

# DOES DUAL NERVE TRANSFER FOR SHOULDER ABDUCTION PRODUCE BETTER RESULTS IN TOTAL BRACHIAL PLEXUS INJURY?

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## Introduction

While dual nerve transfer has demonstrated favorable outcomes for shoulder abduction in UBP injury patients, specifically with the branch to the triceps to axillary nerve (AXN) transfer being used as a second nerve transfer, the use of intercostal nerves as a donor nerve for axillary neurotization is less well established. We hypothesize that TBP injury patients with 2NT will have similar postoperative results than patients with 1NT, because the ICN may be an unreliable nerve donor for axillary neurotization.

## Methods

A systematic review of the literature was conducted according to PRISMA guidelines. Inclusion criteria were studies reporting outcomes on patients undergoing spinal accessory nerve (SAN) to suprascapular nerve (SSN) nerve transfer. Patients were excluded for the following reasons: age under 18, brachial plexus injury other than total brachial plexus injury, nerve transfer for reanimation of the shoulder other than SAN to SSN and/or AXN neurotization, and less than 12 months of follow-up postoperatively. The 1NT group had SAN to SSN, the 2NT group had SAN to SSN transfer and ICN to AXN transfer. Pooled analysis was performed, and primary outcomes were Medical Research Council (MRC) score and range of motion (ROM) for shoulder abduction.

## Results

Fifty-eight patients from six studies were included. Age, sex, and injury to surgery interval were well matched between the 1NT and 2NT groups. The 2NT group had a significantly higher abduction range (59.6 vs 85.6,  $p < 0.001$ ), mean MRC score (3.5 vs 2.2,  $p = 0.003$ ), and percentage of patients that achieved MRC scores greater than or equal to 4 (28.2% vs. 8.3,  $p < 0.001$ ).

**Table 1.** A Comparison in Demographics between 1NT and 2NT Groups.

	1NT	2NT	P value	Chi squared
Age in years, mean	25.8	27.5	0.219	
Sex, % male	7.4	12.5	0.542	0.373
Preoperative Delay, mean (SD)	3.9 (1.7)	3.8 (1.0)	0.901	
Abduction Range Degrees, mean (SD)	59.6 (29.6)	85.6 (23.7)	<b>0.001</b>	
Abduction MRC, mean (SD)	2.2. (1.3)	3.5 (0.6)	<b>0.003</b>	16.048
Abduction, %MRC $\geq 4$	8.3	28.2	<b>0.001</b>	11.733

## Conclusions

Dual nerve transfer utilizing SAN to SSN transfer and ICN to AXN transfer produces superior shoulder abduction outcomes in TBP patients than single nerve transfer using SAN to SSN transfer alone. The ICN may be a valuable donor nerve for AXN neurotization in patients with brachial plexus injury involving the upper trunk.