




QUICK REFERENCE GUIDE FOR SPINAL IMAGING ^{1,2,3}

MODALITY	RADIOGRAPHY 	COMPUTED TOMOGRAPHY 	MAGNETIC RESONANCE IMAGING (MRI) 
PHYSICS	X-rays penetrate human tissue to produce an image based upon the varying radiodensity of that tissue	Multiple x-rays of tissues reconstructed to produce cross-sectional images	Cross-sectional images are created by the signal emitted from the hydrogen nuclei's response to a strong magnetic force and radiofrequency pulses
PRIMARY APPLICATION	Visualizing pathology of bones	Visualizing cortical bone for subtle/complex fractures and bony tumors Sensitive to variances in tissue density	Visualizing soft tissue injuries, disk pathology and bone marrow edema T1-weighted fat is bright, fluid darker gray T2-weighted-fluid is bright white
ADVANTAGES	Inexpensive Fast Good first order test	Multiplanar/3D views Fast Superior contrast resolution than radiography	Multiplanar/3D views No ionizing radiation
DISADVANTAGES	Superimposition of bone Limited visualization of soft tissue Ionizing radiation (low)	Soft tissue visualization inferior to MRI Expensive Ionizing radiation (high)	Lack of signal of cortical bone Slow Expensive No ferrous materials Claustrophobia Patient must be still

The **ABCs** of Imaging Analysis:²

- A:** Alignment/Appearance
- B:** Bone Density
- C:** Cartilage Space/Consistency
- S:** Soft Tissues

Useful Links:

[ACR Appropriateness Criteria:](https://www.acr.org/Quality-Safety/Appropriateness-Criteria)

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[Canadian C-spine Rule:](http://jmanetwork.com/data/Journals/JAMA/4804/joc10637f1.gif) ⁴

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Beneficial Views:

Open mouth view to visualize C1/C2

Swimmer's view to visualize C7/T1 junction

References

1. Hazle, C. R. (2010). *Diagnostic imaging of the spine - medical screening & integration with clinical decision making*. Unpublished manuscript.
2. McKinnis, L. N. (2013). *Fundamentals of musculoskeletal imaging* FA Davis.
3. Imaging Special Interest Group, Orthopedic Section, APTA, Inc. (2015). *Imaging Education Manual for Doctor of Physical Therapy Professional Degree Programs*.
https://www.orthopt.org/uploads/content_files/ISIG/IMAGING_EDUCATION_MANUAL_FINAL_4.15.15..pdf
4. Stiell, I. G., Wells, G. A., Vandemheen, K. L., Clement, C. M., Lesiuk, H., De Maio, V. J., . . . Verbeek, R. (2001). The Canadian C-spine rule for radiography in alert and stable trauma patients. *Jama*, 286(15), 1841-1848.