



PÉCSI TUDOMÁNYEGYETEM
ÁLTALÁNOS ORVOSTUDOMÁNYI KAR

Neurological physiotherapy

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What is neurophysiotherapy?

Introduction

- Neurological disorders affect movement, coordination, and daily functions.
- Physiotherapy plays a crucial role in rehabilitation and improving quality of life.
- This presentation covers three major conditions: **stroke, multiple sclerosis (MS), and Parkinson's disease (PD).**

Stroke Rehabilitation

What is a Stroke?

- A stroke occurs due to interrupted blood flow to the brain, causing cell damage.

Types:

- Ischemic stroke (87%) – caused by a blood clot.
- Hemorrhagic stroke – caused by a blood vessel rupture.

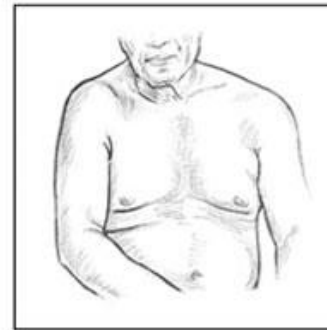
Common symptoms: paralysis, muscle weakness, balance and coordination issues.



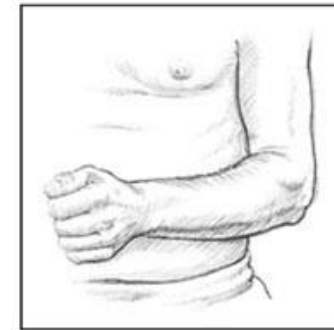
Stroke Rehabilitation Goals

- Restore lost functions through neuroplasticity.
- Improving mobility, strength, and coordination.
- Prevent secondary complications (e.g., contractures, pressure sores).
- Enhance independence in daily activities.

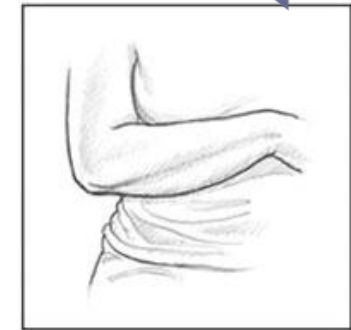
Adducted shoulder
with internal rotation



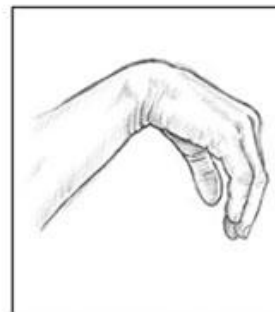
Flexed elbow



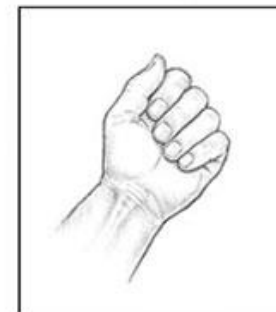
Pronated forearm



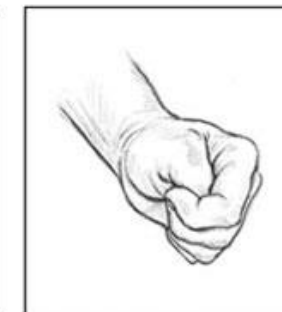
Flexed wrist



Flexed fingers



Thumb-in-palm



Clenched fist



Stroke Physiotherapy Techniques



- Passive and active range of motion (ROM) exercises to prevent stiffness.
- Strength training for weakened muscles.
- Balance and coordination training to prevent falls.
- Task-specific training (e.g., walking, grasping objects).
- Gait training using assistive devices if needed.

<https://www.youtube.com/watch?v=zIUG5DMzZc8>

<https://www.youtube.com/watch?v=WxDOKtUUP4Q>

<https://www.youtube.com/watch?v=gDPomhicLm8>

<https://www.youtube.com/watch?v=ieRovfMKQ00>

<https://www.youtube.com/watch?v=FRmwRqgIJSM>

https://www.youtube.com/watch?v=V2_3IXMKT7Q

Neuroplasticity and Motor Learning



- The brain can reorganize itself through repetition and practice.
- Task-oriented training encourages functional recovery.
- Mirror therapy (this can reduce the perception of pain, improve motor function, and stimulate neural pathways associated with the affected limb)

<https://www.youtube.com/watch?v=5zwsN44wQbQ>

- Constraint-induced movement therapy (CIMT) can enhance recovery

<https://www.youtube.com/watch?v=9DZ3xtF8sks&t=129s>

Stroke Case Study (Work in pairs)



62-year-old male, post-ischemic stroke with right-sided hemiparesis.

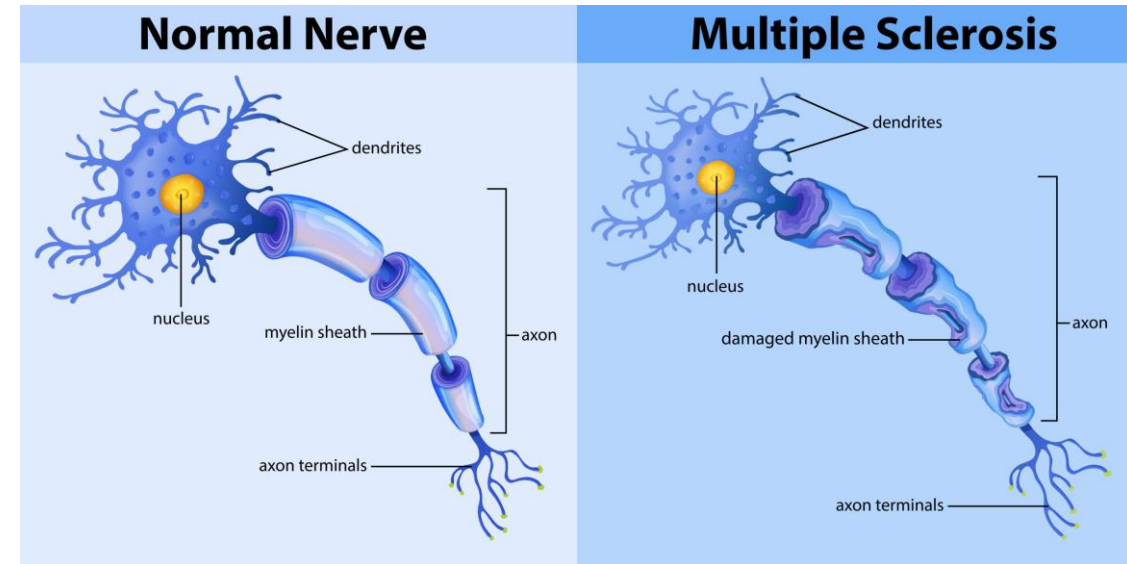
- Initial stage (inpatient):
- Progression (outpatient):
- Outcome:

Multiple Sclerosis Rehabilitation



What is Multiple Sclerosis?

- MS is a chronic autoimmune disease affecting the central nervous system.
- Causes demyelination, leading to impaired nerve conduction.
- Symptoms: muscle weakness, spasticity, fatigue, coordination issues.



MS Physiotherapy Techniques

- Aerobic exercises (low-impact activities like cycling, swimming).
- Strength training (low to moderate resistance to prevent fatigue).
- Stretching exercises for spasticity management.
- Balance training to reduce fall risk.
- Energy conservation techniques (activity pacing).



Heat Sensitivity and Exercise in MS



- Uhthoff's phenomenon: worsening of symptoms with heat exposure.
- Strategies to manage heat sensitivity:
 - Exercise in a cool environment.
 - Hydration and cooling garments.
 - Shorter exercise sessions with frequent breaks.

<https://www.youtube.com/watch?v=2A0pHA6b8sQ>

Parkinson's Disease Rehabilitation



What is Parkinson's Disease?

- PD is a progressive neurodegenerative disorder caused by dopamine deficiency.
- Symptoms:
 - Motor symptoms: tremor, bradykinesia (slowness), rigidity, postural instability.
 - Non-motor symptoms: fatigue, depression, cognitive changes.

<https://www.youtube.com/watch?v=pFLC9C-xH8E>

Parkinson's Rehabilitation Goals

- Improve mobility and functional movement.
- Reduce rigidity and bradykinesia.
- Enhance postural stability and prevent falls.
- Promote independence in daily activities.



Parkinson's Physiotherapy

- Big and Loud Therapy (LSVT BIG) to improve motor control.
- Gait training with auditory and floor markings).
- Postural training to prevent forward
- Strength and flexibility exercises
- Dual-task training (e.g., walking while counting) to improve cognitive-motor interaction.

<https://www.youtube.com/watch?v=jEY2hS9mLVg>

- Draw with non-dominant hand, triangle-quadrant, walk backward, balancing with eyes closed, count backward by threes from 100



Role of Exercise in Neuroprotection



- Regular physical activity slows disease progression.
- Aerobic exercise improves dopamine release and neuroplasticity.
- Recommended activities: tai chi, boxing, cycling, dance therapy.
- https://www.youtube.com/watch?v=2sqo5fZ_H5A
- <https://www.youtube.com/watch?v=QEJWbXzYuuE>

Key Differences in Rehabilitation Approaches



Condition	Key Focus	Special Considerations
Stroke	Neuroplasticity, motor relearning	Hemiparesis, spasticity
MS	Fatigue management, flexibility	Heat sensitivity, variable symptoms
PD	Movement initiation, balance	Bradykinesia, postural instability

Importance of Multidisciplinary Approach

- Collaboration between physiotherapists, occupational therapists, and neurologists.
- Use of assistive devices when needed.
- Long-term patient education and support.

Take-Home Messages

- Early and individualized rehabilitation is key.
- Task-specific, repetitive training enhances recovery.
- **Exercise is medicine** for neurological disorders.
- Physiotherapists play a vital role in improving quality of life.

Rheumatoid Arthritis Physiotherapy



What is Rheumatoid Arthritis (RA)?

- Chronic autoimmune disease affecting joints.
- Causes synovial inflammation, leading to pain, swelling, and stiffness.
- Commonly affects hands, wrists, knees but can involve other joints.
- Can lead to joint deformities and functional impairments.

Goals of Physiotherapy in RA

- Reduce pain and stiffness.
- Maintain and improve joint mobility and flexibility.
- Strengthen muscles to support joints.
- Improve functional abilities and quality of life.
- Prevent joint deformities and disability.



Physiotherapy Techniques for RA



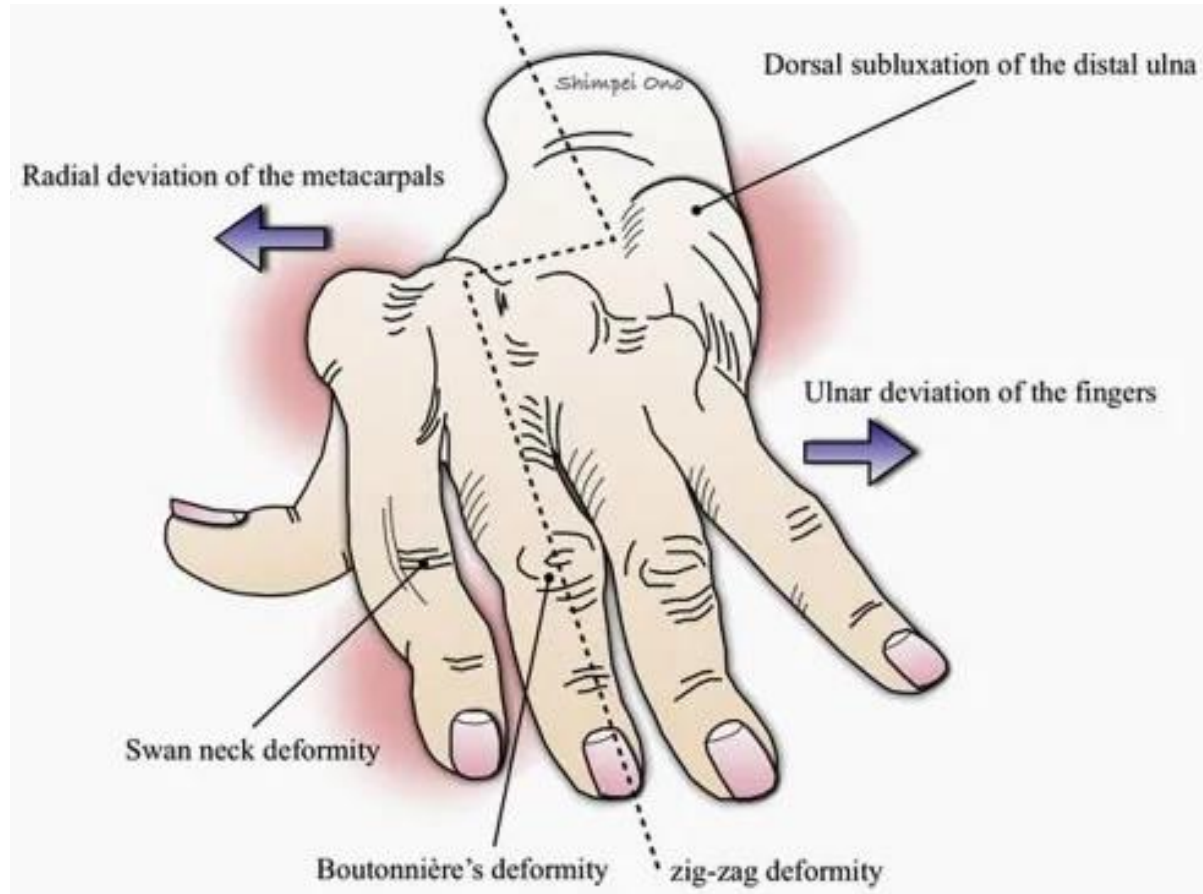
- **Range of Motion (ROM) Exercises** – to maintain joint flexibility.
- **Strength Training** – low-resistance exercises to prevent muscle atrophy.
- **Aerobic Exercise** – low-impact activities (walking, swimming) to improve endurance.
- **Hydrotherapy** – warm water exercises to reduce pain and stiffness.
- **Joint Protection Techniques** – education on avoiding excessive strain.

Key Recommendations & Summary



- **Consistency** is key – regular, low-impact exercises help manage symptoms.
- **Avoid overloading joints** – balance between activity and rest.
- **Heat and cold therapy** can relieve pain before/after exercise.
- **Patient education** is essential for self-management.
- **Multidisciplinary approach** – collaboration with rheumatologists and occupational therapists.

Hand slings and bandages



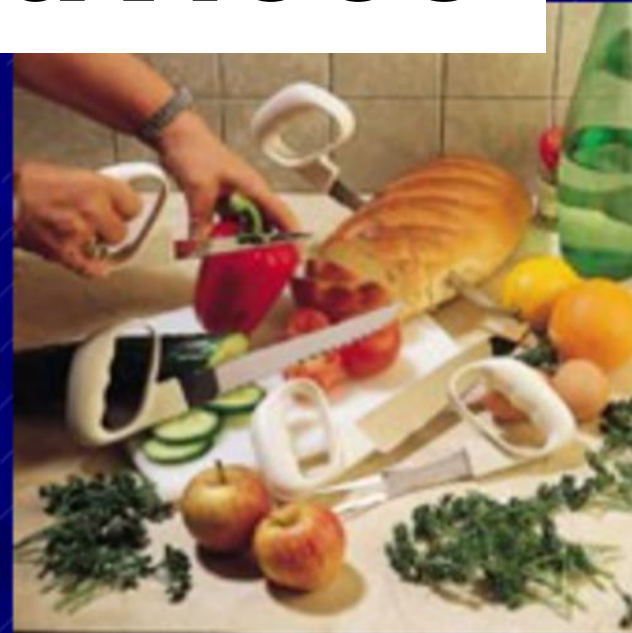
A



B



Ideas, lifestyle advices





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Thank you for your attention!