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SILICONE BLOCK PROSTHESIS FOR ENDOLARYNGEAL MICROSURGERY

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Various types of dental guards against tooth damage during peroral endoscopies including laryngeal microsurgery have been devised and frequently reported[1),2),3)]. Most of them are designed to cover the whole upper dental arch containing weakened, carious teeth and/or post crowns. For all the patients who undergo endolaryngeal microsurgery in our hospital, for example, we currently employ a tooth protector composed of thermoplastic splint material (polycast), which changes its hardness depending on the temperature (Fig. 1).

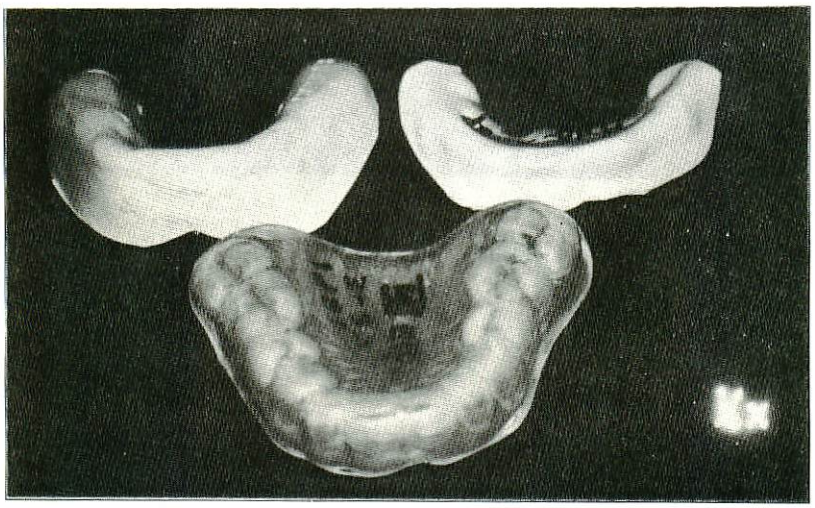

Fig. 1 Various types of tooth guards used during peroral endoscopy.

Although we are generally satisfied with the results of this method, we have also found that there are some serious cases in which this type of prosthesis is not completely effective. In particular, development of a new type of prosthesis is essential for those whose residual upper dentition is at high risk because of missing medial and/or lateral incisors (Fig. 2). Note that, as shown in Fig. 3, the risk for such patients is exceptionally high mainly due to the dangerous tension from the suspension laryngoscope directly against the protruding teeth in an oblique direction, since the distance between the residual incisor and canine is apparently shorter than the outer diameter of the scope.

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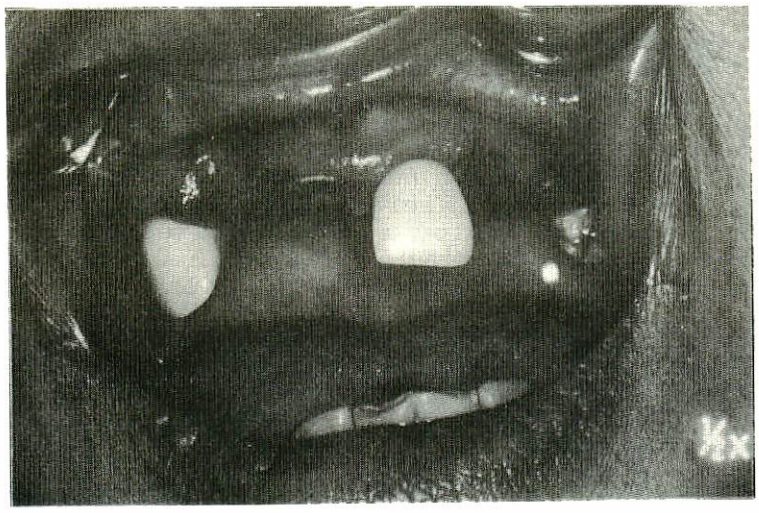


Fig. 2 A high risk case of damage to residual teeth.

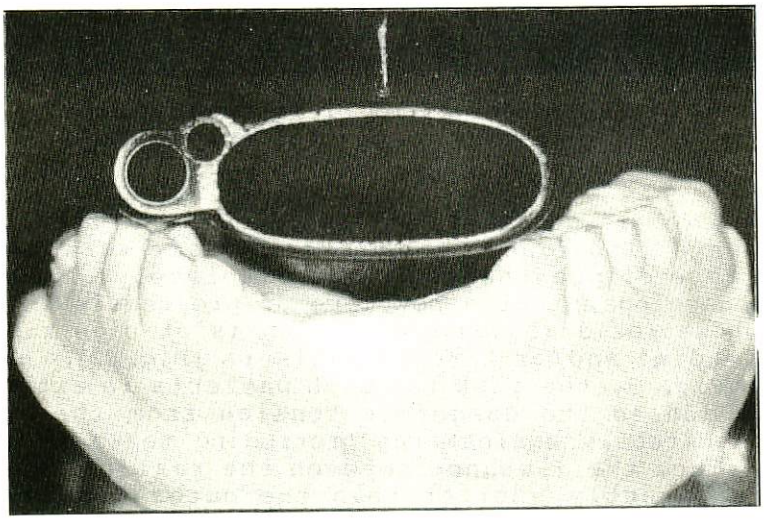


Fig. 3 Schema of tooth damage caused by laryngoscopes.

In this paper, a newly designed block type of dental prosthesis composed of dimethyl polysiloxane is described. This tooth guard is exclusively warranted for these patients. In other words, this new prosthesis should not be considered a substitute for current material, but as a new addition to existing choices for individual cases. Considering that peroral endoscopy is often performed by residents in training even upon patients with poor dental arch configurations in teaching hospitals, such as ours, we cannot overemphasize the importance of paying special attention to the protection of teeth during these maneuvers.

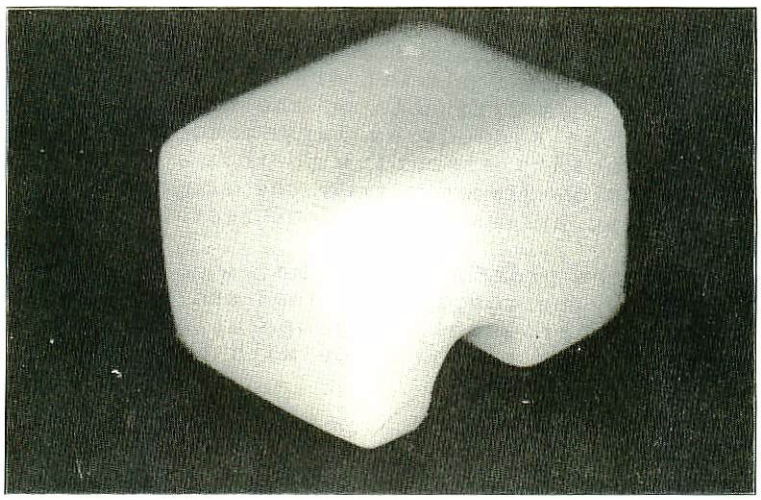
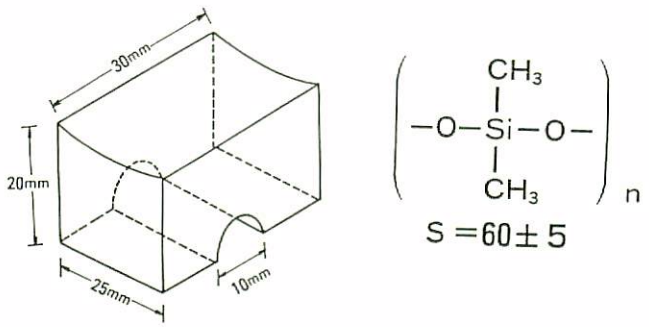


Fig. 4 A picture of the silicone block prosthesis.



D.M.P.S. dimethyl polysiloxane

Fig. 5 The dimentions of the silicone block prosthesis.

Figs. 4 and 5 show a picture of the new silicone block type of dental prosthesis, which is 25 mm wide, 30 mm long and 20 mm high, with a groove on its lower surface which meets the toothless gingiva. The upper surface is also slightly concave to receive the direct tension from the laryngoscope.

The silicone material used is dimethyl polysiloxane, which has been reported as desirable in terms of its biological characteristics as well as its heat stability, water resistance and appropriate elasticity[4]. Since this prosthesis is not planted inside any tissue but is temporally located in the oral cativity, we claim that, at least theoretically, it is reusable.

As for hardness, the Shore code of dimethyl polysiloxane is 60+5, similar to that of a normal eraser. This means that the block prosthesis is less irritable to the oral mucosa and strong enough to support the suspension laryngoscope. Thus, we may conclude that the points essential to this method include the distribution of tension directly from the scope against the hard palate and minimizing stress on the weak residual teeth.

The height of the prosthesis, 20 mm, was set in order to be slightly higher than the residual canines and/or incisors. Thus, unless the surgeon introduces the scope blindly, it is easy to avoid the direct contact of the scope with the weakened teeth of patients.

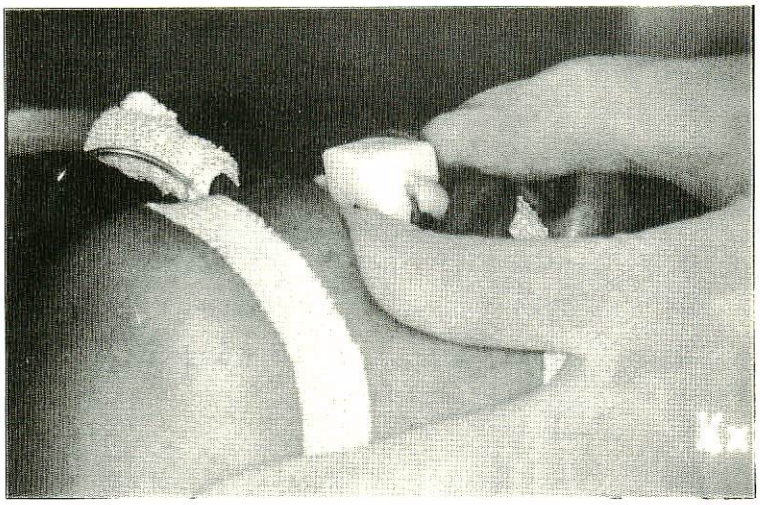


Fig. 6 Application of the silicone block prosthesis.

Fig. 6 shows a case in which this prosthesis has been applied. At first, the surgeon is requested to push the prosthesis in a downward direction in order to make the groove appropriately face the toothless gingiva. The suspension laryngoscope is then gently introduced onto the upper surface of the block prosthesis. When the insertion is not smooth, xylocaine jelly may be considered as a lubricant. In case the shape of the residual upper dentition is too unique to fit this prosthesis, it can be modified by simply cutting it with surgical knife.

References

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