

HOPKINS MEDICINE

WINTER 2008



High Time for HiCy?

Convinced they hold a cure for a host of autoimmune diseases, Hopkins researchers refused to give up in the battle for acceptance. **Now success is in sight.**

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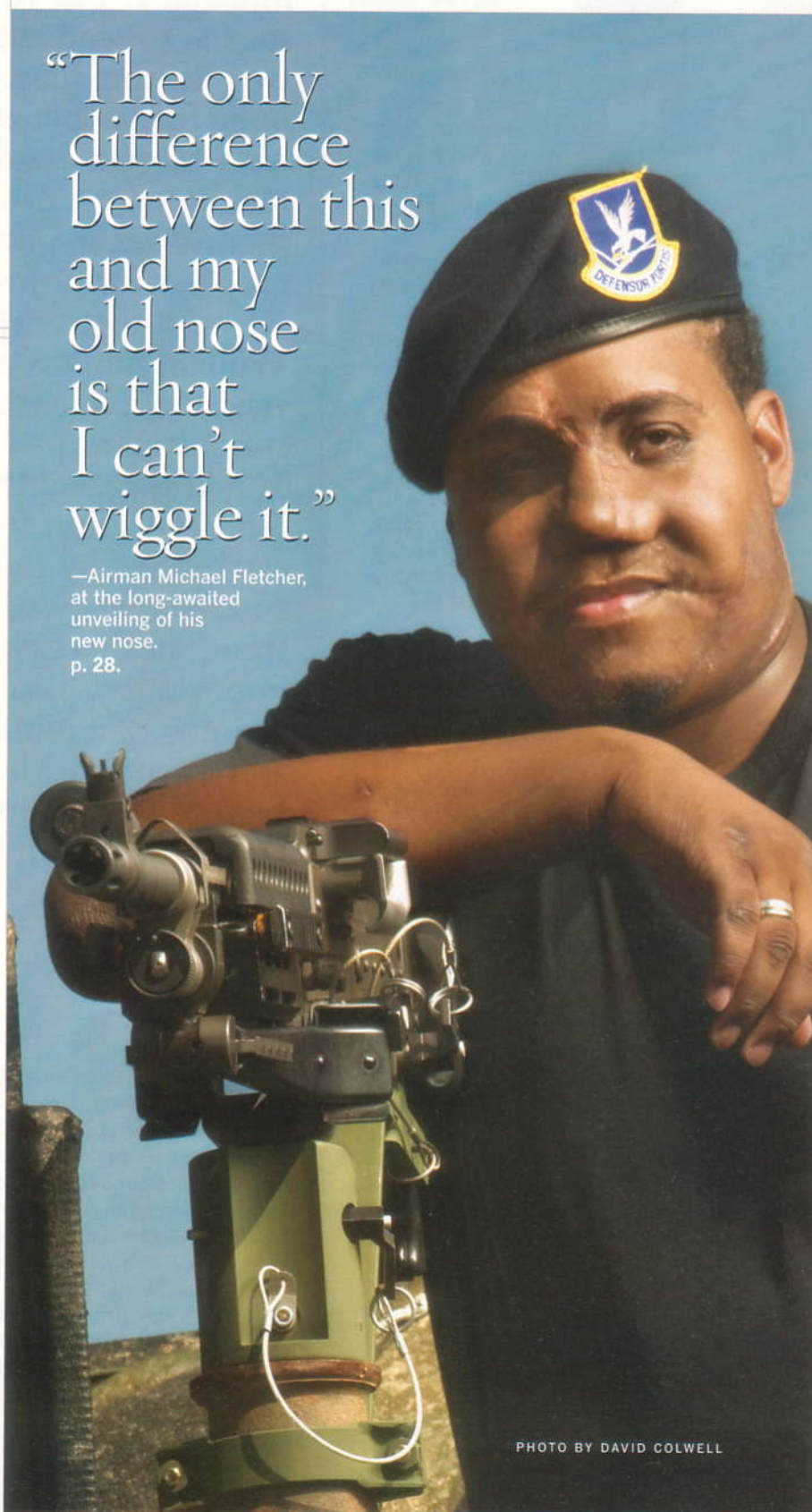
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"The only difference between this and my old nose is that I can't wiggle it."

—Airman Michael Fletcher, at the long-awaited unveiling of his new nose.
p. 28.





Like Something From Nothing

BY RAMSEY FLYNN

PHOTOGRAPHY BY KEITH WELLER AND DAVID COLWELL

When the Humvee started to roll over during a high-speed turn near Iraq's border with Kuwait on the early afternoon of August 12, 2005, a piece of Michael Fletcher's top-mounted turret gun caught him in the face, impaling him beneath the heavy machine moments later.

He remembers intense heat. He remembers standing up and taking a few steps and throwing his helmet off before passing out. Then he remembers waking up in Walter Reed Army Medical Hospital to see televised images of his beloved New Orleans in the wake of Hurricane Katrina.

Though two weeks had passed since the accident, Fletcher found it hard to tell if he was still among the living. On the screen, his ancestral home looked like a twisted wasteland. He remembers thinking: "Am I in hell, or what?"

If he'd seen his face in a mirror then, Fletcher wouldn't have felt assured. Yolanda, his new wife of several months, thought he looked like a "monster." The center of his face was crushed, his nose completely erased into a formless scramble of flesh. By comparison, Fletcher's other injuries—a blinded left eye, a left arm amputated at the shoulder—seemed almost incidental. That the 21-year-old was alive at all was a testament to modern combat medicine: Fast-thinking military doctors had restarted his heart three times during the medevac operation.

By the time Senior Airman Fletcher came into the care of Patrick Byrne at Hopkins in January of 2006, the four metal plates installed beneath the flesh of his mid-face had

settled. Surgeons in Kuwait had placed them there just hours after his injury six months earlier, as an artificial foundation layer to protect the soft tissues beneath. But Fletcher still lacked any human approximation of a nose. He still recoiled at his image in the mirror. One of his physicians at Walter Reed suggested he get used to it; another said he knew of an adventurous physician in Baltimore who might have a different answer.

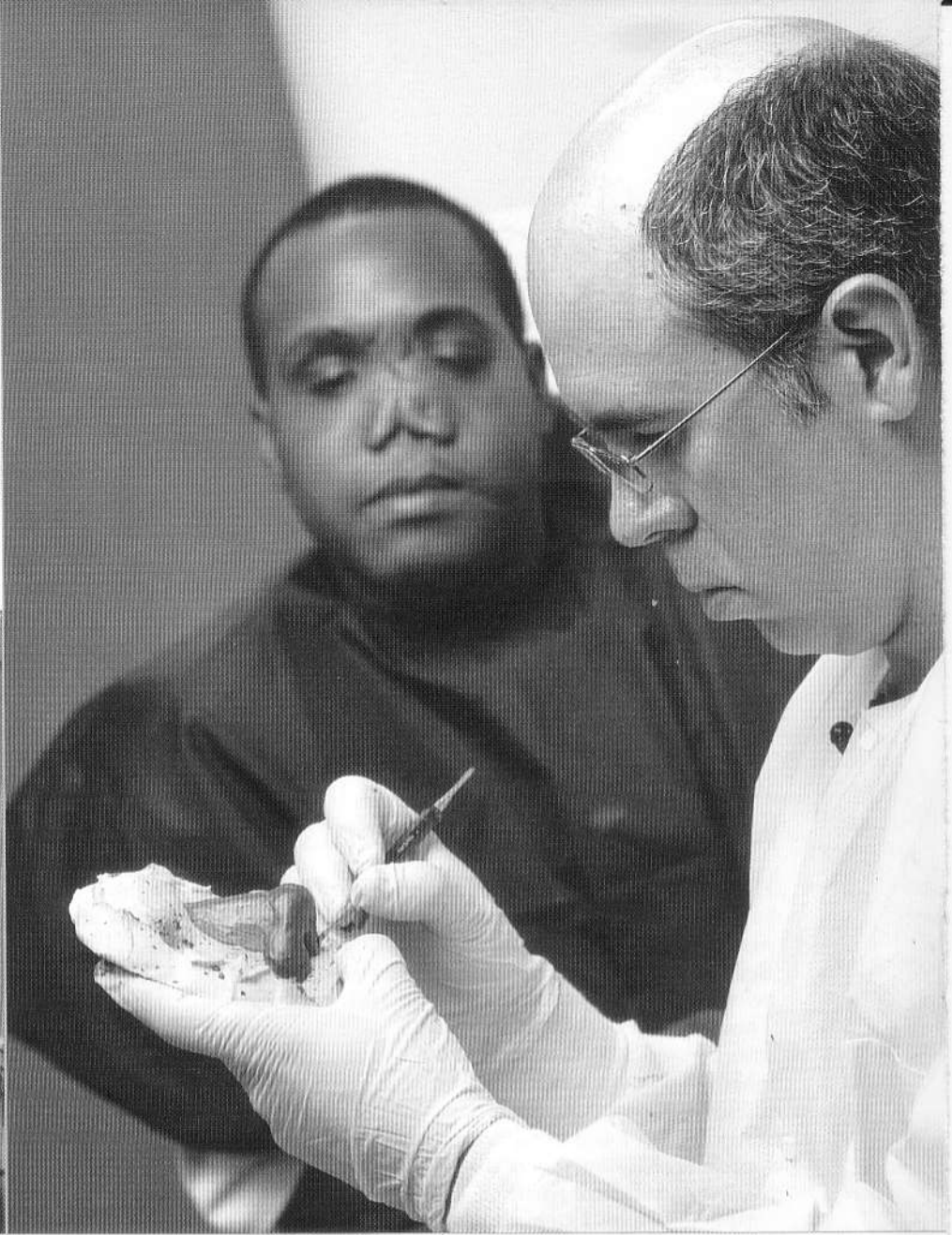
Byrne, an expert in facial plastic reconstruction, knew that building a new nose atop the crude foundation at the center of Michael Fletcher's face would require a long series of difficult procedures. With the original nose missing entirely, he would have to craft one from scratch, harvesting raw parts from multiple locations throughout Fletcher's body. He counseled Fletcher about the torturous changes ahead, and told him there might be an easier way.

They could fashion a real-looking artificial nose. "A prosthesis is a fine option if you want to bail out," said Byrne.

Though Airman Fletcher welcomed anything that would reduce the awkward staring of strangers, he told Byrne he'd suffer any pain required to have a real nose again.

Patrick Byrne was going in.



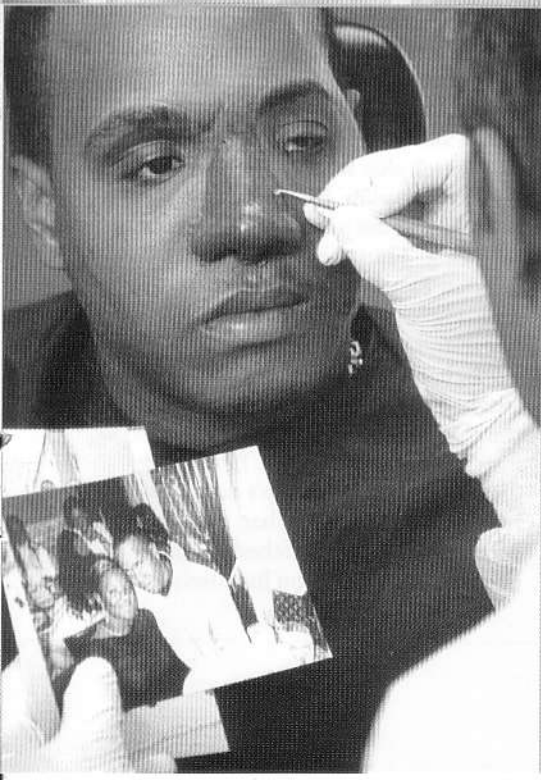
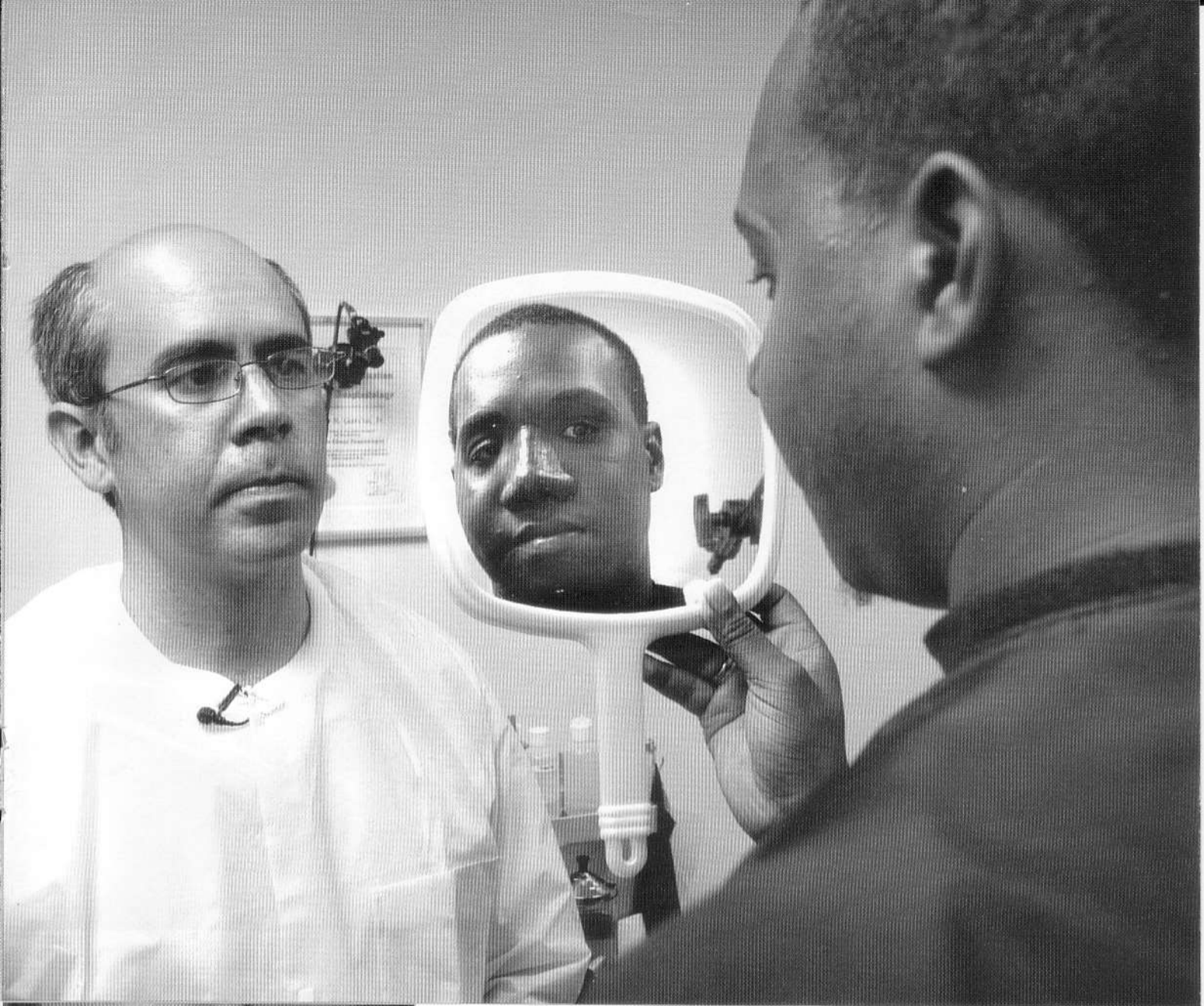


Calling in the Engineers

First, Byrne needed to form his own small army. With so little natural structure to work with, Byrne sought adventurous partners. One came in the form of Hopkins colleague Juan Garcia (above), an anaplastologist who'd already helped Byrne rebuild the faces of patients who'd suffered disfiguring nasal cancers. Garcia developed prototype prostheses that allowed surgeons like Byrne to plan difficult procedures preoperatively. Once surgery started, Byrne could also use these prostheses to help guide his scalpels.

But the Fletcher case was something else altogether. Much of the relevant skin, along with the patient's underlying nasal structure, was completely absent. Byrne and Garcia would have to devise a novel approach to recreate Fletcher's nose from scratch—while also matching the contours of his original nose.

In a process that graduated from silicone to stone and then to wax, Garcia fashioned a replica of the original nose.



Then he turned to technicians at Direct Dimensions (far left), a suburban Maryland computer engineering lab, to transfer it to a 3-D image that would aid in the production of a clear plastic guide. The guide would be manufactured by precision plastics experts at Aberdeen Proving Ground. Once completed, it would serve as the governing mold that Byrne would fill with carefully sculpted flesh on the operating table—from parts of Airman Fletcher's own body. Once the flesh version was sculpted, the guide could be discarded and the bandages applied.



Making It Real

The strategy required Fletcher to undergo six medical procedures over the course of nine months, starting in July of 2006.

The first and most daring of these involved Byrne's effort to harvest flesh to cover the new nose. To do so, he carved out a T-shaped pattern from the flesh of Fletcher's forehead—a nearly perfect match for exterior human nose flesh—"much like a dressmaker's pattern," according to Byrne.

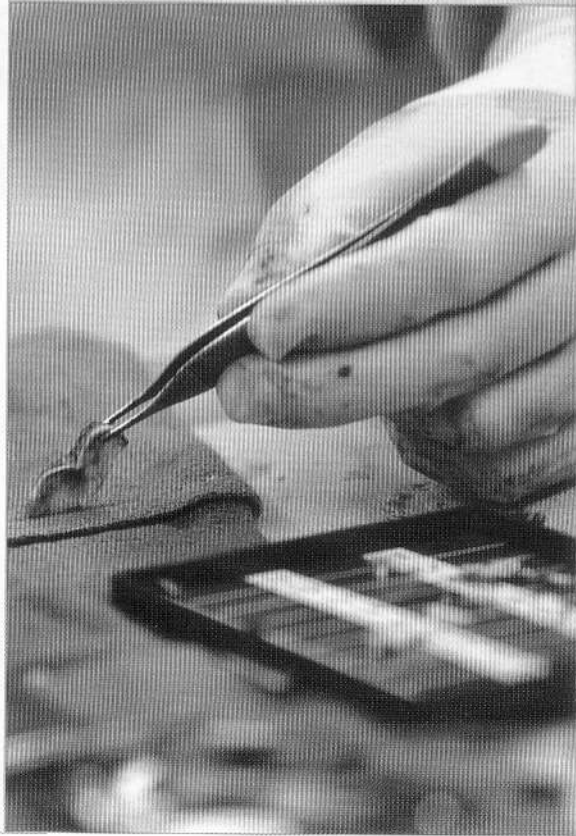
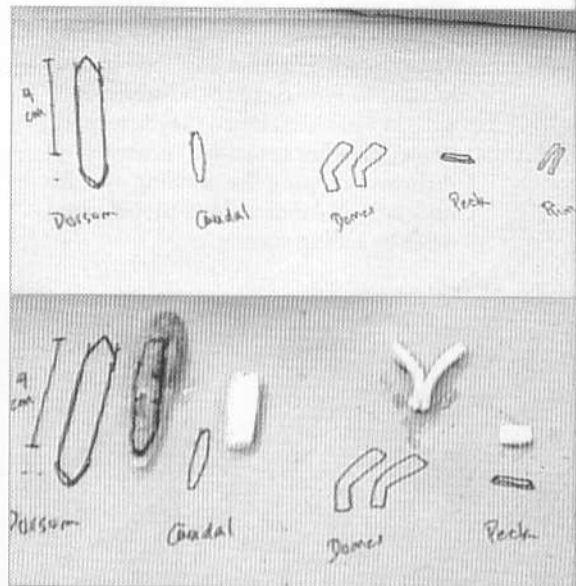
In the meantime, two other surgeons opened a site in Fletcher's lower right rib cage to harvest a three-inch portion of rib bone that would provide the raw material from which Byrne could carve elements for the new nasal structure. While the rib procedure unfolded, Byrne delicately prised apart the critical areas just above Airman Fletcher's mouth.

With a country and western singer wailing from Byrne's personally selected iTunes system, Byrne wielded a surgical dremel to craft the various components of the nose and nasal passage. Methodically, he fitted each completed unit—"domes," "peck," "rims"—into a pen sketch that he had earlier drawn on a surgical napkin. Periodically, he'd clasp one of the units and refine the sculpting. Thin skin tissue came from Airman Fletcher's inner forearm, substituting for the nasal interior. Portions of ear and rib comprised the framework that would prop up the flesh, all stitched together to form a scaffold for the thicker flap prepared from the forehead. For some time, Byrne predicted, the forehead flap's neural ancestry would likely mean that, every time Michael Fletcher scratched his nose, he'd feel a sensation on his forehead.



At key intervals, Byrne stopped to place Garcia's translucent surgical guide over the rising construction site to verify compliance. "This is what we do for a banged-up top-gunner," he explained.

After some healing time for this preliminary structure, Fletcher returned for another heavy lifting phase on October 24, 2006. In this particularly awkward step, the transmogrified forehead flap would arch in a semicircle down to the tip of Fletcher's emerging nasal structure, in a bid to coax it into establishing neural and vascular roots in its new location. It had to remain this way for six weeks to become properly vascularized. The exposed flap had to be protected and cleaned daily. Fletcher adapted by leaving his home near Andrews Air Force base only for the most crucial appointments.



The Detour

But before the six-week period elapsed in December of 2006, Fletcher suffered a setback. Infection had taken root in the exposed flap, especially attacking the area of the emerging nasal tip. Byrne initiated a series of rescue efforts to preserve some progress. He then proposed some rebuilding, but Fletcher asked for a "timeout" for the holidays before any more heavy procedures. He felt depressed. "Can I just take a break for a while?" he asked.

Byrne acquiesced, and Michael and Yolanda, with toddler Mi-Trell in tow, headed to Florida to spend some time with her parents. Once they returned home, Fletcher remained modestly reclusive, keeping the dressing over his mid-face. Yolanda helped to make ends meet by selling cosmetics.

By the afternoon of April 24, 2007, Fletcher was ready for his last procedure, some of it a redo, some of it just a minor refining of contours. During his pre-op visit with the patient, Byrne asked Fletcher which piece of music he'd most like to hear while going under.

"Got any jazz?" asked the native of New Orleans. Fletcher hadn't been back to his hometown since he'd left for the service in 2004. Jazz sounded like a great idea. "I've got Allen Toussaint," smiled Byrne.

As he was prepared for anesthesia in the operating room, Fletcher joked while attendants readied an IV for his remaining arm, his right: "I want it in the other arm this time."



The Unveiling

Just a week later, Michael Fletcher returned to Hopkins for the long-awaited removal of his bandage. He was greeted by three television crews.

"Can you breathe?" one reporter asked as he entered the suite, closely followed by his wife.

"Yeah," smiled Fletcher from behind the bandage. "Perfectly."

Another asked what he most looked forward to after the bandage came off.

"Anonymity," he answered quickly. "When you lose it, you know what it was. I want to be able to walk down the street with Yolanda and my boy and have no one notice me."

With little ceremony, Fletcher took his place on a stool. Patrick Byrne stepped close, gently peeling the band-



age away. Even through the remaining traces of surgical scarring, the new nose looked remarkably normal.

Fletcher looked around, trying to read the faces of the 10 people gathered around him for some sign of approval.

Finally, one of them handed him a mirror. "Wonderful," said Fletcher.

Further questions ensued. One reporter asked if he could touch Fletcher's new nose, and if Fletcher could feel the sensations normally.

Fletcher assured the reporter that he could. "The only difference between this and my old nose is that I can't wiggle it."

Now out of the Air Force and preparing for a new life somewhere in the immigration and customs service, Michael Fletcher has little need to wiggle his new nose. Two-year-old Mi-Trell, however, is doing a lot of that for him. "He's having a field day with it." ★

