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The first naso-sinus laboratory for cadaver preparation in Thailand*

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SUMMARY

The first naso-sinus laboratory has been set up in Siriraj Hospital for better training of rhinosurgeons. The specimens used for practice operation are the entire nasal cavities with all paranasal sinuses, taken from cadavers and preserved in 95% ethanol. The "Siriraj" sinus holder is specially designed and constructed to hold various sizes of specimens. It is made of plastic board and stainless steel screws; it is an inexpensive and simple device which can be afforded by every centre. With this naso-sinus laboratory, ENT residents and rhinosurgeons can achieve their skills in performing nasal endoscopy, endoscopic or microscopical sinus surgery and all kinds of sinus operations at their convenience.

Key words: naso-sinus laboratory, cadaver preparation, "Siriraj" sinus holder

INTRODUCTION

As endoscopic sinus surgery is becoming a widely accepted mode of effective treatment for chronic sinus diseases, it is essential to train otorhinolaryngologists in the use of nasal teleendoscopes for surgery of the paranasal sinuses. Similar to the training of ear surgeons in the temporal-bone laboratory, we feel it is necessary to set up a laboratory to train rhinosurgeons, which we propose to name "naso-sinus laboratory." In order to make the naso-sinus laboratory practically applicable to most centres, we have tried to find an easy technique to obtain specimens from cadavers, preserve them in the proper solutions, and to design and construct an adjustable holder for cadaver preparation.

MATERIAL AND METHODS

The technique for removal of the nasal cavity and paranasal sinus block from cadavers was adopted from the combined techniques described by Bagatella (1981) and Larsen et al. (1994). The specimen removed included bilaterally the frontal bone, the anterior cranial fossae, the orbits, and the bony part of the nose (i.e., nasal bridge) down to the upper jaws. Therefore, the whole cavity of the maxillary, sphenoid and frontal sinuses as well as the ethmoids and ostiomeatal complex were removed *en bloc*. The specimen was then preserved in a glass container filled with 95% ethanol, and which was closed with a tight cover until the time to use. The defect was filled up by cotton wool and cloth and the skin flap was replaced so that there was no obvious deformity.

The device needs to hold the specimen while practising on naso-sinus surgery, has been designed and constructed with the cooperation of the technical unit in our hospital. After several trials we have successfully constructed a specimen holder, which can be adjusted to hold specimens of various sizes.

THE "SIRIRAJ" SINUS HOLDER

A plastic board (thickness: 1 cm) is used as a floor plate. It is cut to a square, sized 30×30 cm. A plastic rod (width: 3.5 cm; thickness: 1.5 cm) is used as a pillar. Altogether, 4 pillars are fixed on the floor plate. The right and left pillars each are 11 cm high and are fixed 16 cm apart. The other two pillars (the anterior and posterior pillars) each are 9 cm high and are fixed 12.5 cm apart. The stainless steel screws (diameter: 0.7 cm; length: 9 cm) are fixed horizontally near the top end of the right and left pillars. On the anterior and posterior pillars the screws are fixed obliquely at an upward angle of 45°. The screw on the anterior pillar is meant to hold the hard palate of the specimen, hence it is longer than the others, i.e. 11 cm. Aluminum caps are adhered to the outside end of each screw to make them handy, because these screws must be moved in or out according to the size of the specimens. The inside end of the screw that has been designed to hold the bony specimen, has the spiky part made from stainless steel (Figure 1).

These specimen holders are placed on the table when in use and can be cleaned and kept in a cabinet after use. If the table used for practice is lower than the operating table, the height of the specimen holder can be increased by adding plastic board

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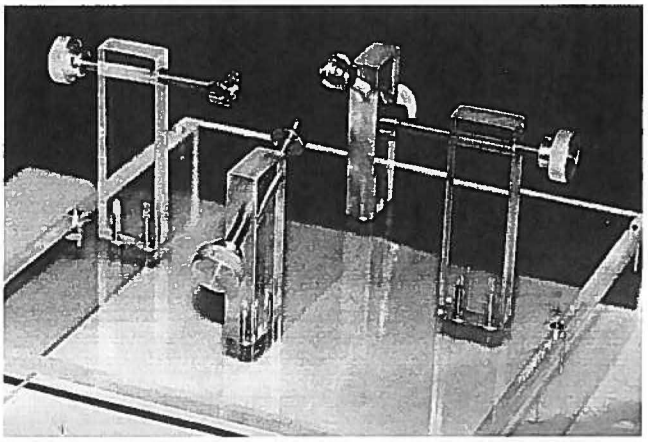

Figure 1. The "Siriraj" sinus holder.

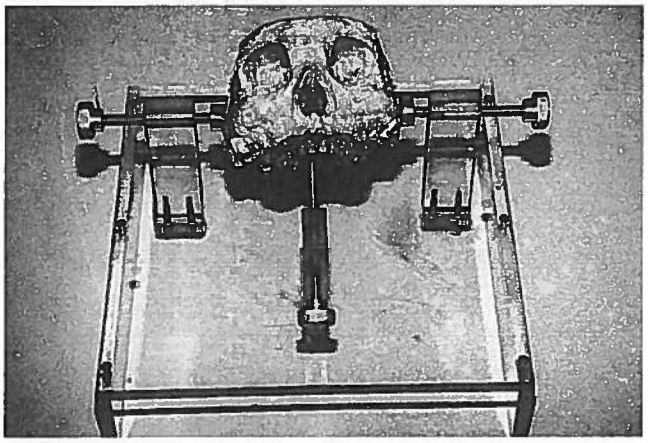

Figure 2. The specimen fixed to the holder after a suitable position has been adjusted.

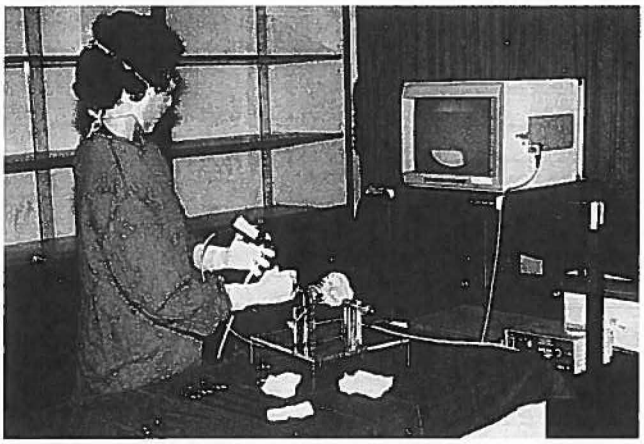

Figure 3. The complete set-up in the naso-sinus laboratory.

on both sides of the floor plate. In the holder that we used, we have added 6-cm-thick plastic board.

The specimen is fixed at both zygomatic regions by the screws on the right and left pillars first, then the body of the sphenoid is secured by the posterior screw and the hard palate by the anterior screw (Figure 2). The position of the specimen can be adjusted until it is nearest to the real position of the patient and is, then, ready to be used for practicing operations (Figure 3).

DISCUSSION

Several intensive courses on endoscopic sinus surgery are currently organized, mostly in Europe and the USA. The most important part of the course is certainly the practice on cadavers. The cadavers used in these courses are either whole heads or total bodies preserved by freezing. The disadvantage of frozen specimens is that the consistency of the tissue is hard and far from natural. This disadvantage is also encountered when formalin is used to preserve the specimen. Furthermore, freezing is not practical in tropical countries such as Thailand, and whole head or total body specimens require more space for storage as well as large amounts of preservation fluids.

In reviewing the available publications about the extent of the specimen removed from cadavers, the method of preservation of the specimens and the specimen holder, we have found certain differences from our report (Table 1).

Table 1. Differences in the specimen removed, preservation method and specimen holder from various reports.

authors (year)	specimen removed	preservation method	spedimen holder
Belal (1978)	ethmoidal sinuses, parts of the frontal, maxillary and sphenoid sinuses (no nasal bridge)	frozen	temporal bone holder
Bagatella (1981)	half of nose septum, lateral wall of nasal fossa, one side of ethmoid, frontal and sphenoid sinuses, medial half of antrum	suitable liquid (not specified)	not mentioned
Rivron and Maran (1991)	ethmoidal sinuses, sphenoid sinuses, parts of frontal and maxillary sinuses	frozen	the Edinburgh FESS system = consisted of the nasal-sinus cavity block embedded in plaster of Paris attached to the vice compartment and wooden base = the acrylic face mask
Larsen et al. (1994)	ethmoidal sinuses, ostiomeatal complex	formalin	not mentioned
this study (1996)	whole nasal cavity, complete cavity of all paranasal sinuses	95% ethanol	the "Siriraj" sinus holder = consisted of plastic board and stainless steel screws

The ideal situations to practise any operation is to do it on fresh cadaver. This has to be done at the mortuary in a certain limited time. Also, for endoscopic or microscopic sinus surgery, surgical instruments including tele-endoscopes, endovision telecam and TV-monitor or surgical microscope have to be moved to the mortuary, and in most cases this is inconvenient and troublesome. The idea of setting up a laboratory for endoscopic sinus surgery training, as proposed by Rivron and Maran (1991), has overcome the disadvantages cited above. However, the Edinburgh FESS training system as they recommend it, is complicated and technically difficult and is too expensive for developing countries. Therefore, we propose a more simple and less expensive way, that is of setting up a naso-sinus laboratory. Firstly, the specimen removed should include the whole nasal cavity and all paranasal sinuses so that other sinus operations (e.g., sinuscopy, Caldwell-Luc approach, transantral ethmoidectomy and external frontal surgery other than FESS) can also be practised, and there is no need to use plaster of Paris and acrylic face masks. The technique for removal of this kind of specimen is not difficult and can be performed by the technicians who do routine autopsy, without the use of special instruments.

Secondly, with regard to the solution used to preserve the specimens, 95% ethanol has been found to be satisfactory, because the consistency of the specimen is as good as the fresh one, no matter how long it was kept. This solution is also not expensive and is available everywhere.

Thirdly, the "Siriraj" specimen holder which we have invented is simple to make, easy to use and also cheap, and we are sure that it is most suitable for all ENT centres.

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