TECHNICAL REPORT

Odontoid fracture depicted on a panoramic radiograph

¹Galal Omami and ²Craig S Miller

¹Department of Oral Health Practice, Division Oral Diagnosis, Oral Medicine, Oral Radiology, University of Kentucky College of Dentistry, Lexington, KY, USA; ²Department of Oral Health Practice, Division Oral Diagnosis, Oral Medicine, Oral Radiology, University of Kentucky College of Dentistry, Lexington, KY, USA

A traumatic odontoid fracture was depicted incidentally on a panoramic radiograph of a 73-year-old male patient. This brief note sheds light on the importance of following a systematic visual interrogation of panoramic radiographs, ensuring all anatomic structures are carefully assessed and incidental findings are not overlooked.

Dentomaxillofacial Radiology (2018) 47, 20180060. doi: [10.1259/dmfr.20180060](https://doi.org/10.1259/dmfr.20180060)

Cite this article as: Omami G, Miller CS. Odontoid fracture depicted on a panoramic radiograph. *Dentomaxillofac Radiol* 2018; 47: 20180060.

Keywords: panoramic; odontoid; fracture; diagnosis

A 73-year-old male patient presented to the dental clinic for post-operative implant assessment. The past medical history was remarkable for hypertension, rheumatoid arthritis and multiple joint replacements (both hips and one shoulder). During the interview, the patient reported a history of falling 3 months prior. Radiographic interpretation of the panoramic image incidentally depicted a lytic lesion on the body of the second cervical vertebra (Figure 1). The cone-beam CT examination revealed an odontoid fracture with posterior displacement (Figure 2). The patient was referred to a neurosurgeon for further evaluation and management. The final diagnosis was an old odontoid fracture with fibrous non-union. Recent follow-up cervical-spine radiographs showed no change in status. The patient was not deemed a candidate for occipitocervical fusion surgery.

Although the panoramic radiograph is generally obtained to evaluate the teeth and jaws, the panoramic image provides significant diagnostic information regarding head and neck anatomy and health. As such, panoramic radiographs should be routinely evaluated for possible pathology and for anatomic variants that might simulate disease.¹ It is not sufficient to limit the interpretation to the area of interest. To ensure that all anatomic structures are assessed, a systematic approach should be used for the visual interrogation of the panoramic image.² The following steps are an example of a methodical approach to analysing the complex

Figure 1 Panoramic radiograph shows lytic lesion of the second cervical vertebra (arrows).

Figure 2 Sagittal cone-beam CT images show displaced fracture of the odontoid process (arrow).

Figure 3 A systematic visual reference for the analysis of panoramic radiographs. There are three zones in the midline and three bilateral zones.

projection of the anatomic structures on a panoramic radiograph (Figure 3):

Step 1. Evaluate the teeth and the supporting alveolar bone.

Step 2. Evaluate the sinonasal cavity. Identify the nasal cavity (turbinates), maxillary sinuses, pterygomaxillary fissures, orbit, and zygomatic complex.

Step 3. Evaluate the mandible. Follow the cortical outline and the trabecular pattern and density of the entire mandible.

Step 4. Evaluate the temporomandibular joints. Evaluate the morphology and cortication pattern of all the articulating surfaces of the temporomandibular joints.

Step 5. Shadows of other structures that can be superimposed over the mandibular ramal areas including pharyngeal airway shadow, posterior wall of the pharynx, soft palate, dorsum of the tongue, styloid processes and cervical vertebrae.

Step 6. Assess soft tissues of the neck and hyoid bone.

Odontoid fracture is the most common type of cervical spine fractures, accounting for up to 15% of all cervical spine injuries.³ However, the frequency of odontoid fracture increases with age. In the elderly, the mechanism of injury is low energy trauma (*e.g.* falling from a standing position), which explains the delayed diagnosis. However, complications following upper cervical spine trauma are frequent regardless of the type of treatment.³

In conclusion, this brief note outlines an algorithm to examining panoramic radiographs, which is recommended to ensure that all anatomical structures are carefully assessed and incidental findings are not overlooked.

Informed consent

Written informed consent for the case to be published (including images, case history and data) was obtained from the patient for publication of this article, including accompanying images.

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