Mitchell Stotland, M.D.: Making faces

By Laura Stephenson Carter

In an office filled with child-size acrylic skulls, Dr. Mitchell Stotland peers at photos of an Iraqi boy whose face has been badly burned. DHMC's executive medical director has asked if Stotland, a craniofacial surgeon, and a couple of colleagues think they can help the child.

Stotland knows at a glance that he can reconstruct the boy's face. Although DHMC doesn't typically treat burn victims, "the management of chronic burn deformities is no different than other complex plastic surgical deformities," explains Stotland. "Whether it's a burn scar, or it's a surgical scar, or it's a motor vehicle accident scar, or it's some kind of birth mark—they're all the same approach to managing soft-tissue reconstructions."

The director of the Craniofacial Anomalies Clinic at the Children's Hospital at Dartmouth and of a program called Face of a Child, Stotland usually treats patients who live in the United States. But this wouldn't be the first time he'd performed surgery on a foreign patient. He recently did reconstructive surgery on a 16-year-old boy from China who was born with a giant black birthmark that covered half his face like a thick mask. Chinese surgeons had removed most of the pigmented mark and replaced it with skin grafts taken from his torso. But the transplanted skin had become taut, unnatural looking, and "gnarly," Stotland says. "Grafts never look perfect. They don't blush, they don't sweat, they don't have the same kind of oil, they look discolored, and they don't move as well" as non-grafted skin.

It took several months, but Stotland was able to grow new skin to replace the boy's skin grafts. He inserted tiny silicon balloons under nearby face and neck skin and gradually inflated them over time with injections of saline solution. As the balloons expanded, new skin cells began to grow and the tissue swelled into huge, blister-like bubbles. When the skin had stretched enough, the expanders were removed and the new skin was repositioned to cover the affected area. The boy may still need several more procedures to look completely normal, but he's now well on his way.

Stotland's expertise in rebuilding faces extends beyond tissue repair. He corrects all sorts of facial deformities, from cleft lips and palates to malformed or missing ears to more severe deformities, where entire skulls have to be rebuilt. In addition to craniofacial surgery on children, he also does reconstructive surgery on adults—fixing both congenital deformities and accidental trauma. And he does Botox injections, nose jobs, and other kinds of cosmetic surgery, too.

Stotland was 18 years old when his interest in craniofacial surgery was sparked by an episode of the public television program *Nova*. The subject of the show was Dr. Paul Tessier, a pioneering craniofacial surgeon who in the 1960s and 1970s developed numerous craniofacial surgery techniques—virtually all of which are still in use today. Tessier believed and proved that deformities of the skull and face could be corrected with radical and aggressive treatment.

"When I saw that [program], I thought that was a combination of so many things that appealed to me—being able to work with kids, to do something meaningful," says Stotland. "I always really had a soft spot for kids who just were shunned for no good reason other than their appearance. I can think of several kids growing up in school who were like that, who were probably every bit as intelligent and talented, but looked a little different."

As an undergraduate at McGill, Stotland would go to the library and read up on craniofacial surgery. So by the time he got to medical school, he already knew the names of famous craniofacial surgeons and was sure he wanted to do such work himself. Part of his training included a year-long craniofacial surgery fellowship with one of Tessier's disciples—Dr. Henry Kawamoto at the University of California at Los Angeles. Right after completing the fellowship, in 1997, Stotland joined the faculty at DMS, where another plastic surgery pioneer, Dr. Radford Tanzer, had developed the standard technique for ear reconstruction.

Stotland felt confident in his abilities by then, but he had a hard time believing that parents would actually entrust their children to him. He would be taking skulls off, moving eye sockets, and doing risky procedures that might cause a child to bleed to death. "I think I

Grew up: Montreal, Canada

Education: McGill University '85 (B.S. in physiology); McGill Faculty of Medicine '89 (M.D.); Dartmouth Medical School '07 (M.S. in the evaluative clinical sciences)

Training: General surgery resident, experimental surgery fellow, and plastic surgery resident, McGill University; craniofacial surgery fellow, University of California at Los Angeles

First paying job: Counselor at Camp Dunmore, near Middlebury, Vt.

What he's fanatic about: Sports—as is his wife, Sheryl. Their first date was at batting cages in Montreal. "The day after I proposed, in LA," says Mitch Stotland, "we . . . stopped at a batting cage. I have pictures of her with her brand new diamond ring on and high heels [as] she's hitting."

Other favorite activities: Writing, reading, skiing, making granola

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Laura Carter is Dartmouth Medicine *magazine's associate editor.*

JON GILBERT FOX

Craniofacial surgeon Mitch Stotland uses delicate screws and wires to totally reconstruct deformed or injured skulls. His interest in the field was sparked by the TV show *Nova*.

looked pretty young 12 years ago, and I felt young," he admits. "I remember thinking that 'I can't believe they're agreeing.'"

In 1998, he was thrilled to meet Tessier himself—at the inaugural lecture for a biannual program at UCLA honoring Kawamoto. He had a question for the legendary surgeon: "When you were doing this 25 years ago, and no one had done it before you, how did you get parents to accept what you were doing?" Tessier's answer, Stotland recalls, went something like this: "You know, the mommy and daddy bring the baby to me and they just say, 'Help.'"

That was it—there were no consent forms to sign back then. The parents simply trusted Tessier. Several months later, Kawamoto told Stotland that Tessier considered that question the most meaningful one he'd been asked during his visit to UCLA. "It made [Tessier] think back about how there was a time when you trusted yourself or your family to a physician," says Stotland, "and how things have changed."

But countless families have trusted Stotland, and he hasn't let them down. He's documented his cases with before and after photos, which he shows to families contemplating reconstructive surgery for their children. His files include photos taken during surgery, too. As he scrolls through the images on his computer, he provides a running commentary. "This is after we take the skull off," he says. "The eye socket has been taken off and put back on in a new shape."

One set of images is of his first midface advancement procedure. In the before photo, the little girl's eyes bulge, she has a severe underbite, and her face is very flat. Stotland did a procedure called distraction osteogenesis to lengthen her facial bones. The surgery involves cutting the bones and slowly moving the cut ends apart—via tiny screws attached to cables that run under the scalp—so new bone tissue grows in the gap. The screws are turned twice a day.

"It's infinitesimal movement forward, but over the course of a few weeks you actually end up moving the face," he says, the same way orthodontic braces move teeth. "So this is her postop, and you can see a little cable coming out here." The girl looks like a different person. "Her upper jaw now is in front of her lower jaw but you can see her eyes are further in, her nose is actually a little more prominent, and you can see the relationship of the upper and lower jaw. She has a better bite. She probably has a better nasal airway."

Children with severe facial deformities may be perfectly normal intellectually, but because of the way they look and speak they are often assumed to be, and treated as if they are, developmentally delayed. There are plenty of problems—breathing, eating, talking, hearing, and so on—associated with craniofacial deformities, but learning is rarely one of them.

Social interaction is, however, a problem for such children. Stotland and his Dartmouth colleagues are doing research on the subject. In one study, Stotland administered an implicit association test—designed to reveal subconscious prejudices—to 163 Dartmouth students. He determined that, to them, faces with repaired cleft palates were more aversive than normal faces.

"By exposing such hidden perceptions, might we better tailor our reconstruction?" Stotland wonders. "Maybe there are certain things that are perceived more negatively than others, such as a twisted nose or no ear. Or maybe left-sided cleft lips are considered worse than right, because of left-brain differences or maybe the way the tooth is exposed." His hope is that if surgeons better understand hidden biases, they can tailor their surgery to produce better outcomes for their patients. "Other than saying, 'She looks good,' maybe the measurement won't be what I say, but what people perceive."

In another study, Stotland is testing a hypothesis called facial feedback—the idea that one's expression can regulate emotion. For instance, he says, if "someone stomps in . . . with an angry face, you begin to process it in a subliminal way. You fire some of your anger muscles because there's a feedback . . . that tells your brain, 'Anger's coming in—you need to process how to deal with anger.'"

As part of this study, Stotland is testing what happens to people who have had facial Botox injections, which prevent their face muscles from responding to external emotional cues. Study participants—some who've had Botox and some who have not—are shown pictures of angry faces while they're lying in a functional MRI scanner (fMRI

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Worthy of note

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ing Disorders: Supporting Self-Esteem, Healthy Eating, and Positive Body Image at Home.

Jennifer Bomberger, Ph.D., a research fellow in physiology, received the Ann Weinberg Research Fellowship from the Cystic Fibrosis Foundation.

Kevin Cummings, Ph.D., a research associate in physiology, was awarded a 2008 Parker B. Francis Fellowship to study reflex imbalances in sudden infant death syndrome.

Sherzana Sunderji, a second-year DMS student, was elected northeastern regional delegate on community and diversity to the Association of American Medical Colleges.

Thomas Scanlon, Ph.D., a postdoctoral fellow at Dartmouth's Thayer School of Engineering and a member of DMS's Lung Biology Program, was the recipient of the Carol Basbaum Fellowship from the Cystic Fibrosis Foundation.

Three members of the DHMC Creative Services staff received awards from the New England Society for Healthcare Communications: **Timothy Dean** was presented with the Owen J. McNamara Award for Excellence in Writing, and **Erin Higgins** and **Mark Washburn** received Lamplighter Awards. The DHMC Transforming Medicine Employee Campaign also received a Lamplighter Award, recognizing work by members of the Development staff: **Amy Schrom**, **Barbara Masteller**, **Kate Villars**, and **Wendy Simpson**.

Gordon Koff has been appointed director of financial aid at DMS. He was formerly director of financial aid and admissions at Vermont Law School and is president-elect of the Eastern Association of Student Financial Aid Administrators.

Dartmouth Medical School was once again ranked among the nation's top medical schools by *U.S. News & World Report*. DMS ranked 13th on a scale emphasizing primary care and 31st on a scale emphasizing research.

The **DHMC Pain Management Center** received the American Pain Society's Clinical Center of Excellence in Pain Management Award.

Erratum: A photo in our Spring issue was miscredited. The top left photo on page 42—of microbiologist Elmer Pfefferkorn with a student—was by Flying Squirrel Graphics, not Jon Gilbert Fox. We regret the error.

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measures changes in blood oxygen during brain activity). "We're going to look at how their brain is firing," he says, and then compare the pattern of activity in those who've had Botox treatments to those who haven't. His pilot results suggest that those treated with Botox do not process the images the same as non-Botox participants; his hypothesis is that because their facial response is different, their emotions are different.

Stotland hopes his contribution to craniofacial surgery will be in the socialization realm, but he thinks it's also important to celebrate the accomplishments of those who've advanced the field's surgical techniques. In fact, he started a biannual symposium in 1995 to honor DMS's Rad Tanzer; considered the "Father of Ear Surgery," Tanzer died in 2003. "Rad was a big inspiration in terms of his ear work and his work with kids," says Stotland. Last year, Stotland invited someone else who was a big inspiration to him to be the keynote speaker for the Tanzer Symposium—Henry Kawamoto.