

NEUROPLASTICITY AND MOTOR RELEARNING IN REHABILITATION FOLLOWING NERVE TRANSFER SURGERY: A CLINICAL CASE REPORT

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Background

Peripheral nerve injuries (PNIs) involving critical motor nerves often lead to severe functional impairments, especially when direct repair is not feasible. Nerve transfer surgery has become a valuable alternative, relying heavily on neuroplasticity for functional recovery. Postoperative rehabilitation strategies, including Constraint-Induced Movement Therapy (CIMT), electrical stimulation, and task-specific training, play a crucial role in motor relearning by promoting cortical reorganization.

Case report

We present the case of a 27-year-old male with traumatic right peroneal nerve injury resulting in foot drop. In February 2024, he underwent nerve transfer surgery, redirecting a finger flexor nerve to the anterior tibialis to restore dorsiflexion. A comprehensive rehabilitation program was implemented, focusing on neuroplasticity through electrical stimulation, task-specific training, motor imagery, and CIMT. One year post-surgery, the patient demonstrated active dorsiflexion with inversion, preserved tibiotarsal joint amplitudes, and functional gait with an orthosis. Without it, slight steppage and inversion were observed.

Conclusion

This case underscores the essential role of tailored, neuroplasticity-oriented rehabilitation following nerve transfer surgery. Combining CIMT, task-specific training, and electrical stimulation contributed to substantial motor recovery. Nevertheless, residual deficits indicate the need for prolonged and individualized therapeutic strategies. Continued research is necessary to refine these protocols and optimize patient outcomes.

Keywords: Neuroplasticity, Nerve, Rehabilitation, Motor, Relearning