LETTER TO THE EDITOR

Letter to the editor concerning Parrott LA, Ng SY. A comparison between bitewing radiographs taken with rectangular and circular collimators in UK military dental practices: a retrospective study published in *Dentomaxillofacial Radiology* (2001;40:102–109)

Dentomaxillofacial Radiology (2011) 40, 262–263. doi: 10.1259/dmfr/38497493

Dear madam,

We would like to comment on the recent *Dentomaxillofacial Radiology* article: “A comparison between bitewing radiographs taken with rectangular and circular collimators in UK military dental practices: a retrospective study”.¹

Firstly, we would like to congratulate the authors on a well performed study and a conclusion with which we wholeheartedly agree.

Our comment concerns the increase in incidence of cone cut errors from 3.3% to 20.9% when rectangular collimators were used as reported by the authors.¹ Whilst the errors in general were small and did not influence the diagnostic value enough to change the recommendation of using rectangular collimators, we would like to offer a potential explanation for many of the cone cut errors. Most dental X-ray tubes supplied with a rectangular collimator also exhibit a primary collimator close to the focus in order to prevent extrafocal radiation. Usually this collimator is placed in the bottom of the aiming device. If misaligned, this collimator will create cone cut errors in the image even if the clinical aiming is perfect. The same reasoning would also apply to a circular collimator but in that case there is usually so much superfluous X-ray field that minor misalignment of the primary collimator will not cause cone cut errors.

Misalignment of the primary collimator can be easily checked by simple inspection of the collimating device and by performing a low-dose exposure with the image receptor kept in contact with the end of the cone. Any cone cut error will readily show up on the images (Figure 1). In Sweden such controls should be performed annually

according to the legislation.² However, in our experience this is often neglected in general dentistry practices.

In the county of Norrbotten, the public dental health care has used rectangular collimators for the last 12 years. In recent weeks we have made visits to public dental clinics within the county and examined their equipment; in total we looked at 165 units of 4 different brands and 6 different models. We then found that 41 (25%) of the dental tubes with rectangular collimators demonstrated cone cut errors of magnitude 1 or 2 as defined in the study by Parrott and Ng.¹ Many of these misalignments of the primary collimator were easily fixed and seem to stem from less than optimal assembly at the manufacturers. The figure 25% is close to the amount of cone cut errors reported by Parrott and Ng.¹ As this factor doesn't seem to have been investigated by them we are led to believe that misaligned primary collimators can be one of the reasons for the increase of cone cut errors found in their study. If so, then this problem, which is possibly universal, can be easily overcome by a simple check of the primary collimator when changing from circular to rectangular collimators, further strengthening the conclusion of their study that all practitioners should adopt rectangular collimation.

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Figure 1 a,b Two examples of cone cut errors created by misaligned primary collimators found at inspection of dental X-ray tubes in public dental health care in the county of Norrbotten, Sweden in January 2011

References

1. Parrott LA, Ng SY. A comparison between bitewing radiographs taken with rectangular and circular collimators in UK military dental practices: a retrospective study. *Dentomaxillofac Radiol* 2011; **40**: 102–109.
2. SSMFS 2008:31. *Strålsäkerhetsmyndighetens föreskrifter om röntgendiagnostik*. Solna: Swedish Radiation Safety Authority 2008; ISSN: 2000-0987.