



**Photographic Processing Tips**  
**for Lower Radiation Doses and Better Image Quality in Dentistry**

***Approximately 40% of the dental facilities in the U.S. under-process their x-ray films resulting in poor image quality and increased x-ray dose to their patients and staff.<sup>1</sup> Photographic processing requires attention to certain details including:***

***Use the developer and fixer solutions recommended by the film manufacturer.*** The film and chemicals are designed to work together for optimum results. In many cases the photographic processing chemicals recommended by the film manufacturer are significantly less expensive than the competing brands.

***Use the development temperature and time recommended by the film manufacturer.*** Film development is a time-temperature based process which impacts the speed of the film, and the density and contrast. (Some dental processors do not control the temperature of the developer, resulting in variations in film density and quality.)

***The developer and fixer must be replenished regularly to maintain film density and image quality, and minimize patient dose.*** Eight ounces of replenisher should be added every day, even on days when films are not processed. (When films are not processed the developer solution continues to oxidize, making replenishment necessary.) An additional eight ounces of replenisher should be added per day for each additional 30 films processed.

***Never top off the chemical tanks with water!!*** This dilutes the chemicals, reduces film quality, and increases patient radiation dose.

***Developer and fixer solutions should be changed every two weeks.***

***The water in the wash tank should be changed daily for up to 30 films per day. For higher volumes, the water should be changed after every 30 films.*** Improper washing of films will result in premature fading and staining of the images. (Some processors have water flowing through the wash tanks—the water in these processors does not have to be changed due to the continuous flow of fresh water.)

***Quality Control is important for image quality and patient radiation dose.*** It is essential to monitor dental image quality and patient radiation dose. Image quality can be monitored simply and easily by using an inexpensive aluminum step wedge (<https://dentalcompliance.com/products/aluminum-step-wedge>). Patient radiation dose can be monitored by tracking x-ray exposure time. The x-ray exposure time should not change from day-to-day or week-to-week if the photographic processing chemicals are properly maintained.

***Use E-F or F-Speed film to reduce patient dose by 40% to 50% for the same image quality!***

The image quality for D- and E-F or F-speed films is the same and there is a dose reduction of 40% to 50% with the faster (E-F- or F-speed) films!



D-Speed Film  
240 mrad

E-F-Speed Film  
140 mrad

For further information see:

American Dental Association. The use of dental radiographs: Update and Recommendations. Journal of the American Dental Association, 2006, 137:1304-1312.

Dental Film Processing FAQs. <http://www.carestreamdental.com/en/film-and-anesthetics/dental-film-faq.aspx>

Dental Image Quality and Dose website ([www.DIQUAD.com](http://www.DIQUAD.com)). Includes information on x-ray doses, frequently asked questions, film processing tips, digital imaging tips, favorite links, and QC book.

Exposure and Processing for Dental Film Radiography. [https://www.carestream.com/en/us/-/media/publicsite/products\\_and\\_solutions/dental/pdf/8170\\_us\\_exposure\\_\\_processing\\_broch.pdf?sc\\_lang=en](https://www.carestream.com/en/us/-/media/publicsite/products_and_solutions/dental/pdf/8170_us_exposure__processing_broch.pdf?sc_lang=en)

Quality Assurance in Dental Radiography. [https://www.carestream.com/en/us/-/media/publicsite/products\\_and\\_solutions/dental/pdf/8661\\_us\\_quality\\_assurance\\_brochure.pdf?sc\\_lang=en](https://www.carestream.com/en/us/-/media/publicsite/products_and_solutions/dental/pdf/8661_us_quality_assurance_brochure.pdf?sc_lang=en)

Thornley PH, Stewardson DA, Rout PGJ, and Burke FJT. Assessing the quality of radiographic processing in general dental practice. British Dental Journal 2006, 200: 515-519.

White SC and Pharoah MJ. Oral Radiology—Principles and Interpretation. Mosby Elsevier, St. Louis, MO, 2014.

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1. Based on data from over 48,000 dental facilities evaluated in the U.S. by DIQUAD, LLC.