

Radiation shielding in dentistry? Comments on the study by Daniel Pinto Agüero (2023)

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Dear Editor,

We have read with great interest the letter by Pinto Agüero (1), entitled “Is radioprotection necessary in dentistry?”, in which he points out that, although digital radiography brings advantages in terms of radiological safety, exposure time, image quality and communication, it is not yet a reality in Latin America due to its high cost, among other reasons. He also argues that, for reasons that are widely known, it is not advisable to follow the worldwide trend in medicine of not using lead aprons. To support this assertion, he cites the recent European Consensus on Patient Contact Shielding (ECPCS) study (2). However, he did not give details and/or did not specify the ECPCS considerations regarding the use (or lack of use) of different types of shielding in dental radiographic examinations. In this sense, the authors of this letter intend to extend the discussion on a subject of utmost importance as this one.

The criteria established by ECPCS for the recommendation (and justification) of shielding (thyroid, ocular, breast and fetal) in medical and dental radiographs are as follows: i) “They should be used” (there is evidence that the use of shielding is beneficial and effective); ii) “They can be used” (there is an agreement that the use of shielding may be beneficial in certain circumstances); and iii) “It is not recommended” (there is evidence or agreement not to use it).

As pointed out by Dr. Pinto (1) and other authors (2, 3), the proximity of the field of view (FOV) to radiosensitive organs of the head and neck, such as the thyroid, the salivary glands, and the oral mucosa of the patient, together with the high frequency of dental radiographic examinations, especially those related to pediatric patients, means that removing the shielding in oral radiographs is not a generalized practice in this area. In this regard, ECPCS mentions:

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1. The thyroid collar is “not recommended” in any case within the FOV, except in cephalometry when the cervical spine does not have to be evaluated.
2. The thyroid collar “can be used” in intraoral radiography, cephalometry or Cone Beam Computed Tomography (CBCT) if it is outside the FOV (to avoid artifact generation or overexposure in automatic exposure systems), prior consultation with a medical physicist.
3. Breast and eye shielding is “not recommended” in any case, either outside or inside the FOV. In the breast, it has been found that it can even increase the dose in the breast and in neighboring organs such as the lungs. In the eyes, despite being the most radiosensitive organ, it would be best to employ a dose reduction strategy rather than shielding, except perhaps in fluoroscopically guided interventional brain procedures.
4. The leaded apron for fetal protection is “not recommended” in any type of radiography, either inside or outside the FOV. The reason is that most of the radiation received by the fetus does not come from the primary beam, but from scattered radiation in the mother’s internal tissues. Ideally, a dose optimization strategy should be applied. Furthermore, ECPCS does not consider it pertinent to use a lead apron to reassure apprehensive patients because that would mean accepting, before the patient and the community, that the risk of radiation is exaggerated in radiodiagnosis. Efforts should focus on explaining the risks of using shielding.

Based on the ECPCS report and our expertise and professional experience, we can conclude the following: (i) the standard is that it is not necessary to use any type of shielding in dental radiographic examinations; (ii) optimization is the best dose reduction strategy (e.g., good beam collimation, high kilovoltage, preferring manual over automatic control

equipment, among others); (iii) explain in advance what the procedure consists of and what the associated risks are to avoid radiophobic events, using even web or mobile applications (4); (iv) receive ongoing training and advice on radiation protection from a medical physicist or radiation expert; v) consider approaches, scenarios, and individual circumstances in which shielding could provide a net benefit to the patient; and vi) it is essential that the institutions providing these services have quality assurance programs in place to evaluate the repeatability of the variables associated with the imaging techniques, such as applied kilovoltage, reproducibility of exposure times, quantification of skin dose and equipment performance. Additionally, it is suggested to establish reference levels by entity or city to reduce the radiation doses administered to patients without affecting the quality of the diagnostic image.

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