

Q.A. Collectible

*Sponsored by CRCPD's Committee on Quality Assurance
In Diagnostic X-Ray (H-7)*

Methods to Reduce Patient Exposure

The following are suggested methods for reducing patient exposure from routine diagnostic x-ray examinations, and may be applicable to both medical and dental facilities. State surveyors may recommend these methods during state inspections.

Hopefully, it can be determined why an exposure is high and a change can be made that will not adversely affect image quality (in most cases, image quality will improve).

- 1) Change the film-screen system to a "faster" one, consistent with the imaging requirements of the examination. Par systems (approximately 100 speed) are no longer the "standard of practice." Faster systems such as rare earth (e.g., 400 speed) should be considered. Screen age and condition will, of course, affect speed.
- 2) Check to assure compatibility of the film and screen. A mismatched system, i.e., a green-light sensitive film and a blue-light emitting screen, may necessitate as much as a factor of 2 increase in exposure. Be aware, however, that some facilities deliberately mismatch in order to decrease quantum mottle.
- 3) Optimize the film processing. Whether processing is manual or automatic, manufacturer's specifications should be followed. This means a proper time/temperature relationship, along with correctly mixed and replenished chemistry. A quality control program is essential to maintain optimal processing.
- 4) Increase the kVp of the technique used, and lower the mAs. Practitioners may be using techniques with too little penetration. See the January 1990 Q.A. Collectible entitled *kVp Ranges for Routine Exams*.
- 5) Increase the filtration. If the HVL is only minimal (i.e., barely compliant), a small amount of additional aluminum can be considered.
- 6) Increase the SID. Short cones in a dental situation, or a shorter than usual SID in a medical situation can give a high exposure. Have the facility use the maximum SID consistent with their practice and the equipment available. Another advantage of increasing distance is the improved image sharpness due to the effective decrease in focal spot size. Note: Your ESE measurements may be inaccurate if you have not verified with the x-ray operator, and accurately measured, the true SID.
- 7) Ask about the grid. It may:
 - a) Be positioned backwards or off center;
 - b) Have an improper focal length for the SID being used;
 - c) Have a ratio that is excessive (8:1 is sufficient for single-phase, low-kVp techniques).

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