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**Redundant Nerve Root Syndrome of the Cauda Equina: The benefits of 3D CISS MRI  
Sequence**

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## Redundant Nerve Root Syndrome of the Cauda Equina:

### The benefits of 3D CISS MRI Sequence

A 58-year-old woman presented with progressive lumbalgia. Conventional lumbar vertebra magnetic resonance imaging (MRI) showed tortuous structures like vascular malformations located cauda equina fibers with narrow lumbar spinal canal findings. After than, a three-dimensional (3D) constructive interference in steady state (CISS) sequence images were obtained. Thanks to its high spatial resolution (SR), 3D CISS sequence images showed the continuity of cauda equina nerve roots (Fig) in this region. These findings are consistent with redundant nerve root syndrome of cauda equina. SR constitutes one of the major problems and objectives in spinal imaging (1). The high SR can be obtained by this sequence and 3D CISS provide detailed information about anatomic structures. Confusing and subtle abnormalities of the spine are more fully clarified by using 3D CISS (1-4).

### References:

- 1) Kulkarni M. Constructive interference in steady-state/FIESTA-C clinical applications in neuroimaging. *Journal of medical imaging and radiation oncology*, 2011, 55(2): 183-190.
- 2) Ramli N, Cooper A, Jaspan T. High resolution CISS imaging of the spine. *The British journal of radiology*, 2001, 74(885): 862-873.
- 3) Algin O, Hakyemez B, Gokalp G, Ozcan T, Korfali E, Parlak M. The contribution of 3D-CISS and contrast-enhanced MR cisternography in detecting cerebrospinal fluid leak in patients with rhinorrhoea, *British journal of radiology*, 2010, 83(987): 225-232.
- 4) Yoshino N, Akimoto H, Yamada I, Nagaoka T, Tetsumura A, Kurabayashi T, Honda E, Nakamura S, Sasaki T. Trigeminal Neuralgia: Evaluation of Neuralgic Manifestation and Site of Neurovascular Compression with 3D CISS MR Imaging and MR Angiography 1. *Radiology*, 2003, 228(2): 539-545.

29 **Figure Legend**

30 **Fig.** Sagittal T2 weighted image (a) shows tortuous structures like vascular malformations  
31 located cauda equina fibers with narrow lumbar spinal canal findings. Sagittal (b) CISS  
32 sequence image shows continuity of elongated tortuous cauda equina nerve roots in this  
33 region.

