

### Study Design/Setting:

Retrospective cohort at a Level 1 trauma center.

**Objective:** To compare the anterior-posterior diameter of the cervical central canal using both imaging software with fixed and user-adjustable scout line axial images.

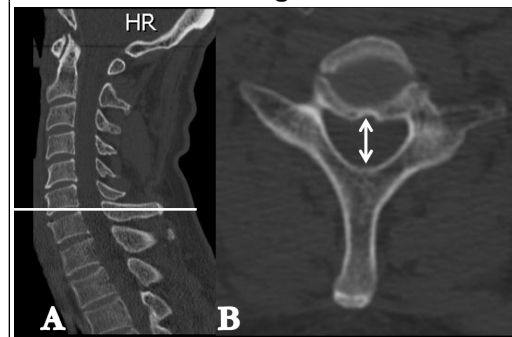
### Summary of Background Data:

The majority of imaging software programs generate oblique axial images through the lordotic and kyphotic regions of the spine due to a fixed reference line. These oblique axial images are not representative of true canal diameter and often provide inaccurate representation of neural compression.

### Methods

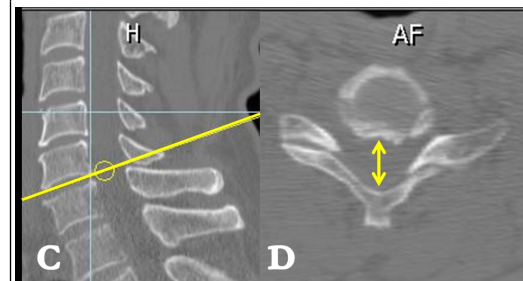
Thirty-three consecutive head trauma patients without evidence of pathology in the cervical spine from September 2011 were chosen for the study. The anterior-posterior diameter of the cervical (levels C2-T1) central canal was measured on axial slices using the default non-adjustable reference line on the picture archiving and communication viewer by three observers and then re-measured using an adjustable scout line on the midline sagittal that most bisected the endplates in a parallel fashion. The two measurements from the three independent observers were then compared directly for differences in the canal diameter at each level.

**Figure 2a. Standard Sagittal cervical CT image.**



Standard Sagittal CT scout line (A) and the respective axial image (B) used to assess the central canal diameter.

**Figure 2b. Sagittal CT with Adjusted scout line.**



In the adjusted scout line sagittal image (C), the line is parallel to the endplate, which changes the adjusted axial image (D).

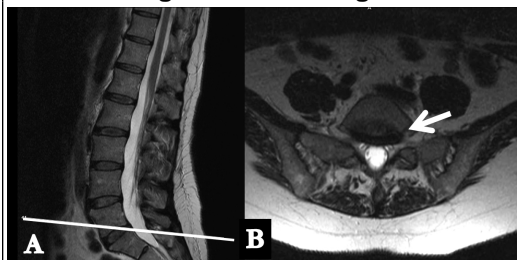
### Results

The average difference between the measurements of the central canal using the fixed scout line versus the adjustable scout line ranged from  $-1.34 \pm 1.59$  mm at the C2-C3 level to  $1.78 \pm 2.32$  mm at the C7-T1 level. Traditional axial images of the cervical spine underestimated the canal space in the upper cervical spine and overestimated the space in the lower cervical spine. The measurement values using the fixed scout line versus the adjustable scout line did not correlate as indicated by low to moderate Pearson r and ICC values.

### Conclusions

There are clear differences between axial slices generated with adjusted and non-adjusted scout lines particularly at disc levels that are not orthogonal to the screen edges, which typically are the levels most commonly affected in cervical spondylosis.

**Figure 1. MRI Image.**



(A) Sagittal T-2 weighted magnetic resonance image of the lumbar spine. Because of the obliquity of the scout angle, the axial reconstruction (B) falsely portrays a L5-S1 disc herniation.