



# Plastic Surgery & Hyperbaric Medicine

*Dual Treatment Results in  
Superior Outcome*

By Scott P. Edwards

It only took a second. As Bill Tyler bent down last Labor Day to put a plant on the floor of his home in East Longmeadow, his daughter's dog attacked. Bruin, a 10-month-old Rottweiler mix, bit off a good-sized chunk of Mr. Tyler's ear.

After being bitten, Mr. Tyler says he saw something on the floor. When he bent to pick it up, he realized it was a piece of his ear.

Mr. Tyler, the vice president of a family-owned construction equipment company, was transported to Baystate Medical Center, along with the piece of his ear packed in ice. Emergency physicians called in plastic surgeon David Refermat, MD, who surgically reattached the missing portion of the ear.

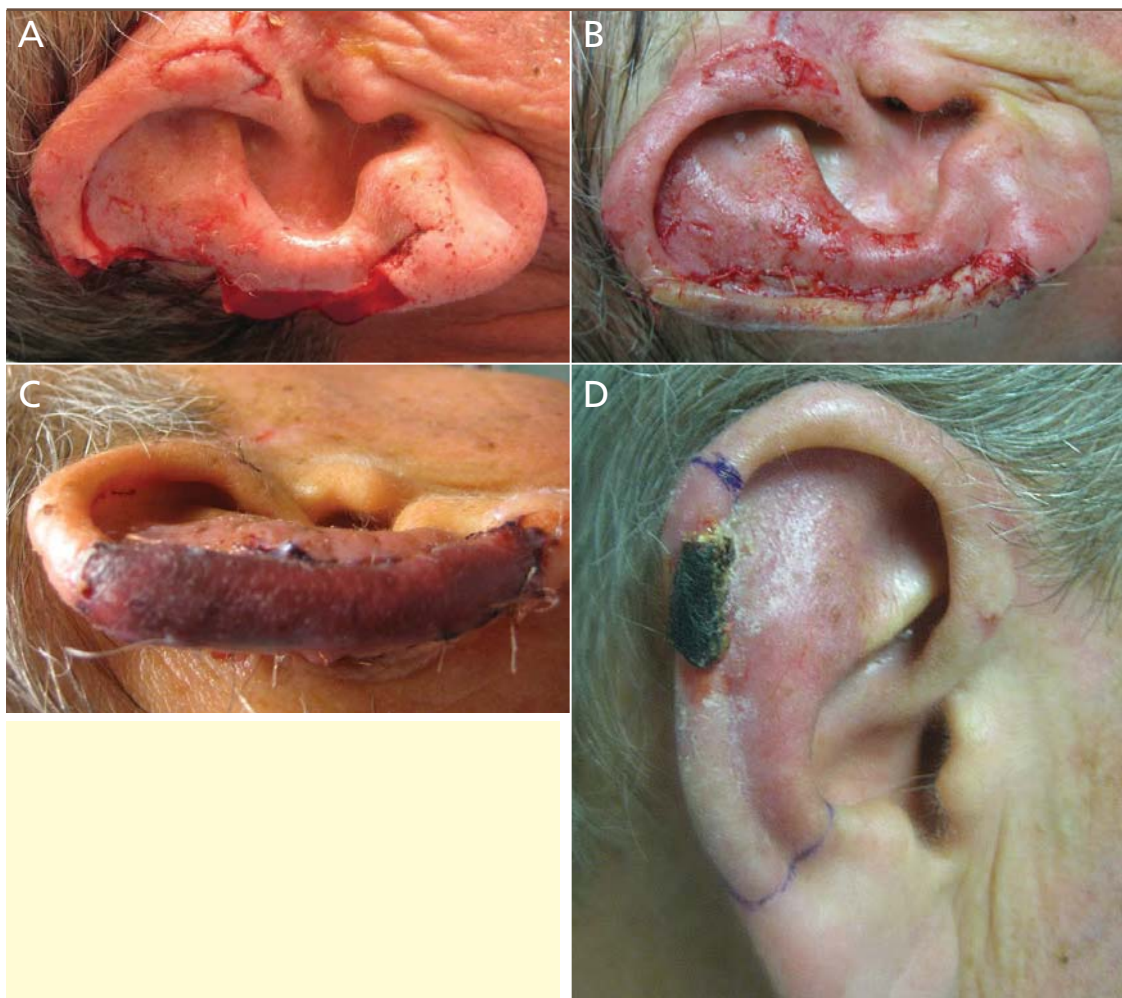
While Dr. Refermat was performing the procedure, he told Mr. Tyler that the odds of success were low. “Research indicates that the chances of successfully reattaching an avulsed ear are close to zero because the oxygen demands are so high and the blood supply is so tenuous,” says Dr. Refermat.

However, Baystate Medical Center is the only hospital in the region to offer hyperbaric oxygen therapy (HBOT), which Dr. Refermat thought would greatly improve the odds of a successful reattachment of Mr. Tyler’s ear.

## Hyperbaric Medicine

The air we breathe contains roughly 21 percent oxygen, 78 percent nitrogen, and 1 percent of other gases. Hyperbaric oxygen therapy, the administration of 100 percent oxygen at increased pressures for a prescribed period of time, dramatically increases the number of oxygen molecules that enter the bloodstream and reach the tissues.

By supersaturating patients with oxygen, HBOT greatly increases the oxygen concentration in all body tissues, even those with reduced or blocked blood flow. It stimulates the growth of new blood vessels to locations with reduced circulation, improving blood flow to areas with arterial damage or insufficiency. It also aids in the treatment of infection by enhancing white blood cell action.



A: Mr. Tyler’s ear after avulsion.

B: Ear reattached as composite graft.

C: Five days post-surgery.

D: Six weeks post-surgery.

“This large increase in oxygen in the tissues generates physiologic responses such as healing, killing of bacteria, and decreasing swelling and inflammation,” says James Moro, RN, a hyperbaric wound care nurse at Baystate.

While HBOT was originally used to treat decompression sickness, a common scuba diving hazard, Mr. Moro says guidelines by the Undersea and Hyperbaric Medical Society support 14 different approved treatments that use HBOT, including wound healing, carbon dioxide poisoning, compromised skin grafts and flaps, crushing injuries in which tissue is damaged, gangrene, and necrotizing fasciitis.

In general, says Dr. Refermat, wounds treated using HBOT show substantial healing within two weeks of injury and nearly complete healing within four weeks. In Mr. Tyler’s case, he was placed in the hyperbaric chamber twice a day for seven days, with each session lasting approximately 110 minutes. Treatments longer than that can result in oxygen toxicity.

### Maximum Benefit

After 14 treatments, Mr. Tyler’s medical team decided they had reached the maximum benefit of the therapy.



Plastic surgeon Dr. David Refermat and hyperbaric wound care nurse James Moro treated Mr. Tyler’s ear with a combination of plastic surgery and hyperbaric oxygen therapy.

## Refer a Patient

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Mr. Tyler says that the damaged tissue would look white before each treatment, but would “pink up real nice” following his HBOT sessions. Slowly, however, he developed darkened tissue on the upper half of his ear, causing the team to become less optimistic about the outcome.

Dr. Refermat decided more surgery might be required and scheduled Mr. Tyler for a flap, a plastic surgery procedure in which tissue is borrowed from one part of the body to cover a defect elsewhere. However, before the surgery took place, the ear continued to heal and looked “fantastic,” says Dr. Refermat, so the surgery was cancelled.

Thanks to the combined treatments of plastic surgery and hyperbaric oxygen therapy, Mr. Tyler’s ear

now looks as good as new. “I defy anyone to say which of my ears was removed,” says Mr. Tyler. “It looks great. The feeling is back. It’s a little sensitive to the cold, but the tissue looks good.”

Dr. Refermat describes Mr. Tyler’s reattached ear as a “superior cosmetic result, much better than even the best reconstruction could have achieved,” and says he requires no further treatment.

Most composite grafts of this size, he adds, don’t work well in adults. “This case nicely illustrates the nexus of plastic surgery and hyperbaric medicine. It allowed us to get a superlative result we would not, and indeed could not, have achieved without using the hyperbaric chamber.”

Today,  
Mr. Tyler **defies**  
anyone to say which  
**one of**  
**his ears** was  
injured.

