F22 Simulated Intraoral Digital and Film Exposures (103) Using a Portable Hand-Held Dental Radiation Emitting Device to Determine Background (Scatter) Radiation "Safe Zones" for Ancillary Personnel Working in an Open Bay Environment

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After attending this presentation, attendees will understand the importance of maintaining ALARA principles when using a hand held radiation emitting device. The learner will be aware of the distances required to maintain a safe zone to avoid scatter radiation exposure to ancillary personnel from a hand held radiation emitting device.

This presentation will impact the forensic community by helping clinical and forensic dental personnel assess the safe distances required to reduce or avoid background (scatter) radiation exposure when a portable, self-contained, cordless, hand-held dental radiation emitting device is in use.

Exposure of ancillary personnel to background (scatter) radiation while using a portable, self-contained, cordless, hand-held dental radiation emitting device was determined while the operator employed typical use scenarios during the exposure of 103 simulated digital and/or film based dental radiographs at 0.25 seconds and 0.65 seconds respectively. The study was conducted in an open bay dental clinic environment, similar to what may be experienced in a morgue setting in which ancillary personnel may inadvertently pass through an area in which a radiation emitting device is in use. Background (scatter) radiation was measured with three ion chamber detectors positioned at three, six, and nine foot radii from the simulated oral cavity image plane. Results of the exposures recorded at these locations were compared with accepted, natural annual background scatter radiation exposure levels (360mR / year.) The ion chamber located opposite the radiation emitting source (Position No. 3) consistently received the highest readings. Extrapolation and comparison of this data to annual background scatter radiation levels of 360mR/ year indicated that an individual standing at position No. 3 would have to be exposed to1260 procedures per year in that position to receive 12.5% of the annual dose at 3 feet, 2.1% of the annual dose at 6 feet, and 1.9% of the annual dose at 9 feet. Radiation safety regulatory guidelines dictate that a six foot safe zone distance be maintained to follow the principles of ALARA for occupational workers when exposing dental radiographs. These findings will help clinical and forensic dental personnel assess the safe distances required to reduce or avoid background (scatter) radiation exposure when a portable, self- contained, cordless, hand-held dental radiation emitting device is in use.

Forensic Science, Radiation Safety, Portable Radiation Emitting Device

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