Author's response to reviews

Title: Thyroid Shields and Neck Exposures in Cephalometric Radiography.

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We thank Dr. Horner for his bringing up these two remaining issues. We have provided the following additional information to his remaining concerns.

1. The authors should address the points raised above. In particular, they should consider whether the use of the thyroid shield matters in comparison with the issue of whether cephalograms are necessary at all and that of using better collimation.

There is a difference between what “could” and “should” be done and what “is” done. In addition to our prior response where we provided published survey data regarding what is done, we would like to add the following comments. A key point is indeed whether cephalographic X-rays are ‘necessary at all’. This topic however is not the topic of this manuscript. Cephalographic X-rays are being taken routinely for most orthodontic patients. The American Board of Orthodontics requires cephalographic X-rays on all patients. American universities routinely take cephalometric X-rays on patients. Orthodontic textbooks recommend cephalometrics. We appreciate Dr. Horner’s point that cephalograms may “not be necessary at all”, but the existing survey data that we are aware of indicate that multiple cephalograms are taken for each patient. We would appreciate to know if Dr. Horner is aware of survey data indicating that certain orthodontic schools and clinical practices do not take cephalograms routinely.

Similarly, we fully agree with Dr. Horner that better collimation to reduce radiation doses is always desirable. We hope Dr. Horner also agrees that the CT parameters should be adjusted for children and infants. Yet, this latter practice is not routinely done (Taking Care of Children - Check Out the Parameters Used for Helical CT AJR 2001; 176:287). With collimation there is also a difference between what “could” and “should” be done, and what “is” done. Multiple examples from the published literature where collimation to the film size is not done are added to this review (see end). There may be practical reasons for not collimating. Some orthodontic schools may desire to see C3-C4 to determine skeletal age, other may feel that collimation leads to too many retakes. This manuscript is not about what could and should be done (on these issues we fully agree with Dr. Horner). This manuscript is to report on what is being done.

The film size is irrelevant if the radiation beam is collimated to the area of diagnostic interest. However, if the radiation beam is collimated to the film, not the area of diagnostic interest, the film size and direction (landscape or portrait) will determine the exposed area of the patient. In our study we describe that T2 is typically exposed in cephalographic X-rays in portrait format while C7 is rarely exposed in landscape format. In addition to this report of what is happening at our university, we have attached pictures...
of the *American Journal of Orthodontics* also illustrating the absence of collimation to the area of diagnostic interest. We would also like to point out that two publications (referred to in the manuscript) discussed thyroid and cricoid calcification prevalences in a series of cephalometric radiographs. Clearly, this is an area not of diagnostic interest in cephalometrics, yet it was apparently routinely exposed. Collimation to the area of diagnostic interest may not be as common as Dr. Horner suggests. If Dr. Horner is aware of survey data on the usage of collimation in cephalometrics, we would like to cite it.

What follows are examples showing the absence of collimation and the importance of film orientation when no collimation occurs.


Fig 4. Pretreatment radiographs.

**Fig 17.** Postretention radiographs.

**Fig 4.** Pretreatment panoramic and lateral cephalometric radiographs.
Fig 8. Posttreatment panoramic and lateral cephalometric radiographs.