of how to set the dynamometer, the toe stre test, and the hip strength test with the optional strap.

Toe strengthening exercises



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ANY QUESTIONS?!

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