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Face Mask Metal Nosepiece Artifact on Various Extraoral Radiologic Imaging Examinations Associated with the Covid-19 Pandemic

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We read with great interest the letter to the editor by Fontenele and colleagues regarding metallic face mask artifacts on panoramic radiography (1). The novel coronavirus (COVID-19) associated with the SARS-CoV-2 virus has necessitated the implementation of an array of strict infection control countermeasures, particularly with face masks and shields to reduce aerosolized viral exposure (2,3). Most face masks contain a metallic nosepiece that creates a tighter seal at the bridge of the nose, minimizing inhalation of airborne pathogens and their transmission. Traditionally, patients remove their face covering immediately prior to radiologic assessment. There is limited information in the literature regarding the generation of metallic nosepiece artifacts from conventionally-placed face masks worn during oral and maxillofacial radiologic imaging since the emergence of the current pandemic (1,4,5). However, radiologic artifacts from face masks repositioned below the patient's mouth has not been reported. The objective of this article is alert clinicians that this relocation of a face mask during radiologic examination may be insufficient to prevent artifact formation. To illustrate this anomalous finding, presentations of face masks inadvertently worn during various radiologic imaging studies have been provided, including panoramic radiographs, lateral cephalograms, and from a series of cone beam computed tomography (CBCT) projections.

Panoramic radiograph metallic nosepiece artifacts may appear as a smooth V-shaped radiopaque structures that have not been adapted to the patient's nose (Fig 1a). Another variant is attributed to the adaption of the nosepiece to conform to the patient's nasal bridge, resulting in a wavy radiopaque structure (Fig 1b). The panoramic radiographic image may demonstrate bilateral brighter, sharper linear structures that depict the ends of the actual nosepiece, whereas more blurred and slightly superior linear images represent ghost images (Fig 1c).

Lateral cephalogram metallic nosepiece artifacts may appear as 2 closely parallel linear metallic structures anterior to the cervical vertebrae (Fig 2a) or the nosepiece may demonstrate a V-shaped radiopacity anterior to the cervical vertebrae (Fig 2b).

Cone beam computed tomography metallic nosepiece artifacts may appear on reconstructed panoramic radiographic views as bilateral hyperdense structures (Fig 3a). A coronal view may display bilateral hyperdensities, with radiating streaks representing x-ray scatter and beam hardening

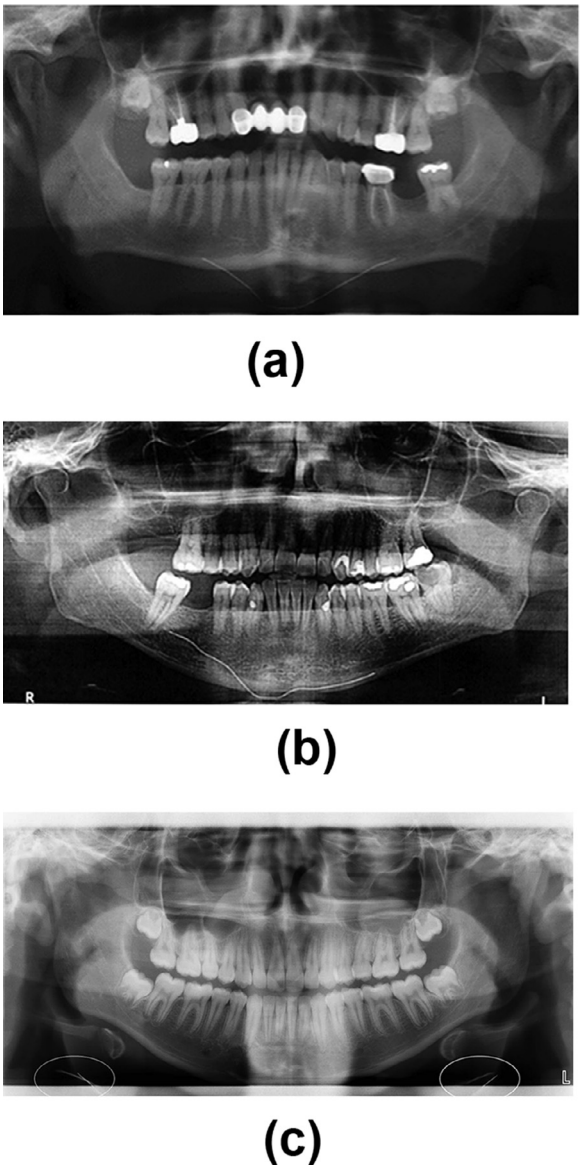

Figure 1. Panoramic radiographs taken with face mask repositioned below the patient's mouth. (a) Variant 1. V-nosepiece. (b) Variant 2. Nosepiece conforming to shape of nose. (C) Variant 3. Nosepiece appearing as bilateral linear objects with contralateral ghost images below the hyoid bone (encircled objects).

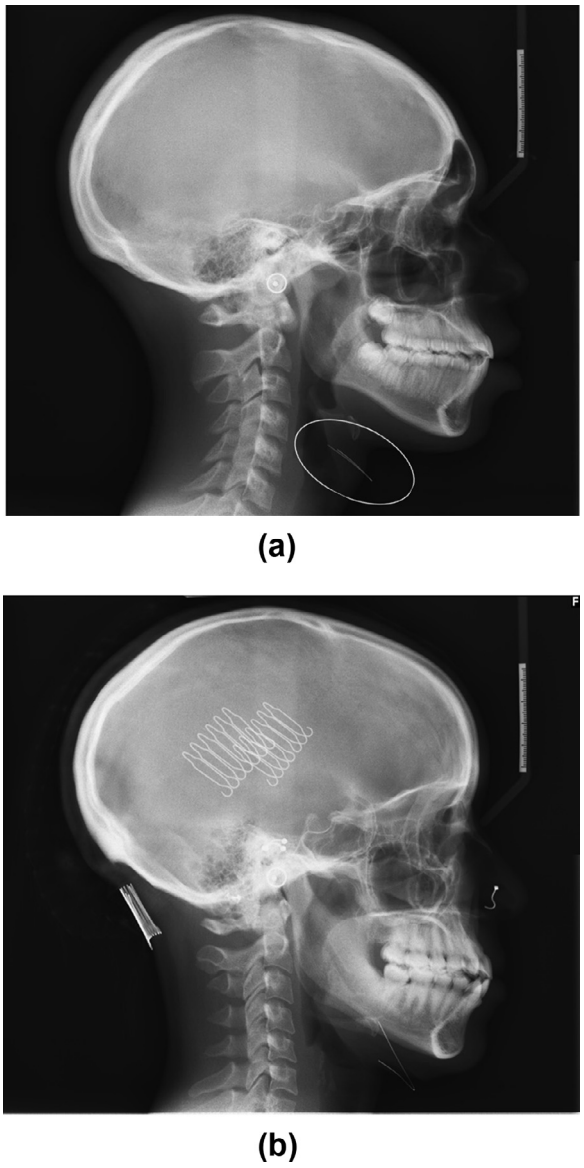

Figure 2. Lateral cephalograms taken with face mask repositioned below the patient's mouth. (a) Variant 1. Two closely parallel linear metallic structures below hyoid bone and anterior to cervical vertebrae. (b) Variant 2. V-shaped radiopacity, anterior to cervical vertebrae. Also evident were 3 wig clips and 1 nasal piercing.

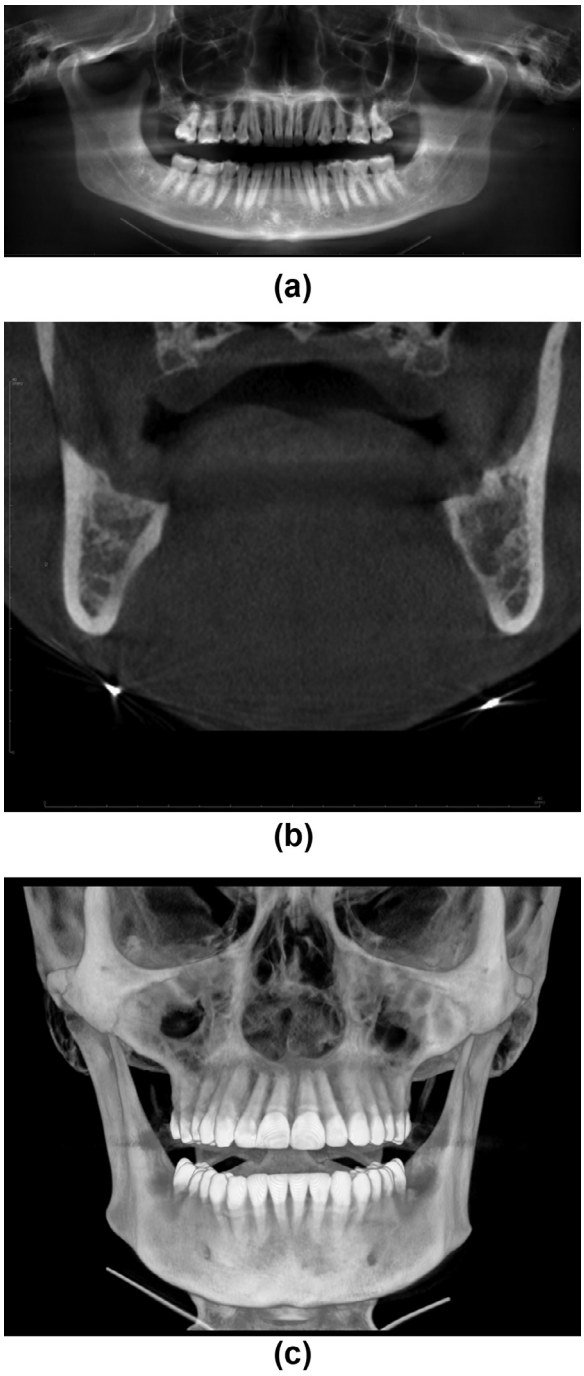

Figure 3. Cone beam computed tomography images with face mask repositioned below the patient's mouth. (a) Reconstructed panoramic view with bilateral hyperdense structures. (b) Coronal view with bilateral hyperdensities concurrent with radiating streaks attributed to-ray scatter and beam hardening. (c) Volumetric view with bilateral hyperdense structures representing the ends of the nosepiece.

(Fig 3b). The volumetric view may demonstrate bilateral hyperdense structures below the body of the mandible (Fig 3c).

Most commercially available face masks contain an aluminum nosepiece strip, approximately 12 cm in length. Repositioning the patient's face mask below their mouth may not be sufficient to prevent part or most of the face mask from appearing as linear radiopaque structures within the field of view, and may possibly resemble broken surgical needles, other embedded foreign bodies, wig clips, and adornments of the head and neck. The propagation of ghost images from face masks worn during panoramic radiography may create a diagnostic challenge(6). and as seen in (Fig 1c). Similarly, the removal of facial jewelry and other metal objects during imaging is advocated to lessen the incidence of artifact formation (7). In addition, the donning of a face mask during CBCT scans may lead to radiating streaks from x-ray scatter and beam hardening that could impede interpretation. It is also important to not wear metallic objects when undergoing

magnetic resonance imaging to prevent radiofrequency-induced cutaneous burns. Metal-free face masks are now commercially available for radiologic surveys. Due to the ongoing surge of the SARS-CoV-2 coronavirus (COVID-19) pandemic, healthcare practitioners should continue to engage in protective efforts to minimize disease acquisition and transmission. When procurement of metal-free masks is not readily obtainable, providers should consider modifying the mask by removing the metal nasal strip and apply tape over the patient's bridge of the nose to enhance the mask fit in preparation for radiologic imaging. In conclusion, the use of metal-free face masks may reduce the risk of extraoral radiologic artifact formation within the oral and maxillofacial region and possibly avoid the need for repeat imaging studies.

CONFLICT OF INTEREST

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