Surgery will restore normal look to soldiers' injured faces

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By Mark Roth, Pittsburgh Post-Gazette

Stacy Innerst/Post-Gazette

In the fighting in Iraq and Afghanistan, more than a quarter of all wounded American soldiers have suffered facial injuries, many of them severe.

Surviving those wounds is one challenge. Coming home is another.

"Any visible facial disfigurement can certainly impair the ability of a returning soldier to integrate back into society," said Dr. J. Peter Rubin, a plastic surgeon at the University of Pittsburgh. "How is their family going to respond? How are their children going to respond? How are job interviewers or people in the grocery store going to respond?"

Dr. Rubin and Dr. Kacey Marra, director of the plastic surgery tissue engineering lab at Pitt, are both committed to restoring soldiers' faces to as close to normal as possible.

This week, they received a $1.6 million grant from the Department of Defense to enhance that process by using fat cells from the injured soldiers to help reshape their faces.

The research team, headed by Dr. Rubin, will perform surgery on 20 American veterans, using advanced "fat grafting" techniques.

Fat grafting has been used in cosmetic surgery for years, but it poses certain basic biological challenges, Drs. Rubin and Marra said.

If fat cells are just moved from one part of the body -- the thigh or abdomen, for example -- and put into the face, they can atrophy and disappear because they don't get a sufficient blood supply.

"If you want to reconstruct a [jawbone]," Dr. Marra said, "you may be able to take part of your leg bone and put it there and it will stay. But if you take some of the patient's fat and inject it, that fat can dissolve."

To counteract that problem, the Pitt team will use techniques and innovative equipment developed by Dr. Sydney Coleman, a New York plastic surgeon who will be part of the research group.

Dr. Coleman has developed a centrifuge that spins the tissue removed from a patient's

body so that fat cells are separated from liquid and connective tissue. That concentrates the fat cells, Dr. Marra said, and also raises the proportion of stem cells, which are specialized cells that can help the fat tissue grow new blood vessels.

Dr. Coleman also has developed special surgical tools for facial reconstruction work, Dr. Rubin said, particularly tiny tubes called cannulas, with different tips and angles, that can be used to implant the fat cells beneath the facial skin.

The goal of all this is to use the fat cells to restore the volume of an injured soldier's face to the best proportions possible.

If the veteran has one side of his face that hasn't been injured, the surgery will try to duplicate that shape on the other side, Dr. Rubin said. If both sides have been hurt, the doctor will aim to achieve certain standard measurements, such as making sure the cheekbone juts out two to three centimeters beyond the lower eyebone, or lining up the lower lip and the tip of the chin.

By the time soldiers are scheduled for this reshaping surgery, they already will have had their major wounds repaired, Dr. Rubin said. "I'd call what we're doing the fine-tuning stage."

Eventually, Dr. Marra said, the Pitt team hopes to take fat cells from soldiers' bodies and grow new stem cells in the laboratory before putting them back into their faces, to increase the vitality of the transplanted tissue.

Dr. Marra said her lab is also working on other projects that could benefit wounded veterans. One is to try to grow new nerve cells for so-called long gap injuries, as when a major wound in the thigh obliterates a long stretch of the sciatic nerve.

Other members of the facial reshaping team include Dr. Gretchen Haas and Dr. Barton Branstetter of Pitt and Col. Robert Hale of the U.S. Army Institute of Surgical Research.

On this Veterans Day, Dr. Rubin reflected on the way his surgery and research will intersect for this project.

"One of my main goals is to bring new technologies into the clinical realm and have a positive impact. To be able to work with wounded soldiers who have sacrificed so much is a real privilege."

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