

MR Physics & Techniques for Clinicians/Artifacts to Artefacts: Causes & Cures from a Clinical Perspective

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Highlights:

- Pathology mimicking artifacts are much more problematic than easily identifiable artifacts.
- Artifacts can be categorized as either primarily due to phase or amplitude errors in the k-space acquisition.
- In general, strategies that minimize artifacts require more care in generating protocols and more scan time.

Target Audience: The presentation is aimed primarily at clinicians and clinician/scientists interested in growing their understanding of the causes and possible corrections for minimizing or eliminating image artifacts. Given the breadth of interdisciplinary researchers utilizing MRI in new ways each year, it is likely that some scientists would also benefit from the presentation. Given this focus, a quantitative, mathematical approach to describing artifacts and their correction will not be given.

Outcomes / Objectives: The presentation will aim to provide a framework by which learners can characterize artifacts. The hope is that the framework will provide 1) understanding of the role clinician/scientists play in identifying pathology mimicking artifacts during development of new MR methods 2) an approach to understanding and recalling artifacts causes and corrections, and 3) the physics behind the cause of imaging artifacts.

Methods: Whenever possible, the presentation will aim to describe artifacts of value to clinicians and clinician scientists of moderate prevalence. Artifacts likely to be explained in the first week of a MR training experience (e.g. phase wrap) will be avoided in favor of artifacts that are important but less prevalent. Artifacts occurring in a narrow spectrum of clinical care will be less emphasized.

Results: Causes, possible solutions, and tradeoffs for each discussed artifact will be provided from an image-based perspective[1].

Conclusions: Clinicians play the key role in guiding imaging science researchers and MR manufacturers to devote limited resources towards the most pressing artifacts in clinical practice. Learning a rudimentary basis for understanding artifacts will make individual clinicians more influential in this advisory role.

[1] J. N. Morelli, V. M. Runge, F. Ai, U. Attenberger, L. Vu, S. H. Schmeets, W. R. Nitz, and J. E. Kirsch, "An image-based approach for understanding the physics of MR artifacts," *Radiographics*, vol. 31, pp. 849-66, May-Jun 2011.