# Treating Nerve Compression Disorders In Athletes

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Two new studies from Washington University School of Medicine in St. Louis suggest ways to improve surgical treatment for a debilitating condition caused by compressed nerves in the neck and shoulder. The condition, neurogenic thoracic outlet syndrome, causes pain, numbness or tingling in the shoulder, arm or hand and is perhaps best known for affecting baseball pitchers and other elite athletes. Patients often describe pain and tension in the neck and upper back, numbness and tingling in the fingers, headaches and perceived muscle weakness in the affected limb.

Treatment begins with physical therapy and sometimes medications such as anti-inflammatory drugs and muscle relaxants. When these treatments fail to improve symptoms and there is substantial disability in the use of the affected upper extremity, surgery can help relieve pressure on the nerves, often by removing the first rib and other structures thought to be causing the compression. One study reported that adolescents do even better after surgery than adults, but evidence suggests that this may not be due to age alone. In the second study, the researchers found that minimally invasive surgery may be just as good for select patients as the traditional, more extensive approach.

Both studies appear online in the *Journal of Vascular Surgery* and are important contributions to the field, according to the papers' senior author, Robert W. Thompson, MD, professor of surgery and director of the Washington University Center for Thoracic Outlet Syndrome at Barnes-Jewish Hospital. The center treats one of the highest volumes of patients in the country, and the paper comparing treatment outcomes by age includes the largest series of adolescent patients reported in the literature to date. "This is an important message for pediatricians who treat teenagers, especially teenage athletes," Thompson says. "These are patients who can do extremely well if identified early and treated."

The study compared outcomes of the traditional surgery in 189 patients treated from 2008 through 2010. Thirty-five of the patients were under age 21, with an average age of 17. The remaining 154 patients were over age 21, with an average age of 40. Both groups showed substantial improvement in symptoms and function at three and six months after surgery, but the adolescent group did significantly better. In fact, a combined measure of shoulder, arm and hand function, pain and severity of symptoms was almost four times better in the adolescent group than the adult group six months after surgery. Adults also reported about four times greater use of pain medication after surgery compared to adolescents.

While much of this gap may simply be attributed to age, other differences between the two groups could be useful in identifying ways to improve outcomes for adult

patients. For example, duration of pain and use of opiate pain medications before surgery were significantly higher in adults, perhaps contributing to their merely moderate improvement, compared with younger patients. Such evidence suggests that if adults were to seek treatment earlier or use less pain medication, they would perhaps do better following surgery.

“These factors may be related to age to some degree, but we need to sort that out,” Thompson says. “Here we have a young group of patients that consistently does very well after surgery. If we can determine which factors contribute to their good outcomes that are independent of age, we may be able to improve the outcomes even further for our adult patients.” The second paper showed that certain patients may do just as well with a minimally invasive procedure done on an outpatient basis as those who require the traditional surgery. The traditional procedure has an average five-day hospital stay.

This study looked at 200 patients treated for neurogenic thoracic outlet syndrome from 2008 through 2011. To determine the best surgical approach for each patient, the doctor examined two locations of potential nerve compression – the side of the neck above the collarbone and the upper chest just below the collarbone, near the shoulder. If patients experienced pain and tenderness in both places, they were offered the traditional procedure that includes removing the first rib and scalene muscles in the neck and detaching the tendon of the pectoralis minor muscle, which connects to the top and front of the shoulder blade. Of the 200 patients, 143 underwent this procedure.

When symptoms occurred exclusively under the collarbone, patients only received detachment of the pectoralis minor tendon as a minimally invasive procedure. The remaining 57 participants in the study underwent this outpatient procedure. To determine outcomes, the researchers compared various measures of the patients’ arm and shoulder function before surgery and again three months after surgery. Both sets of patients improved significantly after surgery, and the extent of their improvement was not statistically different. At the three-month mark, about 75 percent of patients in both groups demonstrated improved function in the affected areas.

“The ideal candidate for the minimally invasive procedure would be a patient with characteristic and debilitating symptoms, no response to physical therapy and clinical exam findings that were completely localized to the pectoralis minor tendon,” Thompson says. “That’s the really exciting subset of patients. You might be able to have a big impact with a minor outpatient procedure. The trick is to properly identify these patients. We still have to rely primarily on the experience of the physician and old-fashioned diagnosis by physical exam – knowing the anatomy, knowing what we’re feeling and what elicits symptoms.”

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