outcomes of revision surgery for recurrent or persistent carpal tunnel syndrome may be improved by the novel use of both nerve wrapping and adipofascial flap.

**METHODS:** The records of patients with recurrent or persistent carpal tunnel syndrome treated with revision decompression, collagen nerve wrap, and adipofascial flap from a 4-year period were retrieved from the Computerized Patient Record System database. Each record was reviewed for pre-operative and post-operative visual-analog pain scale measurements, opioid usage, and severity of symptoms.

**RESULTS:** 22 patients were identified, with 22 revision surgeries for recurrent carpal tunnel syndrome and 3 revision surgeries for persistent carpal tunnel syndrome. The mean age of the patients was 67.8 years and ranged from 51 to 85 years. There was an average follow up of 52 weeks. The average pre-operative median motor nerve conduction velocity was 47.7 m/s. 80% of patients had hypertension as a comorbidity. 76% reported subjective resolution of their symptoms by most recent follow up. Post-operative average visual-analog pain score decreased to 0.20 from an average pre-operative average visual-analog pain score of 5 (p<0.001). Post-operative opiate medication use average decreased to 20% from an average pre-operative opioid average use of 36% (P=0.31). No patient required repeat decompression by latest follow up.

**CONCLUSION:** Revision decompression with collagen nerve wrap and adipofascial flap can successfully treat recurrent and persistent carpal tunnel syndromes. This means of treatment may currently be the optimal way to treat recurrent or persistent carpal tunnel syndrome and should be compared to treatments with isolated nerve wrapping or adipofascial flap for revision carpal tunnel treatment in future prospective studies.

**Reference Citations:**
1. Cobb TK, Amadio PC, Leatherwood DF, et al. Outcome of reoperation for carpal tunnel syndrome. *YJHSU*. 1996;21(3):347–356.
2. Soltani AM, Allan BJ, Best MJ, et al. Revision Decompression and Collagen Nerve Wrap for Recurrent and Persistent Compression Neuropathies of the Upper Extremity. *Annals of plastic surgery*. 2014;72(5):572–578.
3. Strickland JW, Idler RS, Lourie GM, et al. The hypothenar fat pad flap for management of recalcitrant carpal tunnel syndrome. *YJHSU*. 1996;21(5):840–848.

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**Examining Surgical and Patient-Reported Outcomes in the Operative Management of Peripheral Neurofibromas**

**Presenter:** Jordan D. Frey, MD

**Co-Authors:** Marc A. Soares, MD; Z-Hye Lee, MD; Sheel Sharma, MD

**Affiliation:** New York University Langone Medical Center, New York, NY

**INTRODUCTION:** Peripheral nerve tumors, especially of the extremities, impart significant disability with potential malignant transformation, yet surgical management risks permanent deficits. Outcomes with peripheral nerve tumor excision and comparative results with surgical intervention for neurofibromas and schwannomas remain to be elucidated.

**METHODS:** Patients undergoing excision of peripheral nerve neurofibromas or schwannomas from 2009 to 2015 were reviewed. Outcomes, including results of a post-operative outcome survey, were compared between the two groups.

**RESULTS:** Ninety-two peripheral nerve tumors were excised; 72 neurofibromas (78.3%) were removed from 26 patients while 20 schwannomas (21.7%) were removed from 17 patients. Average age in the neurofibroma and schwannoma groups were 34.69 and 39.65 years (p=0.2291). Patients in the neurofibroma group were significantly more likely to carry a diagnosis of neurofibromatosis type 1 or 2 while the schwannoma group was significantly more likely to be diagnosed with schwannomatosis (p<0.0001). Patients in the neurofibroma group were significantly more likely to present complaining of pain (p=0.0144); those in the schwannoma group were significantly more likely to present with motor weakness (p=0.0047). Anatomic tumor distribution to the upper or lower extremities, head/neck, or trunk was equivalent (p=0.3663). Follow-up was significantly greater in the schwannoma group (p=0.0015).

Tumors had an equal size distribution between the two groups (p=0.1520). Excised schwannomas were significant more likely to be associated with a motor or named sensory nerve compared to excised neurofibromas (p=0.0377). Nerve monitoring was employed in an equivalent fashion
between the groups (p=0.3332); however, nerve repair was significantly more frequently employed in the schwannoma group (p=0.0110). Nerve tube repair was more commonly utilized in the schwannoma group (p=0.0004); epineural, fascicular, and nerve graft techniques were utilized equivalently.

There were no significant differences in post-operative motor weakness (6.9% vs. 15.0%; p=0.1529) or sensory changes (2.8% vs. 10.0%; 0.0510) between the groups.

Ten patients in the neurofibroma group and seven in the schwannoma groups responded to a post-operative survey. There were no significant differences for any responses. Both groups reported improvement in post-operative quality of life (p=0.7806), no regret with surgery (p=1.000), and a positive proclivity towards proceeding with surgery for potential future peripheral nerve tumors (p=0.8029).

CONCLUSION: Peripheral neurofibromas and schwannomas are unique in terms of presentation, tumor characteristics, and operative outcomes; however, both may be safely managed surgically.

Syndactyly: National Analysis of Trends in Epidemiology and Surgical Management from 1997–2012

Presenter: Alexandra Bucknor, MBBS, MRCS, MSc
Co-Authors: Winona Wu, BSc; Anne Huang, BS; Anmol S. Chattha, BA; Austin D. Chen, BS; Salim Afshar, DMD, MD; Samuel J. Lin, MD, MBA
Affiliation: Beth Israel Deaconess Medical Center / Harvard Medical School, Boston, MA

INTRODUCTION: Syndactyly is a common congenital hand deformity with an estimated incidence of 1:2000 live births.1 Previous studies have discussed disparities in the provision of hand and upper limb services in the United States.2 Our study aims are to (1) analyze the epidemiology of syndactyly and trends in surgical management over time; (2) identify socioeconomic disparities affecting treatment.

METHODS: A retrospective analysis of the Healthcare Cost and Utilization Project Kids Inpatient Database was performed for all available years (1997, 2000, 2003, 2006, 2009, 2012). Children under the age of three with a diagnosis of syndactyly were retrieved using International Classification of Diseases, Ninth Revision diagnosis codes (ICD-9 755.11, 755.12, 755.55); procedural data for syndactyly correction were also retrieved. Trends over time were analyzed using the Cochran-Armitage test. Patient and hospital characteristics underwent multivariable logistic regression modeling to evaluate predictors of surgical treatment.

RESULTS: Overall, 6,401 cases of syndactyly were retrieved over the study period, with an incidence of 16.32/million in 2012. The majority were Caucasian (59.1%) and male (61.5%), admitted to Southern (35.6%), large bed size (59.2%), urban, teaching hospitals (63.3%), with either predominantly Private (49.6%) or Government-based insurance (44.0%).

Of these, 12.8% (n=821) underwent procedures for syndactyly correction. Over time there was a significant decrease in surgical correction of syndactyly (20.5% in 1997 to 6.0% in 2012, p<0.001). Of those having surgery, there has been a significant increase in flap-based reconstruction of the hand over time (12.2% in 1997 to 30.6% in 2012, p<0.001).

Predictors of not having surgical treatment for syndactyly were Medicaid coverage (OR 1.253, CI 1.066–1.471); lowest three incomes quartiles (OR 1.29, CI 1.051–1.584; OR 1.404, CI 1.152–1.712; OR 1.281, CI 1.062–1.545); admission to a medium (OR 1.248, CI 1.021–1.526), large (OR 1.597, CI 1.321–1.931), urban non-teaching (OR 1.899, CI 1.360–2.653), urban teaching (OR 1.152, CI 1.772–2.615) or Midwestern (OR 1.324, CI 1.054–1.663) hospital.

CONCLUSION: The surgical correction of syndactyly within the inpatient setting is decreasing over time. Socioeconomic disparities are evident: Medicaid insurance status and lower household income had significantly lower rates of surgical correction. Minimizing socioeconomic barriers to care may be important steps in enhancing the quality of care that is delivered to vulnerable pediatric populations.

Reference Citations:
1. Jordan D, Hindocha S, Dhital M, Saleh M, Khan W. The epidemiology, genetics and future management of syndactyly. Open Orthop J. Bentham Science Publishers; 2012;6:14–27.