



RADIATION EXPOSURE AND YOUR DEVELOPER

The correct processing of the radiographic film is critical to ensure the lowest radiation exposure required to produce an acceptable image (or radiograph). Past studies and monitoring by the Radiation Protection Services confirm that incorrect processing techniques result in unnecessary, additional exposure to the patient.

The Radiation Protection Services recommends that owners of x-ray equipment refer this problem to your staff members who are trained in *Standardized Darkroom Technique* and can evaluate all the items discussed below. Others should refer to their film and chemistry supplier representatives for technical assistance.

Under development of the films in the developer tank leads to **overexposure** of the patient, as well as increased levels of stray radiation exposing staff. The problem with under development compensated for by over-exposure, is that the radiograph appears to have received the correct exposure and, therefore, provides no radiographic evidence of over-exposure. To determine if you are over-exposing your patients, ask yourself the following questions:

1. Are you keeping your developer for more than approximately one month?
 Yes No
2. Are you ignoring manufacturer's instructions for making developer and fixer?
 Yes No
3. Have you shortened recommended developing times and/or reduced temperatures from what the film manufacturer recommends (applies to both manual and automatic processors)?
 Yes No

If you answered **YES** to questions 1, 2 or 3 you may be over-exposing your patients and under-developing the films.

4. Do you measure the developer temperature daily with a darkroom thermometer to ensure developer temperature is at the recommended setting?
 Yes No
5. Are you replenishing developer/fixer as recommended by the chemistry and/or film manufacturer?
 Yes No

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If you answered **NO** to questions 4 or 5 you may be over-exposing your patient and under-developing the films.

Are there any clues to help you with these concerns? Try the following:

- A. Make up new developer according to manufacturer's directions. If the new developer produces dark radiographs, then you are likely over-exposing your films. Problem: the developer was allowed to get too old.
- B. Make up chemicals according to manufacturer's instructions. If you get dark films, then you are likely over-exposing. Problem: developer was not made up correctly.
- C. Are you 'sight developing'? That is, viewing the film **during** developing and shortening developing times to get correct density? If you are, you are likely over-exposing. Try correct time/temperature developing, i.e. standardized darkroom technique. If you get dark films, you are likely over-exposing.
- D. Bring developer up to manufacturer's recommended temperature. If films are dark, you are likely over-exposing.

If you are producing dark films when trying any of **A** through **D** above, reduce the timer setting automatic exposure controls to get the correct exposure to the film. This will reduce exposures to the patient. Reducing exposures to the patient may also result in **reduced exposures to staff**.

It should be pointed out that the above problems can apply, in most cases, to both automatic processors as well as manual processing techniques. The ultimate objective in radiology exposures should be **ALARA** - keep exposures **As Low As Reasonably Achievable**. This begins in the darkroom.

Please contact this office if you have further questions.

Radiation Protection Services
Environmental Health Services Division
BC Centre for Disease Control