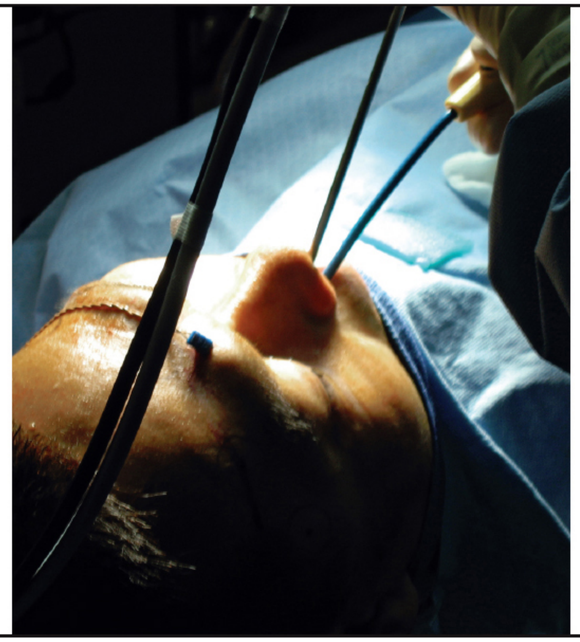
Surgeon Peter Costantino is fighting cancer one patient at a time.

By Joshua Kors

CUTTING EDGE



From left: Courtesy of New York Head & Neck Institute (2); Joshua Kors

Surgeon Peter Costantino observes a video close-up (left) of an operation (right) he is conducting on a man's nasal cancer.

Peter Costantino is rushing through the halls of a hospital in New York City. He stops at the doors of an operating room, slips on a surgical mask, and turns to an assistant. She assures him that the patient has been prepped and is ready for surgery. Costantino nods, steps into the room, and pulls on a pair of yellow rubber gloves.

On the operating table, a middle-aged, Asian American man lies fully sedated, covered by a blue plastic sheet. Costantino turns toward the heart rate monitor and confirms the steady beeping of the patient's heart. Then he picks up a long metallic tool, takes a slow breath, and inserts the tool deep inside the patient's nose. At the tip of the tool, a tiny video camera captures images of cells deep within the patient's nasal cavity.

Costantino checks the video monitors surrounding the operating table, examining the red and white clumps of nasal tissue displayed on the screens. When he recognizes cancerous cells, he grabs a second tool, this one with a tiny drill at its tip, and inserts it into the patient's nose alongside the camera.

"We have to be extremely careful," he says. "If we cut and we're a few millimeters off, we could do serious damage to his *optic nerve*," which sends signals from the eyes to the brain, "or his *carotid artery*," which supplies a steady flow of blood to the brain. "But we have to operate. If we don't eradicate this patient's cancer today, he'll be dead. So the stakes are high."

Welcome to the New York Head & Neck Institute. What happens here may sound like high Hollywood drama, but for Costantino it is simply the daily challenge: guiding patients with lethal cancers and severe *cranial* (skull) injuries back to health. Costantino founded the institute in 2006. Since then he has established himself as one of the premier surgeons in the country and one of medicine's most innovative thinkers.

"I've seen that creativity firsthand," says David Hiltzik, a surgeon at the institute who has worked with Costantino for 10 years. "He has a vision, a curiosity, that leads him to come up with medical solutions others haven't thought off. He's always thinking outside the box."

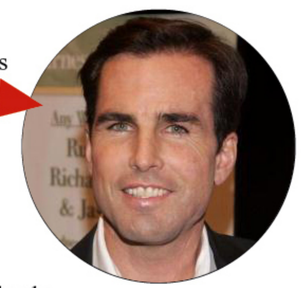
EARLY CURIOSITY

That curiosity developed early. When Costantino was 8 years old, he found a squid—a delicacy that his parents had planned to eat for dinner—in the basement of his house. Costantino performed his first operation, cutting open the squid to see what was inside. "Then, when I was 11, my parents bought me a toy rocket. Instead of launching it, I took it apart and messed around with the explosive powder," he says with a laugh. "I ended up setting off a small explosion and blowing my eyebrows off."

Further examinations paid off more constructively for Costantino in medical school at Northwestern University in Chicago. "My sophomore year, we were looking at patients who had been in accidents and had their skulls fractured," he recalls. "For patients who were missing parts of their skulls, there wasn't a lot that doctors could do."

The young medical student imagined creating a lasting, functional skull out of synthetic material. He experimented with different formulas and eventually developed a suitable material, a calcium-based mix with the sturdiness of real bone. "Dentists had actually been using a similar material for years for crowns and other dental appliances," he says, "but no one in my field was looking to dentistry for solutions."

Years later, surgeons who restore skulls for injured patients are still using a synthetic material based on Costantino's original blend. The latest mixes now have additional elements, such as titanium and other sturdy metals.



"That mix has worked wonders," says ABC News reporter Bob Woodruff. He should know. In January 2006, Woodruff was reporting on the war in Iraq when he was severely wounded by a roadside bomb. The blast fractured his skull and lodged a rock in his neck, leaving him on the brink of death. Doctors removed part of Woodruff's skull to reduce the harm caused by the swelling of his brain. If injured brain tissue isn't given room to swell, it can press against the inside of the skull, tearing blood vessels

After being seriously injured by a bomb explosion in Iraq in 2006, reporter Bob Woodruff was airlifted to surgery in the United States.

and causing further damage. Woodruff was moved to the National Naval Medical Center in Bethesda, Md., where Costantino, a former Air Force major, was called in to treat him.

"Costantino found a very creative way to remove that rock from my neck so that he didn't have to cut so many nerves, which would have left my face numb," says Woodruff. "Other doctors had talked about just splitting my jaw open. Instead, he cut up over the top of my ear. The way he did it, nobody else had even thought to operate that way."

Five years after his surgery, Woodruff appears healthy. He jokes that you wouldn't know from the look of him that his skull is now a patchwork of natural bone and Costantino's synthetic calcium-titanium blend. The reporter is in such good shape, in fact, that he's back on TV and has even won a prestigious Peabody Award for a recent broadcast. "I owe all this to Costantino," says Woodruff. "It's a miracle what he was able to pull off."

BATTLING CANCER

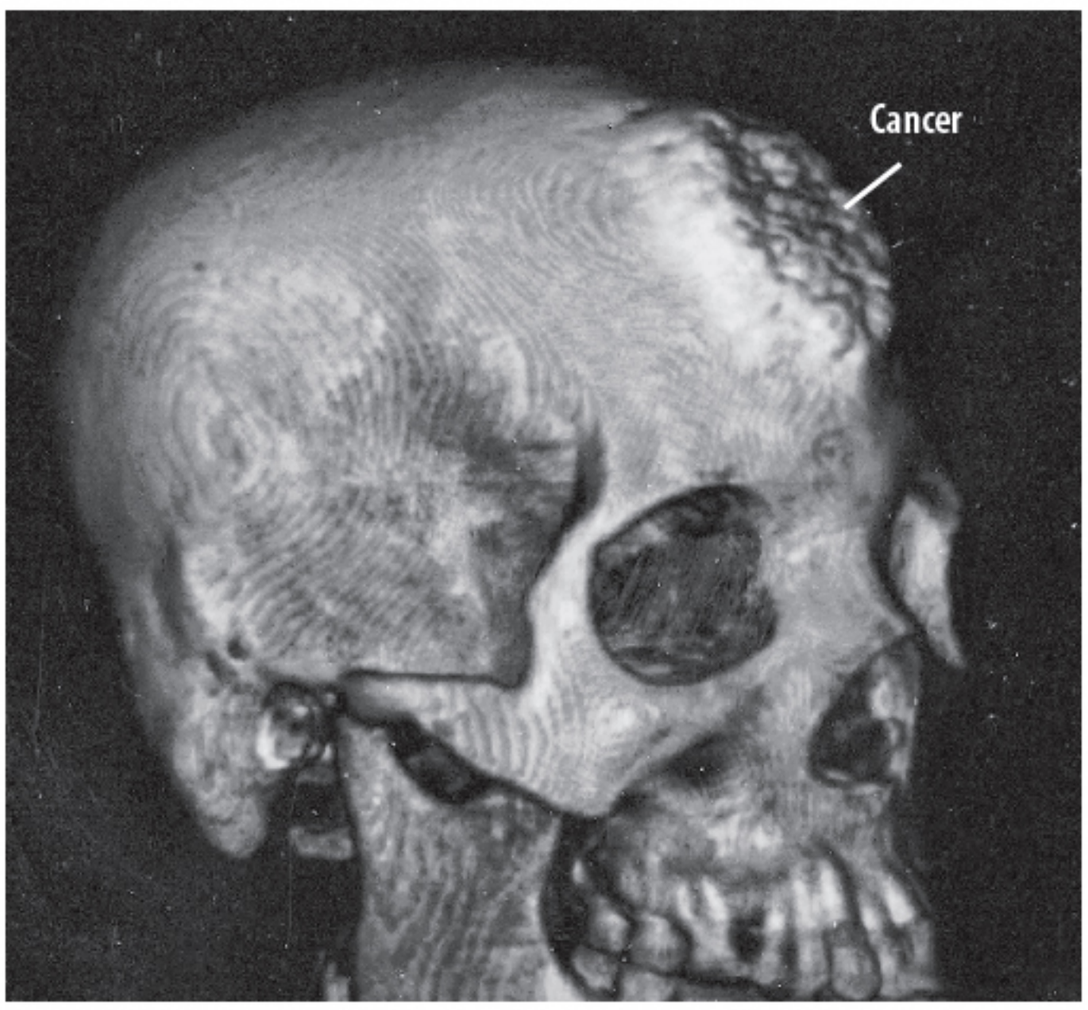
In recent years, Costantino has been focusing on a new challenge: *nasopharyngeal cancer* (*NPC*). NPC is a cancer that grows in the *nasopharynx*, the uppermost region of the throat, where the nasal cavities open into it. In the United States, NPC is relatively rare, occurring in just seven of every 1 million Americans. NPC has a strong genetic component, explains Costantino, which is why the cancer is more common in Southeast Asia and among immigrant families from that region.

In most cases, NPC can be treated successfully with radiation, destroying the cancerous cells with a beam of high-energy particles. The patient that Costantino is operating on this afternoon was not so fortunate. Radiation failed to destroy his tumor, so Costantino was called to the hospital to perform the surgery. With the drill and the video camera now inserted deep into the patient's nasal cavity, Costantino performs an *endoscopic nasopharyngectomy*, cutting and then removing the cancerous growth from the throat. (An *endoscope* is a long, slender instrument that enables a physician to look inside the body. The surgery performed in the patient's nasal cavity was a nasopharyngectomy, with the aid of an endoscope.)

"These procedures can be pretty challenging," says Hiltzik, Costantino's right-hand man. "We need to take out all of the cancer, but we also don't want to remove more healthy tissue than we have to. And it's not that easy to tell the difference. That's why these surgeries, they're a little bit science and a little bit art."

Costantino, he says, brings a sharp eye and a steady hand to the operating table. "That's what you can say about Costantino," says Hiltzik. "In our field, he's both a scientist and an artist." **CS**

X-rays show a cancerous area (left) that Peter Costantino removed from a patient's head and replaced with a sturdy synthetic material (right).



Top: AP Images; Bottom: Courtesy New York Head and Neck Institute (2)