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Patient Safety Tip of the Week

January 6, 2026

Here's Why Firefighters Need MRI Training

In many of our columns on MRI safety, we've harped on the need to train your local first responders on responding to incidents and accidents in MRI centers. A recent article in the firefighting literature really tells the story why this is so important (DeYear 2025).

Firefighters arrived at the site of a fire in the early morning hours. There was heavy smoke coming from the one-story structure so they cut and punched through the roof to ventilate the structure. Officers and firefighters entered a hallway where smoke was thick and about waist level. They then stepped into the room they were in front of, searching for the seat of the fire, when suddenly there was a loud bang. Immediately, a firefighter yelled "It took it" referring to his Halligan (the axe-like tool used to breach roofs). The men quickly realized they needed to get out of the room. The firefighter described the force of the tool being ripped from his hand "like a scene from Star Wars". He noted, at one point, he felt as if he himself was being pulled.



Halligan (left) stuck inside MRI core

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They extinguished the fire, but that was not the end of the story. An MRI maintenance worker and office manager arrived as the companies were mopping up and the fire investigation was taking place. The maintenance worker informed the firefighters that he felt confident he could get their tools out of the MRI machine with the use of a broom handle. Shortly after entering the MRI room, the maintenance worker let out chilling screams. In his effort to pull one of the tools loose, the Halligan rotated, and the adz end pinched the maintenance worker's fingers and hand to the side of the machine with crushing force. Thinking quickly, the officers had their crew strip down to their basic clothing before entering the room. They grabbed an axe handle to help pry off the tools. The property manager entered the room to help, only to then have her cell phone sucked into the machine. Firefighters could not move the tool pinning the maintenance worker's hand because of the tremendous amount of force exerted by the MRI machine. The screaming and yelling of the trapped maintenance worker finally forced them to hit the quench button.

No one at the scene had ever witnessed what a quench would do. The assumption was the quench button would discharge helium gas, rendering the magnet to lose its power. But the discharge of helium occurred with explosive force, being forced out under tremendous pressure through a pipe to the rooftop. If that pipe had been clogged, a serious event could have occurred near the machine. Fortunately, all members were safe and uninjured, and the maintenance worker's hand was now free. EMS personnel were able to treat and transport the maintenance worker for his injury.

The lessons learned from the incident raised additional concerns and dangers should be understood by all fire service responders (or any other first responders). DeYear notes that the importance of pre-incident surveys cannot be overstated. He says "not performing a pre-incident survey of the MRI facility is a failure on the part of the fire service". DeYear emphasizes "**First-due companies should be familiar with every MRI in their response area.**" MRI units are no longer found only in hospitals but are also in physicians' offices, private clinics, freestanding medical facilities, imaging centers, shopping centers, research institutes, and even mobile units (several of our prior columns have noted special difficulties with mobile units).

DeYear goes through the basics of MRI, the supercooling magnet, types of MRI's, layout of typical MRI suites, dangers related to ferromagnetic materials, locations of MRI-compatible fire extinguishers, signage, location of the quench button, and other key elements (with good photos and diagrams).

One important lesson for firefighters is that shutting down power to the building does not shut down the magnet of the MRI machine. Firefighters often falsely assume they are safe because the utilities are shut off.

He goes into detail about what happens and what dangers occur if a quench is initiated, including the threat of burns, hypothermia, ruptured eardrums, or possible asphyxiation that can affect anyone in the room as the gas displaces the oxygen. Visibility can also

become a concern. He therefore emphasizes that the decision to use the quench button should be made with and by staff members of the facility.

He then makes the following recommendations for pre-incident surveys and what to do during an on-site incident:

- Discover the boundary of the 5Q line, identifying the invisible magnetic safe zone. 5Q is the designated "safe area" to operate where the magnetic field of the MRI machine has dropped below 5 gauss. Operating within this line poses a danger because of the strength of the machine. This line varies from machine to machine, as it is determined by the strength of the MRI magnet. This boundary applies to all directions, including upward and downward.
- Identify the location of the emergency shutoff and quench buttons.
- Generate a list of names and contact information for those who understand the system and the dangers.
- Question whether the warning signage is appropriate and if it would prove useful in an IDLH atmosphere where visibility may be nonexistent. Some may even be located on the floor.
- Remember that the magnet is always on, even if the electricity has been shut off. The magnet will attract and draw anything that is ferrous such as steel, iron, nickel, and cobalt. The denser the ferromagnetic material is, the higher the attraction will be.
- All the tools we use, along with the personal protective equipment we wear, are a danger.
- Flashlights, portable radios, TICs, and stethoscopes are never allowed within range of the MRI machine.
- Personal items such as cell phones, hair pins, pens, insulin pumps, cochlear implants, pacemakers, artificial joints, and shrapnel or metal fragments are all dangers in the MRI room.
- Confirm whether there is a nonmagnetic fire extinguisher near the room and where it is located. It is MRI compatible and often blue or white.
- If dangerous or hazardous incidents are identified at the scene of any emergency, communicate it over the fireground radio immediately.
- Consider the high-voltage requirements of the actual machine, especially during fire control and water usage.
- Understand conditions that may require activation of the "emergency power off" or "emergency shutdown" buttons and where they are located. These buttons may need to be used for sparks or fire within the computer room and for flooding or activation of the sprinkler system. Keep in mind that these are different from the quench button. The MRI machine is still active.
- Ensure that you know the circumstances for using and location of the quench button.
- During EMS or entrapment situations:
    - Follow all the above safety procedures.
    - Determine the severity of any injuries.

- Remove the victim before any treatment is initiated under the guidance of trained MRI personnel.
- Never attempt to resuscitate a victim within the MRI room.
- During life-or-death situations, the quench button may be necessary.
- Always allow two minutes to pass before entering the area.

That series of recommendations could be integrated into your training presentations and manuals for first responders and your own MRI staff. In fact, you could probably use DeYear's whole article as the basis for your training for first responders (with, of course, an on-site tour and opportunity for two-way discussion).

This is a really good article that is appropriate for multiple audiences. Don't wait for your local fire department (or other first responders) to reach out to you. Make sure you have contacted them and arranged for at least an annual inservice on MRI safety (with on-site visit) and have a mechanism in place for newly added personnel to their services. The latter is especially important when you deal with volunteer fire companies.

Some of our prior columns on patient safety issues related to MRI:

- February 19, 2008 "MRI Safety"
- March 17, 2009 "More on MRI Safety"
- October 2008 "Preventing Infection in MRI"
- March 2009 "Risk of Burns during MRI Scans from Transdermal Drug Patches"
- January 25, 2011 "Procedural Sedation in Children"
- February 1, 2011 "MRI Safety Audit"
- October 25, 2011 "Renewed Focus on MRI Safety"
- August 2012 "Newest MRI Hazard: Ingested Magnets"
- October 22, 2013 "How Safe Is Your Radiology Suite?"
- October 21, 2014 "The Fire Department and Your Hospital"
- August 25, 2015 "Checklist for Intrahospital Transport"
- August 2016 "Guideline Update for Pediatric Sedation"
- October 2016 "MRI Safety: There's an App for That!"
- January 17, 2017 "Pediatric MRI Safety"
- August 8, 2017 "Sedation for Pediatric MRI Rising"
- March 2018 "MRI Death a Reminder of Dangers"
- March 2018 "Cardiac Devices Safe During MRI But Spinners!?"
- November 2018 "OMG! Not My iPhone!"
- April 2, 2019 "Unexpected Events During MRI"
- September 2019 "New MRI Hazard: Magnetic Eyelashes"
- October 15, 2019 "Lots More on MRI Safety"
- November 5, 2019 "A Near-Fatal MRI Incident"
- November 2019 "ECRI Institute's Top 10 Health Technology Hazards for 2020"
- January 7, 2020 "Even More Concerns About MRI Safety"
- March 2020 "Airway Emergencies in the MRI Suite"

- October 2020 "New Warnings on Implants and MRI"
- January 2021 "New MRI Risk: Face Masks"
- June 1, 2021 "Stronger Magnets, More MRI Safety Concerns"
- November 2021 "Yet Another Risk During MRI"
- January 2022 "MRI Safety Issues"
- July 26, 2022 "More Risks in the Radiology Suite"
- October 24, 2012 "Serious MRI Accident at Unregulated MRI Center"
- November 21, 2023 "Another Terrifying MRI Accident"
- January 2024 "Guns and MRI Don't Mix"
- February 20, 2024 "What is a "Safety Case"?"
- June 11, 2024 "Nursing in the MRI Suite"
- August 13, 2024 "Preventing Thermal Injury During MRI"
- October 2024 "Another MRI Accident Reveals Gap in Oversight
- October 2024 "MRI Special Patient Considerations"
- October 8, 2024 "First Responders and MRI"
- April 22, 2025 "Updated ACR Manual on MRI Safety"
- May 2025 "Add Another Item to Your MRI Screening Protocols"

References:

DeYear D. May the Force Be with You: Response to MRI Machines. fireengineering.com 2025; November 1, 2025 https://www.fireengineering.com/firefighting/may-the-force-be-with-you-response-to-mri-machines/

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