

## Peripheral nerve injuries: non-surgical treatment approaches

### *Periferik sinir yaralanmaları: cerrahi olmayan tedavi yaklaşımları*

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#### Dear Editor

I read with great interest the review titled 'Peripheral nerve injuries: current surgical management strategies' written by Mr Orif et al. in Volume 63, Issue 3 of your journal dated 09 September 2024. I would like to thank the authors for their valuable contribution to this topic, which is of great interest to physicians interested in the musculoskeletal system and whose diagnosis and treatment is very important (1). Although the review focuses on surgical approaches, I would like to contribute and share my knowledge on non-surgical treatment methods from the perspective of a physiatrist.

In peripheral nerve injuries, non-surgical treatment approaches, especially physical therapy applications, can play an effective and supportive role in many cases.

#### *Physical Exercise*

Even if there is no loss of muscle strength, pain and sensory disturbances may lead the patient to use the affected limb less. This may lead to the development of motor loss over time. In this process, the following exercise approaches can be applied effectively, with or without motor loss:

Range of motion exercises,

Assistive exercises,

Proprioceptive neuromuscular facilitation techniques,

Strengthening exercises

Nerve mobilization techniques.

These methods may play an important role in the preservation of muscle functions and prevention of motor losses (2).

#### *Electrical Stimulation*

Electrical stimulation is an important physical therapy method that should be included in the treatment plan in order to prevent atrophy due to muscle immobilization, to prevent muscle loss due to denervation in the early period and to accelerate nerve regeneration (2).

Clinical studies have demonstrated that electrical stimulation applied after peripheral nerve injuries increases axon growth and accelerates the sensorimotor recovery process (3). This application plays a supportive role in nerve repair, contributing to improved functional outcomes.

#### *Low Level Laser Therapy*

Low-level laser therapy (LLLTT) plays an important role in scar tissue remodeling by mechanisms such as reducing inflammation and oedema, providing analgesic effect, promoting collagen synthesis and accelerating tissue repair. In addition, it has been shown to promote axon regeneration in peripheral nerve injuries, increase the secretion of neurotrophic factors, support revascularization and angiogenesis, and reduce Wallerian degeneration (4).

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Studies conducted with various intensities, irradiation points, application numbers and treatment durations have reported that LLLT supports improvement in axon myelination and acceleration of regeneration process (2). With these features, LLLT offers an effective complementary treatment option for peripheral nerve injuries.

#### *Therapeutic Ultrasound*

Studies have shown that low intensity ultrasound (LIU) improves nerve conduction velocity and muscle action potentials by increasing axon number, diameter and myelination. (2, 5). LIU should be applied in the intensity range of 200-500 mW/cm<sup>2</sup> to promote nerve regeneration. It has been reported that it is not effective at lower intensities ( $\leq 100$  mW/cm<sup>2</sup>) and the effects decrease or disappear at higher intensities ( $\geq 1$  W/cm<sup>2</sup>) (5). These findings reveal that LIU plays an important role in nerve healing and offers a valuable treatment option in clinical applications.

#### *Extracorporeal Shock Wave Therapy*

Extracorporeal shock wave therapy (ESWT) has been observed to significantly increase functional recovery by supporting regeneration of injured nerves. In addition, ESWT has been found to prevent denervation atrophy and to have positive effects on neuro-reorganization and nerve redistribution (2). This treatment method provides an important supportive mechanism in nerve healing and accelerates the functional recovery process.

## **CONCLUSION**

Non-surgical treatment modalities in peripheral nerve injuries offer effective results, especially when initiated early. These approaches should be applied within the framework of a multidisciplinary treatment plan to optimize nerve regeneration, control pain and improve the quality of life of patients. These approaches, which can be considered as alternative or complementary to surgical methods, should be planned according to patient selection and individualized rehabilitation goals, which will increase the success of clinical outcomes.

Best regards

**Keywords:** Peripheral nerve, injuries, physical medicine and rehabilitation.

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