The Thoracic Outlet Syndrome (TOS) is a collection of different symptoms and disorders that result in the neurovascular structures compression in the upper extremity area of the brachial plexus, subclavian artery and vein, which results in pain, numbness, and tingling. The diagnosis for TOS is often complex as it may include a physical examination and complementary clinical tests such as: radiography, MRI, Arteriography by digital subtraction, Adson’s maneuver, Tinel’s maneuver, etc. The imaging of the involved structures is usually normal. Indications for surgical treatment are debated and often reserved for cases which involve the failure of conservative management. Various surgical approaches have been proposed for the treatment of thoracic outlet syndrome (TOS), however, there is no “gold” procedure for its complicated and multi-disciplinary pathologies. The objective of this review is to analyze the recently collected surgical data to detect which surgical approach is more efficient. Specifically, understanding the key differences between the supraclavicular procedure and the transaxillary approach was investigated. This literature review examines studies conducted on surgical techniques based on the thoracic outlet syndrome.

### Systematic Literature Review

Publications were found through databases: PubMed and Google Scholars on patients who underwent supraclavicular neuroplastic of brachial plexus (SNBP [no rib resection]) and transaxillary first rib resection (TFRR) in patients in whom the dominant clinical problem was pain and other relevant publications. A total of fifty-five patients were randomized to undergo TFRR or SNBP. Review of the literature found that transaxillary first rib resection provided better relief of symptoms than SNBP. Patients reported significantly less pain, greater percentage of pain relief, and less pain on an effective scale (VAS) compared with those as well to come to a clear conclusion.

### Data Analysis & Results

There are both slight and significant differences between the supraclavicular approach and the transaxillary approach before and after surgery of the thoracic outlet syndrome. For example, in terms of pain, analysis of these findings demonstrated that TFRR was associated with greater benefits than SNBP. Additionally, the patients who underwent TFRR were significantly more likely to report good or excellent pain relief (75% compared with 48%, respectively; p = 0.02). However, we can also see that minor complications were set in 6% (n = 5) of patients with no significant difference in both groups.

Future experiments analyzing this data could be used to enhance and perfect both these surgical techniques to help create a more effective surgical approach solution to thoracic outlet syndrome. Additionally, researchers could work on looking at other surgical approaches and comparing those as well to come to a clear conclusion.

**Figure 6:** Thoracic outlet and relevant anatomy

**Figure 7:** Patient positioning and incision site for the transaxillary approach

**Figure 8:** Patient positioning and incision site for the supraclavicular approach

**Figure 9:** Bar graph showing pre- and postoperative VAS pain scores (TA = 0.83) (affective scale: 0, no pain; 1, not; 2, barely; 3, slightly; 4, annoying; 5, very annoying; 6, distressing; 7, intolerable; and 8, very intolerable).

**Figure 10:** Comparison of postoperative pain ratings based on the VAS compared with the affective scale for each patient (R2 = 0.83) (affective scale: 0, no pain; 1, not; 2, barely; 3, slightly; 4, annoying; 5, very annoying; 6, distressing; 7, intolerable; and 8, very intolerable).