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Is it Possible to Obtain Extraoral X-Ray Images of Patients Wearing Face Masks? A New Infection Control Measure During the COVID-19 Pandemic

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Although several types of vaccines for the coronavirus disease 2019 (COVID-19) are already available, their distribution is not equal around the world, with most of the doses concentrated in a relatively small number of countries (1). The association between the rapid increase of COVID-19 cases and the low rate of vaccination in some countries favors virus mutations, with the emergence of virus variants, which accelerate the spread of the virus and its resistance to treatments and currently available vaccines (2).

The oral radiology centers are considered environments of risk for SARS-CoV2 cross contamination due to transmission through direct or indirect contact with oral secretions containing viral particles (3,4). An alternative to reduce this risk of contamination is to use extraoral rather than intraoral examination techniques whenever possible. (4,5).

Recently published guidelines on measures to perform extraoral examinations in oral radiology centers during the COVID-19 pandemic suggest that patients diagnosed with COVID-19 and those with suspected COVID-19 wear a face mask during these imaging examinations (5,6). Accordingly, a chin rest must be used instead of a bite block and the canine prominence must be used as reference to correctly position the patient's head. However, since many individuals infected with SARS-CoV2 are asymptomatic or have mild symptoms similar to those of seasonal flu, all patients should wear a face mask (3,4).

Because most of the face masks include a nose wire with metal components, it is advisable to remove it from the mask before image acquisition to avoid the superposition of its image on the nasal cavity and maxilla. Figure 1 shows panoramic radiographs of an anthropomorphic phantom covered with a soft tissue simulator (Mix-D) (7) acquired with the use of a face mask with the nose wire (Fig 1a) and with the use of a face mask without the nose wire (Fig 1b). Also, one may assume that the presence of a nose metal wire during cone-beam computed tomography (CBCT) acquisition can lead to the generation of metal artifacts, which may decrease image quality. Figure 2 shows sagittal images of CBCT of an anthropomorphic phantom acquired under the same conditions as the panoramic radiographs. Subjectively, the quality of both types of extraoral images is unaffected by the face mask without the nose wire. However, imaging professionals should be aware that the effect of the nose wire may vary according to the thickness of the metal. Another option for developing countries, where access to surgical face masks may be limited, is the use of cloth masks.

Importantly, the acquisition of extraoral examinations with the patient wearing a face mask requires extra positioning adjustments (Fig 3). As previously explained, the bite block must be replaced with the chin rest to acquire extraoral images from edentulous patients. It is also essential to place protective barriers on surfaces that will be in contact with the patient. After positioning the patient's chin on the chin rest, the professional should instruct the patient to bite a disposable item such as a wood stick to promote disocclusion and avoid the overlap of the crowns of the upper and lower teeth (Fig 4a). Then, the midsagittal plane and the patient's canine prominence, which can be palpated without the need to remove the mask, must be aligned with the laser lights of the X-ray device. The protective barriers must be removed from the device surfaces after exposure and the device must be properly disinfected in accordance with the local protocols for infection control (5,6).

Therefore, the use of a face mask without nose wire during extraoral imaging examinations may be considered a new infection control measure to control the exposure to oral

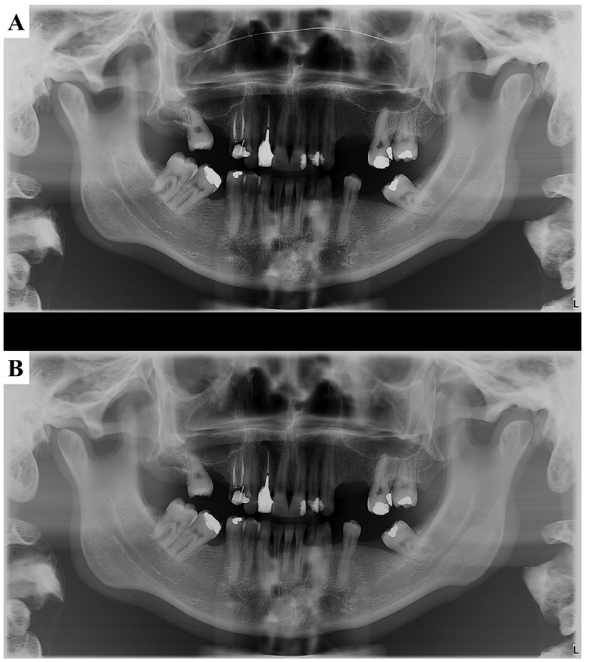

Figure 1. Panoramic radiographs of an anthropomorphic phantom covered with a soft tissue simulator (Mix-D) acquired with the use of a face mask (with nose wire) (A) and with the use of a face mask (without nose wire) (B).

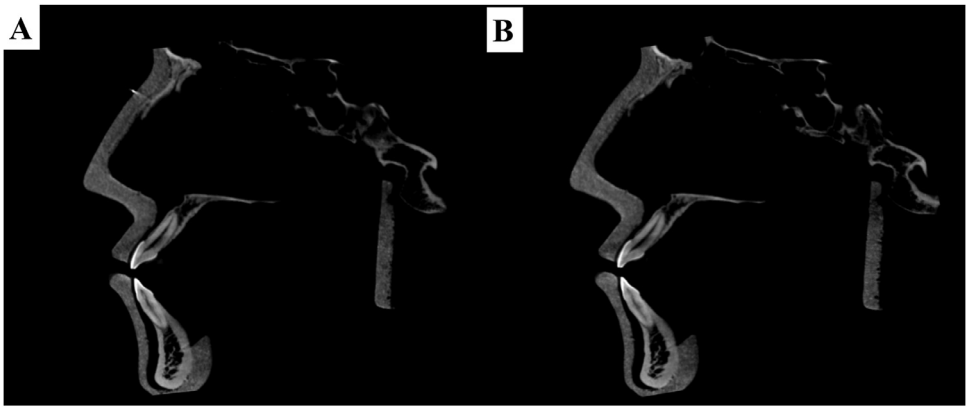

Figure 2. Sagittal images of CBCT of an anthropomorphic phantom acquired with the use of a face mask (with nose wire) (A)and with the use of a face mask (without nose wire) (B).

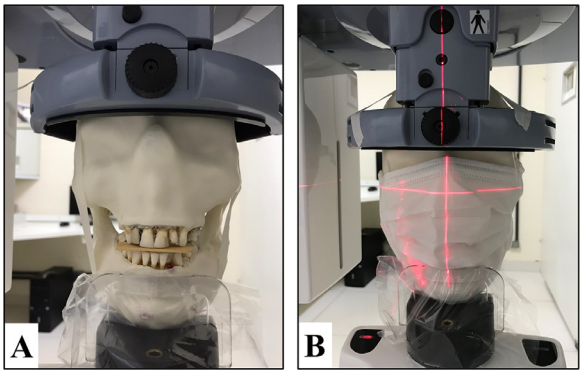

Figure 3. Positioning of the anthropomorphic phantom with a face mask on the panoramic radiography device. (A) Use of the chin rest covered with a plastic barrier and a wood stick for teeth disocclusion (the face mask was removed for better visualization). (B) Positioning of the laser lights of the panoramic device on the medial sagittal plane and canine prominence of the phantom. Color version of figure is available online.

secretions containing viral particles in oral radiology centers, preventing the contamination of professionals and patients and the spread of the COVID-19 disease.

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