Multiple Sclerosis and Balance

Ryan Mueller, PT, DPT, NCS

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Multiple Sclerosis Alliance of Southern Colorado

Disclaimer

The exercises discussed are not intended to be recommendations or prescriptions for attendees. They are educational in nature to provide potential ideas and to provide evidence in support of exercise/physical activity for persons with MS. Please consult your doctor or a license healthcare provider (physical therapist) to discuss initiation of a balance regime.

Objectives

Understand components of balance

Understand balance strategies

Understand how MS can effect balance

Prevalence

Falls are one of most common reported incidences for PwMS

50 to 80% report balance or gait deficits

50% of PwMS can suffer a fall within a 2 to 6 month period (other stats are within a 1 year period)

Input for Balance

Visual system

Somatosensory system

Vestibular (inner ear)

Somatosensory System

Includes:

- **Light touch**
- **Proprioception (body position awareness)**
- Vibration
- Kinesthesia (body movement awareness)
- Deep pressure

Primary balance on firm surfaces

Fastest response for input

Input is sent to the cerebellum for process

How Does MS Affect This?

Changes in sensation (paresthesias, numbness, tingling) leading to reduced input

Lack of body awareness with movement of position (impaired proprioception)

Cerebellum deficits for processing or sending changes in postural response

Evidence of pathway being impaired in PwMS leading to slower input processing

Visual System

Visual feedback to our world

System is slower

Increases in feedback on unstable surface

How Does MS Affect This?

Optic Neuritis

- Vision loss
- Visual field cuts
- Inflammation in optic nerve

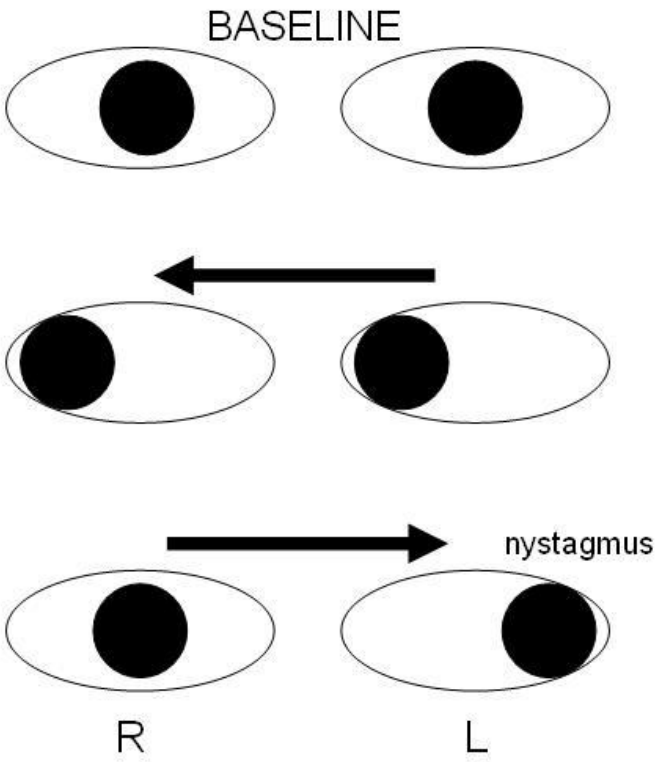
Internuclear ophthalmoplegia (INO) INO

- Inability to move eye in medial direction due to damage to neuron (demyelination) and get resulting nystagmus

Dipoplia (double vision)

Nystagmus

Impaired smooth pursuits, saccades, convergence



What To Do?

See eye specialist (neuro-ophthalmologist)

Perform visual therapy

Assess for prisms

Promote use of vestibular or somatosensory system

Vestibular System

Inner ear system

Becomes most dominant system on unstable surface

Includes reflexes for balance

- Reflex to keep us upright – postural reflex (vestibulo-spinal)
- Reflex to maintain our focused while head is in motion (vestibulo-ocular)
- Reflex to keep our head and neck centered (vestibulo-colic)

How Does MS Affect This?

Possibility of demyelination leading to slower processing

Can have impairments in reflexes

Alterations in visual feedback leading to changes

Can develop peripheral vertigo or central vertigo

Can lead to dizziness symptoms

- Discussion with PT about your symptoms to determine possible cause

System Sends Input....Now What?

Balance Strategies

Ankle strategy

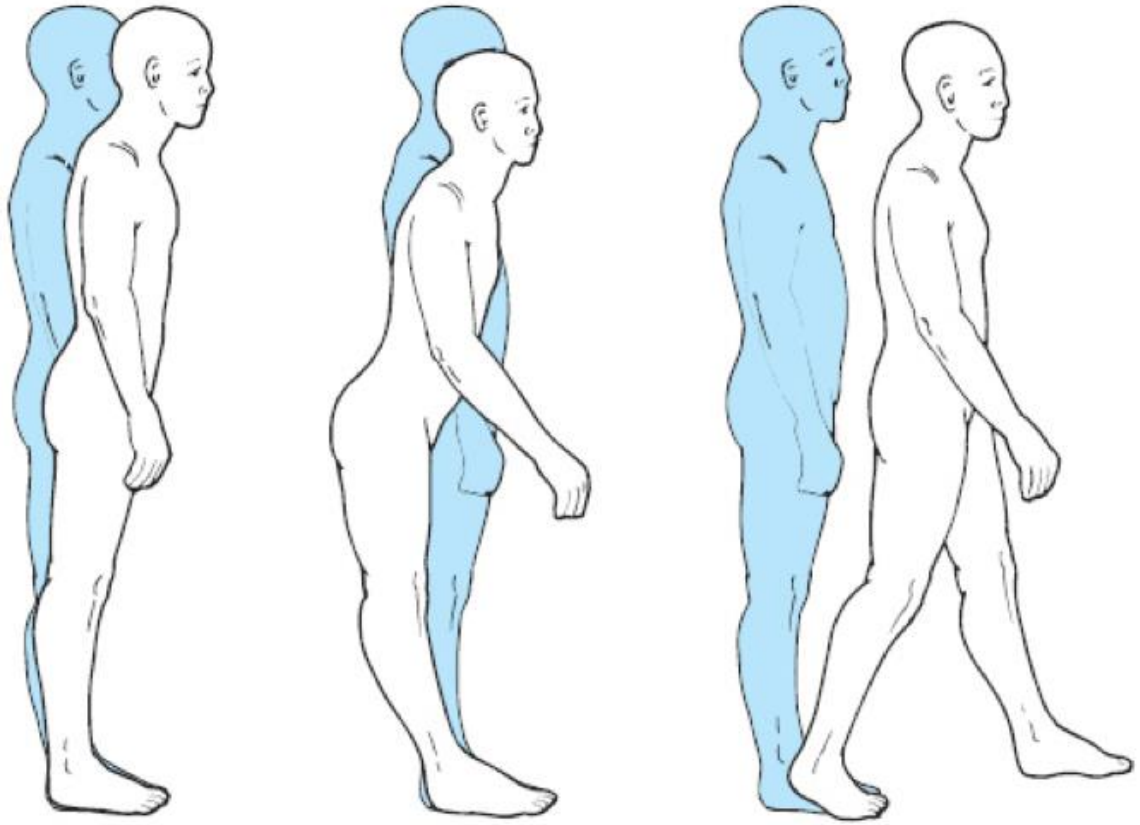
- Smallest loss of balance
- Responds to somatosensory system

Hip strategy

- Responds to vestibular system

Stepping strategy

- Typically for largest loss of balance
- Responds to vestibular system



Response

Motor activation

- Body creates a motor activation to respond to response and promote strategy

Brain assesses and predicts proper response and changes in real time

How Does MS Affect This?

Delayed processing for input and output effects responses

Weakness in muscles lead to diminished or lack of response

- Amplitude of response can be smaller
- Trunk or leg muscles

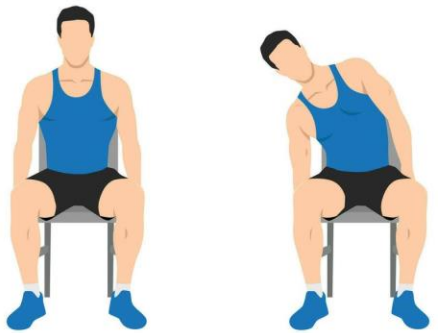
Limited ROM or spasticity can limit proper positioning

Cerebellum plays part in input and output

Coordination deficits

Speed of muscles

- Fast twitch muscles



Other Considerations with Strategies

Ankle, core, etc strengthening

Flexibility

Use of AFOs?

Amplitude training

Fatigue and fatigability

Use of assistive devices

Static vs Dynamic Balance

Static: ability to maintain balance in fixed posture

Dynamic: ability to transfer body over base of support; ability to maintain body while parts of moving

- Walking, walking with head turns, stepping over objects, stairs, bed mobility

Both can be influenced by many factors

- All balance inputs
- Strength
- Coordination

Dual Tasking

Performing two tasks at the same time

Can be motor-motor or motor-cognitive

- Walking and grab phone
- Walking and holding a conversation

Part of brain can lead to “distraction” or reduced processing

Can lead to more falls or impaired balance

Dual Tasking

Including dual tasking in formal rehabilitation settings

Reducing amount of time performing multiple tasks

Attend to single tasks

Reducing distractions

Non MS Issues

Other things can cause vestibular issues or impairments not related to MS

- Meniere's disease

Neuropathy not related to MS

Normal visual changes

General weakness

Blood pressure? Could be MS

Medications

Takeaways

3 balance systems: somatosensory, visual, vestibular

MS can effect each system differently

Balance strategies include ankle, hip, and stepping

Can address systems and strategies through various interventions

Other MS related impairments can influence balance strategies

Dual tasking can lead to greater balance or gait issues

Questions?

Neuro Logic Rehabilitation and Wellness

Ryan@neurologicrehab.com

www.neurologicrehab.com

719-306-0009