

## The Role of Physiotherapy in Peripheral Nerve Injury and Disease



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

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# What is a peripheral nerve injury? PARE

- 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-CARE

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 join
- 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'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

i-CARE

- 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



















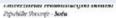
PROBLEMS	AIMS	TREATMENT
Paralysed muscles	<ul><li>Prevent contacture</li><li>Maintain muscle characteristics</li></ul>	<ul><li>Passive muscle stretches</li><li>Electric muscle stimulations</li></ul>
Decreased muscle strength	Facilitate, re- educate and strengthen affected muscles	<ul> <li>Ice , Tapping ,</li> <li>Suspension</li> <li>PNF</li> <li>Active functional exercises</li> </ul>



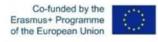












i-CARE











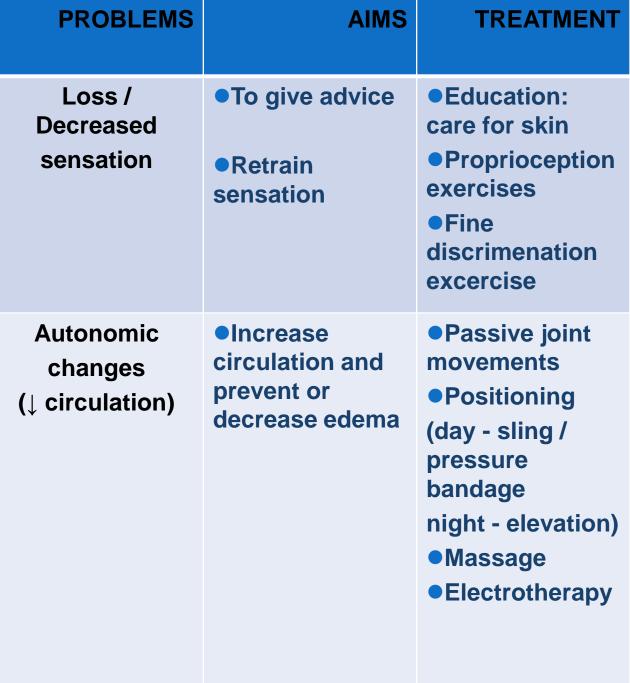












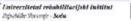












Papabilhe Stocomje - Soda



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





















## Thank You

Keep connected with i-CARE project:

Email: <u>icare@alazhar.edu.ps</u>

















