The evolution of the obturator framework design

Gregory R. Parr, DDS, MS,[a] and L. Kirk Gardner, DDS[b]
School of Dentistry, Medical College of Georgia, Augusta, Ga; Veterans Administration Hospital, Portland, Ore.

This brief overview of the progress and evolution of philosophies of obturator framework designs was accomplished by hand, as well as via Medline. It begins in 1530 AD with Ambrose Paré who described the first button-shaped sponge and metal obturator, and continues through the formation of the American Academy of Maxillofacial Prosthetics and the development of the specialty. It concludes with a simplified discussion of complex surgical-prosthetic coordination and the use of vascularized free flaps with osseointegrated dental implants. (J Prosthet Dent 2003;89:608-10.)

Man's need for artificial replacement of missing body parts undoubtedly dates back as far as humanity itself. Over the centuries, people have used their creativity and have adapted the available materials for use in prosthetic restoration.

The earliest attempts at obturator construction are credited to Ambrose Paré who, around 1530, described button-shaped obturators made of metal and sponge.[1] As so often happens, Paré may not have been the first to perform these procedures, but he is one of the first to write about, describe, and illustrate them.

The search for better materials and improved means of prosthesis retention was advanced in the 18th century by Fauchard[2] who, using metal, created the prototype of the maxillary major connector for use in the replacement of natural teeth. This treatise was translated into German in 1733 but was not available in English until 1946.[3]

In 1867, Süersen suggested the rigid fixed obturator using a wire-loop posterior extension shaped by use of warm gutta-percha. This technique, except for modifications facilitating the use of newer materials, has remained the basis for current practices.[4]

The following 80 years were marked with good ideas but little progress because materials science lagged behind clinical creativity.[5] Lack of a prosthodontic specialty journal probably also hindered refinement of the specialty because advances were recorded in a number of different journals[6,7] rather than concentrated in 1 convenient place. This article reviews the literature of maxillary obturator design obtained via a Medline and hand search over the period of 1649 to 2002.

THE SPECIALTY DEFINED AND THE PRACTICE REFINED—1950-2000

In 1953 Ackerman[8] published his seminal article on maxillofacial prosthetics. This publication seems to have served as the basis for the specialty today and for the formation of the American Academy of Maxillofacial Prosthetics. In 1955 the companion to this early article was published.[9] The ensuing decades saw the development of the specialty of maxillofacial prosthetics and the refinement of obturator design and application through a series of small clinical and basic research steps.[10-18] Representing just a few of the many publications during this period, the cited references demonstrate how routine removable partial denture principles could improve obturator framework design and prosthesis success. Occasionally, clinicians such as Brown[19] published observations that helped clinicians to appreciate how intradefect considerations could compliment the effectiveness of obturator framework design.

At this time, 2 widely available maxillofacial textbooks were published,[20,21] organizing information from various sources and providing a framework for further development.[22-26] That development came when Aramany[27,28] provided a classification system of obturator defects and obturator framework design templates for each classification.

The existence of this classification seems to have provided the impetus for rapid refinement of obturator framework considerations via both clinical and basic science publications. These included additional framework designs,[29-32] retentive capacities of various clasp designs,[33,34] occlusion,[35] and the general effectiveness of prosthetic obturation and its effect on oral function.[36,37]

A text on clinical maxillofacial care was published by Beumer et al[38] in 1979. This volume recommended obturator framework designs making extensive use of infrabulge direct retainers for retention. This text was complemented by a second edition[39] that added a large and well-organized collection of the current research to the mix of information. These 2 texts, taken together,

[a]Professor, Department of Oral Rehabilitation.
[b]Veterans Administration Hospital, Portland, Ore..
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constitute a complete and timely collection of information on obturator framework design and other subjects relevant to maxillofacial prosthetics. The most recent maxillofacial textbook, edited by Taylor,[40] includes review of current obturator designs and design considerations, as well as a review of dental implant considerations for the maxillofacial patient.

THE FUTURE

The next phase in the evolutionary process for reconstruction of the maxillary defect seems to involve the blending of surgical and prosthetic reconstruction by use of microvascular surgical techniques and dental implants,[41-43] often to replace conventional obturation with removable prostheses. Classification systems with 3-dimensional visualization are available and may be valuable in facilitating and coordinating the surgical-prosthetic reconstruction of maxillary defects.[44,45] Although removable prostheses still provide most maxillary reconstructions, this trend portends a reduction but probably never the complete elimination of maxillary reconstruction with removable obturators.

SUMMARY

Observation is the first step in the process of scientific inquiry. The bulk of professional experience in any medical field is largely anecdotal in nature. Much of the available published literature in the field of obturator framework design is of this type. The development of specialty specific periodicals provided past practitioners and students with an outlet that facilitated the review and refinement of this information. The current evidence-based dental literature orientation should facilitate efficient and rapid development of new and unique maxillofacial treatment modalities.

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Reprint requests to:
Dr Gregory R. Parr
Department of Oral Rehabilitation
Medical College of Georgia
School of Dentistry
Augusta, GA 30912
Fax: 706-721-8349
E-mail: gparr@mail.mcg.edu

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Noteworthy Abstracts of the Current Literature

Systematic review of 10 years of systematic reviews in prosthodontics
Nico H. J. Creugers, and Cees M. Kreulen. *Int J Prosthodont* 2003;16:123-127.

Purpose. The objective was to make an inventory of systematic reviews in the field of prosthodontics and to assess the strength of evidence yielded by these studies.
Materials and Methods. The literature was searched using MEDLINE (keywords "dental" in subset combined with "meta-analysis" in publication type, and "dental" in subset combined with "systematic review"). Reviews related to prosthodontics were selected by hand. Analogies between the reviewing processes were assessed, and the quality was described.
Results. There were 138 articles qualifying as either systematic reviews or meta-analyses. Of these, 13 reported pooled data on prosthodontic subjects. Two pairs of reviews were identified as dealing with comparable items; the others described all different subjects. In one pair, the studies reviewed the survival of conventional fixed partial dentures (FPD); the other pair was on single-tooth implants. The pooled results within each pair were almost equal. For the FPD reviews, 65% of the unity of studies was included in both reviews. For the single-tooth implants, 29% of the potentially useful studies were included in both reviews. The data pooling processes showed the same pattern. One large study included in both reviews explained a large part of the similarity of the combined survivals of FPDs. For the single-tooth implant reviews, the largest common study explained 20% of the similarity.
Conclusion. Although there were methodologic differences between the paired reviews, they produced similar results. The outcomes of the evaluated reviews may be used as prognostic data; however, they cannot be used for direct comparison of treatments. —*Reprinted with permission of Quintessence Publishing.*