

Incidental findings of skull-base abnormalities in cone-beam computed tomography scans with consultation by maxillofacial radiologists

Zubad A. Newaz,^a Sevin Barghan,^b Rujuta A. Katkar,^c Jeffrey A. Bennett,^d and Madhu K. Nair^e
Gainesville, Fla

Introduction: Cone-beam computed tomography (CBCT) gives orthodontists and other dental clinicians 3-dimensional information for planning treatment in the craniofacial region. Often overlooked are incidental findings outside the treatment region of interest. **Methods:** Two patients with incidental findings of skull-base abnormalities are presented. The orthodontic patient was tentatively diagnosed with a notochordal remnant in the clivus; the implant patient exhibited an empty sella turcica. **Results:** For the clivus lesion in the orthodontic patient, an artifact was ruled out after a second CBCT image and further distinguished from a fat-containing tumor after magnetic resonance imaging. The impression after magnetic resonance imaging was a notochordal remnant, although chordoma was also included in the differential, warranting a 6-month follow-up magnetic resonance image to confirm the diagnosis. The CBCT study for the implant patient demonstrated an enlarged sella turcica. The impression after the magnetic resonance imaging was an enlarged and partially empty sella with no evidence of a pituitary mass. **Conclusions:** Orthodontists and implant surgeons may come across incidental findings outside their area of expertise on CBCT scans, highlighting the importance of appropriate consultation with maxillofacial radiologists. Notochordal remnants may present as nonexpansile intraosseous low-density areas. The challenge in distinguishing these lesions radiographically with chordomas warrants follow-up to confirm a diagnosis. An empty sella is a noteworthy finding because of its potential for endocrine and neuro-ophthalmological disorders despite an asymptomatic presentation. (*Am J Orthod Dentofacial Orthop* 2015;147:127-31)

Cone-beam computed tomography (CBCT) is increasingly used by orthodontists and other dental practitioners. It provides volumetric information that is otherwise unavailable in standard

radiographs. This aids in making accurate orthodontic diagnoses in 3 planes of space¹ and provides localization of vital structures during other dental and surgical procedures.² However, CBCT scans typically cover a field of view larger than the practitioner's area of expertise. This leads to the possibility of overlooking incidental findings outside these regions of interest, even though the practitioner is responsible for evaluating the entire volume for pathology.³⁻⁶ Such findings may be significant and warrant further investigation. The literature has reported that about 25% of CBCT images taken for orthodontics and other dental purposes show incidental findings.⁷ Another study reports 701 "reportable" findings in 381 CBCT scans.⁸

In medical radiology, the most common reason for malpractice litigation is missed lesions.⁹ Coupled with the frequency of incidental findings on CBCT volumes, this becomes an important consideration for the clinician. A study evaluating the efficacy of identification of maxillofacial lesions by orthodontists and orthodontic residents concluded with the recommendation that

^aResident, Division of Radiology, Department of Oral and Maxillofacial Diagnostic Sciences, College of Dentistry, University of Florida, Gainesville, Fla.

^bResident, Division of Radiology, Department of Oral and Maxillofacial Diagnostic Sciences, College of Dentistry, University of Florida, Gainesville, Fla.

^cClinical assistant professor, Division of Radiology, Department of Oral and Maxillofacial Diagnostic Sciences, College of Dentistry, University of Florida, Gainesville, Fla.

^dAssociate professor, Division of Neuroradiology, Department of Radiology, College of Medicine, University of Florida, Gainesville, Fla.

^eChairman and professor, Division of Radiology, Department of Oral and Maxillofacial Diagnostic Sciences, College of Dentistry, University of Florida, Gainesville, Fla.

All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest, and none were reported.

Address correspondence to: Zubad A. Newaz, 1395 Center Dr, Room D8-22, Gainesville, FL 32610; e-mail, newazz@gmail.com.

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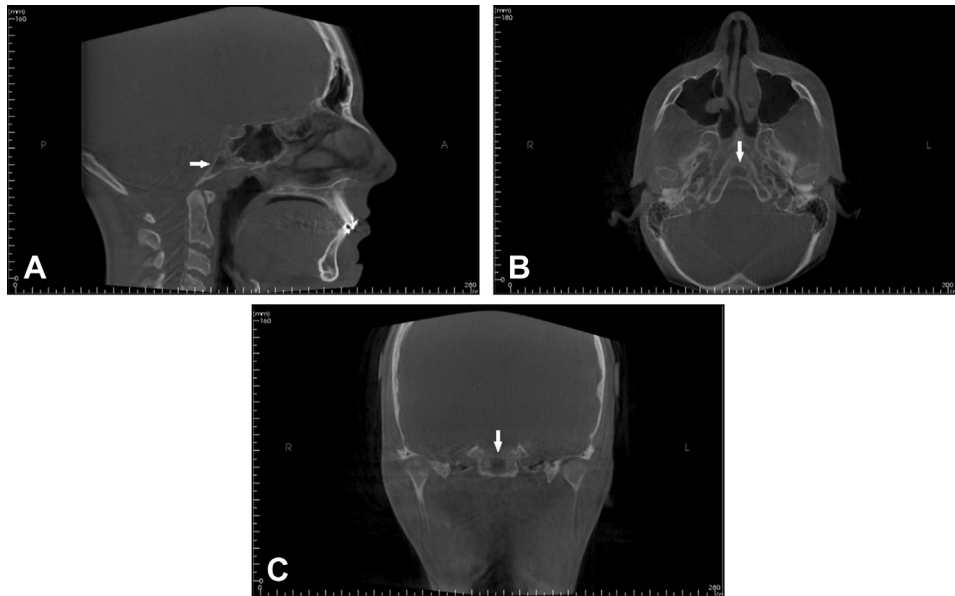


Fig 1. Patient 1: CBCT images of **A**, axial; **B**, sagittal; and **C**, coronal views showing low-attenuation area in the center of the clivus (*arrows*).

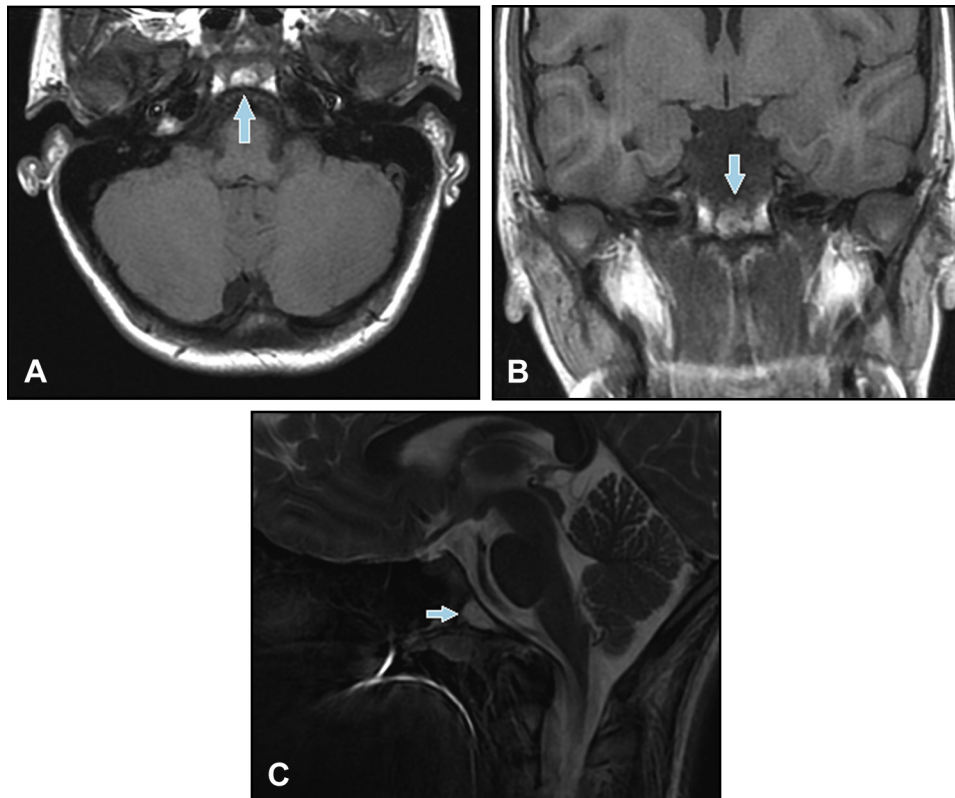


Fig 2. Patient 1: **A**, axial gadolinium-enhanced T1-weighted magnetic resonance image; **B**, coronal noncontrast T1-weighted magnetic resonance image; **C**, sagittal T2-weighted magnetic resonance image. These images show an enhancing region (*bright signal*) in the clivus area as depicted by the *arrows*. This corresponds to the low-attenuation area in the clivus in the CBCT images in Figure 1.

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