

Evidence Discussion (Spinal Deformities [e.g. Scoliosis/Kyphosis]) (SP-14)

Plain radiography continues to be the primary imaging modality for the initial diagnosis of spinal deformity and for follow up of deformity progression. [1, 2] Plain x-rays allow the easy measurement of Cobb angles which remains essential in the evaluation of scoliosis. [2]

Patients with congenital scoliosis, atypical curves (for example, left thoracic) or abnormal neurological findings will benefit from MRI to help identify spinal cord abnormalities. [2, 3, 4, 5, 6] CT is considered the gold standard for the evaluation of osseous structures and can be useful in the evaluation of complex bony deformity. [2] Additionally, MRI and CT can be valuable for preoperative evaluation. [7, 8, 9]

For revision anterior spinal deformity surgery, CT angiography or MR angiography may be indicated, however, concerns associated with these modalities are radiation exposure (CT), availability of the imaging modalities in close proximity to patients, potential out of pocket costs to patients and sensitivity to patient movement (MRI). [10, 11]

References:

1. Wright N. Imaging in scoliosis. Arch Dis Child. 2000 Jan;82(1):38-40.
2. Calloni SF, Huisman TA, Poretti A, Soares BP. Back pain and scoliosis in children: When to image, what to consider. Neuroradiol J. 2017 Oct;30(5):393-404.
3. Wright N. Imaging in scoliosis. Arch Dis Child. 2000 Jan;82(1):38-40. (references the below 2 articles)
4. Winter RB, Lonstein JE, Denis F, Koop SE. Prevalence of spinal canal or cord abnormalities in idiopathic, congenital, and neuromuscular scoliosis. Orthopedic Transcripts 1992; 16:135.
5. Barnes PD, Brody JD, Jaramillo D, Akbar JU, Emans JB. Atypical idiopathic scoliosis: MR imaging evaluation. Radiology 1993;186:247–53
6. Belmont PJ, Jr., Kuklo TR, Taylor KF, Freedman BA, Prahinski JR, Kruse RW. Intraspinal anomalies associated with isolated congenital hemivertebra: the role of routine magnetic resonance imaging. J Bone Joint Surg Am 2004;86-A:1704-10.
7. Ozturk C, Karadereler S, Ornek I, Enercan M, Ganiyusufoglu K, Hamzaoglu A. The role of routine magnetic resonance imaging in the preoperative evaluation of adolescent idiopathic scoliosis. Int Orthop. 2010 Apr;34(4):543-6.

8. Garg, B., Aryal, A. (2023). Preoperative Evaluation and Imaging in AIS. In: Zacharia, B., Raja, S.D.C., KV, N. (eds) Paediatric Scoliosis . Springer, Singapore.
9. Negrini S, Donzelli S, Aulisa AG, et al. 2016 SOSORT guidelines: orthopaedic and rehabilitation treatment of idiopathic scoliosis during growth. *Scoliosis Spinal Disord.* 2018;13:3.
10. Watson RE, Yu L. Safety Considerations in MRI and CT. *Continuum (Minneap Minn).* 2023 Feb 1;29(1):27-53.
11. Gstottner M, Godny B, Petersen J., et al. CT angiography for anterior lumbar spine access: high radiation exposure and low clinical relevance. *Clin Orthop Relat Res.* 2011;469(3):819-824.