The Palatal Approach to Osseous Surgery

I. RATIONALE

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The primary objective of dentistry is the retention and maintenance of the natural dentition in health and comfort. The value of periodontal therapy in the satisfaction of this objective is well recognized.

Pocket elimination is a fundamental objective of periodontal therapy and, for many years, the gingivectomy has been regarded the basic surgical procedure in achieving this objective. Discomfort with the gingivectomy gradually developed, however, because of its failure to produce uniform success in pocket eradication and the inability of many areas, treated in this fashion, to maintain the immediate postoperative result.

Schluger was the first to express profound discontent with the gingivectomy. He stated that osseous deformities frequently resulted from periodontal lesions and that the neglect of these alterations in bone architecture was responsible for many surgical failures. He then presented the first sound concepts of modern osseous surgery. Others followed with various modifications and refinements.

The purpose of this paper is to discuss profound arch of maxillary molar teeth, suggest the application of knowledge gained from recent wound healing studies in the treatment of this area, and to introduce the palatal approach as a further refinement and as a possible solution to some of the problems to be discussed.

ARCHITECTURAL PATTERNS

Observation and study of normal periodontal architecture has exerted a profound influence on current standards for success in the treatment of periodontal disease.

Since the aim of therapy is to restore the periodontium to a status approximating the normal in form and in function, it is logical that the periodontist should attempt to copy the normal periodontium in his therapeutic endeavors.

Normally, the interproximal bone is at level coronal level than that on the buccal and lingual root surfaces (Fig. 1). This same scollop pattern is then reflected in the overlying gingival tissue. Bone and gingiva are adjacent and consistent with each other in health and, in effect, bone forms a scaffolding draped by gingival tissue.

The most frequent indication of a deviation from this normal architectural pattern has been found to be the development of the interproximal periodontal pocket. The osseous defect commonly developed in this area is termed the "interproximal crater" or "sugar-shaped defect." Crater development was explained by Weinmann, as the result of interproximal extension of the inflammatory process by way of the perivascular tissues of the interdental vessels.

Routine procedures of osseous surgery have been directed toward the elimination of the crater and the return of the arch to normal architectural form. Although osseous surgical techniques for the management of crater reduction have met with a high degree of success in the anterior and premolar areas, this has not been uniformly true in molar areas. A discussion of the reverse architectural pattern will serve to introduce the difficulties faced in the molar region.

A reverse architectural pattern exists when the interproximal bone (crest of the interdental septum) is at a more apical
Osseous surgery

The extraction of a maxillary central incisor is associated with the development of an alveolar crest that is a characteristic feature of this anatomy. The alveolar crest is a bony prominence located at the junction of the alveolar bone and the gingiva. It serves as a natural border between the bone and the soft tissues and is a key feature in the maintenance of periodontal health.

When a tooth is extracted, the alveolar crest may be injured or fractured, leading to a loss of bone. This can result in the formation of a bony crater or defect. In order to restore the alveolar crest and maintain the cosmetic and functional aspects of the maxilla, osseous surgery may be necessary. This involves the surgical removal of bone to create a new crest and restore the alveolar ridge.

The surgical approach for osseous surgery typically involves the use of osteotomes or drills to remove bone and create a new crest. The surgical incision is made, and the bone is carefully dissected to create a new alveolar ridge. The incision is then closed with sutures to allow for healing.

The goal of osseous surgery is to create a new alveolar crest that is as close as possible to the original crest. This may require the use of specialized surgical techniques and instruments. The success of osseous surgery depends on various factors, including the extent of bone loss, the condition of the surrounding soft tissues, and the skill of the surgeon.

In conclusion, osseous surgery is a valuable tool in the management of alveolar crest injuries and defects. It allows for the restoration of a normal alveolar ridge, improving both the cosmetic and functional aspects of the maxilla. However, it is important to carefully consider the indications and limitations of osseous surgery in each individual case.
gingival papilla restored. This tissue does not become attached to the root surface and pocket depth recurs concomitant with the coronal proliferation. Such techniques of osseous surgery not only fail to eliminate the pocket, but may produce a post-operative deformity more serious than the original lesion. Reverse architecture on single rooted teeth can be avoided by the removal of marginal bone from the radicular surfaces after reduction of the labial or buccal wall of the crater has been performed; the presence of trifurcated or bifurcated molar teeth, however, introduces a different and more difficult problem.

TRADITIONAL APPROACH TO OSEOUS SURGERY

Because of accessibility, it has been common practice to employ a buccal approach in regions where osseous craters were to be operated. The accepted procedure has been to elevate the overlying tissue and expose the buccal bony area, with subsequent removal of the buccal wall of the crater and the adjacent marginal bone. Although a few have advocated the removal of both buccal and lingual walls of the crater, thereby establishing the base of the crater as the new tip of the surgically prepared interradicular cone of the bone, most therapists have generally avoided the lingual area. While the buccal approach has usually produced an acceptable result, certain inherent problems have been seen to develop. These will be discussed as they affect the maxillary molar area. Of concern to the therapist have been the following:

1. Reverse gingival architecture and subsequent post-operative development of a bulbous interradicular papilla.

2. Denudation of buccal radicular surfaces.


4. Inadequate buccal embrasure space.

REVERSE GINGIVAL ARCHITECTURE

A typical pattern encountered in maxillary molar areas presents interradicular osseous craters with little, or no buccal or lingual pocket depth. Therapy involving the removal of the buccal crater wall produces a serious problem, if reverse architecture is to be avoided. To eliminate the crater, while avoiding reverse architecture, bone would necessarily have to be sacrificed from the buccal root surfaces to a level dependent upon the depth of the interradicular craters. The more buccal bone indicated for removal, the greater the danger of creating a concomitant therapeutic buccal trifurcation exposure.

In the past, most therapists have chosen to compromise and to accept a reverse architectural pattern in molar areas rather than risk a trifurcation involvement produced by buccal bone removal. Needless to say, the return of pocket depth, because of mesio-distal bridging of tissue and the reformation of an interradicular papilla, has been a common post-operative finding. Yet, in this situation, the therapist deemed this compromise justifiable, even though the results were not completely satisfactory. A few therapists attempted to minimize the effects of the reverse architectural pattern by grooving the interradicular bone. Although this was an improvement in selected cases, it did not alter the fact that reverse architecture still existed and, consequently, a compromised result remained.

Another undesirable sequel to this reversed architectural pattern of the maxillary buccal molar area has been the post-operative development of a prominent bulbous interradicular papilla. Perhaps this is due to a number of factors. The placement of a papilla in a prominent radicular position, not protected as in an interradicular area, violates a physiologic arrangement. Since it is prominent, it is no doubt traumatized by the tooth brush and also by its passage, to a lesser degree. The bulbous interradicular papilla can also be influen-
A study of human skull material sometimes reveals the bony housing of buccal roots of maxillary molars to be exceedingly thin and cortical in nature. With rotation of these teeth, one root may become exceptionally prominent resulting in a fenestration or complete destruction. The mesiobuccal root of a distally rotated maxillary first molar is a common site for this occurrence. Regardless of the condition over the buccal radiopaque surfaces, the interradicular area contains cancellous bone beneath the cortical plate. Therefore, after osteous exposure, subsequent resorption over the root prominences is greater than that occurring interproximally, serving to accentuate the interradicular papilla. This in turn is reflected by the overlying soft tissue formed and virtually assures an abnormal physiologic contour. The poor post-operative results of such a pattern (Fig. 1) can probably be explained by the studies on wound healing previously cited.

The resorative pattern also forms a strong contra-indication to the establishment of long beams, resulting in a very thin buccal plate, on the bone overlying root prominences.

** Buccal Recession**

It has been the repeated observation of the authors that buccal recession in molar areas is not tolerated as well as a similar amount of recession on the palatal. Imme-
the interdental papilla results in poor papillary form, and produces a difficult area to maintain. A similar situation occurs when broad, flat contacts or crown rotations of adjacent teeth create a narrow buccal embrasure.

The problem of a poor post-operative esthetic pattern is of concern in certain cases. Some patients object to the altered appearance which results from periodontal surgical procedures. Therapists have rationalized this to be of minimal importance when compared to the advantages of prolonging the retention of the teeth. Few would argue, however, that the conservation of buccal tissue would not be a desirable aim.

**THE PALATAL APPROACH**

Definite objections can be seen to performing onous crater reduction from the buccal aspect of maxillary molars. The palatal approach should not be interpreted to mean that craters involving the maxillary molars can be managed routinely by palatal surgery alone. It is not a substitute for buccal osseous surgery. If certain osseous problems exist on the buccal aspect, they must be handled from the buccal. The overwhelming majority of cases having onous craters involving the maxillary molars will require some "beveling" of a thick buccal plate or "hollowing out" of an interdental area for a proper sluiceway.

Most medium depth craters will require some reduction of the buccal wall of the crater along with the complete reduction of the palatal wall of the crater. All deep craters will require some reduction of the buccal wall of the crater along with the reduction of the palatal wall of the crater. However, in both of these instances, when the buccal wall is reduced, it is done with discretion and caution and seldom ever reduced to the extent of that on the palatal aspect. The type or topography of crater will vary considerably, and an accurate appraisal of this deformity is mandatory before corrective steps can be instituted.

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**INADEQUATE BuccAL EMBRASURE SPACE**

The disto-buccal root of the first maxillary molar frequently converges distally in close proximity to the mesial root of the second molar. If an interproximal crater exists between two such molars and is operated from the buccal, a poor post-operative result occurs. The reduction in height of the buccal wall of the crater reduces the mesio-distal width of the interproximal bone because of the convergence of the two roots. Inadequate embrasure space to house
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PLACEMENT

In establishing the rationale for
the palatal approach, there are anatomical
considerations that deserve attention. A
comparison of the osseous morphology of the
buccal aspect of the palatal plate with that of the buccal area is
helpful. The buccal bony housing is sometimes thin, being formed by the fusion of

the cortical plate and the alveolar bone.
Bone fenestration and dehiscence are more
common than was formerly suspected. The
thicker palatal area, on the other hand,
swelling away from the teeth, is more likely to prevent cancellous bone between
the outer cortical plate and the alveolar
bone (Fig. 6). This topographical pattern
may be used advantageously in regard to
post-operative resorption and subsequent
redistribution during healing. If a parallel
can be drawn with the results of the animal
studies to date, it could be speculated
that palatal resorption might be less than
that on the buccal and that eventual refor-
mation of the resorbed bone palatally might
also exceed that on the buccal. At least, it is

Fig. 6 Buccal-Lingual section of maxillary second premolar tooth.
Buccal surface (B) shows a remnant bulging consisting of fused
enamel plates. Lingual surface (L) indicates thicker bone with narrow
spaces evident. (Courtesy Dr. D. W. Cohen.)
presently believed that greater latitude and safety exist for avascular surgery in the presence of cancellous bone. It should be remembered that if the marginal bone is thin there is no need for osteous contouring; an adequate bevel can be made in the gingival tissue and bone exposure is therefore contraindicated.

The importance of an adequate preoperative essay of tooth relationship to alveolar housing and the relative amount and type of osteous tissue present cannot be overemphasized. It is here that refinement in diagnostic measures is imperative. When pocket depth exists in the presence of a thin unfavorable osseous topography, the therapist’s objectives must be lowered; some areas should not be opened at all, for a far greater defect than was originally present may occur as a result of treatment (Fig. 7).

![Fig. 7. Recession near midbuccal root of maxillary first molar. Tissue covering the incisal surface is exceedingly thin indicating minimal or no osseous covering. Buccal approach in this instance is contraindicated. (Refer to Figure 6.)](image)

The entire palate is covered by masticatory mucosa (essentially attached gingiva) a dense, collagenous, keratinized tissue firmly bound to underlying bone. This tissue is well adapted to function in resisting the trauma of food passage over and beyond the marginal area. Buccal coverage, on the other hand, consists of both attached gingiva and alveolar mucosa in varying proportions.

Other marked anatomical advantages to a palatal approach are provided by the variation in tooth form from buccal to lingual. When viewed from the palatal, maxillary molar teeth can be considered single rooted, simulating a series of premolars. The removal of the lingual wall of an inter-arched tooth, coupled with the marginal reduction necessary to return normal physiologic architecture, obviously avoids the possibility of opening an uninvolved buccal trifurcation area.

The coroinal anatomy of maxillary molar teeth, together with the usual divergent pattern of their lingual roots, normally creates a wider embrasure space palatally than is found on the buccal aspect. This wider embrasure provides another important operative advantage. In the event that interproximal involvement has progressed to the point of entry into a mesial or distal trifurcation, greater access and latitude for grooving and contouring is provided.

The stimulators and cleansing effect of the tongue operating against the palatal tissues is one important maintenance feature that is frequently overlooked. Speech, deglutition and mastication as well as other activities of the tongue, create repeated contact with palatal tissues. This natural cleansing action reduces the accumulation of materia alba, microcosm and deposit formation and serves to stimulate and maintain the palatal tissues in a state of health (Fig. 8). The cleansing effect may well account for the reduced caries index on palatal surfaces of maxillary teeth, as compared with that of the buccal.

Contrary to common opinion, the palatal aspect affords adequate access and visibility for the operative procedure. Difficulties encountered with cheek retraction, particularly in the second maxillary molar area, are completely eliminated. Although the tongue is present, it is far below the operative site and presents no problem.

Although the authors have had no problems involving the major (posterior) palat-
The anatomical advantage is measured by the variation between buccal lingual, from the palatal maxillary. It is considered single rooted, border of the premolar. The retromolar area of an interdental... or interproximal. The marginal ridges return normal physiologic function. The possibility of an uninvolved buccal pre-... to the buccal aspect. This provides another important advantage. In the event that involvement has progressed vertically into a mesial or distal aspect, access and latitude for suturing is provided.

...tery, and cleansing effect of retting against the palatal... is reduced. Speech, mastication as well as other activities, create repeated dental tissues. This natural reduces the accumulation of microorganisms and deposit...ed to stimulate and dislodge tissues in a state of health. The cleansing effect may be reduced when indexes of maxillary teeth, as that of the buccal.

Common opinion, the palatal leukocyte access and visibility procedure. Difficulties encounter retraction, particularly maxillary molar areas, eliminated. Although the area is well below the denture plane, the retting presents no problem.

Thus, most advantages cited for the palatal approach are not present in the mandibular arch.

The classification of osseous crests and their therapy utilizing the palatal approach will be presented in a subsequent paper.

SUMMARY
Problems associated with the elimination of osseous crests in the maxillary molar area have been discussed. The rationale for a refinement in the surgical management of this area has been presented with special attention given the unique anatomical features of the area and the significance of recent studies on periodontal wound healing.

BIBLIOGRAPHY
UNIVERSITY OF PENNSYLVANIA

A Clinical Fellowship in Oral Pathology, supported by the American Cancer Society, is available to qualified applicants at the University of Pennsylvania, School of Dentistry. A tax-free stipend of $3,600.00 accompanies the Fellowship for 1 year beginning July 1. The deadline for receipt of all credentials is March 1. Address all inquiries to: CHAIRMAN, Committee on Tenurehips and Fellowships, University of Pennsylvania, School of Dentistry, 4001 Spruce Street, Philadelphia 4, Pennsylvania.

Book Reviews


This text discusses in a concise manner the basic principles of periodontology. In spite of the size of this book, (224 pages) it covers most phases of periodontics. It has a complete index and is well illustrated by photographs.

The first few chapters are devoted to the description of supportive periodontal disease. In succeeding chapters, treatment is discussed for various conditions. Scaling, subgingival curettage, the surgical approach, and the equilibrium of occlusion are covered. The last chapters point out the importance of systemic influence on the periodontium.

Due to the brevity of the book, some details are omitted and therefore the reviewers would not recommend it for the dental student or periodontist. It would, however, be a good text for the general practitioner who desires a review of the subject.

H. M. S.


As so adequately stated and qualified in the foreword and preface by Sir Charles Hesseus and Dr. J. P. Walsh, this manual's main function is to bring to light broad principles and generalities of the oral cavity which should be of interest to the medical practitioner.

This synopsis was put together from lectures which were presented to the 4th year medical students at the University of Oregon. Considering that Dr. Walsh has condensed many months of dental education into 127 pages, he has done well.

As a reference, this manual seems inadequate for the dental student or practitioner; but on the other hand, it will serve the purpose of preparing the medical student or practitioner to appreciate those oral and para-oral problems which confront the dentist.

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