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AJNR Am J Neuroradiol 1984, 5 (3) 331-332

<http://www.ajnr.org/content/5/3/331.citation>

This information is current as
of August 8, 2025.

C2 "Target": Composite Shadow

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Cervical spine radiographs are crowded with superimposed bony and soft-tissue structures that make interpretation difficult. In addition, there are many anatomic and projectional variants that have been described [1-6]. Knowledge of them is essential to distinguish the normal from the pathologic. We illustrate another pseudolesion, the C2 "target," and provide a radiologic description and anatomic explanation. The incidence of this finding in 100 consecutive lateral cervical spine radiographs is reported.

Case Report

A 20-year-old woman was evaluated after 10 days of pain in her cervical spine, which followed a whiplash injury sustained in an automobile accident. Physical examination revealed minor neck stiffness without neurologic deficit. On the lateral radiograph of the cervical spine, a sharply defined, round radiolucency was seen overlying the posterior part of the body of C2. It was bordered by a fine sclerotic rim and contained a central punctate density (fig. 1A). These features could suggest the diagnosis of an osteoid osteoma.

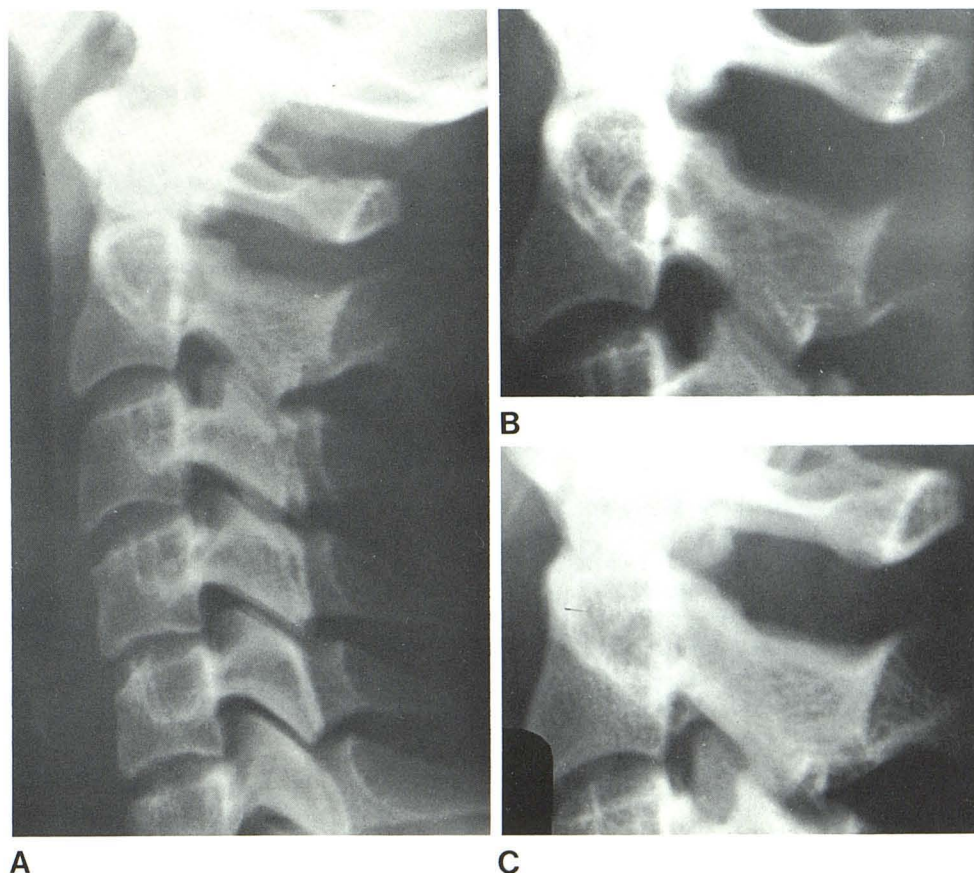


Fig. 1.—A, Lateral cervical spine film. Rounded lucency with sclerotic borders and punctate central hyperdensity projects over posterior part of body of C2. B, Fluoroscopic lateral view, 5° caudad tube angulation. Target image is well outlined. C, 5° cephalad tube angulation. Image has disappeared.

Received December 2, 1982; accepted after revision March 7, 1983

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AJNR 5:331-332, May/June 1984 0195-6108/84/0503-0331 \$00.00 © American Roentgen Ray Society

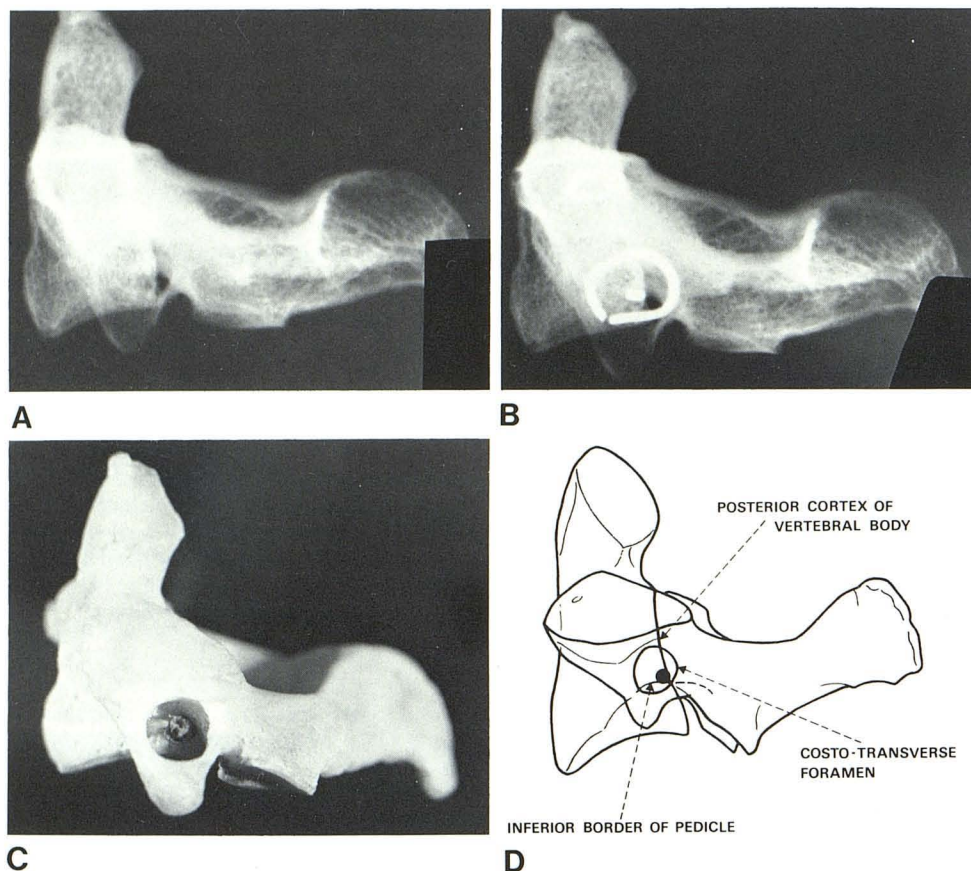


Fig. 2.—Specimen study. A, Typical C2 target appearance reproduced. B, Costotransverse foramen and ipsilateral inferior border of pedicle have been marked with metallic wire. C, Photograph of specimen. Marker outlines inferior border of pedicle. D, Schematic drawing of lateral view of C2, showing costotransverse foramen through which projects junction of inferior border of pedicle with posterior cortex of body of C2.

Because the patient was asymptomatic before the acute traumatic episode, it was believed that the lesion might be a previously undescribed normal projectional variant. However, the investigation was pursued to study this region. Conventional and computed tomography failed to reveal any abnormality. The patient refused a technetium bone scan. The area was studied under fluoroscopy, and the unknown image was present or absent with slight cephalad and caudad tube angulation (figs. 1B and 1C).

Discussion

This initial case stimulated our interest, and we scrutinized 100 consecutive cervical spine radiographs to determine the incidence of the C2 target shadow. We then undertook a specimen study on dry skeletons to demonstrate what produces this composite image.

The 100 patients whose radiographs were studied were distributed equally between genders. They were 15–86 years old (mean, 44). The target composite shadow was found in nine patients, six men and three women with a mean age of 40 years and range of 19–65.

The C2 target image discovered on the lateral cervical spine film of our initial patient (fig. 1A) led to further investigation to eliminate an osteoid osteoma. At fluoroscopy, slight caudad tube angulation reproduced this image (fig. 1B), which disappeared with cephalad angulation (fig. 1C).

From our specimen study, the C2 target was determined to be a projectional variant formed by a composite image

(figs. 2A–2C). On a true lateral view, the target image was not seen; with a slight cephalad tilt of the vertebra the pseudolesion appeared. The sharply defined, round radiolucency bordered by a sclerotic rim represented a costotransverse foramen. The central punctate density was from the ipsilateral inferior border of the pedicle overlapping the posterior cortex of the body of C2 (fig. 2D). This projectional composite shadow was seen in nine of 100 consecutive cervical spine films subsequently reviewed. Knowledge of this anatomic feature prevents an erroneous diagnosis or an unwarranted radiologic investigation.

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