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2026 PATH Intl. Region 6 Conference

Moving with Purpose: Physical Activity for Individuals with Neuromuscular and Spinal Cord Disorders

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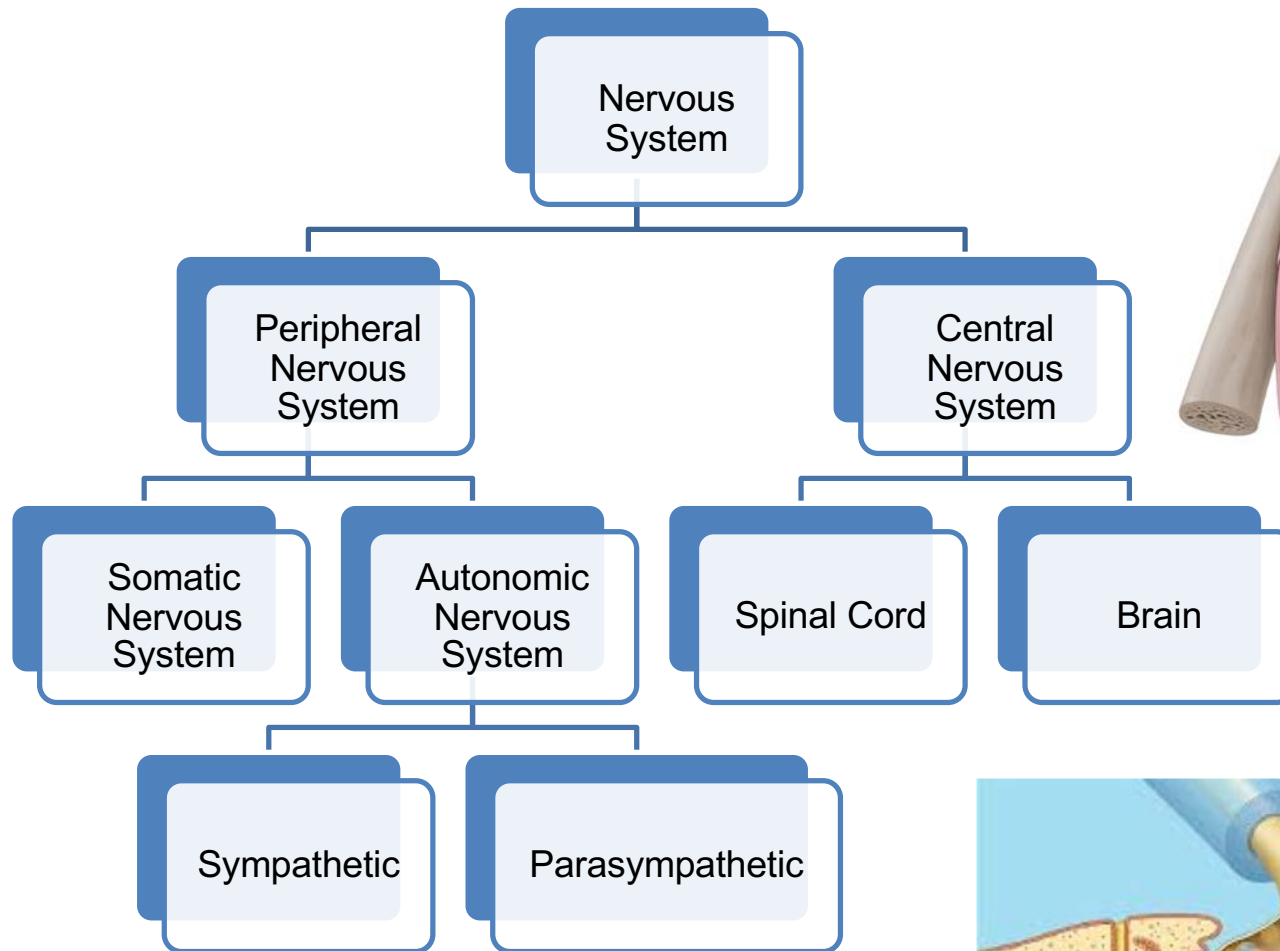
Physical Activity Matters

- Inactivity accelerates:
 - Functional decline
 - Mobility loss
 - Secondary health complications
- Adaptive programs help maintain:
 - Mobility
 - Strength
 - Independence
 - Participation

Movement Limitations

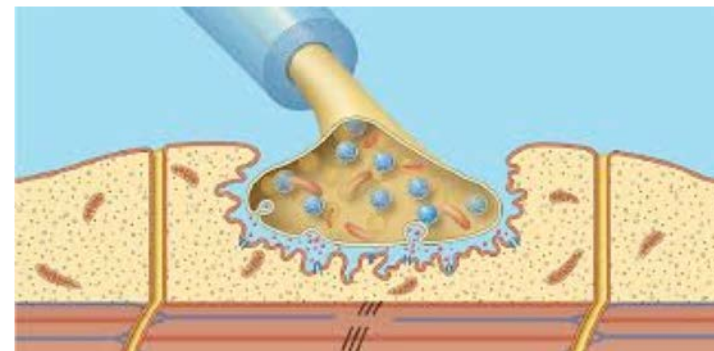
- Major Pathways:
 - Brain-based movement disorders
 - Spinal cord injury/disorders
 - Neuromuscular disorders
- Causes differ, but movement changes overlap
- Focus on functional movement ability

Neuromuscular Function



KEN HUB

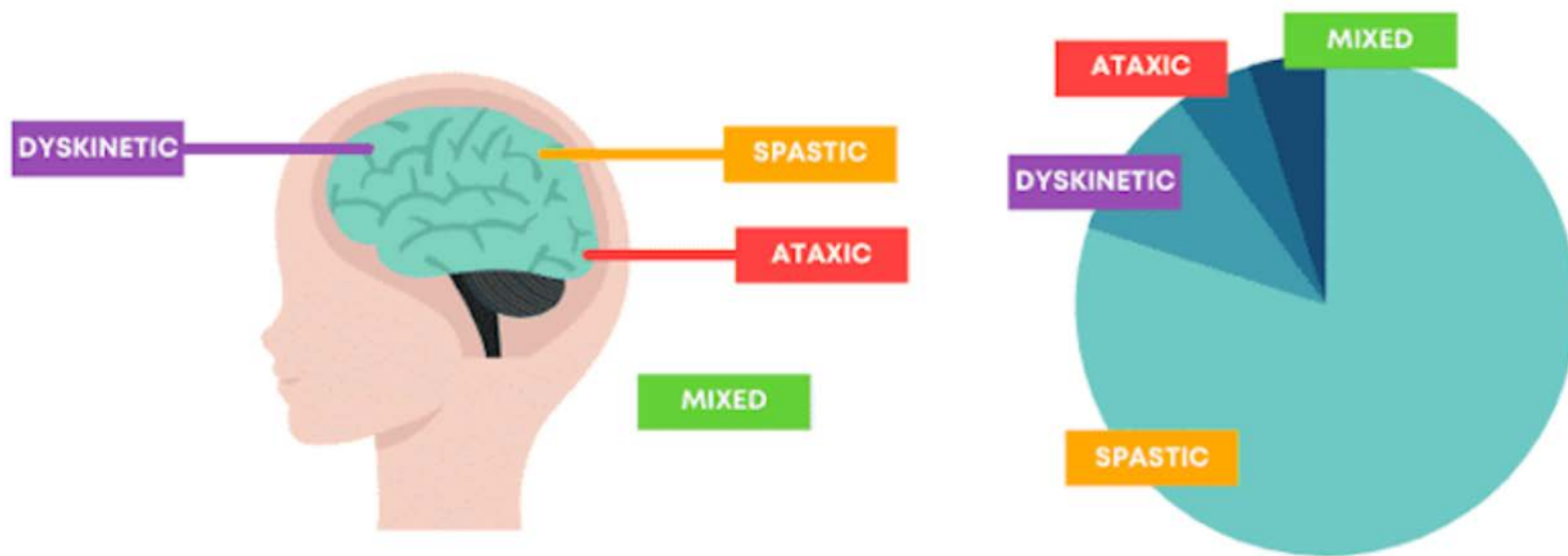
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Common Movement Challenges

- Across neurological conditions:
 - Weakness
 - Fatigue
 - Balance impairments
 - Altered coordination
 - Abnormal muscle tone
- Participants may move differently day to day

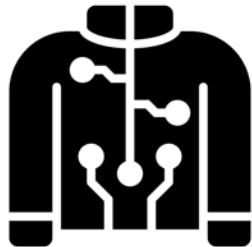
Cerebral Palsy (CP)



Cerebral Palsy: Physiological Considerations



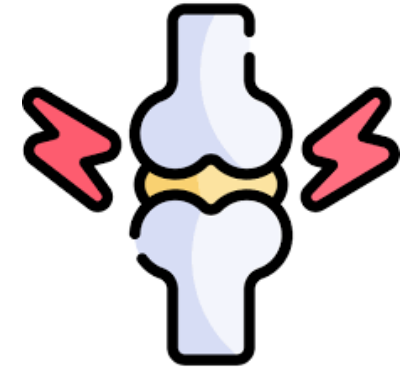
Spasticity



Poor Trunk Control



Coordination
Difficulties



Joint Contractures



Balance Impairment



Muscle Tone
& Weakness



Fatigue

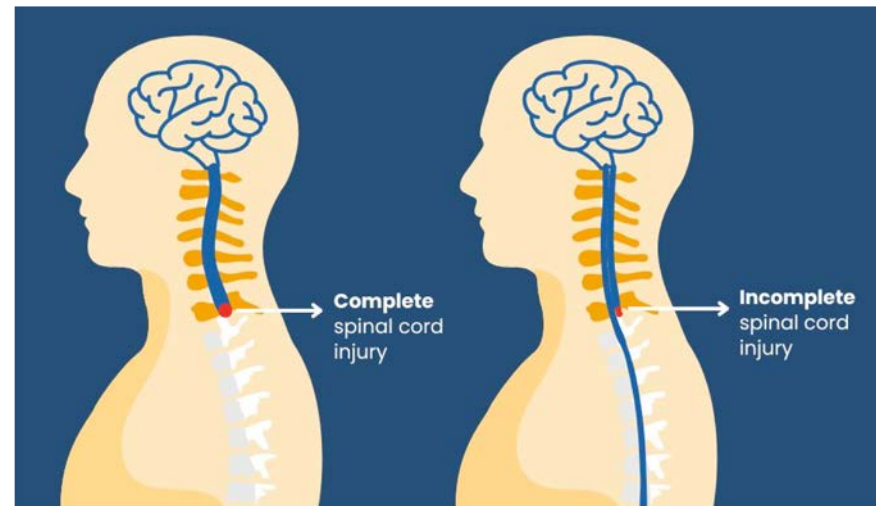
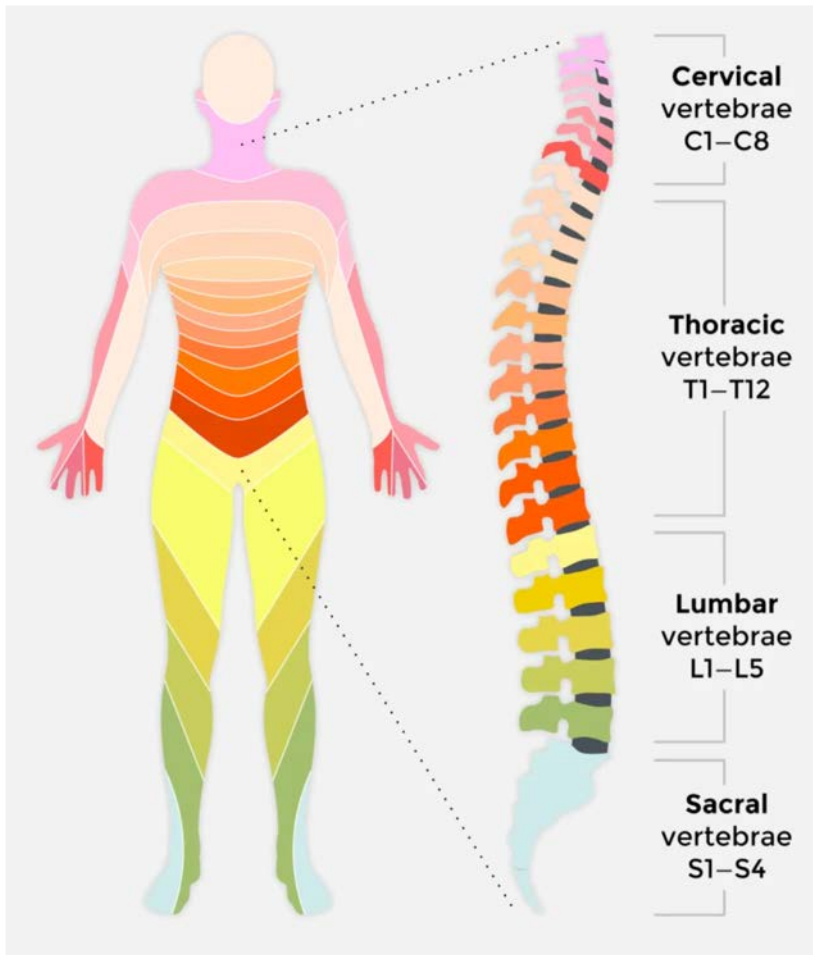


Abnormal
Reflexes

Cerebral Palsy: Physical Activity Guidelines

Type of Exercise	Frequency	Intensity	Volume
Resistance Training			
<ul style="list-style-type: none"> - Weights - Bodyweight - Resistance Bands 	<ul style="list-style-type: none"> - 1 - 2 sessions per week - ↑ 4 days per week, split routine 	<ul style="list-style-type: none"> - 4 - 8 exercises at 50-60% 1RM - Single-joint 	<ul style="list-style-type: none"> - 1 set of 10 - 12 reps per exercise - Possibly ↑ to 2 - 3 sets per exercise (1-2 mins between)
Cardiovascular Training			
<ul style="list-style-type: none"> - Cycling - Arm & Leg Cycling - Rowing 	<ul style="list-style-type: none"> - 1 or 2 sessions per week - Progress to 3 - 5 days per week 	<ul style="list-style-type: none"> - Light to moderate - 30 - 60% VO₂ - 55 - 75% MHR - RPE of 9 – 13 - Increase intensity gradually 	<ul style="list-style-type: none"> - 15 - 20 min sessions - Gradually ↑ to 30 min sessions

Spinal Cord Injury (SCI)



SCI:

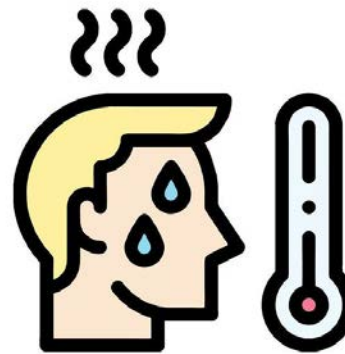
Physiological Considerations



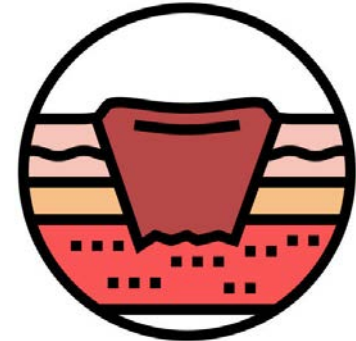
Paralysis/Weakness



Impaired
Trunk Stability



Temperature Regulation



Pressure
Injury Risk



Reduced Sensation



Orthostatic Hypotension



Autonomic
Dysreflexia

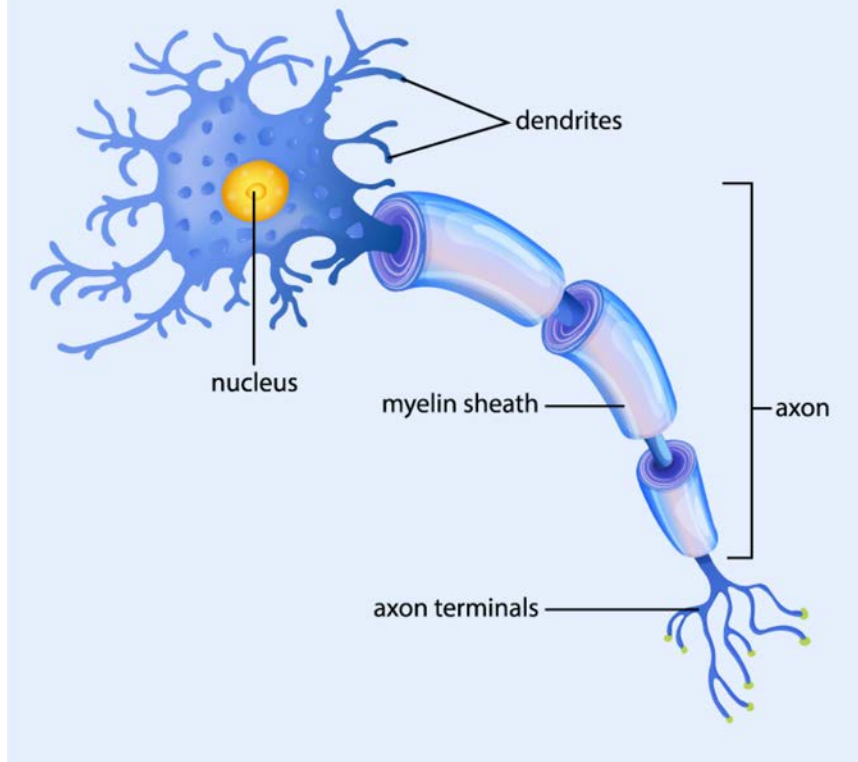
SCI:

Physical Activity Guidelines

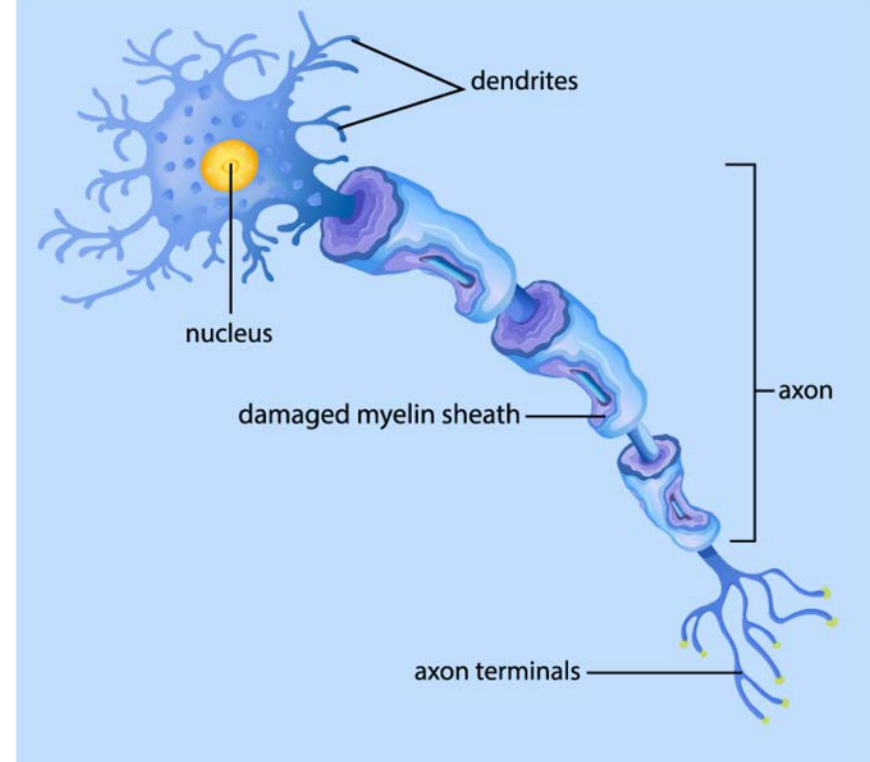
Type of Exercise	Frequency	Intensity	Volume
Resistance Training			
<ul style="list-style-type: none">- Weights- Bodyweight- Resistance Bands	<ul style="list-style-type: none">- 1 - 2 sessions per week- ↑ 4 days per week, split routine	<ul style="list-style-type: none">- 8 - 10 exercises at 40-60% 1RM- Multi-joint- Intensity to 60-85% 1RM as tolerated	<ul style="list-style-type: none">- 1 set of 10 - 12 reps per exercise- Possibly ↑ to 2 - 3 sets per exercise (1-2 mins between)
Cardiovascular Training			
<ul style="list-style-type: none">- Arm Cycling- Reciprocal press-pull exercise	<ul style="list-style-type: none">- 1 session per week- Progress to 2 - 3 days per week	<ul style="list-style-type: none">- Light to moderate- 30 - 60% VO₂- 55 - 75% MHR- RPE of 9 – 13- Increase intensity gradually	<ul style="list-style-type: none">- 15 - 20 min sessions- Gradually ↑ to 30 min sessions

Multiple Sclerosis (MS)

Normal Nerve



Multiple Sclerosis



Multiple Sclerosis: Physiological Considerations



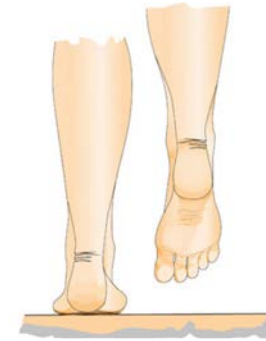
Fatigue



Blunted
Heart Rate



Muscle Movement and
Weakness



Foot Drop



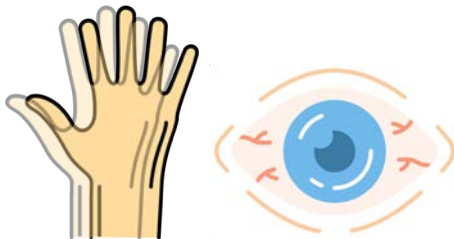
Thermoregulation



Reduced
Blood Pressure



Abnormal
Numbness,
Tingling, Pain



Painful blurring or
loss of vision

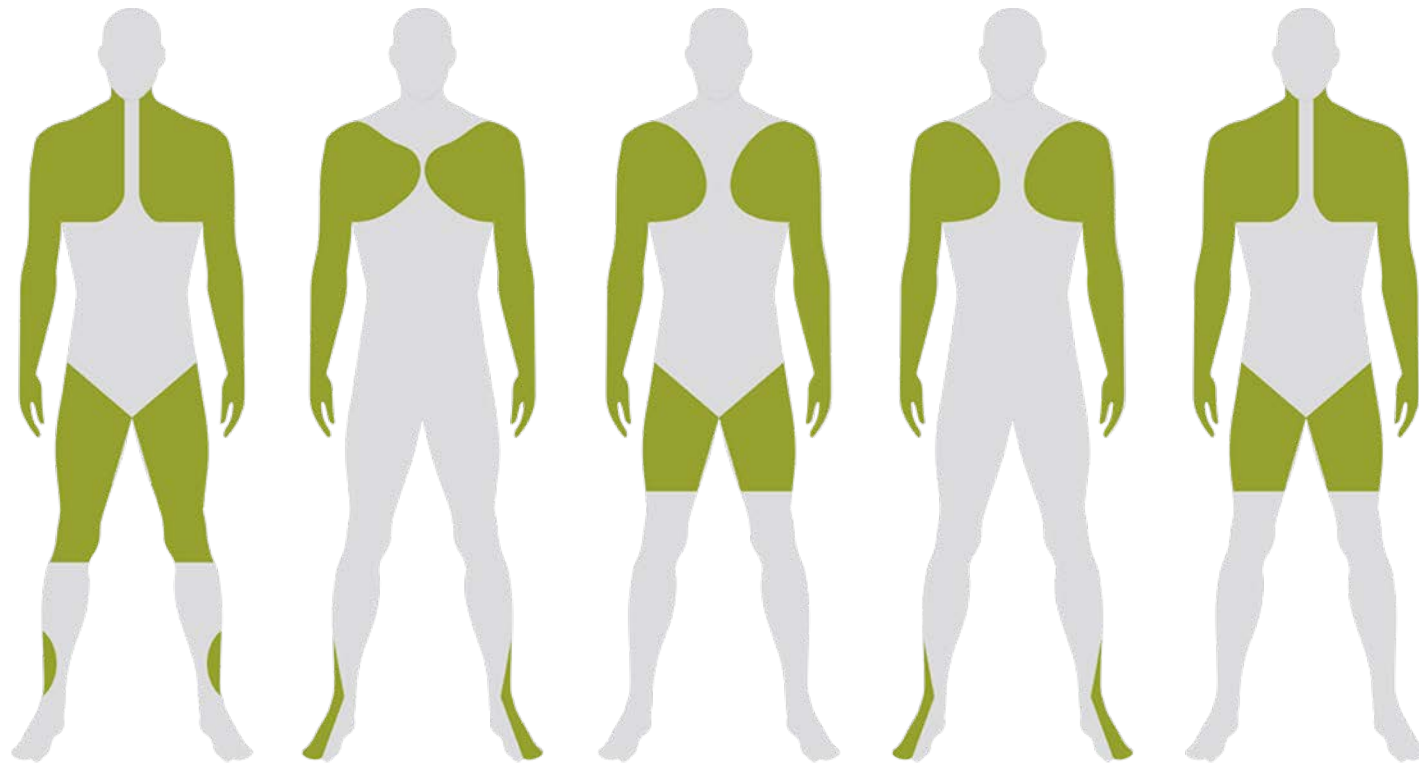


Neurogenic Bladder

Multiple Sclerosis: Physical Activity Guidelines

Type of Exercise	Frequency	Intensity	Volume
Resistance Training			
<ul style="list-style-type: none"> - Weights - Bodyweight - Resistance Bands 	<ul style="list-style-type: none"> - 1 - 2 sessions per week - ↑ 2 or 3 as tolerated 	<ul style="list-style-type: none"> - 4 - 8 exercises at 15RM - Multi-joint - ↑ to 8 - 10RM - Recovery 2 - 4 mins 	<ul style="list-style-type: none"> - 1 - 3 sets of 10 - 12 reps per exercise - Potentially ↑ to 3 - 4 sets per exercise
Cardiovascular Training			
<ul style="list-style-type: none"> - Treadmill - Cycling - Arm & Leg Cycling - Rowing - Aquatics 	<ul style="list-style-type: none"> - 1 session per week - Progress to 2 - 3 days per week 	<ul style="list-style-type: none"> - Light to moderate - 30 - 60% VO₂ - 55 - 75% MHR - RPE of 9 – 13 - Increase intensity gradually 	<ul style="list-style-type: none"> - 10 - 20 min sessions - Gradually ↑ to 30 – 40 min sessions

Muscular Dystrophy (MD)



Duchenne and
Becker types

Emery-Dreifuss
type

Limb Girdle
Type

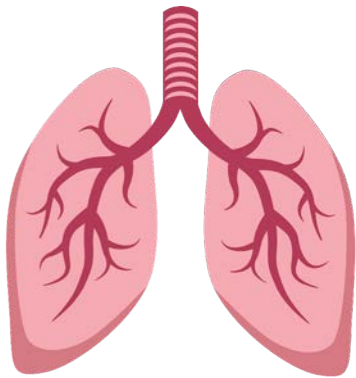
Facioscapulo
humeral type

Oculopharyngeal
type

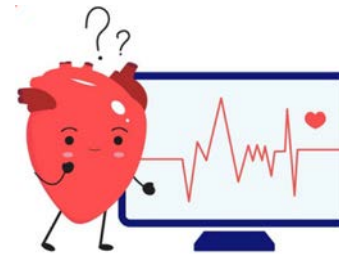
Main areas of muscle weakness in different types of dystrophy

Muscular Dystrophy: Physiological Considerations

Muscle Weakness



Cardiac Compromise



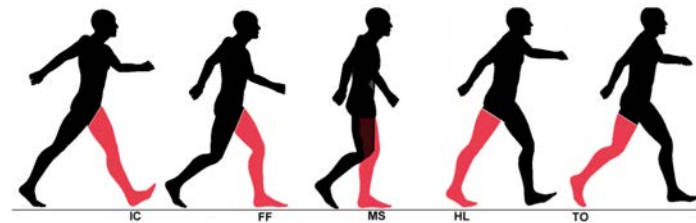
Movement &
Balance



Spinal
Deformities



Spasticity

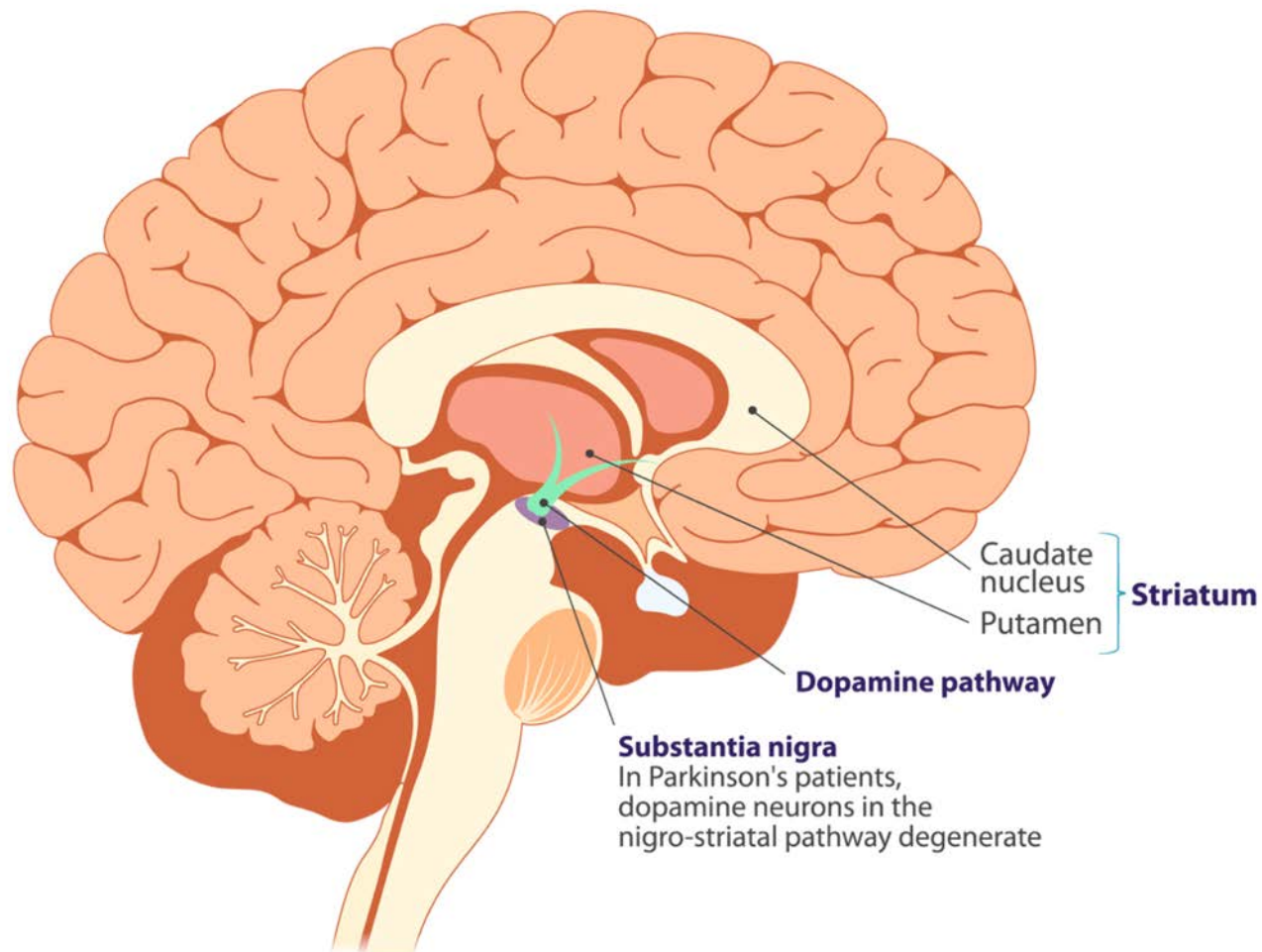


Altered Gait Pattern

Muscular Dystrophy: Physical Activity Guidelines

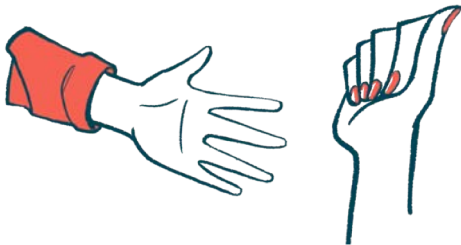
Type of Exercise	Frequency	Intensity	Volume
Resistance Training			
<ul style="list-style-type: none"> - Weight Machines - Resistance Bands 	<ul style="list-style-type: none"> - 1 session per week - ↑ to 4 days per week as tolerated 	<ul style="list-style-type: none"> - 8 - 10 exercises - 40 - 60% of 1RM - Multi-joint 	<ul style="list-style-type: none"> - 1 set of 10 - 12 reps per exercise - Potentially ↑ to 1 - 2 sets per exercise
Cardiovascular Training			
<ul style="list-style-type: none"> - Walking - Cycling - Rowing 	<ul style="list-style-type: none"> - 1 session per week - Progress to 2 - 3 days per week 	<ul style="list-style-type: none"> - Light to moderate - 30 - 60% VO₂ - 55 - 75% MHR - RPE of 9 – 13 - Increase intensity gradually 	<ul style="list-style-type: none"> - 15 - 20 min sessions - Gradually ↑ to 30 min sessions

Parkinson's Disease



Parkinson's Disease: Physiological Considerations

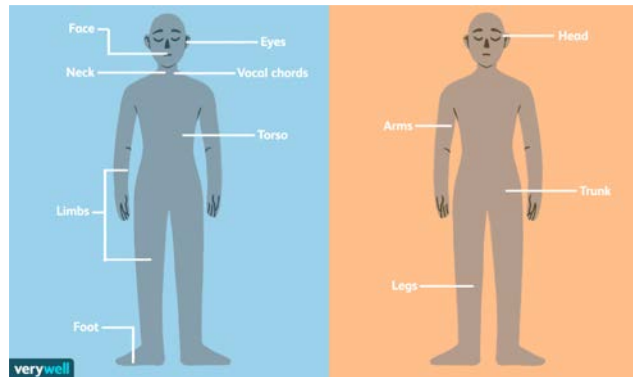
Bradykinesia



Tremors &
Rigidity



Gait Alterations



Dystonia

Dyskinesia



Postural
Instability



Medication Impacts

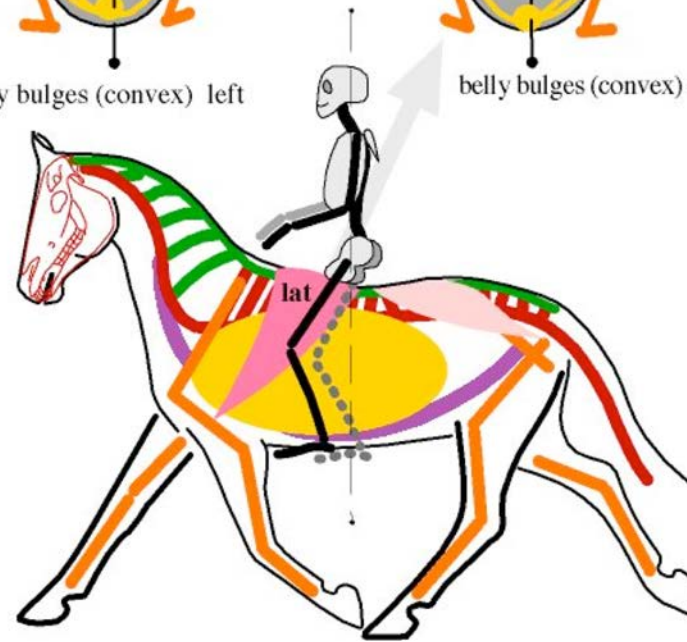
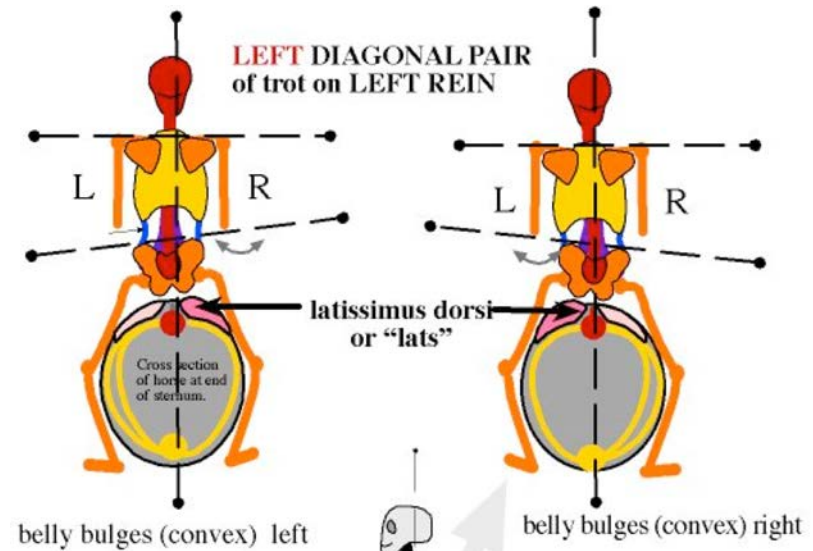
Parkinson's Disease: Physical Activity Guidelines

Type of Exercise	Frequency	Intensity	Volume
Resistance Training			
<ul style="list-style-type: none"> - Weights - Bodyweight - Resistance Bands 	<ul style="list-style-type: none"> - 1 - 2 sessions per week - ↑ to 4 days per week, split routine 	<ul style="list-style-type: none"> - 8 - 10 exercises - 40 - 60% of 1RM - Multi-joint - Progress to 60 - 80% of 1RM 	<ul style="list-style-type: none"> - 1 set of 10 - 12 reps per exercise - Potentially ↑ to 2 - 3 sets per exercise
Cardiovascular Training			
<ul style="list-style-type: none"> - Walking - Cycling - Rowing 	<ul style="list-style-type: none"> - 1 session per week - Progress to 4 or more days per week as tolerated 	<ul style="list-style-type: none"> - Light to moderate - 30 - 60% VO₂ - 55 - 75% MHR - RPE of 9 – 13 - Increase intensity gradually 	<ul style="list-style-type: none"> - 15 - 20 min sessions - Gradually ↑ to 30 min sessions

Safety Considerations

Physiological Issue	Most Affected	Arena Indicators	Instructor Actions
Fatigue & High Energy Cost of Movement	CP, MS, MD	Posture collapse, Delayed responses, Loss of coordination	Alternate task intensity, Incorporate short recovery periods, Reduce simultaneous cognitive and physical demands
Autonomic Nervous System Dysfunction	SCI, MS	Dizziness, Flushed or pale skin, Headache, Sudden fatigue	Avoid abrupt positional changes, Monitor symptoms closely, Stop activity if autonomic dysreflexia signs appear
Impaired Thermoregulation	MS, SCI	Rapid fatigue, Balance decline, Visual disturbances	Schedule sessions during cooler times, Provide hydration, Use shaded or indoor arenas
Altered Muscle Tone (Spasticity / Rigidity)	CP, Parkinson's	Stiff posture, Reduced joint movement, Difficulty initiating movement	Use rhythmic horse movement, Allow gradual transitions, Incorporate relaxation or stretching
Reduced Sensation & Pressure Injury Risk	SCI	Prolonged leaning, Inability to shift weight, Skin irritation	Monitor rider positioning, Encourage weight shifts, Ensure proper saddle fit and padding

Horse Movement Matters



Exercise Science & Riding

Exercise Science Goal	Functional Movement	Riding Skill Developed	Example Riding Activities
Trunk Stability	Maintain upright posture against movement	Maintaining centered seat	Hands-free riding, airplane arms, reaching for rings, holding objects while riding
Dynamic Balance	Adjust body position during movement	Responding to horse motion	Serpentines, circles, figure-eight patterns, riding over ground poles
Postural Control	Maintain body alignment while horse changes direction	Stable seat during movement transitions	Riding with reduced hand support, arms out, reaching tasks
Coordination	Timing movements with external motion	Synchronizing body with horse rhythm	Posting rhythm exercises, steering patterns, obstacle navigation
Weight Shifting	Moving body mass safely across midline	Shifting weight in the saddle	Reaching across the saddle, touching horse's neck or tail, ring retrieval tasks
Motor Planning	Organizing and sequencing movements	Navigating patterns in arena	Cone patterns, obstacle courses, memorized riding routes

Exercise Science & Riding

Exercise Science Goal	Functional Movement	Riding Skill Developed	Example Riding Activities
Endurance	Sustaining physical activity over time	Maintaining posture during longer sessions	Extended arena patterns, continuous riding circuits, multiple activity stations
Upper Body Strength	Stabilizing torso and managing reins/equipment	Rein control and posture	Carrying objects, grooming tasks, lifting tack
Lower Body Stability	Maintaining leg position and contact with horse	Effective leg positioning	Riding transitions, balance exercises, riding without stirrups (when appropriate)
Range of Motion	Maintaining joint mobility and flexibility	Reaching and body rotation	Grooming tasks, stretching arms overhead, reaching across horse
Sensory Integration	Responding to movement and environmental input	Adjusting posture to motion	Riding different arena paths, navigating obstacles
Attention & Cognitive Engagement	Maintaining focus during movement tasks	Following instructions while riding	Color matching games, ring toss, target-based riding activities

Movement Matters

Neurological conditions change how movement occurs, not whether meaningful movement is possible.

- PA Supports:
 - Postural stability
 - Balance & Coordination
 - Functional strength
 - Cardio endurance
- Observe Physiology:
 - Movement quality
 - Fatigue development
 - Postural control
 - Symptom changes

Focus on movement responses rather than diagnosis.

thank
you



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