

Teaching Radiology Residents: Expectations

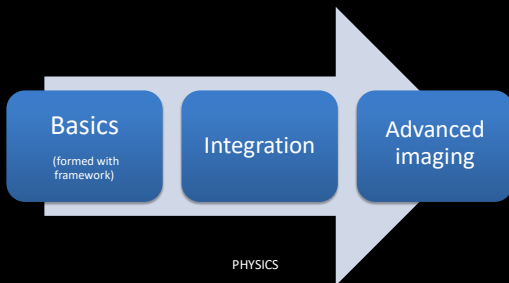


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Form and Function



Resident learning progression



Basics

Where do we start with resident education?



Nuts and bolts :

Seemingly simple concepts should be presented in digestible forms that lay the initial framework for the resident who is first encountering them.

- Residents should supplement this with self study.



Basics

Examples of basic concepts:

- - How does a magnet produce signal using a hydrogen atom?
- - What is the anode portion of X-ray tube?
- -How does a CT rotate without wires becoming tangled?

Residents early in there career may not ask details for various reasons...it is partially the obligation of the teacher to try and tease these weaknesses out.

Integration

- Further integration of Physics concepts into daily practice at the workstation
 - Artifacts- **high yield**
 - Imaging manipulation/improvement
 - Basics revisited on a frequent basis
 - Review In and out-of-phase MR physics on abdomen
 - Review Mammography differences on the rotation

Integration of education

- Hands-on training:
 - How are the images obtained?
 - What are the technologists doing on a regular basis to ensure quality images?
 - Changes made at the scanner to limit ionizing radiation?
- Hardware of the equipment:
 - Only to the level needed by the resident for clinical applications and usefulness.

Integration using phantoms

Simulated events utilizing phantom models:

- Allows residents to visualize and gauge what parameter changes are noteworthy without exposing a live patient.
- See active parameter changes and the value it adds or subtracts from the actual produced image quality.

"I can experiment with changes in imaging parameters with no repercussions of increased radiation exposure"

Integration of changes

Scenario:

Resident on the pediatric rotation and notices that images are sometimes good quality but also sometimes poor quality on the same radiography system?

Evaluation: Determine if this is patient positioning, inappropriate use of AEC sensor, etc.

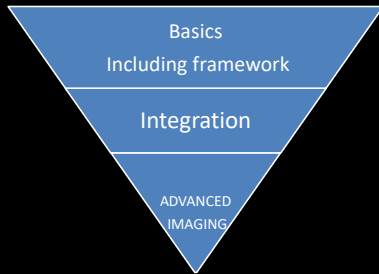
Integration of changes

Scenario:

Resident is called to the control room of MR scanner where chemical shift artifact is noted, what is done?

Evaluation: Resident then instructs the use of Spin-Echo instead of gradient, increasing the bandwidth, etc. to improve the imaging and then reevaluates images.

Advanced Imaging



Expectations

- Succinct information, especially with the basics
- Foundations to build upon to eventual advanced imaging techniques
- Clinical relevance of teaching
- Limited Equations
- Artifacts and fixes for them
- Cost effective alternatives for real world decision making

Resident Expectations

- "Physics that is taught at a clinical level with a radiologist in mind"
- "Keep it simple, you can overcomplicate anything"

References:
Photography by Fabian Ofner