

## TECHNICAL NOTE

M. P. Oeschger,<sup>1</sup> Ph.D. and J. S. Hubar,<sup>2</sup> D.M.D., M.S.

# Modified Intraoral Film Holders for Postmortem Identification\*

**REFERENCE:** Oeschger MP, Hubar JS. Modified intraoral film holders for postmortem identification. *J Forensic Sci* 1999;44(4): 846–848.

**ABSTRACT:** To date there have not been any commercial dental X-ray film holders marketed to accommodate the special needs of forensic odontologists. Modification of standard Rinn XCP® film holders by the investigators produced self-supporting film holders that do not require the active participation from the examinee. The modified film holders greatly simplify the operator's technique of exposing dental radiographs on cadavers.

**KEYWORDS:** forensic science, dental radiography; X-ray film holders

Diagnostic quality ante- and postmortem dental radiographs are valuable forensic tools used in the identification of individuals. The inability of the deceased to participate, exacerbated by conditions such as rigor mortis of the oral musculature or the effect of incineration, complicates the operator's ability to obtain quality intraoral radiographs. Today, a forensic expert's armamentarium of tools to use in the positioning of dental remains for taking intraoral radiographs may only include a pedestal, modeling clay, wadded up wet paper towels, and a string of wax. The use of commercially available X-ray film holders designed for use on living patients requires that the patient assist the operator by biting down on the instrument for achieving proper stability and orientation during exposure of the film. Du Saucey and Brown published a technique for postmortem dental radiography developed by Renson for handicapped patients. Renson placed a balloon catheter between the film and the tongue and inflated it to wedge the film against the dental arch (1). In this study, we report a simpler technique using modified Rinn XCP intraoral film holders that are self supporting. The functionality of the modified film holders was established using a variety of intraoral techniques.

<sup>1</sup> Associate professor, Department of Microbiology, Immunology and Parasitology, Louisiana State University Medical Center, New Orleans, LA.

<sup>2</sup> Associate professor, Department of Oral Diagnosis, Medicine and Radiology Louisiana State University School of Dentistry, New Orleans, LA.

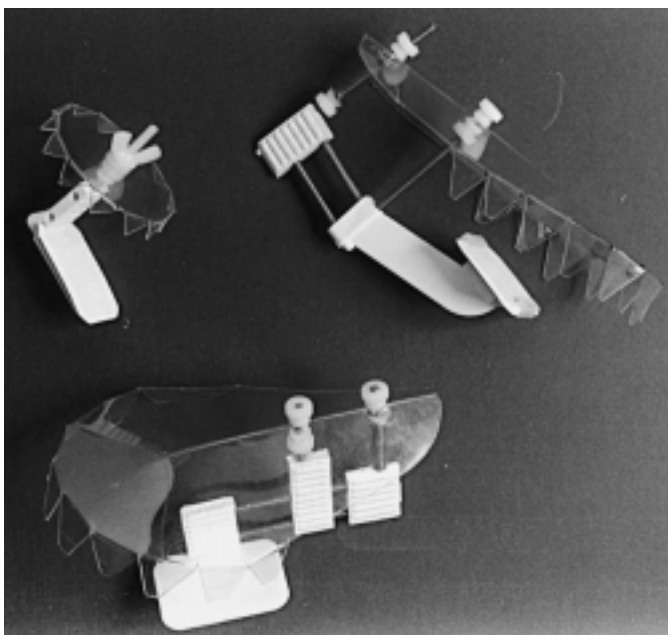
\* A poster presentation of this work was made at the annual meeting of the American Academy of Oral and Maxillofacial Radiology held October 15 to 18, 1997 in Washington, DC.

Received 29 May 1998; and in revised form 28 Sept. 1998; accepted 2 Nov. 1998.

## Material and Methods

Three standard types of Rinn XCP® film holders were modified: one for exposing anterior periapical radiographs, another for exposing bite-wing radiographs and a third for exposing posterior periapical radiographs (Fig. 1). In all cases, an extraoral brace was added to support the intraoral bite-blocks. 8–32 (US standard) stainless steel threaded rod, nylon wing nuts, thumb nuts, and washers were purchased from Small Parts Inc., Miami Lakes, FL. Silicone rubber tubing was obtained from New Brunswick Scientific, Edison, NJ, while springs and stainless steel washers were obtained at a local hardware store.

Figure 1 shows a modified anterior Rinn XCP periapical film holder. The length of the bite block was reduced by 1.0 cm and the block tapped and fitted with a 4 cm nylon threaded rod and a nylon washer and nylon wing-nut. The tap and screw dimensions employed were 8–32. A 6-cm diameter supporting brace was cut from



**FIG. 1**—Three modified Rinn XCP film holders: (1) an anterior periapical film holder as seen in the upper left side of the figure; (2) a bite-wing film holder on upper right side, and (3) a posterior periapical film holder visible in the lower aspect of the figure.

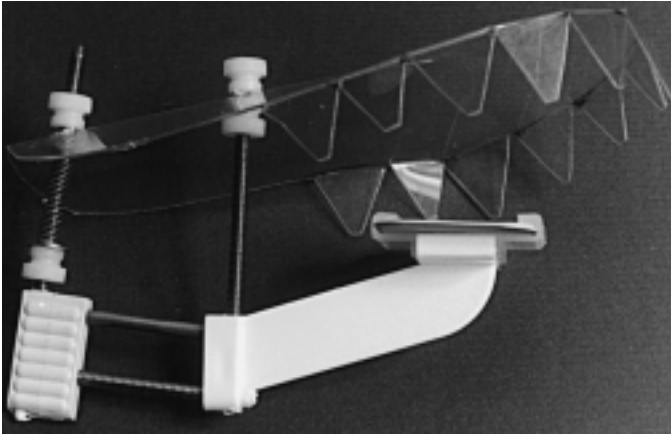


FIG. 2—Close-up picture of modified Rinn XCP bite-wing film holder.

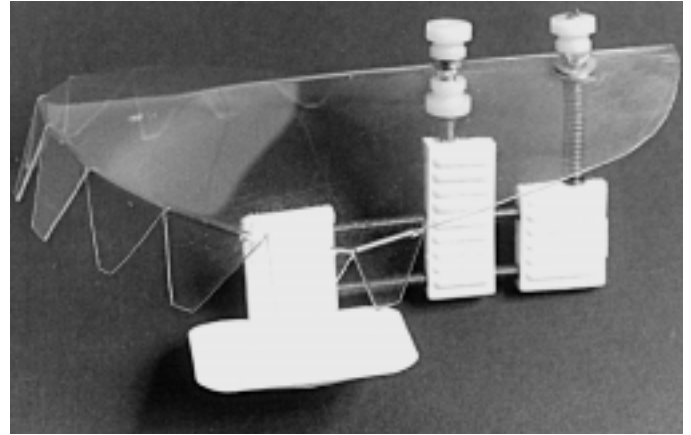


FIG. 3—Close-up picture of modified Rinn XCP posterior periapical film holder.

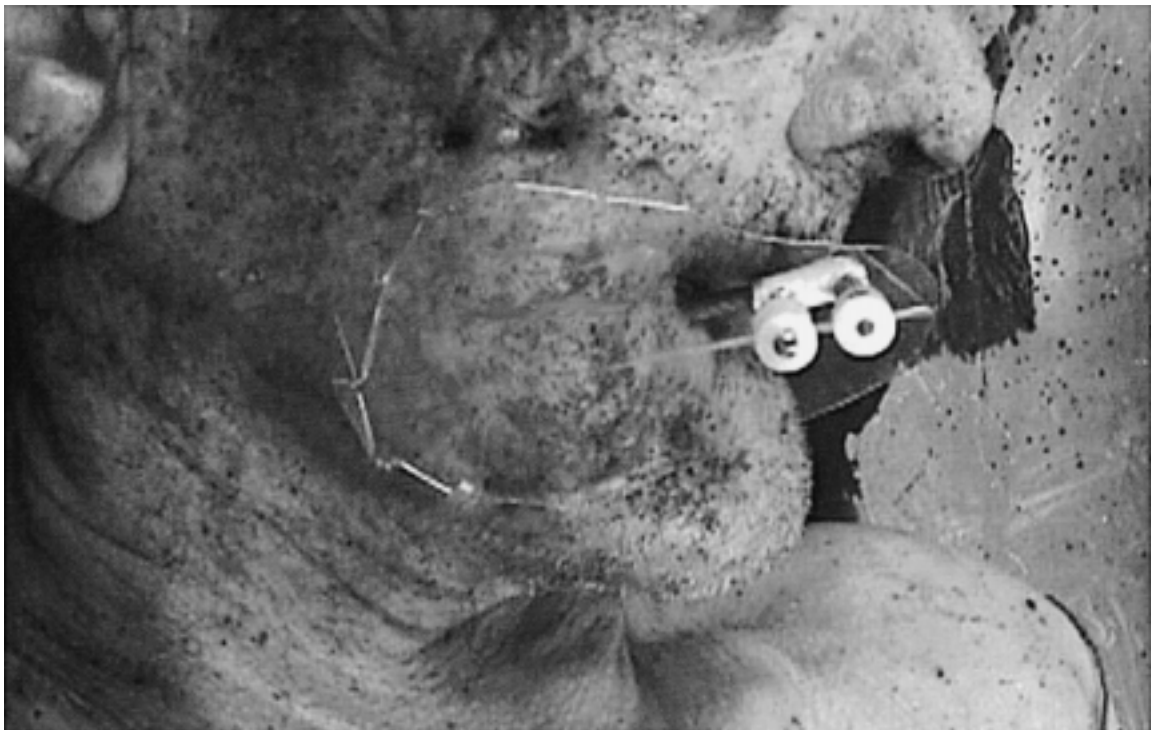


FIG. 4—A modified Rinn XCP posterior periapical film holder in position in a cadaver.

a 0.75 mm thick polycarbonate plastic sheet and its circumference coarsely toothed and angled to help stabilize positioning of the film holder.

Figures 2 and 3 show modified Rinn XCP posterior bite-wing and periapical film holders. Because it is often impossible to retract the cheek for posterior radiographs, the units were designed to bracket the cheek. For these units, 8–32 stainless steel threaded rods were used because the extensions and supports do not lie in the X-ray beam path. The supporting block of the extension was cut from a second Rinn XCP bite block and drilled and tapped as required (see APPENDIX). The stabilizing shield was cut as an oval, coarsely toothed at one end and creased along its midline to increase strength. A coil spring was fitted on one of the supporting rods of the shield so that the film holder could be opened by squeez-

ing the unit to compress the spring and held in place upon release by spring tension. A thumb nut was fitted on the threaded rod above the plastic retainer to adjust spring tension.

### Discussion

Insertion and placement of dental radiographs is often compromised by the inability of the operator to rigidly lock the intraoral film against the mandible or maxilla of deceased individuals. A variety of forensic cases from the local coroner's office requiring identification were selected to demonstrate a variety of situations where access into the mouth was limited. In each case the film holders were easily inserted and self-stabilized. The plastic brace permitted the film holder to be tightened securely in place. Figure 4

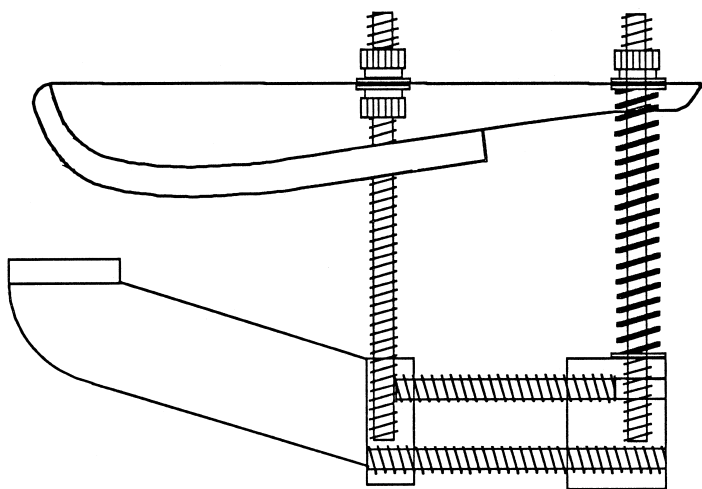
shows a modified bite-wing film holder in position in a cadaver. Placement of a modified posterior and anterior periapical film holders are similar to that of the modified posterior bite-wing film holder shown in Fig. 4 (illustration not shown).

Modification to the length of the bite-block was also performed to facilitate adaptation of this technique to situations where restricted opening was a concern. This is particularly a problem with severely burned individuals or when rigor mortis has set in.

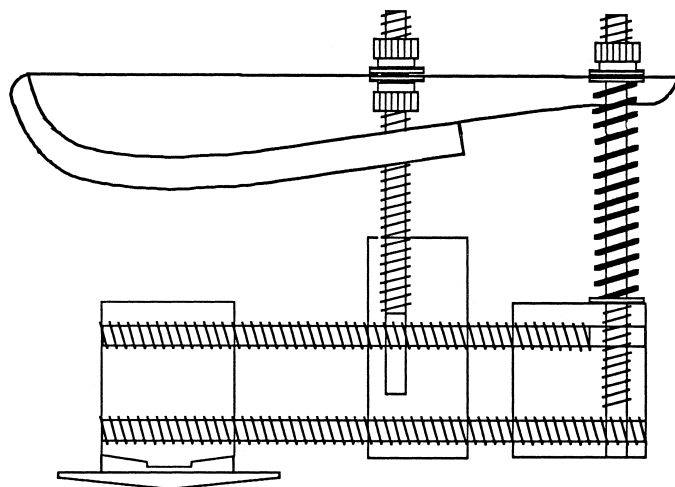
In any severely compromised scenario where the individual is unable to cooperate, the modified film holders permit the operator to easily produce higher quality radiographs than would otherwise be possible. The intent of the investigators was to illustrate how modification of a standard Rinn XCP intra-oral film holder can be accomplished fairly easily. However, should the operator have difficulty or a lack of desire to perform the necessary modifications to these instruments, plans are to have them commercially manufactured and made widely available for anyone requiring intraoral radiographs. These instruments can be easily scrubbed clean with a bristle brush. However, the modified instrument can only be cold sterilized and should therefore not be used on living patients unless it is treated as a disposable item (estimated cost should be under three dollars per unit). In that situation, silicone rubber tubing ( $1/2$  in. diameter slit lengthwise) may be placed over the teeth of the external support to prevent irritation to soft tissues.

#### Reference

1. du Saucy MJ, Brown KA. Postmortem dental radiography: a useful innovation. *J Forensic Odontostomatol* 1991;9(1):24-8.



Appendix FIG. 1—Diagram of modified Rinn XCP bite-wing film holder showing placement of threaded rods. The diagram shows silicone rubber tubing covering the teeth on the exterior support.



Appendix FIG. 2—Diagram of modified Rinn XCP posterior periapical film holder showing placement of threaded rods. The diagram shows silicone rubber tubing covering the teeth on the exterior support.

## APPENDIX

External supports for the modified film holders were fabricated from Rinn XCP<sup>®</sup> film holders. The principal advantage of using pre-fabricated bite-blocks is that the holes accept 8-32 threaded rod without modification and that these holes are aligned from block to block. The horizontal rods were positioned in these holes. To install the vertical rods, additional holes were drilled and tapped as shown in the drawings (Appendix Figs. 1 and 2). Appendix Figs. 1 and 2 show the layout of the holes and rods; a pattern designed to provide maximal strength and stability to the units. Insertion of the horizontal threaded rods was a three step process. First, a section of rod was cut to length and two nuts were locked together at one end by turning the nuts against each other with wrenches. Next, the locked nuts were used as a "head" for a wrench to screw in the rod. Finally, to completely screw in the horizontal rods, the nuts were removed and a pair of pliers were used to turn the rod by gripping the section exposed between the blocks. The vertical rods were then installed using double locked nuts as described above. Springs, washers, thumb nuts, and lexan supports were attached as shown in the photos. The diagrams show silicone rubber tubing ( $1/2$  in. diameter slit lengthwise) placed over the teeth of the Lexan external support.

Additional information and reprint requests:  
 Max Oeschger, Ph.D.  
 LSU Medical Center  
 1100 Florida Avenue  
 New Orleans, LA 70119