



OHSU Surgeons Challenge Age-old Practice

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Surgeons in the Oregon Health & Science University Trauma/Critical Care Program are challenging the decades-old practice of 'not fixing' rib fractures. In a first-of-its kind pilot study, the surgeons hope to identify people most at risk of prolonged pain and disability from broken ribs. They also hope to expedite pain relief and healing using a surgical technique, and a new device, called a U-plate. Neither the technique nor the device are used anywhere else.

"Historically, physicians have been taught that nothing can be done to fix a rib fracture," said John Mayberry, M.D., principal investigator of the study and associate professor of surgery in the OHSU School of Medicine. "My colleagues and I have long thought that wasn't true, but we have yet to prove it. With this study, we hope to identify subsets of people who respond better to surgical repair than nonsurgical therapy, then develop a standard criteria for treatment."

Traditionally, people with rib fractures, some 300,000 a year, are discharged from the hospital with large doses of oral narcotics and anti-inflammatory painkillers, explained Mayberry. They are advised to use a liberal amount of these agents to control pain; to cough and breathe deeply to prevent pneumonia; and to expect several weeks to pass before the ribs heal and become pain-free.

"Based on findings from our previous research, we are convinced that current, traditional nonsurgical management of rib fractures does not facilitate pain relief or a speedy return to normal activity. We believe new strategies, including a minimally invasive surgical method we've developed, will alleviate pain and reduce disability for individual participants," said Mayberry, adding that patients in the United States disabled by acute rib fractures collectively lose approximately 58,000 years of productive work each year.

Horse enthusiast Gary Schaub, 60, of Lake Oswego, Ore., is exactly the type of person Mayberry is hoping to help.

Schaub was thrown from his horse while jumping a barrier, breaking every rib on his left side. He was rushed to the nearest hospital, where he was stabilized. Three of his broken ribs had impaled his lung, so he was slowly bleeding to death with every breath and movement. After two weeks in the hospital, he still couldn't catch his breath. It became clear to his family that he was not getting better. Schaub then was transferred to the OHSU Trauma Center, where he underwent eight hours of elective surgery to repair his broken ribs, broken collar bone, collapsed lung and fractured shoulder blade.

"When I woke up after Dr. Mayberry's operation, my wife was wondering why I was smiling from ear to ear. I could take my first full breath without agonizing pain. Dr. Mayberry not only saved my life, but he also enabled me to resume my very active lifestyle. I am now riding [horses], downhill skiing, doing U.S. Cavalry living history and hiking again. Also, I am back to work full time."

Without surgical intervention, Mayberry explained, Schaub may have endured months of pain and discomfort and years of slow recovery. "Had we not interceded and sped up that process, there was a 20 percent chance that his ribs would have never properly healed, and ribs are a lot harder to fix a year or two after an injury."

Thomas Ellis, M.D., assistant professor of orthopaedics and rehabilitation in the OHSU School of Medicine, routinely assists Mayberry in surgically repairing rib fractures. Ellis, along with Joel Gillard, a mechanical engineer, invented a new device, known as a U-plate, which could better facilitate rib healing. Once implanted, the U-plate, which is made of titanium and resembles a U-shaped hook, bridges the fracture, which helps promote and expedite healing, and helps prevent further injury.

The U-plate is approved by the Food and Drug Administration and is distributed by Acute Innovations, located in Hillsboro, Ore.

Several people, including Eric Vanzura, D.O., 45, of Boulder, Colo., have been implanted with this device. Vanzura broke five ribs after hitting a stump while telemark skiing. He says he's happy with the results.

"At the time of my injury, I was told by several pulmonologists and trauma surgeons to let the displaced fracture heal on its own. After more than two months, I still had a lot of disability and my chest would frequently go numb, so I did an Internet search and found Dr. Mayberry."

The OHSU Trauma Service sees an average 134 rib fracture cases each year, and even more are evaluated in the OHSU Emergency Department. Consequently, as many as 200 rib fracture participants a year may be enrolled in this two-year study. About 60 participants currently are enrolled.

To be eligible for the rib fracture surgical repair study, participants must be 16 or older and have a rib fracture confirmed by X-Ray or CT scan within 10 days of injury and be registered at OHSU. Participants will be surveyed to measure: their overall health at 10, 30, 60, 120 and 180 days post-injury; the dosage, frequency and identification of pain medications; and whether they've returned to work, with or without restrictions.

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At the end of the study, which is funded by the Medical Research Foundation (MRF) of the Oregon Health & Science University Foundation, the researchers expect to have established and validated a reliable method of accurately measuring the long-term pain and disability of rib fractures. They also hope to establish that certain subsets of people with rib fractures benefit more from minimally invasive surgical treatment than from nonsurgical treatment.

In addition to the MRF-funded study, Mayberry and colleagues also are researching the efficacy of the U-plate. While, the MRF study requires people with rib fractures be seen within 10 days of injury, the U-plate study accepts rib fracture referrals at any time, days or even years after injury. Candidates for the U-plate study include those with unrelenting pain within several days of injury or those whose rib fractures are not healing and are still painful some months or years after injury. Mayberry anticipates approximately 10 percent of participants, those with the most severe fractures, will need the U-plate.

OHSU has licensed the U-plate device used in these research studies to Acute Innovations. This potential conflict of interest has been reviewed and managed by the OHSU Conflict of Interest in Research Committee.

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