

**BELOW** | A bad jump last year sent Gary Schaub tumbling off his horse, Pierpont. The Lake Oswego man broke seven ribs, his collarbone and his left shoulder. Though doctors usually let ribs heal on their own, a surgeon fixed Schaub's ribs after two weeks of unyielding pain. Now doctors are studying whether more people with badly broken ribs could benefit from surgery.

**RIGHT** | An OHSU surgeon and engineer teamed to design a U-shaped plate just for broken ribs. This X-ray shows an early use of the plate, made in Hillsboro by Acute Innovations.



Photo courtesy of Acute Innovations

## Fixing broken ribs moves beyond pain pills and time

OHSU doctors are studying the use of surgery and a taco-shaped plate to speed and ease healing

By ANDY DWORKIN  
THE OREGONIAN

Most of the 300,000-plus people who break ribs each year in this country get little but sympathy and pain pills.

Rib fractures hurt intensely and often take two months to heal. But ribs don't bear much weight, and chest muscles usually hold broken ribs in good alignment. So doctors mostly let cracked ribs heal over time, with no cast or surgery.

The hands-off approach works — usually.

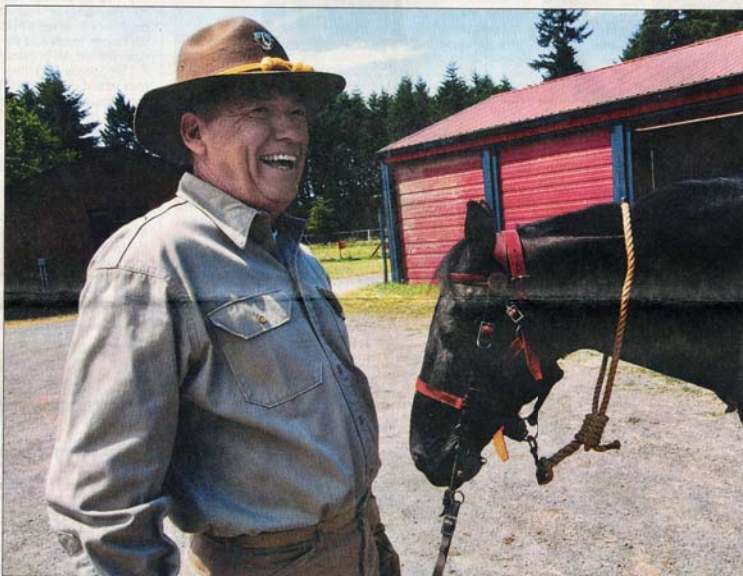
But a few surgeons wonder whether some patients might heal faster, with less pain, if doctors operate to patch broken ribs with plates and screws.

Oregon Health & Science University doctors are launching two studies, hoping to identify which patients need help healing their ribs and to test a U-shaped rib-fixing plate invented by an OHSU doctor and an engineer.

They're especially focused on patients with several bad breaks and who end up in intensive care on a ventilator, increasing their odds of getting infections, including pneumonia.

Lake Oswego resident Gary Schaub, who broke seven ribs, his collarbone and a shoulder in a 2005 horse-jumping accident, is a perfect example. An ambulance rushed the 60-year-old to a hospital where doctors told him "the standard is just to go home and heal." But he was in such pain, he stayed in the hospital for

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DOUG BEGHTEL/THE OREGONIAN

### Health: Plate curls over soft-boned ribs to hold in place

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two weeks "living on morphine and Oxycotin."

Finally, he transferred to OHSU, where he had heard of Dr. John Mayberry, a surgeon with a special interest in broken ribs. A CT scan showed that three of Schaub's ribs had punctured his lung and he was bleeding internally. The next day, Mayberry ran a bolt through Schaub's collarbone and patched three ribs with small metal plates designed for broken jaws. Schaub said he could breathe easily as soon as he came to and he left the hospital in four days. After many weeks of rehabilitation, he regained full motion and returned to normal activities. He's even back riding his horse.

"If I'd had that horse wreck anywhere else, and hadn't heard of

Doctor Mayberry, I'd have been a cripple — if I'd lived," Schaub says.

Mayberry, who says he's among a handful of surgeons interested in broken ribs, thinks more people would benefit from surgery — though most ribs could still probably heal on their own. What's not clear is who needs surgery and just how you should fix ribs. Mayberry is working on two studies to address those questions.

One will track 200 patients with broken ribs who get the current standard care: no operation. Researchers will record information about each, including the patient's age and the extent of their injuries. They'll track patients' healing, assessing their pain and how soon they return to normal activity. Then researchers will look back to see which factors, at the time of an injury, help predict that a patient heals poorly and might need surgery.

The second study will test a new titanium plate designed for broken ribs by Dr. Thomas Ellis, an OHSU orthopedic surgeon, and mechanical engineer Joel Gillard. Their design was spurred by concerns that plates made for other bones might not work well on thin, soft ribs.

"The rib bone is really soft," Ellis

said. "If you fix a femur, it's like putting something into hardwood. But the rib is like drywall." The motion of breathing will occasionally dislodge a screw put into a rib, he said, like jiggling a bracket screwed into drywall.

The team's answer is a U-shaped plate that curls over a rib, like a taco shell. Surgeons can screw from one side, through the rib, into the plate itself, which should hold the screws fast. The plate is open at the bottom to help avoid nerves and vessels running below the ribs, said Gillard. Tests on ribs taken from cadavers proved the U-plate holds better than jawbone plates, winning federal approval to use the plate.

The duo also designed tools so that general surgeons can install the plate easily. Bigger plates need a long incision through the chest muscle, Ellis said. But the U-plate, less than 2 inches long, can be installed through a small cut for shorter surgeries and faster healing.

The designers approached Hillsboro-based Acumed, which spun off a company called Acute Innovations to make the device. Gillard, who left OHSU to work for Acute Innovations, said the plate

sells for roughly \$600, in line with other plates. The company paid to license the technology from OHSU and will pay royalties, he said. It also will fund the study on the U-plate.

Mayberry, who gets no financial gain from U-plate sales, hopes to start that study soon, enrolling patients with unyielding pain or breaks that won't heal and comparing their progress with that of patients without surgery.

Just how many people with broken ribs need surgery is an open question, said Dr. Raminder Nirula, a surgeon at the Medical College of Wisconsin. He worked on a recent study of 60 patients with "flail chest" — sections of ribs so badly broken they move independently from other ribs — that suggests surgery cuts the time on a ventilator by about six days. But other studies have not shown benefit, he added.

Nirula and Mayberry both think a minority of patients could benefit from rib surgery. And both hope to someday have a big, multi-hospital trial that randomly assigns people to get a plate or no surgery. That will be the best way to settle the question of whether time or the scalpel is the best fix.