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ROSEMONT, Ill., July 22, 2019 – Hardly a sports season goes by without at least one professional player going on the injured list for thoracic outlet syndrome, also called TOS.

The latest is Pittsburgh Pirates pitcher Nick Burdi, according to recent news reports, but not so long ago, this condition was almost unknown. So, what exactly is TOS?

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Published on Society for Vascular Surgery (<https://vascular.org>)

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The compression syndrome is not unique to baseball pitchers but is found in some people who have had a previous injury and/or who do a great deal of repetitive upper arm movements. Depending on the type of TOS, it can cause pain, numbness, and clumsiness in the arm and hand. It affects a small number of well-known professional athletes, which is why it has been in the news.

If exercise and physical therapy don't improve it, often surgery is required to relieve compression in the shoulder and thoracic areas.

The syndrome has become far better known just in the past few years, according to vascular surgeon Dr. Karl A. Illig, an author of the textbook, "Thoracic Outlet Syndrome," who has performed many TOS procedures. Vascular surgeons treat disorders of the arteries and veins with medication, noninvasive procedures or open surgery.

"TOS has definitely become more recognized," he said. "There was an international conference on this in 2011 and a textbook devoted entirely to it in 2013. People are taking it more seriously."

That's good news, since years ago, people who developed TOS could lose the use of their arm.

"It was very poorly recognized and treated in the old days," Dr. Illig said. "I ran across a lady who in retrospect had it 50 years ago, untreated. Her arm was essentially nonfunctional now. Really the modern era of recognition started in the '70s and '80s, more in the Midwest and on the West Coast than anywhere else, and the era of more objective diagnosis started in the 21st century."

Part of the issue with TOS – and the reason a vascular surgeon may be needed for treatment – is that there has been no single definition of what the syndrome is, and there are three distinct variations that are all considered TOS. All involve a compression of nerves and/or an artery or vein, which results from a buildup of tissue in a tight part of the body, and cause pain and/or numbness.

Because the syndrome needed more clarity, in 2016 the Society for Vascular Surgery developed reporting standards that designated three types of thoracic outlet syndrome, neurogenic (NTOS), venous (VTOS) and arterial (ATOS). Of the three, neurogenic accounts for three-quarters of cases, venous accounts for most of the rest, but the occasional aortic TOS does occur.

"Many, if not most NTOS are thought to follow an accident, perhaps minor," Dr. Illig said, "but the usual timeframe is years and years. We think the injury causes scar tissue in the anterior scalene muscle (or perhaps biomechanical changes) that put pressure on the brachial plexus. ATOS is almost always the result of an extra (cervical) rib, while venous TOS is usually related to muscular development and/or constant "arms overhead" type activity such as pitching (interestingly, softball as much as hardball)."

In the literature, it's clear that there are far more TOS procedures than there used to be, but the reasons are unclear. It's likely that surgeons have determined how to treat it and have started programs and become known as surgeons who can repair the syndrome. "I do think there are more cases being done. People are taking it more and more seriously. Several vascular surgeons around the country do nothing but TOS. It is also becoming more accepted in England and Europe."

But could it be more common among high performance athletes because of training regimens that increase muscle mass?

"It's hard to prove, but a lot of people think so," Dr. Illig noted. "After we treated two Tampa Bay professional hockey players, their trainer brought this up. It may be a cause but is hard to say."

Even though thoracic outlet syndrome can be debilitating, with treatment, many patients can expect to resume their normal lives.

"People do pretty well," Dr. Illig said. "Approximately 80 to 90 percent of those with NTOS have good to excellent results, with VTOS it's more like 95 percent return to normal lives and about 80 percent of high-performance athletes

return to their baseline level of function.”

## 10 warning signs of TOS

Could you have thoracic outlet syndrome? Only your doctor can make a diagnosis, so be sure to seek professional help if you have a medical problem. Here are some of the common symptoms. Some are common to all variations, some could indicate one version of TOS or another.

1. A job or hobby that keeps arms overhead for long periods
2. History of trauma in the chest, neck and shoulders, particularly between the shoulder and sternum
3. Pain, numbness, tingling and weakness in an arm (characteristic of neurogenic TOS)
4. Symptoms in #3 get worse when arms are overhead, or while driving, walking or running (NTOS)
5. Arm swelling, usually with discoloration and heaviness (characteristic of venous TOS)
6. Family or personal history of blood clots (VTOS)
7. Pain in the arm, hands or fingers, even when at rest (arterial TOS)
8. Loss of dexterity in the hand; arm clumsiness (ATOS)
9. Keen sensitivity to cold in the arm and hand (ATOS)
10. Isolated finger pain or ulcers (ATOS)

Source: “Reporting standards of the SVS for thoracic outlet syndrome .” Journal of Vascular Surgery Sept. 2016.

**Article Date:** Monday, July 22, 2019

**Tags:** Patient Information

**Article Type:** Press Release