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# Emergent panoramic artefact in dental radiology Footprint of Covid19 pandemic

**Koketso Tshite**

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MAXILLOFACIAL RADIOLOGY

# Emergent panoramic artefact in dental radiology: Footprint of Covid-19 pandemic

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**K Tshite**[1]

## CASE

The following patient was referred for a panoramic radiograph for post-operative assessment, following extractions, after which a foreign body was noted below the mandible.

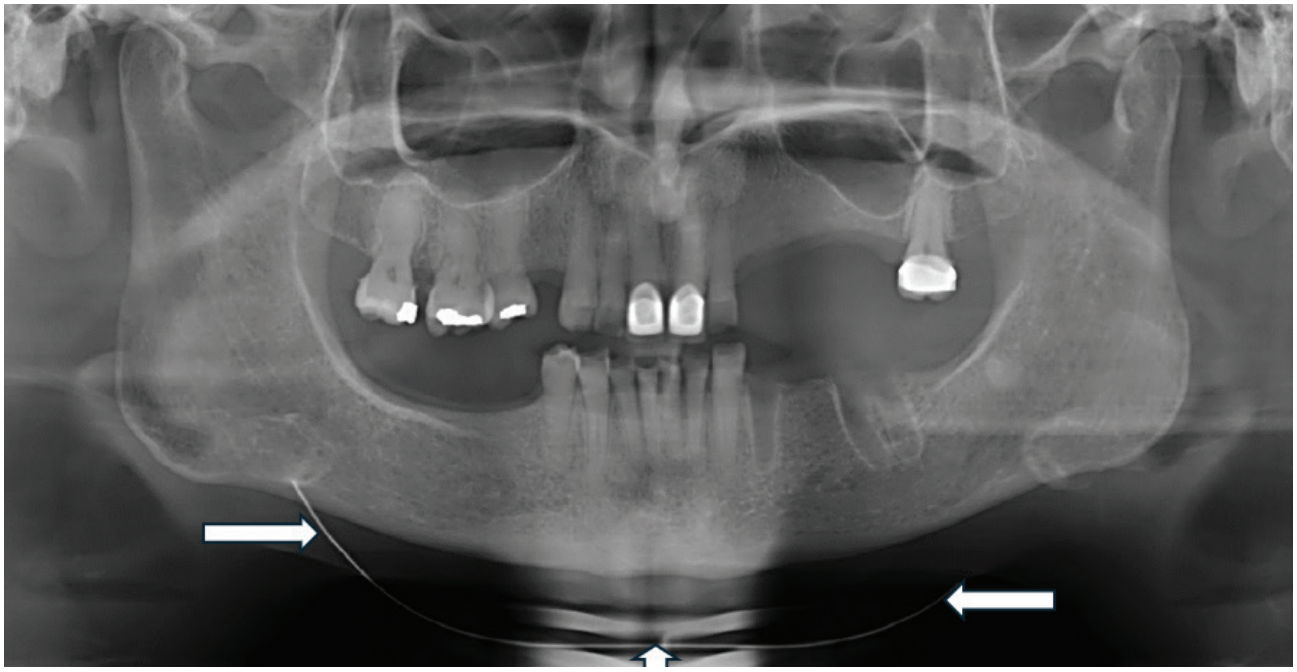


**Figure 1:** A panoramic radiograph taken of a patient wearing a face mask positioned below the mandible.

## INTERPRETATION

The unprecedented educational challenges presented by the Covid-19 pandemic continue to offer opportunities to update, improve and strengthen the dental curriculum. Intra-oral radiographic methods were restricted during the Covid-19 pandemic due to their aerosol-generating nature, which resulted in extra-oral radiographs being predominantly used.[1] The strict usage of face masks during the pandemic, which continues to date, emerged a new patient preparation error in dental radiology.

**Authors' information**
1. Dr Koketso Tshite, *UDOH, BDT, BDS, MSc* Dentistry (Maxillofacial and Oral Radiology), Masters in Health Sciences Education, General Dental Practice Department (Radiology Unit), School of Oral Health Sciences, University of the Witwatersrand, Johannesburg, South Africa. ORCID: 0000-0002-6634-2957

**Corresponding author**
Name: Dr Koketso Tshite
Email: Koketso.tshite@wits.ac.za

**Author's contribution**
Dr Koketso Tshite Primary author – 100%

As seen in figure 1, a panoramic radiograph taken on a patient who did not completely remove the face mask resulted in a thin radiopaque line below the body of the mandible.

Panoramic radiography is a complex projection of the jaws with multiple superimpositions and distortions of anatomical structures, which may be exacerbated by technical errors in image acquisition.[2] It forms part of the tools that are used for general assessment during dental examination.[3] One of its key features is the ability to scan broader anatomical regions with a relatively low radiation dose, including several structures beyond the jaws.[2,4] Panoramic radiography plays a vital role in diagnosis, decision-making and treatment planning; however, structures outside the jaws, incorporated in the final image, may create challenges in radiographic interpretation.[2,4,5] Furthermore, like other imaging methods, a panoramic radiograph is also prone to have low resolution as a result of different factors and situations, such as patient-related issues.[6] These factors are highlighted during clinical training because they may complicate image interpretation.

Dental students are taught about the principles of tomographic movement, emphasising the centre of rotation and all the structures within the focal trough, which appear in

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the final image.[7,8] Although this is not the focus of the paper, students are also taught about the limitations of a panoramic radiograph, particularly its 2-dimensional (2D) representation of 3-dimensional (3D) structures.[3] Due to this limitation, the bucco-lingual extensions of structures cannot be properly assessed. Therefore, a full understanding of image acquisition including its limitations is important.

There are general requirements that are common to all machines, which include *patient preparation, equipment preparation* and *patient positioning.*[7] These requirements are mandatory to ensure quality radiographs of good diagnostic value. Dental radiology textbooks published before the Covid-19 pandemic only state that patients should remove jewellery such as earrings, hairpins, spectacles and dentures before taking panoramic radiographs. When asked to remove face masks before taking a panoramic radiograph, patients usually pull the masks down below the mandible, with the elastic loops still around the ears, resulting in a radiopaque artefact in the final image. These errors usually do not have major impacts on diagnosis, but for updated teaching and training, and to produce high-quality radiographs, students must be taught how to prevent them. Students depend mostly on prescribed textbooks for studying. If some elements or concepts are not covered in them, it unfortunately creates gaps in knowledge.

It is our duty as educators to update the modules in the curriculum to fill these gaps. The purpose of this paper is to revisit and update patient preparation protocols in dental radiology. The metal component in the face masks has been added to the list of patient preparation errors. To optimise learning, copies of radiographs of patients wearing face masks are kept in our radiology unit. They are used in teaching and training, as a supplement to the current prescribed textbooks.

## AUTHORS' DECLARATION

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### Conflict of interest

The authors declare that they have no conflict of interest.

### Ethics approval

This study was approved by the University of the Witwatersrand Human Research Ethics Committee (Reference no: M240764). All procedures followed the ethical standards of the Helsinki Declaration of 1975, as revised in 2008.

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