

Basic principles of obturator design for partially edentulous patients. Part I: Classification

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Although there are many articles in the literature dealing with conventional removable partial denture design,¹⁻⁹ only a few of them address the problems of framework design for maxillary obturators.¹⁰⁻¹² Current design principles are formulated essentially for a bilateral model where components are placed on both sides of the dental arch to achieve cross-arch stabilization. This aids in the allocation of proportionate sharing of stress sustained by abutment teeth and thus increases their longevity. Patients with partial maxillectomies demonstrate a unilateral defect which replaces the residual tissue-bearing area, and the remaining teeth are located on one side of the dental arch.

RATIONALE

The need for the study of obturator design is evident because of (1) the increase in the number of partially edentulous patients undergoing partial resection of the maxilla, (2) the increase in the life expectancy after surgery, creating a need for definitive restorations, and (3) an ever-increasing percentage of younger patients in the maxillary resection patient population.

CLASSIFICATION

To discuss metal framework design for maxillectomy patients in a systematic manner, the classification shown in Fig. 1 is proposed. The classification is divided into six different groups based on the relationship of the defect area to the remaining abutment teeth. Class sequence reflects the frequency of occurrence in a patient population of 123 patients treated during a period of over 6 years.

Class I

The resection in this group is performed along the midline of the maxilla; the teeth are maintained on one side of the arch. This is the most frequent maxillary

defect, and most patients fall into this category (Fig. 2).

Class II

The defect in this group is unilateral, retaining the anterior teeth on the contralateral side (Fig. 3). The recommended design is similar to the design of a Class II Kennedy removable partial denture, in which indirect retention minimizes the possibility of dislodgement of the prosthesis under gravity. This type of surgical resection is favored more than the classical maxillectomy described in head and neck surgery texts. Presurgical consultation with surgeons has modified their surgical approach, with the objective of preserving the dentition on the contralateral side. The central incisor and sometimes all the anterior teeth to the canine or premolar are saved.

Class III

The palatal defect occurs in the central portion of the hard palate and may involve part of the soft palate (Fig. 4). The surgery does not involve the remaining teeth. The design for these patients is simple, and retention, stabilization, and reciprocation can be effectively planned.

Class IV

The defect crosses the midline and involves both sides of the maxillae. There are few teeth remaining which lie in a straight line (Fig. 5), which may create a unique design problem similar to the unilateral design of conventional removable partial dentures.

Class V

The surgical defect in this situation is bilateral and lies posterior to the remaining abutment teeth (Fig. 6). Labial stabilization may be needed, and splinting of remaining abutments is advisable.

Class VI

It is rare to have an acquired maxillary defect anterior to the remaining abutment teeth (Fig. 7). This occurs mostly in trauma or in congenital defects rather than as a planned surgical intervention. In this class, cross-arch stabilization is derived through a system of cross-arch bars which will provide wide

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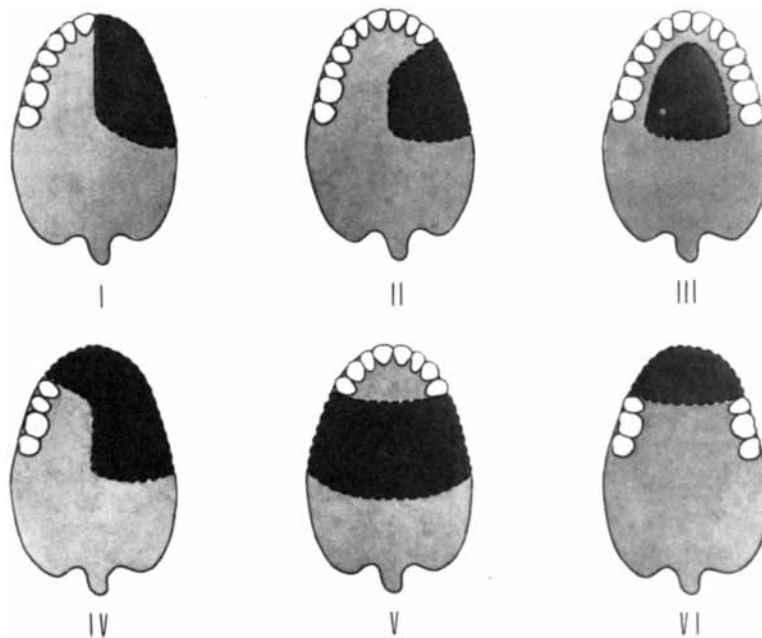


Fig. 1. Classification for partially edentulous maxillectomy dental arches: *Class I*, Midline resection. *Class II*, Unilateral resection. *Class III*, Central resection. *Class IV*, Bilateral anterior-posterior resection. *Class V*, Posterior resection. *Class VI*, Anterior resection.



Fig. 2. Class I defect. Midline resection of the maxilla to eradicate adenoid cystic carcinoma of the antrum.

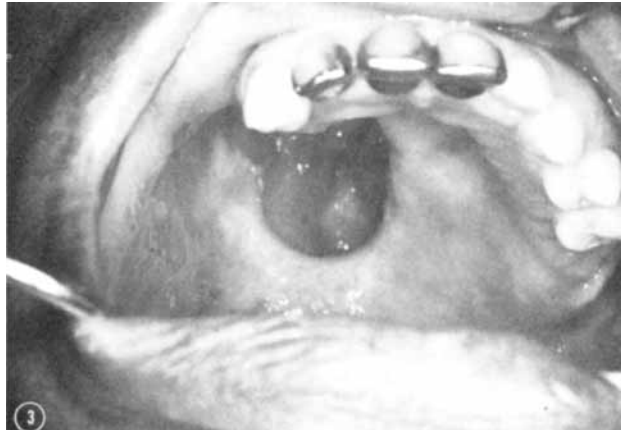


Fig. 3. Class II defect. The anterior teeth are preserved on the defect side of the dental arch.

distribution of support and retention from separated abutment teeth.

DISCUSSION

No attempt has previously been made to classify the dental arches for patients who have had partial resection of the maxilla. It seems logical that a system of grouping such patients be developed prior to the discussion of various obturator designs. Reviewing the patient population treated, six different groups were

classified according to the relationship of the remaining abutment teeth to the palatal defect. The classification excluded patients who have large palatal defects involving both sides of the dental arch and those who have only one tooth remaining. For these patients, the principle of design is similar to that for the edentulous maxillectomy patients. The remaining tooth or teeth are reduced in height to improve the crown-to-root ratio, and support is derived primarily from the residual soft tissue. These teeth are either



Fig. 4. Class III defect. The midportion of the palate is removed, leaving the teeth and dental arch intact.



Fig. 5. Class IV defect. The anterior teeth are resected on the contralateral side of the defect.



Fig. 6. Class V defect. The defect is located posterior to the remaining teeth.



Fig. 7. Class VI defect. The defect is located anterior to the remaining teeth.

covered by an overdenture or clasped with a flexible wrought-wire clasp.

In subsequent articles, the design for each class will be discussed in detail.

SUMMARY

A classification for partially edentulous maxillectomy dental arches is proposed. This classification is based on the frequency of occurrence of maxillary defects in a population of 123 patients.

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