

# Anterior Interosseous Nerve Transfer: Breaking through the Glass Ceiling in Treatment of Traumatic High Ulnar Nerve Injuries; a case report

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## Introduction:

Traditionally, traumatic high ulnar nerve injuries (THUNI) exhibited a poor prognosis, with a 71% decreased likelihood of motor recovery compared to corresponding median nerve injuries<sup>1</sup>. Due to long re-innervation distance, conventional repairs fail to restore effective innervation to the intrinsic muscles. This results in significant impairment in hand function, including loss of dexterity, decreased grip strength and claw hand deformities. Innovative surgery involving anterior interosseous nerve (AIN) transfer to the deep motor branch of the ulnar nerve (MUN) hope to improve functional outcomes in these patients.

## Case Description:

A 53-year-old male presented to the Emergency Department with a laceration to his left arm, after falling through a glass door while intoxicated. Examination of his left upper limb revealed a 5cm laceration superior to the medial epicondyle. No claw deformity was observed. Finger abduction was weak globally. Sensation was absent in his little finger and 2/10 in his ulnar ring finger. Froment's test was positive. Upper limb X-rays and CT C-spine revealed no fractures. THUNI was suspected. Exploration and repair of his transected left ulnar nerve proximal to Osbourne's Ligament was performed under general anaesthetic with no complications.

Eight weeks post-operatively, weak left intrinsic muscle function persisted, consistent with MRC grade 2. Subsequently, an end-to-side nerve transfer of the pronator quadratus branch of AIN to MUN was performed with a good outcome.

#### **Discussion:**

Our case demonstrates the effectiveness of AIN transfer in regaining intrinsic muscle function and enhancing quality of life post THUNI. THUNI have been associated with poor outcomes regarding sensorimotor recovery with resultant hand dysfunction and marked psychosocial morbidity due to dextrous loss and fixed hand deformities. Undoubtedly, distal nerve transfers have revolutionized management of nerve injuries over the past decade. A recent study by George et al. demonstrated motor recovery to MRC grade 3 or more in 81.3% of patients who underwent AIN transfer post THUNI<sup>2</sup>. Despite these promising results, many questions still remain; when is the optimal to perform surgery? Which type of neurorrhaphy (conventional end-to-end, hemi end-to-end or end-to-side) achieves superior results? In our case, an end-to-side neurorrhaphy was successfully utilized, with care taken to outrule Martin-Gruber Anastomosis pre-surgery. Further large multicenter studies are necessary to establish best operative approach.

#### **References:**

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2. George SC, Burahee AS, Sanders AD, Power DM. Outcomes of anterior interosseous nerve transfer to restore intrinsic muscle function after high ulnar nerve injury. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. Published online October 22, 2021. doi:10.1016/j.bjps.2021.09.072