



Functional Improvement For Nerve Damaged Upper Extremities With Soft Tissue Reconstruction

Irfan Ahmed MD, Michael Baumholtz MD, Wendell Bristol, MS, OTR/L, Sean Hightower, OTR/L; Harly Jean, MS, OTR/L, Dept Of Orthopedics and Sports Medicine and Plastic Surgery, Temple University Hospital, Philadelphia, PA.

Background

- Traumatic peripheral nerve injuries are common and can lead to significant morbidity. We encountered two patients with extensive upper extremity injuries with little or no nerve function.
- Both patients suffered non-lacerating nerve injuries and were not candidates for nerve repair or reconstruction due to the type and severity of their injuries and the time that had prolapsed.
- EMG showed no compound action potentials with poor prognosis for recovery and therefore poor candidates for neurolysis.
- They underwent soft tissue reconstruction and neurolysis for pain relief and in preparation for future tendon transfers/fusion.

Methods

- Patient #1 suffered an electric injury to right hand/forearm. He had active motion of his hand/wrist and only protective sensation in his hand. He underwent median nerve neurolysis at wrist as well as neurolysis of ulnar/median nerves in forearm followed by free anterolateral thigh flap to right forearm
- Patient #2 suffered from a narcotic overdose and was found on his right side. He required fasciotomy to right proximal arm and had no voluntary function from his elbow distally. He had neurolysis of median, ulnar and musculocutaneous nerves, ulnar nerve transposition, and a flexor pronator slide to improve passive motion of fingers. Soft tissue coverage was achieved using a pedicled latissimus dorsi myocutaneous flap and stsg.

Results



Patient #1 pre op

Pateint #1 post op

AROM	Patient #1		Patient #2	
	Pre-op	Post-op	Pre-op	Post-op
Shoulder Flexion	Full	Full	0-20 deg	0-160 deg
Shoulder Abduction	Full	Full	0-10 deg	0-70 deg
Elbow ROM	Full	Full	0 deg	80 deg
Forearm Pronation (0-80)	0-70 deg	0-80 deg	0 deg	0-10 deg
Forearm Supination (0-80)	0-10 deg	0-70 deg	0 deg	0-10 deg
Wrist Flexion (0-60)	0-40 deg	0-80 deg	0 deg	0-5 deg
Wrist Extension (0-60)	0-10 deg	0-40 deg	0 deg	0-5 deg
Wrist Radial deviation	0-15 deg	0-20 deg	0 deg	0-5 deg
Wrist Ulnar deviation	0-35 deg	0-40 deg	0 deg	0-5 deg
Thumb MCP (0-60)	0-35 deg	0-45 deg	0 deg	0-5 deg
Thumb IP (0-80)	0-50 deg	0-65 deg	0 deg	0-5 deg
MCP digits (-20 - +90)	0-45 deg	0-90 deg	0 deg	0-5 deg
PIP digits (0-100)	0-50 deg	0-100 deg	0 deg	0-5 deg
DIP digits (0-70)	0-30 deg	0-50 deg	0 deg	0-5 deg

Conclusion

- We did not find any material showing outcomes following soft tissue reconstruction and neurolysis for these patients if EMG showed no compound action potential.
- Kim et al demonstrated improvement in function of median nerve injury after neurolysis but this was in patients with presence of nerve compound action potential.
- If there was no nerve action potential, the injury required resection and graft repair for recovery
- Both showed improvement with regard to these outcomes
- From starting out as preparatory surgery for more extensive reconstruction they have shown enough functional return that there may be no further surgery required.
- It is unclear whether the reconstruction of soft tissue envelope, neurolysis or a combination of both was the main factor and further studies are needed to clearly identify the cause.
- But the encouraging results we observed indicate the potential benefits of neurolysis and tissue reconstruction even in patients who are poor candidates for these procedures and this may be an option before more extensive surgeries are undertaken.

References

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