



## Use of Scalene Fat Pad Wrap to Protect the Brachial Plexus After Supraclavicular Thoracic Outlet Decompression for Neurogenic Thoracic Outlet Syndrome

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### INTRODUCTION

Neurogenic thoracic outlet syndrome (NTOS) may be the result of constraining combinations of first rib, cervical rib, scalene (minimus) variants, fibrotic bands, and Sibson's fascia. If all are removed completely at primary surgery; neurologically active, fibrotic tissue surrounding the brachial plexus is often encountered in redo cases as the cause of brachial plexus compression/irritation.

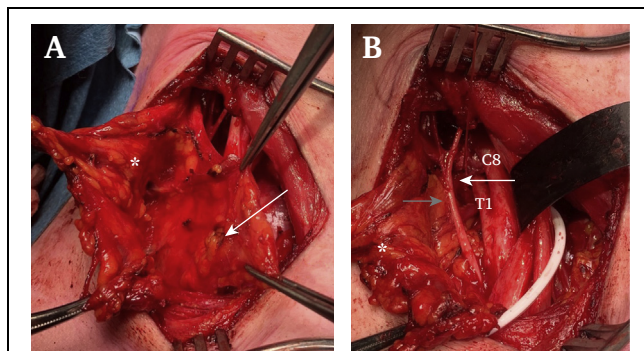
Thoracic outlet decompression (TOD) surgery in primary and recurrent NTOS should target all these factors and remove them. TOD surgery itself is also an inciting traumatic event possibly leading to scar tissue formation and the risk of recurrent NTOS complaints.

To limit perineural scar tissue formation, different materials have been used to wrap the brachial plexus and provide a (temporary or permanent) physical barrier around

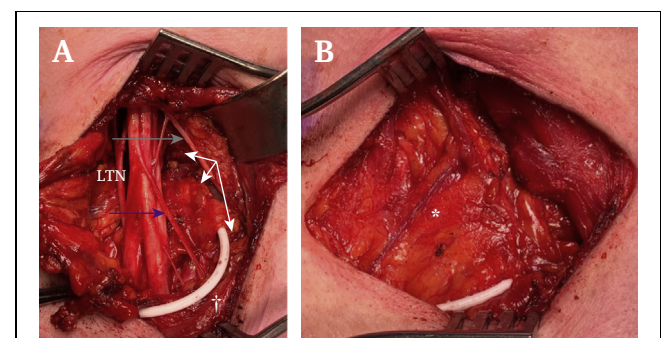
the nerves (e.g., Surgiwrap, PTFE, Seprafilm, Human Amnion Membrane, omentum, groin fat, or adipofascial deltopectoral flap). Autologous wraps additionally supply vascularised tissue around the nerves permitting neural gliding and revascularisation of the scarred nerves.

### TECHNIQUE

One of the first steps in supraclavicular TOD surgery is mobilisation and laterocranial deflection of the scalene fat pad. The omohyoid muscle can be removed, and divides the scalene fat pad into a deep and superficial layer (Fig. 1). On completion of the TOD surgery the deep fat pad layer is positioned over the pleura, underneath the long thoracic nerve, the T1 root/inferior trunk and accessory phrenic nerve and secured with five or six 5-0 Prolene sutures. In case of an intentional or iatrogenic defect, a pleural catheter must be placed before securing the deep layer (Fig. 2A and B). The wrap is finished by closing the superficial fat pad layer over the brachial plexus as usual (Fig. 2B). This technique has been used in 19 consecutive cases over the past two years (18 redo cases).



**Figure 1.** (A) Division of the superficial (asterisk) and deep (arrow) scalene fat pad at the level of the omohyoid muscle. (B) Positioning of the deep fat pad layer (white arrow) underneath the long thoracic nerve (gray arrow), the brachial plexus (the T1 thoracic root as the lowest part of the brachial plexus), and the phrenic nerve, covering the pleura and remnants of the intercostal muscles of the second rib, leaving the superficial fat pad (asterisk) in its original position.



**Figure 2.** (A) Securing the deep fat pad (white arrows) below T1, medially underneath the phrenic nerve (gray arrow) and laterally underneath the accessory phrenic nerve (violet arrow). <sup>†</sup>Note the positioning of the long thoracic nerve (LTN) and pleural catheter. (B) Closing the superficial fat pad layer (asterisk) over the brachial plexus as usual.

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<https://doi.org/10.1016/j.ejvs.2022.01.018>

### CONCLUSION

A scalene fat pad wrap seems safe and feasible in a small cohort of patients. Functional results are pending.