

## Shielding From Unwanted Artifacts

By: Carly Holloway Oct 22,2014

The appearance of visual artifacts accounts for 30% of all problems seen on MR systems. An artifact is any item that appears on the image which is not present in the scanned tissue. Many of these artifacts appear because the integrity of the RF shield is compromised. Movement from the patients, or problems with the scanner can also attribute to these distorted images. Artifacts decrease the quality of the MR image, and in some cases can lead to misdiagnosis.

One of the most common artifacts that occur on MR images is called Corduroy. MR scans with these artifacts show patterns of parallel lines on the image. Corduroy artifacts are caused by any type of current moving through the imaging area. Lighting and ventilation systems can cause these artifacts to appear on scans. LED lighting systems are a perfect substitute for fluorescent lights, because they do not emit any UV, IR, or RF waves. LED spotlights will also not affect image quality. Corduroy artifacts can also be caused by a leak in the RF shield. Replacing or repairing an existing RF shield is the only way to stop Corduroy artifacts caused by a leaking shield.



Ghosting artifacts are also common and can be caused by magnetic problems, patient movements, and RF transmissions. If an MRI room is having RF problems; repairing or replacing the shield is necessary to prevent RF frequencies from entering the room. Installing an Open Shielding Box (OSB) can also reduce patient movements that can cause ghosting artifacts. When using an open MR system, an OSB eliminates a patient's sense of confinement. With an OSB, the patient and operator are able to have better communication, which helps the patient remain calm during the scan. Voluntary patient movement can be reduce with RGB Lighting and Chromotherapy. This gives the patient a full immersive color experience throughout the duration of the scan.



Chromotherapy easily integrates into the existing lighting systems and provides continuous

comfort for patients and medical operators. Hospital workflow is improved with relaxed patients, procedures can run smoothly.

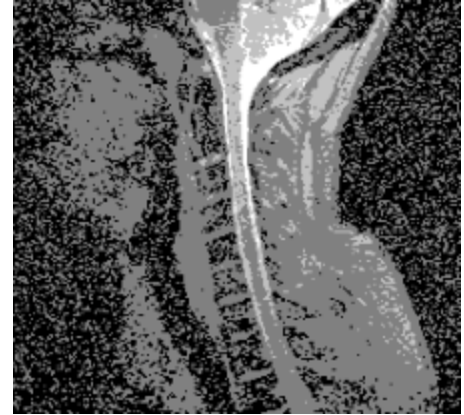
Having a poor signal to noise ratio can also cause unwanted artifacts on images. MR rooms that have a poor SNR can cause inferior image quality.

When background noise is greater than signal strength, MR images appear to be grainy and unclear. Installing a new RF shield or repairing the existing shield will stop background noise from entering the MR room and distorting images.

Solid shielding or an Open Shielding Box(OSB) are two options to prevent RF frequencies from entering the MR room. Solid shielding is more common in MR rooms, but installing an OSB has its advantages. The OSB is a

transparent like, modular, pre-fabricated self-standing RFI shielding enclosure. Its is designed for low field open

MR systems of up to 0.4 T. However, the OSB can also be used with some high field MR systems. One advantage that an OSB has compared to traditional copper shielding is even after years of use, the shield's integrity will never diminish.



Zipper artifacts appear on MR images as one or more nonexistent dashed lines that extend across the series of images. There are several causes for zipper artifacts in images. Most zipper artifacts are caused by hardware or software malfunctions that can be difficult to correct. The zipper artifacts that can be corrected easily are those due to RF entering the MR room during scanning. Solutions include identifying and removing RF sources, and auditing the existing RF shield to ensure that there are no leaks.

