



The American Academy of Oral and Maxillofacial Radiology

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January 24, 2010

To: Dr. Michael Razzano, DDS
From: Dr. Allan G. Farman

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Re: Importance of optimizing collimation to reduce unnecessary dose.

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Dear Dr. Razzano:

As you are well aware, dentists and dental specialists own a very large number of X-ray generators as these are indispensable both for dental diagnosis and also for guidance of a variety of procedures. By far the most common radiographic study conducted by the more than 180,000 dentists in the USA, is the intraoral periapical radiograph. Several hundred million such procedures are completed each year in the USA. Environmentally, over the population as a whole, substantial savings in radiation dose are possible through a few relatively simple means. It is undoubtedly time to revisit existing regulations for dental radiography concerning safety standards that are now 40 years old.

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The first rule is to minimize the number of radiographs made by use of selection criteria, and also by reducing the need to remake radiographs due to poor technique, such as “cone cutting” from improper alignment of the beam and image receptor. As you are aware, practitioners have increased difficulty in accurate placement of image receptors when they make the transition from thin flexible film radiographic techniques to thicker and more inflexible solid state X-ray detectors. For this reason, the need for a device that can improve placement of the digital detector within the mouth is ever more important.

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Perhaps an even greater concern is that in moving from a 2.75 inch round beam to a rectangular collimated beam is well referenced that radiation dose can be decreased by 60% or more irrespective of the speed of film used. Much of the radiation dose that remains is actually transmitted through film or storage phosphor to the deeper tissues of the mouth. Solid state receptors stop the radiation almost completely from affecting the deeper tissues so it is likely that rectangular collimation will result in an even more efficient reduction in dose

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with solid state detectors. Further, it is a common misconception that use of digital solid state detectors results in a substantial patient dose reduction. This is not the case. Caveat Emptor! Obviously manufacturers like to stress dose savings as a sales ploy. However, dose has been increasing for digital detectors as pixel size has declines and more X-ray signal is needed to sustain a suitable signal to noise ratio. Further the latitude of CMOS and storage phosphors is quite wide, and dentists are able to produce a good (or better image) at higher dosages than are sometimes reported in dosimetry studies. At the same time, intraoral analog film has increased in sensitivity providing the fastest available films are used. Consequently, rectangular collimation is at least as important with solid state detectors as with radiographic film. Irrespective of the speed of the detector, rectangular collimation will reduce the chances of fatal cancer from dental radiography by at least 60%, and perhaps even more with solid state digital radiography given presently accepted assumptions of a stochastic relation between dose and carcinogenesis.

There are several reasons why a rectangular collimation device such as the Tru-Align should be successful in the market. First, all scientific evidence supports the high import of optimal collimation in dose reduction, both to the patient and inadequately shielded staff and other patients. Second, rectangular collimation reduces scattering of the primary beam and therefore will theoretically improve image quality. Third, your device can help accurate positioning of digital sensors that are more difficult to position than radiographic film. Hence the device undoubtedly will assist in transition from film to digital imaging. Fourth, the device should reduce the number of remade radiographs saving both patient dose and also costly wastage of dental personnel and patient time. Remakes also reduce the confidence of patients in the quality of the dental practice so their avoidance can have beneficial psychological advantages. Fifth, as your device has audible feedback, it is possible for the first time to know whether the patient has inadvertently affected beam geometry in an untoward manner when the operator has move to a shielded space to make the exposure.

Use of rectangular collimator is fully endorsed by the American Academy of Oral and Maxillofacial Radiology and also by the latest guidelines on Dental Radiography from the National Council on Radiation Protection. Having seen your rectangular collimation device, I believe it would add a "high tech" appearance to existing dental X-ray systems if existing units are retrofitted. It is also the type of relative inexpensive device that a dentist would tend to buy on impulse at a dental show, through a dental equipment supplier or even directly via mail order.

Thank you for promoting good radiation hygiene and patient safety.

Sincerely,

A handwritten signature in black ink that reads "Allan G. Farman". The signature is written in a cursive style with a large initial 'A'.

Allan G. Farman, BDS, PhD, DSc, MBA,
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