

## **Nerve Transfers Thought to Have High Failure Rates That Don't**

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**INTRODUCTION:** Our institutions maintain the position that children have to be taught how to use nerve transfers for activation to ensue; they are not intuitive. We hypothesize that many pediatric nerve transfers that are commonly believed to have relatively high failure rates (up to 82% by some authors) do not, and are instead highly dependent on postoperative rehabilitation protocols in the context of brachial plexus birth injury (BPBI). We present our postoperative rehabilitation protocols and outcomes for three common nerve transfers believed to have high failure rates: spinal accessory nerve (SAN) to suprascapular nerve (SSN), anterior interosseous nerve (AIN) to extensor carpi radialis brevis (ECRB) nerve, and medial pectoral nerve (MPN) to axillary nerve (AxN).

**METHODS:** A retrospective cohort study was conducted from November 2020-January 2025. 35 pediatric patients from two institutions presenting with functional limitations as demonstrated by Active Movement Scale (AMS) scores underwent surgery with at least 1/3 nerve transfers listed above. Postoperatively, all patients attended specialized occupational therapy with our postoperative rehabilitation protocols. AMS and Manual Muscle Testing (M) scores were compared prior to and following surgery to analyze outcomes of the nerve transfers. Descriptive statistics, median and interquartile range, nonparametric tests, and Wilcoxon signed-rank tests were employed.

**RESULTS:** 35 patients underwent SAN-SSN at an average age of 8.4 (SD 3.81) months and had an average follow-up time of 16.7 (SD 6.87) months. At the latest follow-up, all patients had significant improvement in shoulder abduction (SA) ( $p < 0.001$ ) and shoulder flexion (SF) ( $p < 0.001$ ) with no nerve transfer failures (recovery  $< \text{AMS } 6$  and  $< \text{M}3$ ). Two patients underwent AIN-ECRB. Patient 1 underwent surgery at 3.5 months old. 10.2 months following surgery, the patient achieved a M4 for this transfer with an AMS of 7 for wrist extension (preoperative AMS 3). Patient 2 underwent surgery at 1.6 months old. 5.3 months following surgery, the patient began achieving activation of the transfer, demonstrating wrist extension with gravity eliminated, AMS 5, M4 (preoperative AMS 0). 21 patients underwent MPN-AxN at an average age of 8.9 (SD 2.86) months and had an average of 17.7 (SD 6.14) months of follow-up. At latest follow-up, significant improvement was demonstrated in SA (median AMS 5, IQR AMS 3-6, range M2-M5) ( $p < 0.001$ ) and SF ( $p < 0.001$ ) (median AMS 6, IQR AMS 5-6, range M2-M5).

### **DISCUSSION AND CONCLUSION:**

Using our rehabilitation protocol, our patients demonstrated significant improvements in AMS scores following nerve transfers, correlating to improved outcomes and lower failure rates when compared to previous literature. We highlight the importance and impact of postoperative rehabilitation for activation of nerve transfers on outcomes in children with BPBI.