



TENDON TRANSFERS FOR RADIAL NERVE PALSY

Plastic Surgery

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KEYWORDS

INTRODUCTION

- The most common indication for upper extremity tendon transfer procedure is a peripheral nerve injury that has no potential to improve.
- This includes nerve injuries that are irreparable such as root avulsions, nerve injuries that do not recover after direct nerve repair or grafting, or failed nerve transfers or delayed presentation.
- In case of radial nerve palsy, the patient cannot extend the wrist, fingers and thumb, so has a great difficulty in grasping objects

PRINCIPLES OF TENDON TRANSFER

- 1) supple joints prior to transfer
- 2) soft tissue equilibrium
- 3) donor of adequate excursion
- 4) donor of adequate strength
- 5) expendable donor
- 6) straight line of pull
- 7) Synergy
- 8) single function per transfer

AIM

There are three main goals when treating radial nerve palsy.

1. restoration of finger extension
2. restoration of thumb extension
3. In cases of high radial nerve palsy, restoration of wrist extension

METHODS

- This was a prospective study over a 2year period (January 2021 to December 2022) and included 26 patients who underwent tendon transfer for radial nerve injury or PIN lesions with either failed repair or during primary repair as internal splint done at Plastic surgery department, Thanjavur medical college.
- None of the patients had significant previous medical history that might affect the results (such as rheumatoid arthritis, osteoarthritis, or steroid use).
- All patients had supple joints with no contracture prior to the tendon transfer.

High radial nerve palsy is treated by

- pronator teres (PT) to extensor carpi radialis brevis (ECRB).
- Flexor carpi radialis (FCR) to extensor digitorum communis (EDC), extensor digiti minimi (EDM), extensor indicis proprius (EIP)
- palmaris longus (PL) to extensor pollicis longus (EPL)

Patients with posterior interosseous nerve palsy do not require restoration of wrist extension and, hence, only the FCR and PL transfer was used.

- Patients were advised regarding post op rehabilitation.
- Post operatively the limb is immobilized in splints The elbow should be flexed at 90degrees, the forearm pronated at 15-30 degrees, the wrist was immobilized in 40 degrees of extension, the MCP joints in 10 degrees of hyperextension and the thumb in

maximum extension and abduction using forearm splint. The PIP and DIP joints of the fingers were left free.

- Patients were followed up for a maximum period of 6 months.

RESULTS

- This study included 26 patients.
- 16 males and 10 females.
- 17 patients had high radial nerve palsy and 9 patients had PIN palsy.
- The wounds healed well in all the patients.
- Motor re-education started one month postoperatively and mean follow-up period was 9 months.

ASSESSMENT

	Excellent	Good	Fair	Poor
Wrist extension	0-80°	0°	45°extension lag	70°extension lag
Fingers' extension	0-10°	0°	45°extension lag	90°extension lag
Thumb abduction and extension	80-100°	60-80°	30-60°	0-30°
Wrist flexion	Full	0-20°	0°	dorsiflexion

Bincaz score	No of patients	Percentage
8 or more than 8 (Excellent)	12	46%
6 or 7 (Good)	8	30%
4 or 5 (Fair)	6	23%
3 or less than 3 (Bad)	0	0%
Total	26	100%

- Wrist extension against resistance was obtained in all patients. However, the range of wrist extension was better with the finger MP joints held flexed. Wrist flexion against resistance was also obtained in all patients, but the range of wrist flexion was better with the fingers extended.

- According Bincaz score, 88% of our patients had good-to-excellent result, while 12% patients had fair results. Wrist extension was comparatively poor in high radial nerve palsy as compared to low radial nerve palsy patients. Power grip was assessed using a jammer dynamometer. All patients had adequate grip strength and good active extension of the wrist and fingers.

DISCUSSION

- The radial nerve is the most frequently injured major nerve in the upper limb
- Sunderland recommended that one year is enough to proceed with tendon transfer as nerve regeneration after this is highly unlikely and might not give good results.
- In early transfer, this was intended as internal splint during regeneration of the nerve after repair.

SURGICAL TECHNIQUE

- The procedure is done under general anaesthesia and tourniquet control.
- The PT to ERCB transfer is done via a longitudinal incision around the insertion site of PT. The PT tendon is harvested with a strip of periosteum and sutured to ERCB at maximum tension (with the wrist fully extended).
- The FCR tendon is cut distally at the wrist. The FCR tendon is then tunneled subcutaneously along the radial border of the forearm to exit at a small curved incision on the dorsum of the forearm sutured first to the finger extensors (EDM, EDC, and EIP).
- EPL tendon is then rerouted and sutured to the PL tendon so that the interphalangeal joint of the thumb is in full extension.



CONCLUSION

- The tendon transfer is a very successful treatment for irreversible radial nerve paralysis, and result in good functional outcome of wrist and finger extension and power of hand grip.
- Early transfer at time of nerve repair is recommended. Because early transfer reduce the period of disability after injury to weeks rather than months after nerve repair.
- FCR transfer preserves the important movement of flexion and ulnar deviation of the wrist which is important for power grip in working men.

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