

Operational MRI Safety Structures

Tobias Gilk - Sept 28, 2022

 2022 Dubai Advanced MRI Safety Seminar

MRI Safety Structures

Outline

Operational MRI Safety Structures

- Intro
- Injury-Reducing ‘Low-Hanging Fruit’
- Policies
- Training
- Culture
- Q & A

Injury-Reducing 'Low-Hanging Fruit'

Injury-Reducing 'Low-Hanging Fruit'

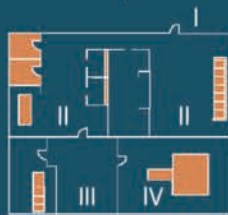
THREE STEPS THAT COULD HAVE PREVENTED 69% ** OF MRI PROJECTILE INJURIES

(The 69% is actually 100%, if we look at only clinical care scenarios, excluding service-related accidents).



IMPLEMENT A 4-ZONE MODEL LINKING ACCESS TO SCREENING / SUPERVISION

1



UTILIZE FERROMAGNETIC DETECTION SYSTEMS FOR ADDITIONAL SCREENING AND PROTECTION

2



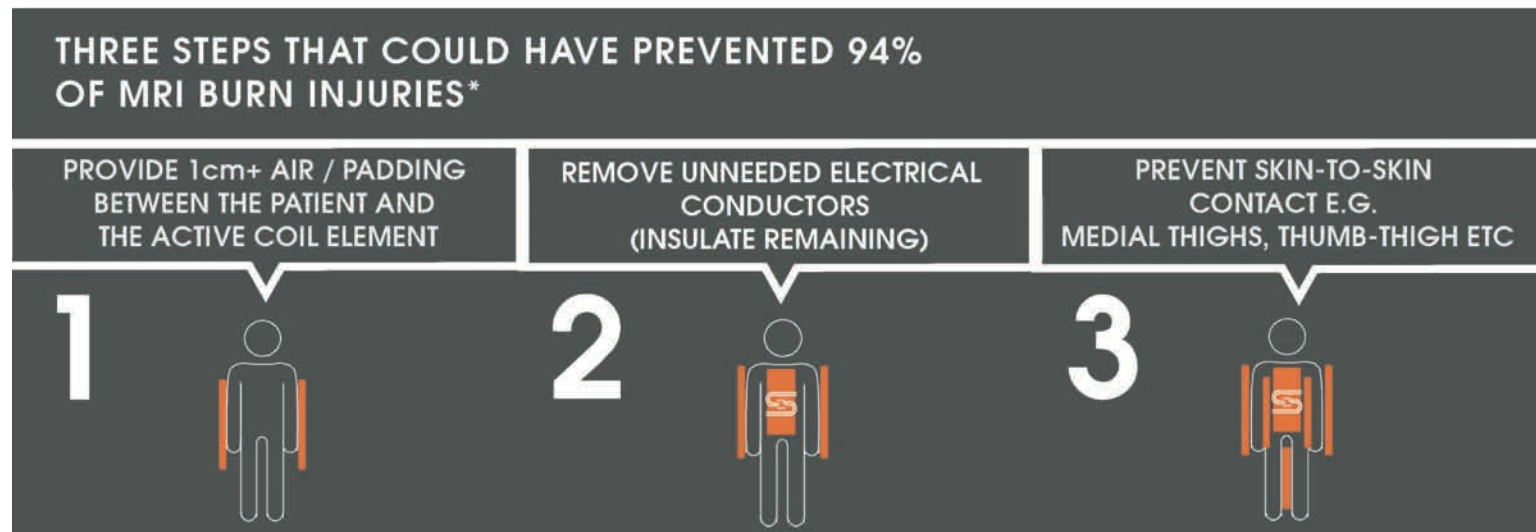
LABEL OBJECTS WITHIN THE MRI SUITE FOR MR CONDITIONS / SAFETY

3



<https://www.metrasens.com/mri-safety/mri-safety-infographic/>

Injury-Reducing 'Low-Hanging Fruit'



<https://www.metrasens.com/mri-safety/mri-safety-infographic/>

Injury-Reducing 'Low-Hanging Fruit'

ONE ACR GUIDANCE DOCUMENT STEP THAT
COULD HAVE PREVENTED 11% OF MRI HEARING DAMAGE INJURIES*

... plus two steps that we believe would dramatically improve patient protection

1 REQUIRE USE OF HEARING
PROTECTION OR EVERYONE IN THE
MAGNET ROOM DURING THE EXAM

1



2 VERIFY PLACEMENT /
EFFECTIVENESS
OF THE HEARING PROTECTION

2



3 PROVIDE AN ALTERNATIVE
MEANS OF HEARING PROTECTION

3



<https://www.metrasens.com/mri-safety/mri-safety-infographic/>

Injury-Reducing 'Low-Hanging Fruit'

Expert Panel on MRI Safety Best Practices

- MRMD / MRSO / MRSE
- Obtain Device Documentation
- Review MRI Site Planning w/ Expert
- Report Near-Miss Events to MRMD
- Documented Annual MRI Safety Training
- +1 Staffing Model
- Supervision By Level 2-Trained Person At All Times
- Use Ferromagnetic Detectors
- Gown All Patients To Skin
- Full-Stop / Final Check
- Pad Patients Per OEM Specifications

“MRI Safety Is Everyone’s Responsibility”

“MRI Safety Is Everyone’s Responsibility”

No, It’s Not!

“MRI Safety Is Everyone’s Responsibility”

MRI Safety Responsibilities & Authorities Need To Be Clearly Defined & Assigned

“MRI Safety Is Everyone’s Responsibility”

“Everyone’s Responsibility” = “Group Project”

“MRI Safety Is Everyone’s Responsibility”

Kitty Genovese



“MRI Safety Is Everyone’s Responsibility”

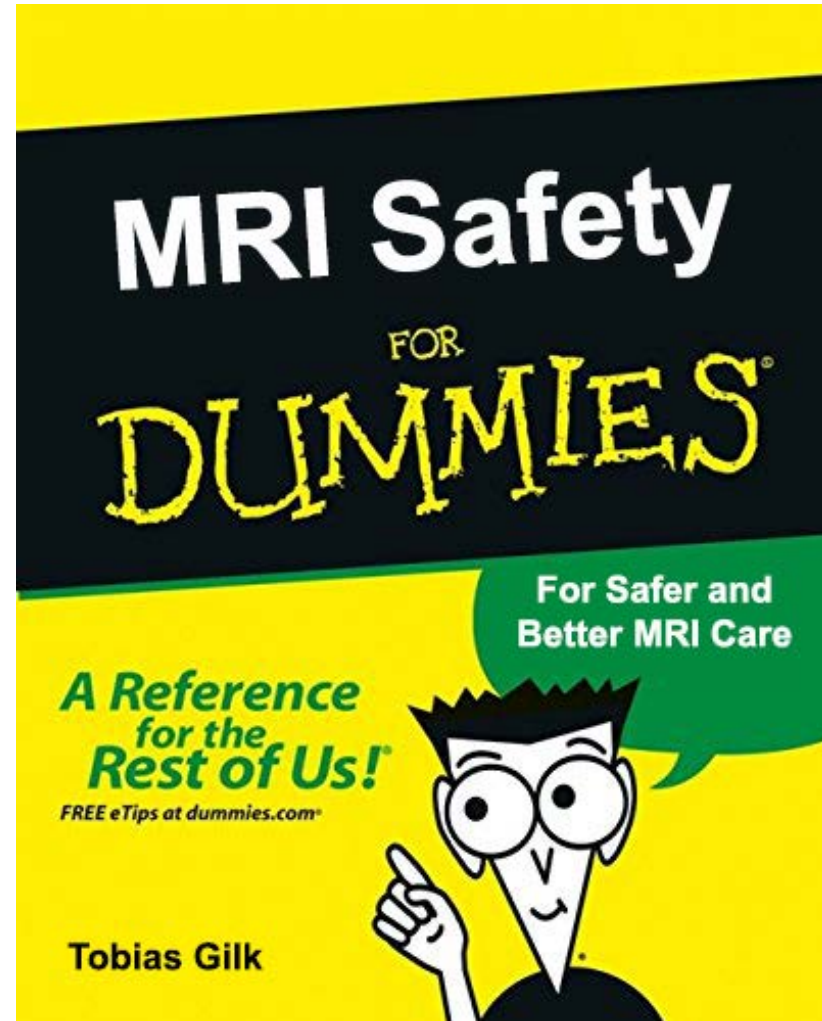
Everyone has a role in MRI safety, but specific responsibilities need to be clearly defined & communicated.

Policies

Policies

Test your policies...

Could a new radiographer safely complete an MRI exam by *only following the direction in your written policies?*



Policies

Test your policies...

Could a new radiographer safely complete an MRI exam by *only following the direction in your written policies?*

**Gilk Radiology Consultants
MRI Safety Policies & Procedures Checklist**

1.0 MR Safety Policy Structure

MRI Safety Practices Review
 Annual Review of Policies, Procedures, Practices
 Annual (Re-)Endorsement of Clinical P&P by MR Clinical Head and / or MRMD
 Annual (Re-)Endorsement of Operational P&P by MR Administrator
 P&P Review Trigger Criteria (e.g., new clinical practice, or change to MR equipment)
 Culture (protection of staff based on adhering to policies)

2.0 MRI Physical Environment Safety

Zones and Access Controls
 Four Zone Concept
 Controlled Access Areas
 General Restriction
 MRI Scanner Room (Zone IV) Restriction

Who is permitted within the MRI Controlled Access area(s) (Zones 3 and 4)

- Patients
- Visitors
- Associates
- MR Departmental Staff

Who is permitted within the MRI scanner room(s) (Zone 4)

Not During MR Scanning / During MR Scanning (Screening / Protection Required)

- Patients
- Visitors
- Clinical Associates (e.g., anesthesia)
- Non-clinical Associates (e.g., maintenance)
- MR Departmental Staff

3.0 MRI Safety Training & Staff Standards

Safety Training Levels

Level 1 Safety Training
 Allowed Access / Restrictions
 Different Training for different needs (e.g., 1a, 1b, 1c, 1d...)

Level 2 Safety Training
 Allowed Access
 Situational Authority
 Different Training for different needs (e.g 2a, 2b...)

Safety Training Content / Frequency

Level 1 (Associates)
 Annual (Documented)
 Training / Competency content by need / purpose
 Joint Commission Required Training
 Annual (Documented)
 Level 2 (MR Staff)

Purpose
 Identification

Process

Patients

How

Patients with Emergent Patients

Conditional Labeling

MR Conditional Labeling

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Policies

In My Experience...

... Many hospitals develop 'standard operating procedures' but never write them down.

This can lead to tremendous variation in delivery of care.

Policies

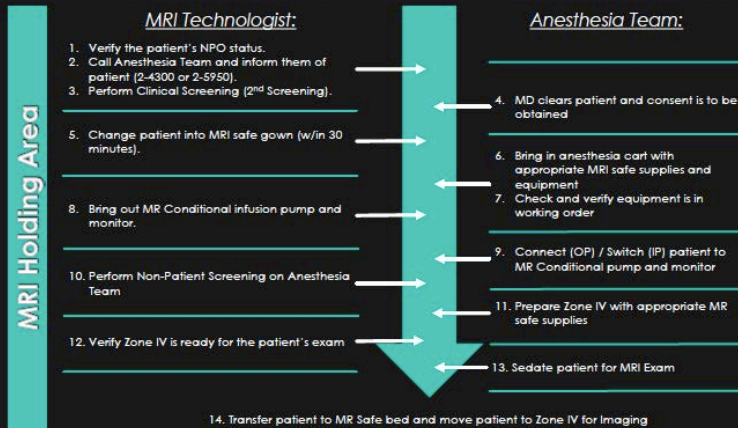
MRI Anesthesia Procedures and Responsibilities

Scheduling:

Radiology MRI Scheduling (All Anesthesia Cases should be scheduled on MRI 2 when possible):

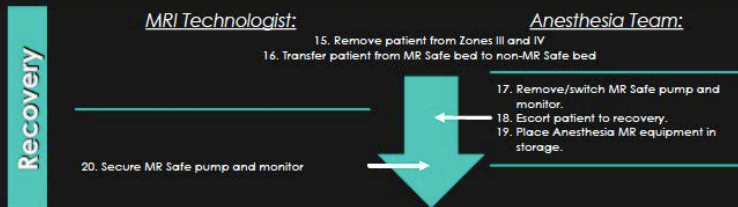
- **STAT Exams** (to be scheduled by the MRI Technologist): Will be considered on a case by case basis and coordinated with Anesthesia by calling, 2-4300 (ANES) or 2-5950 (TECH).
- **Inpatient (IP) Exams** (to be scheduled by the MRI Technologist): Will be done on Tuesdays and Thursdays during the 10 am time slot.
- **Outpatient (OP) Exams** (to be scheduled by the Radiology Schedulers): Will only be performed on Fridays and scheduled at least 3 weeks out.

Patient Preparation / Pre-MRI Exam

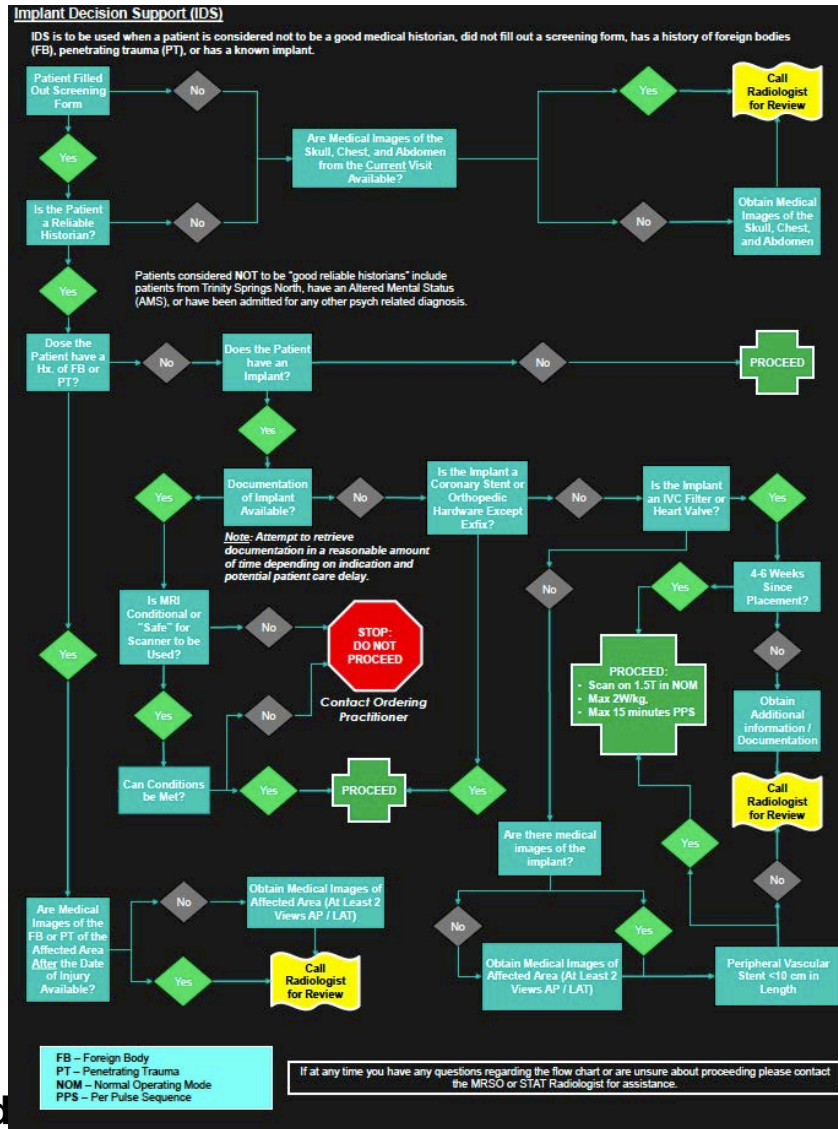


MRI Exam

Post-MRI Exam



Policies



Training

Training

ACR Manual Describes Two Levels of MRI Safety Training

- Level 1 & Level 2
 - Code Team
 - Aides / Porters
 - Engineering
 - Cleaning Staff
 - Vendor Reps
 - EP
 - Anesthesia
 - Radiographers
 - Radiology Nurses
 - Radiologists
 - Respiratory
 - ICU Nursing
 - Cardiology
 - Administration
 - Security
 - CRNAs

Training

In My Opinion, Most Hospitals Need 4 (or more) Levels of MRI Safety Training:

- Level 0 (General Hospital Staff Orientation to MRI Safety)
 - Don't Go To MRI (unless you have a specific reason to)
 - It Is Always A Dangerous Place (24 / 7 / 365)
 - If You Do Have To Go, Follow MRI Staff Directions

Training

In My Opinion, Most Hospitals Need 4 (or more) Levels of MRI Safety Training:

- Level 1 (MRI Support Staff)
 - static magnetic field forces and risks (torque and translation)
 - quench risks
 - authority to act within the controlled access areas
 - implications of clinical and physical MRI safety screenings
 - emergency response / code events
 - MRI safety labeling and terminology

Training

In My Opinion, Most Hospitals Need 4 (or more) Levels of MRI Safety Training:

- Level 2 (non-radiographer / technologist)
 - time-varying gradient and RF fields / forces / and risks
 - physiological effects of MRI's electromagnetic fields
 - detailed understanding of MR safety labeling and terminology
 - detailed understanding of both clinical and physical screening processes
 - detailed understanding of emergency response policies and practices
 - detailed understanding of the site quench policy
 - detailed understanding of the chain-of-command with respect to MRI safety decisions.

Training

In My Opinion, Most Hospitals Need 4 (or more) Levels of MRI Safety Training:

- Level 2 (radiographer / technologist)
 - In addition to the fundamental elements of Level 2 MRI Safety Training, MRI radiographers must also receive competency training on the safe operation of the MRI equipment in order to be able to safely and effectively deliver MRI patient care.

Training

- The MRMD can / should tailor educational content / competency requirements for site needs (even if that means making more / fewer levels)

Culture

Culture

“It is easier to bend steel than to twist arms.”

— John Gosbee, MD, PhD

Culture

Set up structures & practices that reinforce the culture you want to have...

- 'Good Catch' Rewards
- Thank People for Identifying Problems
- Reward People for Identifying Solutions
- Collaborate With Other Parts of Care Team
- Develop Documented Policies
- Make Sure Policies Are Being Followed

Q&A

Thank You

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www.facebook.com/groups/MRIsafety