

# CT Imaging of Cervical Spine Soft Tissues – Pictorial Review & Imaging Technique



Leidner Bertil, Shalabi Adel  
 Karolinska Institutet, CLINTEC, Division of Radiology  
 Karolinska University Hospital Huddinge, Stockholm, Sweden



## Conclusion

From standard multislice CT scanning, it is possible to visualize the soft tissues (i.e. spinal cord/posterior longitudinal ligament) from the skull base to the lower cervical spine.

## Background

In multiple trauma cases, it is mandatory to clear the cervical spine from injuries, either by clinical examination or by radiology. CT of the cervical spine is now documented as the method of choice to clear from bony injuries. Today, the high quality of thin section multislice CT makes it also possible to evaluate the soft tissues with a standard CT examination.

## Pictorial Review

CT soft tissue findings including soft tissue swelling, disc herniation, epidural hematoma, anterior fat planes are shown in the three upper rows in the pictorial section. Two images show supplementary exams made with higher radiation dose.

## Material & Methods

- Standard bone algorithm mm- or sub-mm images from 4 and 64 channel CT were reformatted into sagittal images with 2-3-4-5-6-7 mm thickness with 50% overlap. Image window settings were adjusted to show soft tissue (c.f. abdominal windowing). The authors judged the image sets from 10 patients (20 evaluations) to define the optimal thickness for soft tissue visualization.
- Thirty-four patients were then evaluated to find the lowest possible level of visualization of the spinal cord/posterior longitudinal ligament (PLL).

## Results

- Optimal image thickness (noise/detail) was defined to 6 mm in 12/20; to 5 mm in 7/20 and to 4 mm 1/20 judgments. (see 4th row – thickness)
- In 31 of 34 patients it was possible to visualize the spinal cord/PLL from skull base to C5/6 and in 19/34 patients to C6/7. In 7/34 patients C7/T1 level was depicted (see bottom row – level).

## Discussion

In Sweden the C-spine is considered as fully cleared from injury, whenever bony injury is excluded with CT, even in the obtunded patient.

The international standard is different, i.e. it is considered necessary also to exclude soft tissue injuries. This is often performed with MRI causing time delay, time consumption and potential transportation complications.

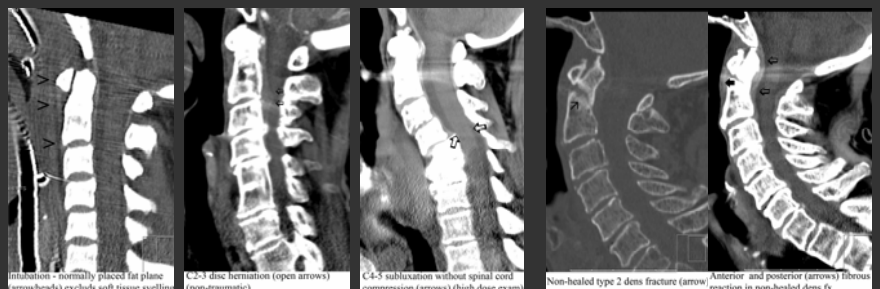
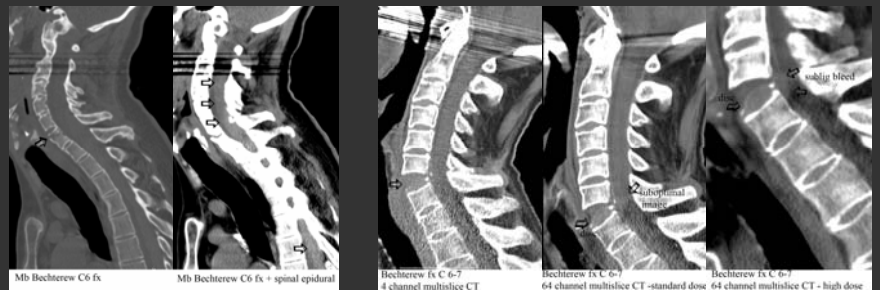
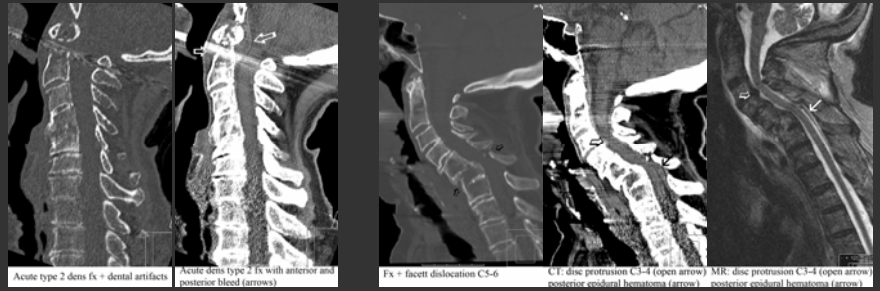
We show that CT imaging of the soft tissues in C-spine is routinely feasible to a certain extent. Dedicated rescanning with higher radiation dose may visualize the lower C-spine fully and thus obviate the need for MRI.

## Technical CT Parameters

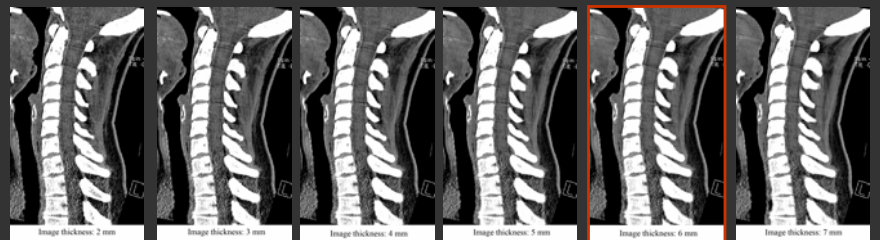
**Images:** bone algorithm, 0.6 mm thick images, interval 0.5 mm, reformatted to 1 mm thick images in 5 planes for bone evaluation. The same 0.6 mm source images are reformatted to 6 mm thick images with interval 3 mm in sagittal projection with adjusted window settings for soft tissue evaluation.

**Scan parameters:** 64 channel x 0.625 mm multislice CT; 120-140 kV, variable mAs: 60-300; pitch -1, scan duration 3 sec, radiation dose 1-3 mSv.

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