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Rehabilitation of Median Nerve and Radial Artery Injuries in Children: A Mini Review

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Introduction

Peripheral nerve Injuries in children, particularly those involving the median nerve and radial artery, represent complex and functionally significant conditions. Damage to these structures can lead to profound deficits in fine motor coordination, precision grip, sensory discrimination, and overall hand function. Early and well-structured rehabilitation is essential to prevent long-term complications and to maximize functional recovery, especially considering the high degree of neuroplasticity in pediatric patients.

The median nerve plays a central role in thumb opposition, thenar muscle activation, and delicate hand movements. Injury to the recurrent thenar motor branch can result in severe thenar muscle denervation, significant difficulty with pinch and grip, and delays in the development of age-appropriate fine motor skills. Although children tend to heal faster than adults, severe denervation still presents a challenge that requires prolonged and carefully planned therapy.

Rehabilitation strategies for median nerve injuries typically focus on maintaining joint mobility, preventing muscle atrophy, and stimulating sensory and motor pathways. Fine motor exercises, including the use of cubes, blocks, nerve balls, and precision tasks, are essential for rebuilding dexterity and restoring functional hand use. Sensory re-education is equally important to enhance cortical processing and improve tactile discrimination following nerve injury.

Neuromuscular Electrical Stimulation (NMES) is increasingly recognized as a valuable modality in pediatric nerve rehabilitation. It supports muscle activation, reduces atrophy in partially denervated or re-innervating muscles, and enhances cortical re-education through repeated patterned stimulation. When combined with task-specific functional training, NMES can accelerate functional gains and improve the quality of motor recovery. The Stimpower device is frequently used due to its flexible settings suitable for small hand muscles, and the application of NMES for 20 minutes per session is considered clinically appropriate for pediatric cases.

Overall, rehabilitation of median nerve injuries in children requires a multimodal approach that integrates NMES, fine motor training, sensory re-education, and functional play therapy. This combined strategy maximizes the potential for neural regeneration and supports the restoration of meaningful hand function. Early intervention, continuous reassessment, and individualized therapy plans are fundamental for achieving optimal outcomes in pediatric patients with complex nerve and tendon injuries.

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