Triceps to Axillary Nerve Transfer Following Reverse Total Shoulder Arthroplasty for Traumatic Proximal Humerus Fracture

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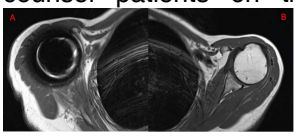
INTRODUCTION: Nerve injuries are uncommon yet significant complications following reverse total shoulder arthroplasty (rTSA), with the axillary nerve being most frequently injured. Prior reports have described the use of a triceps-to-axillary nerve transfer to treat axillary nerve injury prior to rTSA; however, there is a paucity of literature regarding a triceps-to-axillary nerve transfer *after* an rTSA.

METHODS: We report a case of a 67□year□old female who developed persistent motor dysfunction and decreased sensation in the axillary distribution following rTSA for a comminuted proximal humerus fracture. This patient underwent a triceps-to-axillary nerve transfer 5 months after her initial surgery.

RESULTS: After no improvement in deltoid function at three□months following rTSA, a discussion of conservative versus operative management was had and the patient opted for a reverse end□to□side triceps□to□axillary nerve transfer. Electrodiagnostic studies confirmed right axillary focal neuropathy with reduced motor unit recruitment **(Table 1).** Postoperative evaluations over a four□year follow□up revealed marked improvements in range of motion, strength, and patient□reported outcomes **(Table 2)**. Ultrasound and magnetic resonance imaging studies obtained at four years post-op demonstrated mild deltoid atrophy and fatty infiltration, despite the excellent clinical result **(Table 3, Image 1)**.

DISCUSSION AND CONCLUSION:

Our patient's excellent functional and symptomatic outcomes underscore the potential of nerve transfer to restore innervation, offering a viable solution for axillary nerve injuries with persistent dysfunction following rTSA. Future studies should investigate ways to measure deltoid function following triceps to axillary nerve transfer so that we can better counsel patients on the anticipated post-operative course and recovery following these complex procedures.



	Insertional	Spontaneous Activity			Volitional MUAPs					Maximal Patient Effort		
	Ins Act	Fibs	Pos Waves	Fasc	Amp	Dur	Config	Poly	Pattern	Recruitment	Interf Pattern	Effort
Deltoid	Inc	4+	4+	None	Inc	Inc	Norm	Few	Fr Decr	Gr Decr	2-3 units	Full

Table 1: Electrodiagnostic Studies of the Axillary Nerve

Key: MUAPs = Motor Unit Action Potentials; Ins Act = Insertional Activity; Fibs = Fibrillations; Pos Waves = Positive Sharp Waves; Fasc = Fasciculations; Amp = Amplitude, Dur = Duration; Config = Configuration, Poly = Polyphasic Potentials; Interf Pattern = Interference Pattern; Inc = Increased; Norm = Normal; Fr Decr = Frequently Decreased; Gr Decr = Greatly Decreased

Patient Reported Outcome	Pre-Nerve Transfer	4 Years Post-Nerve Transfer	Difference
PROMIS Upper Extremity	37.2	40.7	3.5
PROMIS Pain	52.2	47.8	-4.4
PROMIS Physical Function	42.9	50.2	7.3
DASH	N/A	4.9999	N/A

Table 2: Pre- and Post-Operative Patient Reported Outcomes

Range of Motion	Pre-operative	8 Weeks Post-Operative	7 Months Post-Operative	Final Follow-up (44 months)
Forward Flexion	60 degrees	120 degrees	150 degrees	155 degrees
Abduction with Deltoid in Isolation	NA	75 degrees	90 degrees	100 degrees
Composite Shoulder Abduction	20 degrees	160 degrees	160 degrees	160 degrees
Deltoid MRC	1	NA	NA	5-

Table 3: Range of Motion Values Throughout Clinical Course