

# Enhanced Patient Safety with Computer-Assisted Instrumentation during Endoscopic Transaxillary First-Rib Resection for Thoracic Outlet Syndrome

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## Purpose

In 1982, the late Dr. Andrew Dale, reporting on iatrogenic neurovascular injuries, questioned the safety of the transaxillary approach for thoracic outlet syndrome (TOS). In the past 20 years, no new outcome data on the transaxillary area has been forthcoming. Endoscopic-assisted video was adopted in 1983 to offer direct visualization of cervical anomalies and compression of the neurovascular bundle. This article's purpose is to discuss the feasibility of using computer-enhanced instrumentation to further improve visualization and therefore patient safety during transaxillary first-rib resection.

## Methods

From November 1998 to June 30, 2005, 103 patients (71 female and 32 male) who had failed conservative treatment underwent 128 procedures for thoracic outlet decompression. Eighty-nine endoscopic transaxillary first-rib resections were completed using Aesop Robotic Arm/Hermes integrated voice-control instrumentation. Since February 2003, dissection in 39 procedures was performed using the daVinci Surgical System.

## Results

Surgical findings of cervical bands correlated with pre-operative symptoms. One hundred percent of patients with neurogenic/arterial TOS requiring cervical-rib resection had Roos types I and/ or II bands. Additional surgical findings included the following: patients with neurogenic/arterial without cervical ribs or neurogenic alone had type III, IV, or V bands; patients with venous compression (100%) had type VII bands. No mortalities or permanent neurovascular injuries occurred. There was a 6.3% (8 of 128) postoperative complication rate. Actual length of stay was 2.9 days. Mean follow-up for 87% of patients was 19.9 months. Complete or partial ablation of symptoms occurred in 86% of patients. Persistent myofibrositis was found in 37% of patients with ongoing symptoms. Staged supraclavicular scalenectomies were required in 7.0% (9 of 128).

## Conclusion

In properly trained hands, endoscopic computerized instrumentation in transaxillary first-rib resection decreases the risk of neurovascular injury, promotes complete decompression, and enhances patient safety. The daVinci 3D optical imaging system further enhances visualization, thereby promoting telemanipulation of soft tissue structures in a relatively inaccessible working space.

## References

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