

FEATURE



Radiation Safety: Know the “MUSTs” Before You Expose

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In Canada, the principles and practices for optimal radiation protection in oral health are laid out in the recently published *Radiation Protection in Dentistry: Safety Procedures for the Installation, Use and Control of Dental X-Ray Equipment. Safety Code 30 (2022)*.¹ What does this updated guideline mean for Canadian dental hygienists? It means essential changes have occurred for compliance regarding protection, collimation, and use of handheld devices. When consulting this document, remember that the word “must” is used to indicate an **essential** requirement, whereas the word “should” indicates a **suggested** recommendation.¹

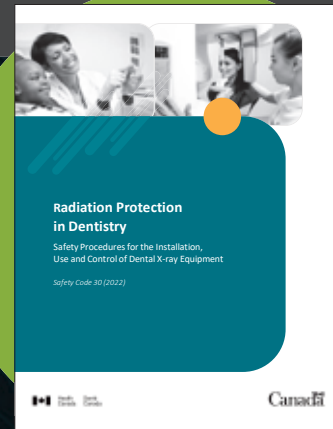
PROTECTION

Client Protection

Clients **MUST** wear thyroid collars for all X-ray procedures other than panoramic exposures or when it interferes with obtaining a diagnostic image.¹ However, clients no longer need to wear lead aprons except for cone beam computed tomography (CBCT) imaging or to help reduce anxiety if they are fearful of radiation.¹ Receptor holders with alignment devices and long cones (30 cm or longer) **SHOULD** be used.¹ For clients who are pregnant, the level of radiation to the foetus from dental X-rays is extremely low. However, best practice is to expose the minimum number of radiographs needed for diagnosis.¹

Intraoral radiography considerations: Rectangular collimation of the X-ray beam **MUST** be used for all exposures with the exception of exposing occlusal images.¹ Restricting the size and shape of the X-ray beam to correspond with the size of the rectangular receptors reduces scatter radiation, clients’ radiation dose (40%), and thyroid tissue exposure (25% to 33%).² Although vertical angulation errors will be reduced, cone cutting errors will increase.² These errors often do not affect the diagnostic quality of the image, so retakes may not be required.² Cost-effective attachable rectangular collimation adaptors are available.^{1,2}

Intraoral X-ray units **MUST** have pre-settings for client size (adult/child), anatomical landmarks (anterior/posterior teeth), and type of exposure (bitewing, occlusal). If there are no pre-settings, then a chart with the required settings **SHOULD** be near the control panel.



▲ *Radiation Protection in Dentistry: Safety Procedures for the Installation, Use and Control of Dental X-Ray Equipment. Safety Code 30 (2022)*

Extraoral radiography considerations: Oral health professionals **MUST** have a mechanism to view the client during exposure (e.g., shielded window, camera/monitor, mirror), and light beams **SHOULD** be used to facilitate the client’s positioning.¹ When only a panoramic image is prescribed, it **MUST NOT** be reconstructed from a CBCT due to the higher dose of radiation to the client.¹ CBCT **SHOULD** always use the smallest field of view setting and the lowest resolution setting/largest voxel size that meets the diagnostic objectives.¹

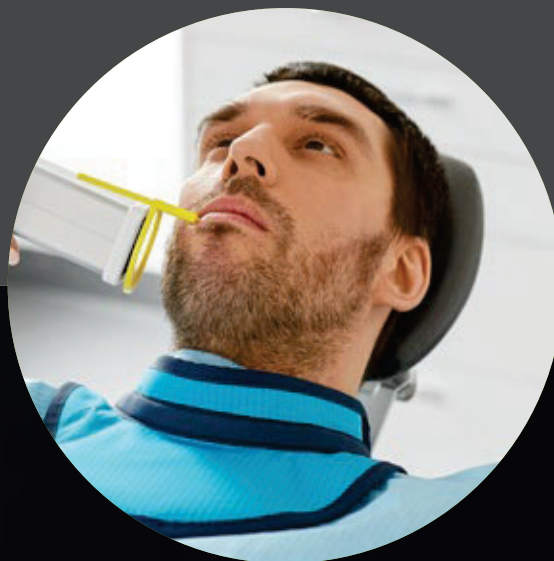
Operator Protection

Operators of dental X-ray equipment are not considered radiation workers as they typically do not receive annual radiation doses above 1 mSv, whereas radiation workers have a limit of 20 mSv.¹ When the dosage to the operator exceeds 1 mSv annually, the operator **MUST** wear a personal dosimeter for the first year of operation to obtain baseline data, then if below 1 mSv the personal dosimeter is no longer required.¹ If the operator is pregnant, they must ensure the dosage is not above the recommended amount; generally there are no restrictions for X-ray duties.¹

In the X-ray room, no more than one radiographic unit can be used at the same time. If a room contains both panoramic and cephalometric machines then only one unit can be used at a time.¹ Control panel *MUST* be in a shielded area, X-ray tubing *MUST NOT* be held during exposure unless it is a handheld device, and the operator *MUST* be two metres away from the radiation source and not in the path of the central beam.¹

HANDHELD DEVICES

Provinces and territories may have specific guidelines for handheld devices. Operators *MUST* contact their regulatory body for these guidelines.¹ Safety Code 30 states that these devices *MUST* only be used in exceptional situations due to the location where imaging is being undertaken and/or the condition of the client.¹ They can only be held by hand when the device cannot be supported on a stand and used with corded or remote irradiation switch.¹ For the first year when the device is held by hand, the operator *MUST* wear a personal dosimeter to establish a baseline annual radiation dose.¹ *If you are using a handheld device, please refer to Safety Code 30, Section A.2.2, for additional information.*



PRESCRIBING RADIOGRAPHS

Prescribing radiographs *SHOULD* be based on client history and after clinical examination. More information on prescribing criteria can be found in the recommendations released in 2012 by the American Dental Association in collaboration with the US Food and Drug Administration.³



RECORDKEEPING

Clients' clinical records *MUST* contain details of all radiographic examinations carried out, including indications and findings.

OTHER

For further information on quality assurance programs, prescribing CBCT images, and facility and equipment requirements, refer to the appropriate sections of Safety Code 30.

References

1. Health Canada. *Radiation protection in dentistry: Safety procedures for the installation, use and control of dental X-ray equipment. Safety Code 30 (2022)*. Ottawa: Minister of Health; June 2022 [cited 2022 July 17]. Available from: canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/radiation-protection-dentistry-recommended-safety-procedures-use-dental-equipment-safety-code-30.html
2. Shetty A, Almeida FT, Ganatra S, Senior A, Pacheco-Pereira C. Evidence on radiation dose reduction using rectangular collimation: a systematic review. *Int Dent J*. 2019;69(2):84–97. doi:10.1111/idj.12411
3. American Dental Association Council on Scientific Affairs, US Food and Drug Administration. *Dental radiographic examinations: Recommendations for patient selection and limiting radiation exposure*. Revised 2012. Available from: fda.gov/media/84818/download