Review Article

Delaying Intraoral Radiographs during the COVID-19 Pandemic: A Conundrum

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Background. The COVID-19 pandemic has made dentists very assiduous about cross-infection during dental treatment, thereby delaying dental radiographs for treatment. However, patients needing dental emergency treatment in the ongoing pandemic require relevant intra/extraroral dental radiography for adequate diagnosis and treatment planning. Methods. This article is aimed at adding to the hot debate: Is delay for intraoral radiographs justified or a possible proxy? As a narrative review, it provides an insight into the reasons for delaying intra-oral dental radiographs during in the pandemic and options of the nontraditional radiographic techniques available until the pandemic subsides. Discussion and Conclusion. Cross-contamination concerns through respiratory droplets grow while using intraoral film holders that stimulate gag reflex, coughing, saliva secretion, and if proper disinfection protocols are not applied. Since the patients’ acquiring emergency dental treatment cannot be neglected, the return-to-work guidelines by the health regulatory bodies urge to prioritize extraoral radiographic imaging techniques to curb the infection, offering the best diagnostic efficacy. The dental professionals can consider cone-beam computed tomography (CBCT) scans and sectional dental panoramic radiographs (SDPRs), followed by a risk assessment for COVID-19, a safer modality in reducing cross-contamination and assuring an innocuous environment for both patient and coworkers.

1. Introduction

The COVID-19 pandemic has been a multidimensional global crisis, increasing the need for optimal healthcare resources [1]. Most of the elective procedures in dentistry have been suspended or delayed [2, 3]. In this predica-
hot debate—whether delay for intraoral radiographs is justified?

2. Methodology

2.1. Where Precisely the Problem Begins? According to the WHO/ADA categorization of dental procedures for COVID safety, we can also grade the dental radiographs as per the need based on the same categorization. (Table 1) [6, 7]. This categorization clears the pavement to the enigma that IOPA or bitewing radiographs are the most routinely used dental radiographs and need a proxy in emergencies [8]. Aerosol-generated transmission of COVID-19 means the person-to-person transmission of the deadly virus through respiratory droplets [9, 10]. Hence, the concerns of aerosol generation during intraoral radiography by coughing or gagging induced from film holders are valid in COVID-19 infection control guidance. This includes using appropriate personal protective equipment by dental practitioners and radiography staff per World Health Organization 2020b protocol [11].

Gag is amongst the common problems associated with intraoral radiographs. The overall frequency of gagging during intraoral radiography differs significantly when the radiographs are taken by experienced radiographical workers [12]. Also, it cannot be denied that gag due to positioning of intraoral receptors in all sites is most typical in the maxillary
Thus, the prescription of intraoral radiography for selective criteria is required to be published in association with the most recent guidelines about COVID-19 pandemic infection prevention protocol [14]. Till then, an interim guidance for reducing aerosol generation due to intraoral radiography during the COVID-19 crisis should be considered [15].

### 2.2. The Alternatives to Intraoral Radiography.

Sectional dental panoramic radiographs (SDPRs) and cone-beam computed tomography (CBCT) scans have been prioritized over intraoral radiography due to the ongoing pandemic [16]. A particular crisis like unstable maxillofacial fractures, a diffuse soft-tissue bacterial infection that can compromise the patient’s airway or uncontrolled postoperative bleeding, can be attended with the multidisciplinary approach to substitute IOPA like CBCT, panoramic radiography [17].

Only interventions for dental emergencies are managed in dedicated clinics, following a formal risk assessment for COVID-19. In these interventional procedures, relevant imaging and dental intraoral radiography have been advantageous since traditional times [11]. In routine diagnosis-based imaging like oral examination, aesthetic dental procedures, restorative treatment, extraction of asymptomatic teeth, dental cleaning, replacement of missing tooth/teeth with fixed or removable prosthesis, and/or routine orthodontic visits, intraoral radiography can be advantageous in non-COVID patients [2]. Some clinicians may prefer SDPR and CBCT equipment over intraoral radiography instead of preventing aerosol productions by repeated imaging exposures for IOPAs.

**Now the question is if intraoral radiography offers the best diagnostic efficacy.** The answer is, probably, not. SDPRs are reasonable in an emergency setting, eliminating the probable gag due to intolerable intraoral films [18]. However, CBCT cannot be an alternative to intraoral radiography—mainly because of the higher radiation dose exposure that is not encouraged in routine procedures where bare minimum 2D imaging stands diagnostically acceptable [19].

### 3. Discussion

The SARS-CoV-2 virus is unfathomable and can persist for extended periods in aerosol and is potentially contagious via intraoral radiography through gagging and coughing [20]. During this unusual pandemic straw-hat, the goal is to keep dental radiography simple to minimize staff-to-patient contact with qualitative diagnostic radiographs. Various healthcare international bodies have advocated sectional (SDPRs) or full-width dental panoramic radiography (OPG) or CBCT to be the first line of imaging [21, 22], adequate for managing patients in acute settings considering emergency interventional strategy-based dental treatment.

It may be pretentious to mention that intraoral radiographs, if required, can be taken with caution due to the potential of patient aerosol production from coughing, gagging, retching, or vomiting by film holders (even in COVID-19 negative cases) [22, 23]. However, various constraints were...
imposed on dental practice during the COVID-19 era, limiting
the unrestricted use of intraoral radiography and encouraging
different technologies, like SDPRs and CBCT. This will allow
dental practitioners to accomplish corresponding intraoral
radiography goals without aerosol generation [24].

Under cautions of the COVID-19 pandemic, we have
proposed a broad overview summarized in an algorithm that
compares the strengths, limitations, and radiation burdens
of intraoral radiography, SDPR, and CBCT (Figure 1). It is
significant to mention that intraoral radiography in dentistry
is compromised by COVID-19 attributing to review other
radiographic technologies [25]; this will emphasize thorough
clinical examination and history taking. In intraoral radiog-
raphy, some literature-based evidence advocates bitewings
that detect mainly proximal caries, swellings, or tumours
[26]. These can be solely revealed via diagnostic observa-
tions, and the clinical management decisions for a nonca-
vitated lesion to treat nonoperatively need to be handled
in COVID negative cases. In a cavitated lesion, intraopera-
tive interventions can rely on a visual-tactile method
through superior strategy, resulting in appropriate clinical
management [27]. A multidisciplinary approach—an oral
radiologist, working closely with the maxillofacial surgeon/o-
cologist/oral pathologist—radiologist, working closely with the maxillofacial surgeon/oncologist/oral pathologist—is essential to maximize the
chances for definitive diagnosis and minimize potential comp-
ications in biopsy procedures for tumour cases. Due to high
soft-tissue resolution, CBCT offers a noninvasive delineation
of soft tissues with high accuracy [28]. Still, the antiquity
for bitewing and caries studies being four decades older
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4. Conclusion

The delay for intraoral radiographs seems to be justified in the
COVID-19 crisis. It is undeniable that radiological workflow
protocols and policies applicable to various emergency clinical
conditions/investigations must be readressed. This will help
to accomplish an imaging investigation making it vital to
have an interdisciplinary dental streamed interaction. The
conundrum justifies the role of proxy to intraoral radiogra-
phy- cone-beam computed tomography (CBCT) scans and
sectional dental panoramic radiographs (SDPRs)- in the new
infection control protocol until the pandemic subsides.

Abbreviations

COVID-19: Coronavirus disease 2019
WHO: World Health Organization
ADA: American Dental Association
IOPA: Intraoral periapical radiograph
OPG: Orthopantomogram/panoramic radiograph
SDPR: Sectional dental panoramic radiographs
SMV: Submento-vertex X-ray
CBCT: Cone-beam computed tomography
PA: Posteroanterior.

Data Availability

All data are available within the manuscript.

Conflicts of Interest

The authors declare no conflict of interest for this article.

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