



The Role of Physiotherapy in Peripheral Nerve Injury and Disease



**Increasing the Conformance of Academia
towards Rehabilitation Engineering (i-CARE)**

Project ref. 586403-EPP-1-2017-1-PS-EPPKA2-CBHE-JP

Prepared by : d. Samah Owaidah

Date: 29/2/2020



الكلية الجامعية للعلوم التطبيقية
University College of Applied Sciences



Univerzitetni rehabilitacijski inštitut
Republike Slovenije - Soča



BATTI
Ideas transforming the future

What is a peripheral nerve injury?

- Peripheral nerve injuries are **damage** to the **peripheral nerves** and/or the **surrounding tissue** caused by disease, trauma.
- **Damage to the sensory** nerves can cause **loss of sensation** including **numbness**, **tingling** and **pain**
- **Damage to the motor** nerves can cause **loss of motor function** including **weakness** and **difficulty walking**
- **Damage to autonomic** nerves can cause **urine incontinence**, **constipation**, **dizziness**.

What is the causes of peripheral nerve injury?

Injury to the nerve can be caused by:

- **trauma** (Penetrating wounds , Pressure, Fractures , Dislocations , Traction)
- **Autoimmune diseases** - such as Guillain-Barre syndrome.
- **Cancer** .
- **Compression** : carpal tunnel syndrome .
- **Diabetes** .

Classification of nerve injuries

Complete nerve injuries disrupt all the neurons across the injured segment, causing **total loss** of **motor** or **sensory** or **function**.(**Neuropraxia**)

Incomplete nerve injuries damage only some neurons which cause **some loss of muscle strength** and **sensation below** the level of the injury. A chance of **a full recovery** is enhanced as some neurons remain undamaged.(**Axonotmesis** , **Neurotmesis**)

- **Neurotmesis** (in Greek tmesis signifies "to cut") is part of Seddon's classification scheme used to classify nerve damage. It is the most serious nerve injury in the scheme. In this type of injury, both the nerve and the nerve sheath are disrupted
- **Axonotmesis** is the term used when there is complete interruption of the nerve axon and its myelin sheath, but the mesenchymal structures including perineurium and epineurium are either completely or partially intact. ... **Neurotmesis** occurs when a nerve, along with its surrounding stroma, becomes completely disconnected
- **Neurotmesis** occurs with knife lacerations, gunshot wounds or severe ischemic injuries. The axon and surrounding connective tissues are damaged, this is the most serious nerve injury. No recovery will take place, fibrillation is present and surgery is usually required.
- What causes Neurapraxia?

This condition is typically caused by a blunt neural **injury** due to external blows or shock-like injuries to muscle fibers and skeletal nerve fibers, which leads to repeated or prolonged pressure buildup on the nerve.

symptoms of a peripheral nerve injury?



1. Pain ranging from tingling to burning.
2. Muscle weakness of the affected body part
3. Lack of muscle control , loss of coordination
4. Loss of feeling or abnormal sensation , decreased proprioception (balance) ,
5. Decreased range of movement of the affected joint
6. autonomic dysfunction including fainting, dizziness and bladder and bowel function



Evaluation

- **Observation** : Posture , Skin (colour, condition, wounds) , Oedema , Atrophy.
 - **Palpation** : Skin temperature , Oedema
 - **Sensation** : Proprioception , Stereognosis , Tinell's sign .
 - **ROM** : Passive ROM , Muscle lengths
 - **Muscle testing** : Use Oxford scale , Test in groups → individual muscles .
 - **Neurodynamic tests** : Within limits of pain , Test applicable nerve , (▪confirmed nerve injury , and ▪mechanism of injury)
- Function** : With & without splint , (static and / or dynamic splint)

Peripheral Neuropathy Physiotherapy



- **Passive movement** of muscles and joints
- **Weight bearing** through joint
- **Balance training** to reduce the risk of falling
- **Gait re-education** to facilitate mobility and promote independence
- Soft tissue **massage**
- **Mirror imaging** to stimulate nerve pathways
- **Pain management**. Hydrotherapy treatment relaxes muscle and increases circulation. This type of treatment can also reduce pain
- Advice about **walking aids**, orthotics, and wheelchairs.
- **Improving safety** with everyday tasks



PROBLEMS	AIMS	TREATMENT
Paralysed muscles	● Prevent contracture ● Maintain muscle characteristics	- splint ● Passive muscle stretches ● Electric muscle stimulations
Decreased muscle strength	Facilitate, re-educate and strengthen affected muscles	● Ice , Tapping , Suspension ● PNF ● Active functional exercises

PROBLEMS	AIMS	TREATMENT
Loss / Decreased sensation	●To give advice ●Retrain sensation	●Education: care for skin ●Proprioception exercises ●Fine discrimination exercise
Autonomic changes (↓ circulation)	●Increase circulation and prevent or decrease edema	●Passive joint movements ●Positioning (day - sling / pressure bandage night - elevation) ●Massage ●Electrotherapy

PROBLEMS	AIMS	TREATMENT
Pain	Decrease pain	● Mobilising neural tissue ● Trigger points ● Massage ● Electrotherapy
Decreased functionality	Improve functionality	● Functional exercises, with / without splints ● Functional exercises using trick movements

Thank You

Keep connected with i-CARE project:

Email: icare@alazhar.edu.ps