

# High rate of ear and hearing injuries after Boston Marathon bombings

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After the Boston Marathon bombings, more than 100 people were treated for trauma affecting the ears and hearing—with many having persistent or worsening hearing loss or other symptoms, reports a study in the December issue of *Otology & Neurotology*.

Dr. Aaron Remenschneider and principal investigator Dr. Alicia Quesnel of Massachusetts Eye and Ear Infirmary led a Boston-wide collaboration that reviewed the experience with otologic injuries caused by the 2013 attack, including follow-up evaluation of [hearing](#) and related outcomes. The researchers conclude, "Blast-related otologic injuries constitute a major source of morbidity following the Boston Marathon bombings."

## Ruptured Eardrum and Other Injuries after Marathon Bombings

The study assembles data from eight hospitals that provided care for patients with otologic (ear- and hearing-related) [trauma](#) caused by two bomb explosions near the finish line of the 2013 Boston Marathon. "Acute otologic trauma following the dual blasts was immediately apparent," Dr Remenschneider and coauthors write. "However, the extensiveness was not appreciated until the days and weeks that followed."

The study included 94 of the more than 100 patients evaluated at Boston area hospitals and clinics (Massachusetts Eye and Ear Infirmary,

Massachusetts General Hospital, Brigham and Women's Hospital, Beth Israel Deaconess Hospital, Boston Children's Hospital, Boston Medical Center, Tufts Medical Center, and Harvard Vanguard Medical Associates) after the blasts. Only seven percent of patients had any hearing-related symptoms before the attack.

Most of the patients sustained primary blast injury known as barotrauma. The most common type of otologic injury was tympanic membrane perforation, which is a ruptured eardrum. Forty-eight patients had tympanic membrane perforations, with 14 patients having perforations in both ears. Overall, 90 percent of patients hospitalized for other injuries had tympanic membrane perforations on examination.

Rates of perforations were nearly three times higher for patients who had other significant injuries related to the bombings, and for those who were closer to the blast. In 38 percent of cases, the perforations healed spontaneously. Patients with larger ruptures required surgical repair, which had a high rate of success (86 percent).

## **One Year Later, Many Have Persistent Hearing Loss**

All patients expressed concern about hearing loss or tinnitus (ringing in the [ears](#)). On follow-up evaluation of 44 patients, 80 percent had reduced hearing and 68 percent had new or worsened tinnitus. Other symptoms included increased sensitivity to sound (hyperacusis) and dizziness or balance problems.

For many patients, [hearing problems](#) were still present—and sometimes still worsening—one year after the attacks. Many had difficulty hearing in noisy situations; others developed delayed problems with disequilibrium. In follow-up surveys, many patients had ongoing disability related to hearing loss, tinnitus, or dizziness.

Most of what is known about blast-related otologic injury comes from military studies; blast trauma to the ear is fortunately rare in civilian populations. The new study suggests that the impact of blast-related injury might be greater in civilians, perhaps because protective equipment normally worn by military personnel is absent in civilians.

The Boston Marathon experience suggests that otologic trauma can be a major source of immediate and lasting injury for victims of civilian bombing attacks. Dr Remenschneider and coauthors point out that many patients have "hidden [hearing loss](#)," which may not be apparent on routine hearing tests. They emphasize the need for long-term follow-up assessments to ensure that [patients](#) receive appropriate testing and treatment for any resultant disabling symptoms.

**More information:** "Otologic Outcomes After Blast Injury: The Boston Marathon Experience", [journals.lww.com/otology-neuro...  
The\\_Boston.29.aspx](https://journals.lww.com/otology-neuro...The_Boston.29.aspx)

Provided by Wolters Kluwer Health

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