

Case Report: Cervical Spine MRI. *syngo* SPACE in a Claustrophobic Patient with Congenital Scoliosis

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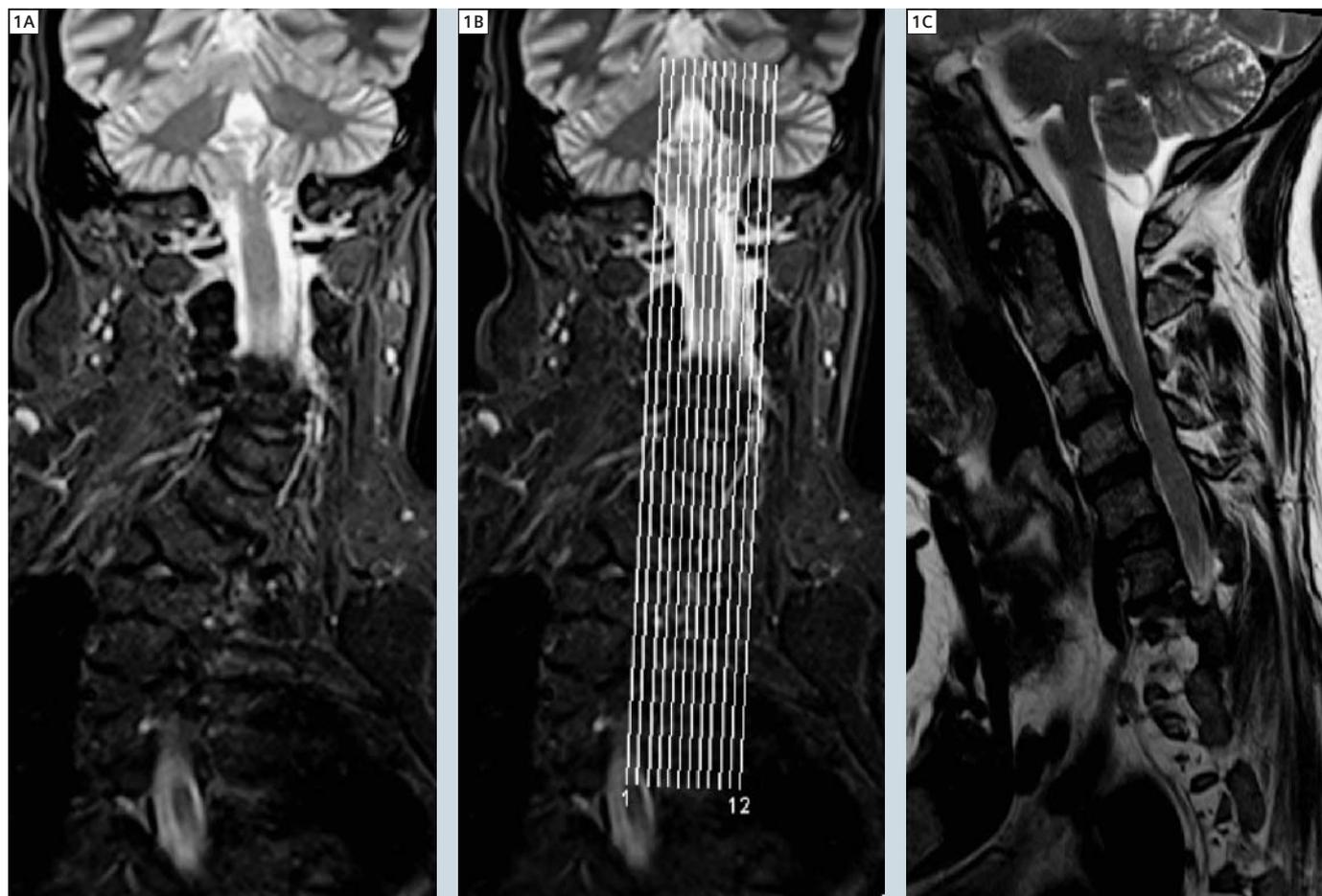
Patient history

38-year-old female patient presented with chronic pain of the neck and shoulder for imaging of intervertebral disk disease. Previous imaging of the lumbar spine has revealed congenital scoliosis with hemivertebrae and fusion

of vertebral bodies. The patient suffers from severe claustrophobia, MRI was accepted after proposing sedation and a “quick” examination. Moreover the known scoliosis was expected to impair a detailed study.

Sequence details

All images have been acquired with an open bore 1.5T MAGNETOM Espree scanner (Siemens Healthcare, Erlangen) with software version *syngo* MR B15. The lower part of the Head Matrix coil, the Neck Matrix coil and the first elements of



1 1A: STIR cor, 1B: Locator T2-TSE, 1C: T2-TSE-sag

the Spine Matrix coil were used. A coronal STIR overview (Fig. 1A) revealed a pronounced curvature of the cervical and upper thoracic spine, thus the standard T2-TSE sagittal sequences (Figs. 1B, C) with 12 slices of 3 mm were obviously not able to cover the spine with standardized orientation to both sides with adequate coverage of anatomical structures. The 3D SPACE (localizer Fig. 2A and Figs. 2B, C), measured with 64 slices of 1.5 mm in a sagittal orientation with good overall image quality and similar contrast, enables the full coverage of the spine segments without the need for additional sequences.

Axial images were also acquired with 3D SPACE. Coronal images were based on MPR reconstruction based on the sagittal oriented *syngo* SPACE sequence (Figs. 3A, B).

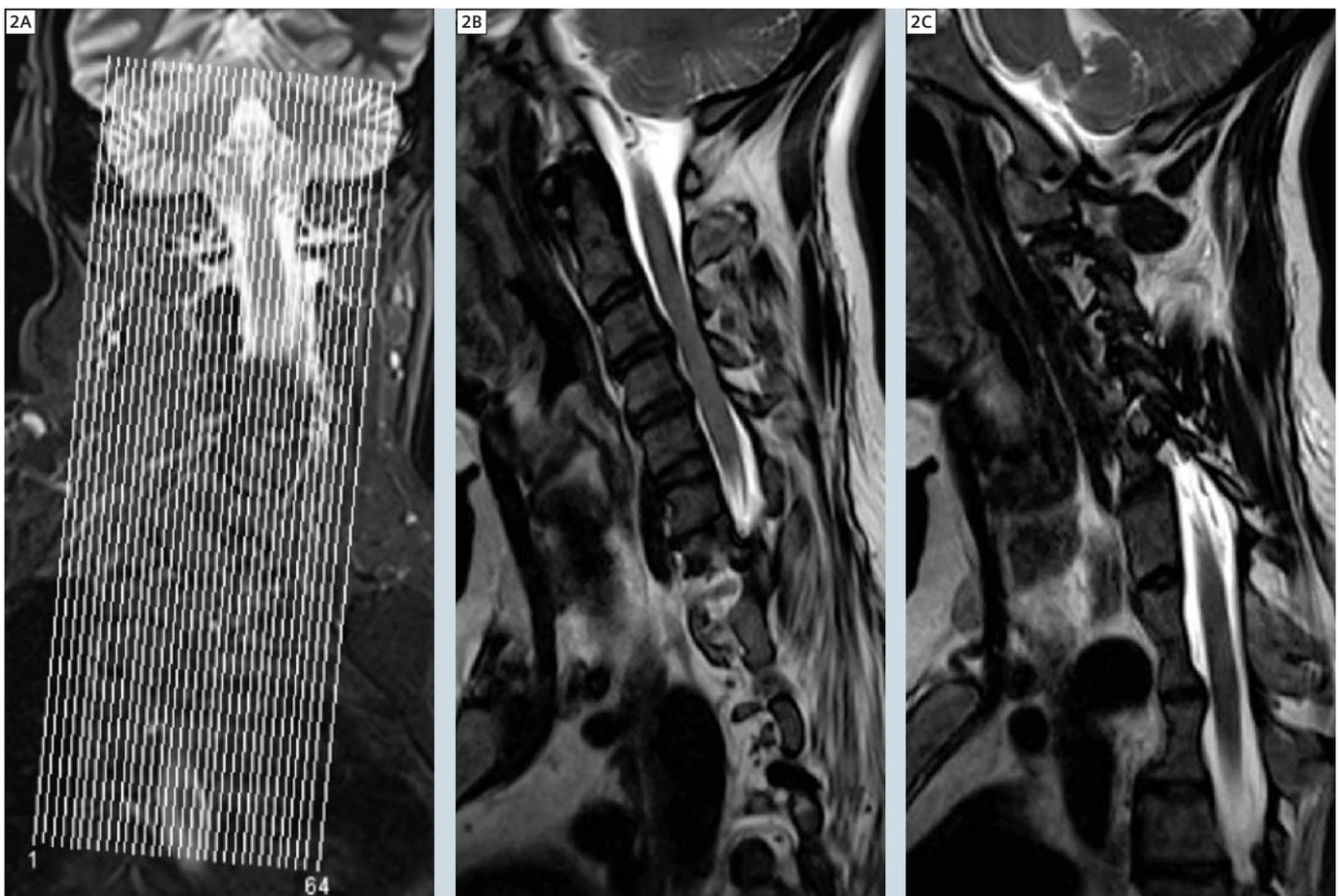
Overall, the following sequences were applied in this case:

- STIR-cor (Fig. 1A): TR = 4240 ms, TE = 49 ms, Slices = 15, Thickness = 4 mm, Matrix = 224 x 256i, iPAT *syngo* GRAPPA, Ref. Lines = 24, TA = 1:14 min.
- T2-TSE sagittal (Fig. 1C): TR = 4141 ms, TE = 125 ms, Slices = 12, Thickness = 3 mm, Matrix = 282 x 512, iPAT *syngo* GRAPPA, Ref. Lines = 32, TA = 3:33 min.
- 3D SPACE sagittal (Fig. 2B, C): TR =

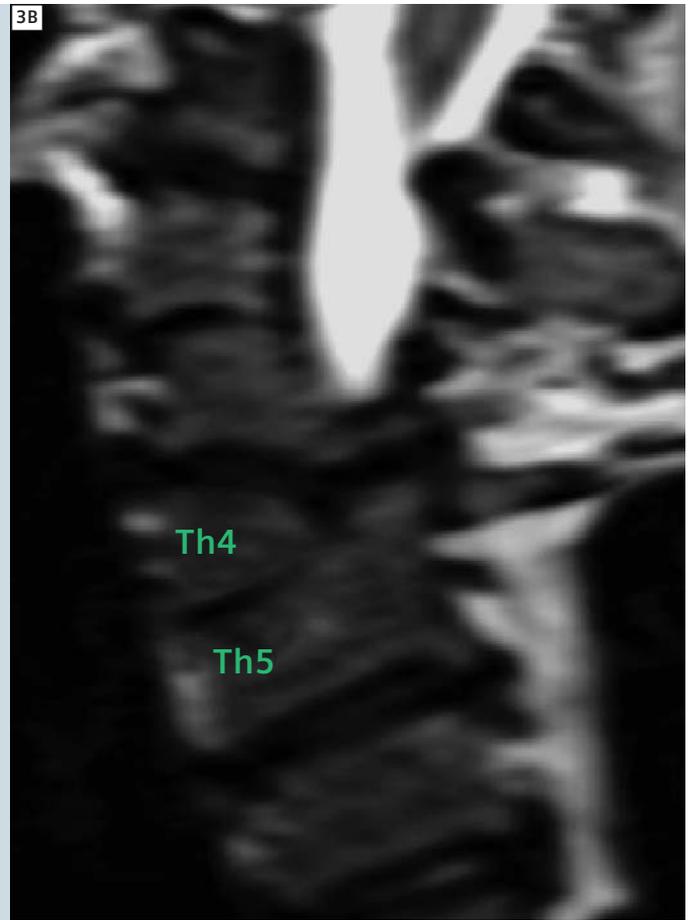
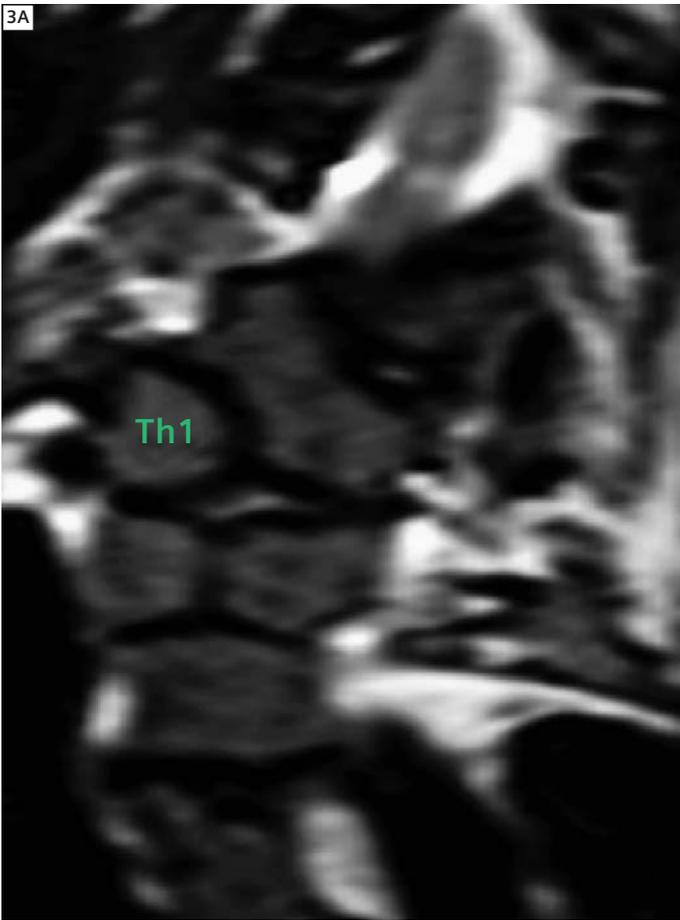
- 1500 ms, TE = 124 ms, Slices = 64, Thickness = 1.5 mm, Matrix = 310 x 320, iPAT *syngo* GRAPPA, Ref. Lines = 24, TA = 3:33 min.
- 3D SPACE axial (Fig. 3): TR = 1500 ms, TE = 123 ms, Slices = 40, Thickness = 1.6 mm, Matrix = 318 x 320i, iPAT *syngo* GRAPPA, Ref. Lines = 24, TA = 2:30 min.

Imaging findings

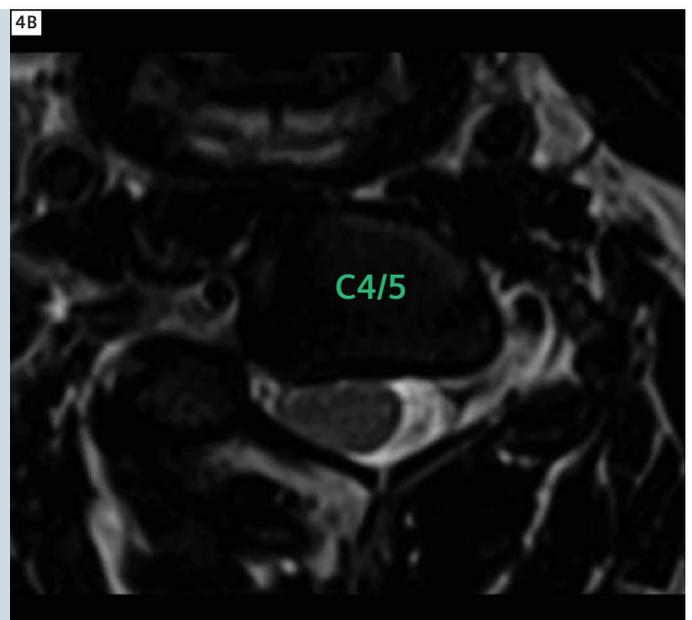
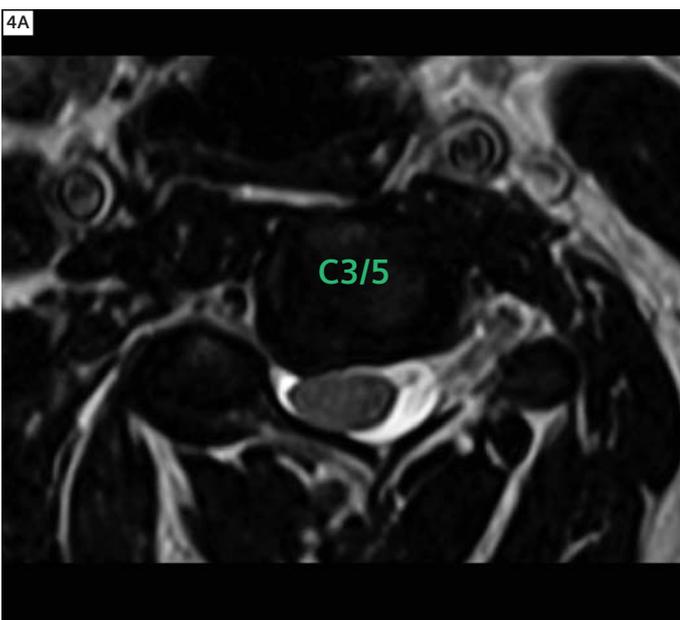
Coronal reconstruction clearly showed the hemivertebra Th1 on the right, the sagittal cleft at the level of Th2 (Fig. 3A) and Th4 resulting in the shape of a butterfly and a unilateral bar at the level of Th4 and 5 on the left (Fig. 3B).



2 2A: Localizer SPACE, 2B: 3D SPACE sagittal, 2C: 3D SPACE sagittal



3 3A: Coronal reconstruction, 3B: Coronal oblique reconstruction



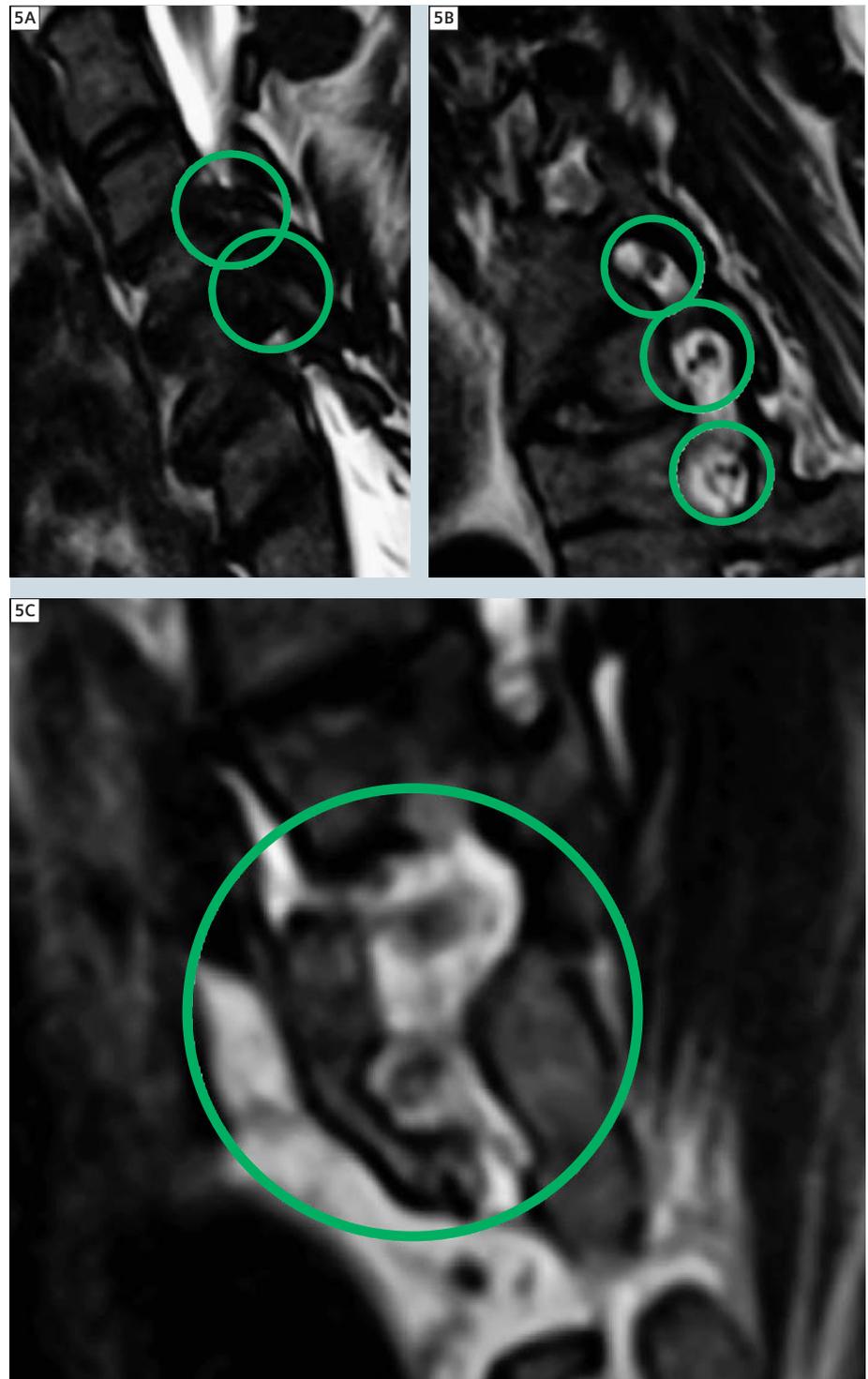
4 4A, 4B: 3D SPACE axial

Disk herniation could be clearly demonstrated in axial SPACE at the level of C3/4 (Fig. 4A) and C 4/5 with a slight impression of the myelon (Fig. 4B). Associated foraminal stenosis was depicted in sagittal oblique reconstruction on the right (Fig. 5A) whereas at the level of the hemivertebra the spinal nerves on both sides were clearly seen (Figs. 5B, C).

Discussion

MRI of the cervical spine is a well-known routine procedure commonly performed with standard T1 and T2-weighted sagittal and axial 2D sequences, which rarely require adaptations. However, this case demonstrates clearly the value of 3D imaging with *syngo* SPACE in a patient with congenital scoliosis. The patient was claustrophobic, which limited the scan time. The normal 2D T2w TSE sequence would require more than 8 min scan time for a sufficient, but smaller, coverage than the *syngo* SPACE sequence. Additionally, with 2D-slices, no oblique reconstruction is possible. With *syngo* SPACE a complete coverage of the bend cervical spine was obtained and the possibility of multiplanar reconstruction allowed the correct interpretation of the complex malformation of the vertebral elements and the damage of the intervertebral disks.

It should be noted that patients with congenital scoliosis also have a high incidence of abnormalities in other organs (heart problems, kidney or bladder problems) and should be screened for spinal cord malformations.



5 5A, B, C: Sagittal oblique reconstruction of 3D SPACE.

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