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Pterygoid Implants: Expanding Posterior Maxillary Rehabilitation without Grafting

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ABSTRACT
Pterygoid implants have emerged as a valuable alternative for the rehabilitation of severely atrophic posterior maxillae. Their unique placement in the pterygoid region allows clinicians to avoid complex grafting procedures such as sinus lifts and bone augmentation. This article provides a descriptive overview of the pterygoid implant technique, including anatomical considerations, indications, surgical protocol, prosthetic rehabilitation, advantages, and clinical considerations.

I. INTRODUCTION

Rehabilitation of the posterior maxilla poses significant challenges due to limited bone availability, maxillary sinus pneumatization, and poor bone quality. Traditionally, bone grafting and sinus lift procedures were the standard approach for placing implants in this region. However, these techniques increase treatment time, cost, and patient morbidity.

Pterygoid implants, first introduced in the early 1990s, offer a graftless solution by engaging the dense cortical bone of the pterygoid process of the sphenoid bone, providing anchorage for posterior maxillary prostheses.

Methods (Descriptive Surgical Technique)
-Patient Assessment
-Patients indicated for pterygoid implants typically present with:
-Severe posterior maxillary atrophy
-Insufficient vertical bone height for conventional implant placement
-Desire to avoid sinus lift surgery
-Pre-operative evaluation includes:
-Panoramic radiographs
-Cone Beam Computed Tomography (CBCT) to assess bone anatomy, pterygoid region position, and proximity to anatomical landmarks such as the maxillary sinus, greater palatine canal, and pterygopalatine fossa.

Surgical Approach
-The procedure is performed under local anesthesia with or without intravenous sedation.
-A crestal or slightly palatal incision is made to expose the posterior maxillary ridge and pterygoid region.
-Osteotomy preparation starts from the maxillary tuberosity and is directed posteriorly and superiorly towards the pterygoid process at an angle of approximately 45° to 60° relative to the occlusal plane.
-Implant length typically ranges from 15 to 20 mm, with diameters around 3.75–4.3 mm, depending on the manufacturer and bone volume.
-The implant is advanced through the maxillary tuberosity into the pterygoid process until primary stability is achieved.

Prosthetic Rehabilitation
-Pterygoid implants are commonly used in conjunction with anterior implants as part of full-arch fixed prosthetic rehabilitation, such as in All-on-4 or All-on-6 variations.
-After a healing period of 4 to 6 months (or immediate loading if primary stability is high), impressions are taken for fabrication of the final prosthesis.

Materials for the prosthesis may include:
-Metal-acrylic hybrid
-Monolithic zirconia
-Metal-ceramic
-Postoperative Care
-Patients are advised on standard postoperative care:
-Antibiotics and anti-inflammatory medication
-Soft diet for initial weeks
-Regular follow-ups for clinical and radiographic monitoring

II. DISCUSSION

Pterygoid implants provide posterior support for maxillary prostheses, reducing cantilever length and improving load distribution. Their placement avoids the need for sinus augmentation procedures, reducing surgical complexity and patient morbidity.
However, surgical expertise and thorough anatomical knowledge are essential to avoid complications, such as penetration into the pterygopalatine fossa or injury to neurovascular structures.
-Potential challenges include:
-Limited surgical access
-Difficulty in achieving parallelism with anterior implants
-Prosthetic angulation issues
-With appropriate planning and execution, pterygoid implants represent a predictable and effective solution for atrophic posterior maxilla rehabilitation.

III. CONCLUSION

Pterygoid implants offer a graftless, stable, and functionally efficient alternative for posterior maxillary rehabilitation in patients with severe bone loss. Their use helps reduce treatment time, improve patient comfort, and achieve predictable long-term outcomes when performed by experienced clinicians.

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