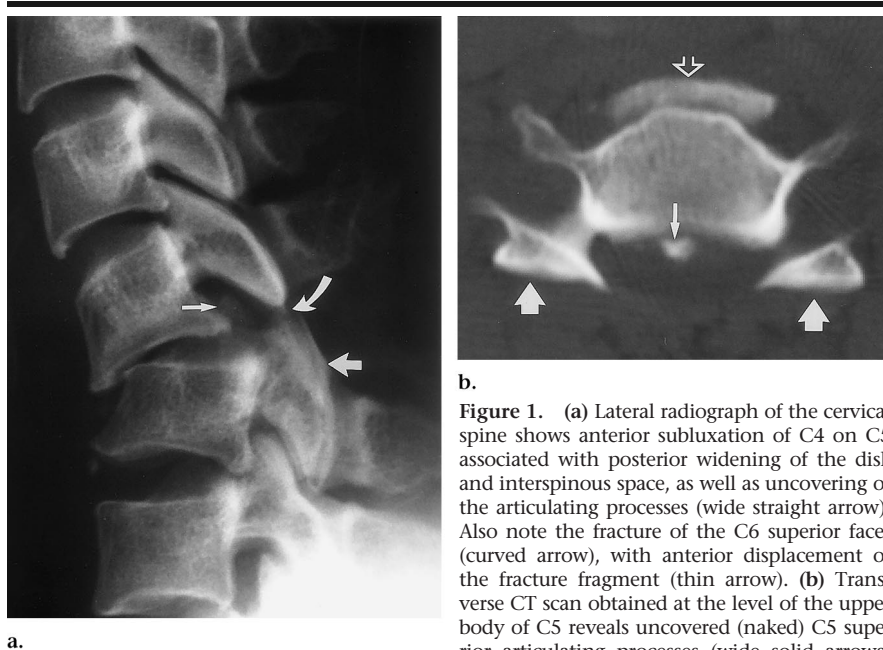


## Signs in Imaging

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# The Naked Facet Sign<sup>1</sup>



**Figure 1.** (a) Lateral radiograph of the cervical spine shows anterior subluxation of C4 on C5 associated with posterior widening of the disk and interspinous space, as well as uncovering of the articulating processes (wide straight arrow). Also note the fracture of the C6 superior facet (curved arrow), with anterior displacement of the fracture fragment (thin arrow). (b) Transverse CT scan obtained at the level of the upper body of C5 reveals uncovered (naked) C5 superior articulating processes (wide solid arrows) and a C4 anterior subluxation (open arrow). Also note the C5 posterior cortex avulsion fracture (thin solid arrow).

### APPEARANCE

The naked facet sign refers to the computed tomographic (CT) appearance of uncovered articulating processes (Fig 1) (1,2). On transverse CT scans, the involved level will reveal solitary nonarticulating facets with loss of the joint space.

#### Index terms:

Signs in Imaging  
Spine, CT, 318.1211  
Spine, dislocation, 318.421  
Spine, facet joints, 314.421  
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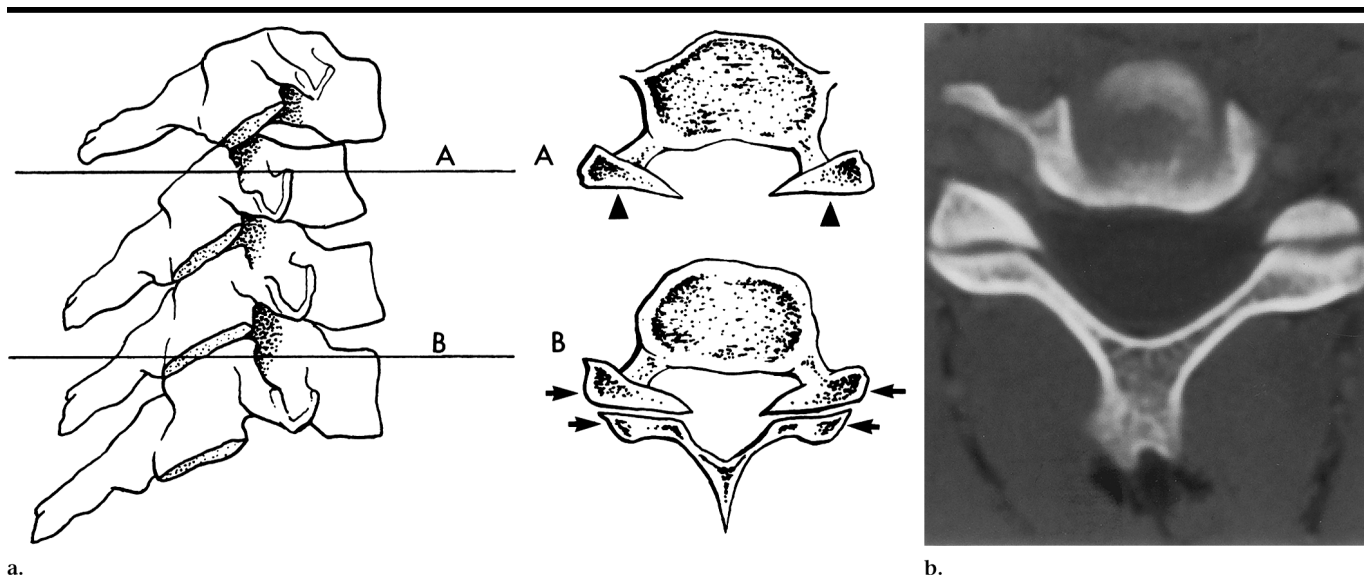
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### EXPLANATION

The facet joints (apophyseal joints) are normally symmetrically and uniformly superimposed and kept in fixed relation, with minimal physiologic movement in both flexion and extension positions. The supraspinous and interspinous ligaments, the ligamentum flavum, and the facet joint capsule maintain this anatomic relation. The anterior and posterior longitudinal ligaments mainly maintain the vertebral body alignment; they may also play an indirect role in facet joint stability (3). In severe flexion-distraction injury of the spine, disruption of these ligamentous structures occurs with or without fractures. This results in anterior subluxation of the vertebra, with widening of the facet joints and uncovering of the articulating processes. The superior and inferior articulating facets lie “naked.”

A trainee (resident or fellow) wishing to submit a manuscript for Signs in Imaging should first write to the Editor for approval of the sign to be prepared, to avoid duplicate preparation of the same sign.



**Figure 2.** (a) Schematic representation of perched facets resulting in the CT naked facet sign (level A), in comparison with normal facet alignment (level B). Normal articulating processes are indicated by arrows, while naked facets are indicated by arrowheads. (b) Normal articulating processes at facet joints at C4 through C5 (in a different patient). Compare this image with the diagram in a.

## DISCUSSION

Since conventional radiography remains the main and first-line modality in investigating spinal injury, one must be familiar with the various conventional radiographic signs of spinal injury. Green et al (3) have listed the radiographic signs of flexion injury in order from the most common to the least common. The findings include localized hyperkyphosis, anterior subluxation of the vertebra, widening of the disk space posteriorly, wedge fracture of the anterosuperior portion of the vertebra below, distraction of the facet joints, and fanning of the spinous processes. The recognition of these radiographic findings is crucial for early diagnosis, since delayed instability is the most common (20%) and clinically substantial complication following flexion injuries.

Transverse CT imaging with sagittal and coronal reconstruction offers a comprehensive demonstration of osseous and soft-tissue injuries, with accurate depiction of both the anterior and posterior elements of the vertebrae, the vertebral element alignment, and the degree of spinal canal compromise (4). Anterior subluxation of vertebral bodies usually occurs as a result of an excessive flexion force that causes disruption of the ligamentous complex that stabilizes the facet joint. Consequently, the superior vertebra undergoes forward subluxation, with anterior displacement of the corresponding inferior articulating facet on the superior articulating facet of the vertebra below. This results in uncovering of the articulating facet surfaces (Fig 2). The degree of facet uncovering could be partial (subluxed facets) or complete (perched facets). Further flexion forces can transform perched facets into a facet lock. In such situations, the transverse CT image will reveal the reversed relation between the facet joints where the inferior facets of the vertebra above are displaced anterior to the superior facet of the vertebra below (back-to-back apposition). A lateral radiograph of the spine will reveal the reversed relation of the facet joints and an anterior subluxation of more than 50% of the superior vertebral body.

The naked facet sign was originally used in the setting of flexion fracture of the thoracolumbar junction, with distract-

tion of the lower thoracic facets (1). Despite the differences in the normal facet alignment between the thoracolumbar junction and the cervical spine, the use of this sign has been extended to the evaluation of cervical vertebrae that undergo facet uncovering due to similar mechanisms (2,5).

Study findings by Yetkin et al (6) suggest a correlation between the presence of facet distraction and facet fracture or lock at the same or adjacent level. These are often associated with a rotational element, particularly if the mechanism of injury is a unilateral process. It has been previously reported (7) that 73% of unilateral facet dislocations are associated with fractures of the involved articular processes. This is crucial for patient care, since it implies spinal instability (5). Facet dislocation with the presence or absence of fracture is best evaluated by using thin-section helical CT with two-dimensional reconstruction.

In summary, the naked facet sign is a characteristic CT finding of flexion-distraction injury of the spine and indicates severe ligamentous disruption and spinal instability.

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## References

- O'Callaghan JP, Ullrich CG, Yuan HA, Kieffer SA. CT of facet distraction in flexion injuries of the thoracolumbar spine: the "naked" facet. *AJNR Am J Neuroradiol* 1980; 1:97-102.
- Castillo M, Harris JH Jr. *Imaging of the spine: a teaching file*. Baltimore, Md: Williams & Wilkins, 1998; 203-204.
- Green JD, Harle TS, Harris JH Jr. Anterior subluxation of the cervical spine: hyperflexion sprain. *AJNR Am J Neuroradiol* 1981; 2:243-250.
- Gellad FE, Levine AM, Joslyn JN, Edwards CC, Bosse M. Pure thoracolumbar facet dislocation: clinical features and CT appearance. *Radiology* 1986; 161:505-508.
- Harris JH Jr, Mirvis SE. *The radiology of acute cervical spine trauma*. 3rd ed. Baltimore, Md: Williams & Wilkins, 1996; 290-319.
- Yetkin Z, Osborn AG, Giles DS, Houghton VM. Uncovertebral and facet joint dislocation in cervical articular pillar fractures: CT evaluation. *AJNR Am J Neuroradiol* 1985; 6:633-637.
- Shanmubanathan K, Mirvis SE, Levine AM. Rotational injury of cervical facets: CT analysis of fracture patterns with implications for management and neurologic outcome. *AJR Am J Roentgenol* 1994; 163:1165-1169.