IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 23, Issue 7 Ser. 2 (July. 2024), PP 57-61
www.iosrjournals.org

"Maxillofacial Defect and Rehabilitation: A Review Article."

Dr. Pragya Agarwal[1],Dr. Alok Sharma[2],Dr. Jitendra khetan[3],
Dr. Akshata Nirgude[4]

2rd year PG ,Department of Prosthodontics and Crown & Bridge, NIMS dental college, Jaipur, Rajasthan[1]
Professor and Head, Department of Prosthodontics and Crown & Bridge, NIMS Dental College, Jaipur, Rajasthan[2]
Professor, Department of Prosthodontics and Crown & Bridge, NIMS Dental College, Jaipur, Rajasthan[3]
3rd year PG, Department of Prosthodontics and Crown & Bridge, NIMS dental college, Jaipur, Rajasthan[4]

Abstract
Maxillofacial prosthetics plays a pivotal role in restoring function and aesthetics for patients with a variety of conditions, including congenital deformities, acquired defects, and post-surgical reconstructions. This article provides an overview of the field, emphasizing its importance in addressing complex healthcare challenges, such as mucormycosis cases in individuals recovering from COVID-19. The objectives of maxillofacial prosthetics include restoring aesthetics and function, protecting tissues, providing therapeutic effects, and offering psychological therapy. Classification systems for maxillary and mandibular defects are discussed, guiding treatment planning and management. Rehabilitation strategies, including the use of obturator prostheses and various prosthetic options, are outlined in detail. Proper retention methods and the potential role of endosseous implants in enhancing prosthetic outcomes are also highlighted. In summary, maxillofacial prosthodontists play a vital role in providing comprehensive rehabilitation, combining scientific knowledge with artistic skill to improve patients' quality of life in the face of maxillofacial defects.

Date of Submission: 01-07-2024 Date of Acceptance: 11-07-2024

I.INTRODUCTION

Maxillofacial prosthetics has evolved as a crucial field post-World War II, serving as a vital connection between dentistry and surgery, especially in cases following surgical removal of cancer in the head and neck area.[1] Prosthodontists are integral members of the rehabilitation team, engaged in pre-treatment planning and the creation of post-treatment devices to restore patients' appearance and functionality, including chewing, swallowing, and speaking. The complexity of surgical reconstruction for maxillofacial deformities often makes prosthetic treatment the preferred choice, addressing both congenital and acquired deformities that can significantly impact patients' physical and psychological well-being, underlining the importance of this specialized area in healthcare.Moreover, the recent emergence of mucormycosis cases in individuals recovering from COVID-19 Research has revealed the important role of maxillofacial prosthodontists. in addressing complex healthcare challenges.[2] This article discuss the techniques for constructing maxillofacial prosthetic devices for various clinical situations emphasizes the importance of the prosthetic aspect in the implant field for long-term success. As advancements in surgical and radiation treatments continue to progress, the demand for trained maxillofacial prosthodontists is expected to rise, highlighting the ongoing need for specialized professionals in this field to cater to the evolving healthcare landscape effectively.

II.DEFINITION

"Maxillofacial prosthetics is the branch of prosthodontics concerned with the restoration and / or replacement of the stomatognathic and craniofacial structures with prostheses that may or may not be removed on a regular or elective basis".[3]

III.OBJECTIVE

1. Restore esthetics and function.
2. Protect tissues.
3. Provide therapeutic effects.
4. Offer psychological therapy.

IV.TYPES:

Acquired (e.g. Accidents), congenital (e.g. cleft), and developmental (e.g., prognathism).

V.MAXILLARY DEFECTS

Maxillary defects include a variety of conditions that can result from different causes, such as surgical treatment of benign or malignant tumors and traumatic injuries. These defects can have significant implications for patients, affecting their ability to speak, eat, and maintain proper oral health.

One of the key classification systems used to categorize maxillary defects is Armany's classification, which was introduced in 1987. Armany classified maxillectomy defects into six categories according to their relationship with the adjacent teeth.

Armany's classification system provides a structured approach to understanding and managing maxillary defects, helping healthcare professionals determine the most appropriate treatment strategies for each specific case.[4,5]

Class I: The resection is performed in the front midline of the maxilla, with supporting teeth on one side of the arch.

Class II: The defect is on one side only, with the anterior teeth remaining on the opposite side.

Class III: The defect is located in the central part of the hard palate and might extend to the soft palate.

Class IV: The defect spans the midline and affects both sides of the maxilla, with supporting teeth on one side.

Class V: The surgical defect is on both sides and behind the supporting teeth, possibly requiring labial stabilization.

Class VI: The defect is in the front of the maxilla with supporting teeth present on both sides in the back[.6].

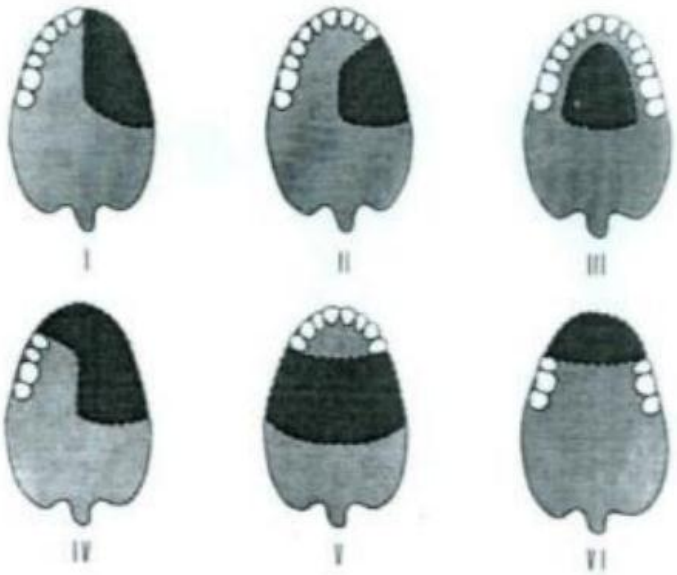

Fig1: Armany's Classification

Soft palate defects represent another category of maxillary issues that can significantly impact a patient's quality of life. These defects can be congenital, acquired, or developmental in nature, leading to structural or functional challenges. The loss of part or all of the soft palate can lead to inadequate closure of the pharynx, necessitating the use of obdurator prostheses to bridge the gap between the remaining hard and/or soft palate and the pharynx..[5]

Cleft lip and palate deformities are some of the most common congenital anomalies that affect the midface. These deformities include clefts in the upper lip and/or palate, varying in severity and complexity. Veau's classification system is commonly used to categorize cleft lip and palate defects based on their characteristics.

Veau's classification system:

Type 1: Defect in the vermilion or red part of the lip.

Type 2: Clefts involving the vermilion and part of the lip muscle, but not reaching the floor of the nostril on the affected side.

Type 3: Unilateral complete clefts affecting the entire thickness of the lip, usually with significant nasal deformity.

Type 4: Bilateral clefts of the lip, which can be partial, complete, or a combination of both.

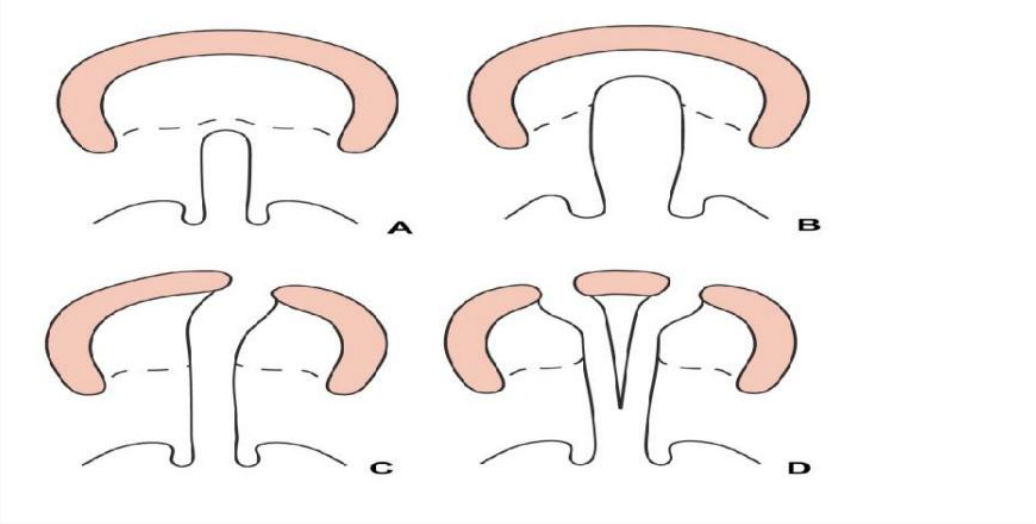

Fig 2: classification by Veau's

VI.MANDIBULAR DEFECTS

The mandible, a crucial bone in the human body, can be impacted by various pathologies that may necessitate resection for treatment. Pathologies affecting the mandible can be primary or secondary, often requiring mandibular resection with or without involvement of surrounding soft tissues. Mandibular discontinuity caused by tumor surgery can be effectively addressed with immediate or delayed surgical reconstruction to restore both continuity and function. Failure to re-establish mandibular continuity can lead to functional limitations for the patient, including mandibular deviation due to cicatricial changes and muscle absence on the resected side. [7]

Cantor and Curtis classification system categorizes acquired mandibular defects into different classes based on the extent of resection, providing a framework for treatment planning and management.

Class I: Marginal resection. The alveolar process is resected, but the lower border of the mandible remains intact.
Class II: Segmental free-end resection (discontinuity defect) that does not cross the midline.
- Modification a: Bilateral resection behind the second premolar.
- Modification b: Unilateral resection behind the lateral incisor.
- Modification c: Bilateral resection behind the lateral incisor on one side and the second premolar on the other side.

Class III: Segmental free-end resection that extends up to or crosses the midline.
Class IV: Class III plus resection of the TMJ.
Class V: Anterior bounded resection.[6]

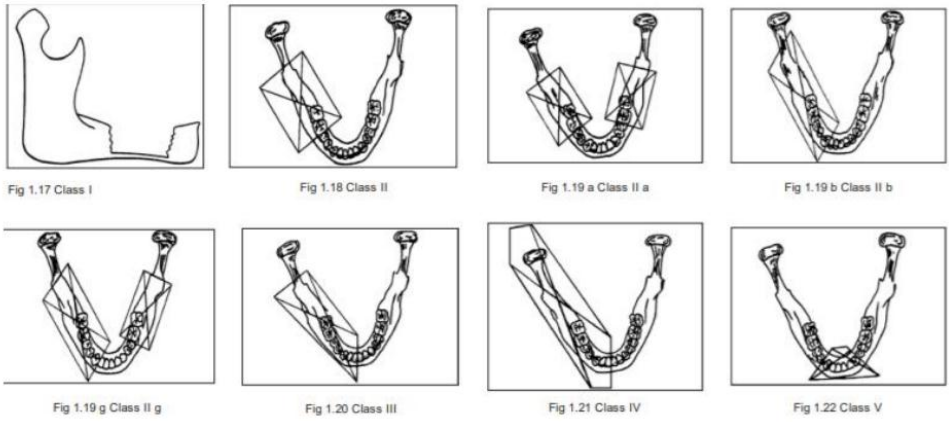

Fig 3: Cantor and Curtis classification for mandibular defects

VII.REHABILITATION

MAXILLARY DEFECT

- **SOFT PALTAE:**

Soft palate defects can lead to structural or functional issues, necessitating the use of an prosthesis like obturator to close the gap between the remaining hard and/or soft palate and the pharynx. Pharyngeal obturator prostheses, also called speech aids, extend beyond the remaining soft palate to separate the oropharynx from the nasopharynx[9]. The obturator's design provides a stable structure that enables the pharyngeal muscles to effectively achieve palatopharyngeal closure.

- **CLEFT PALATE:**
- Various prosthetic options like overlay dentures and removable partial prostheses are used to restore the vertical dimension of the face and improve occlusion in patients with cleft palate.
- Techniques such as border molding and preparation of abutment teeth are crucial for successful prosthetic rehabilitation.
- Patients with malpositioned teeth may need full coverage preparation using anatomically carved crowns, thimble crowns, and a splinting bar to correct the problem..[10-12]

- **MANDIBULAR DEFECT:-**

Surgical removal of the mandible can lead to structural changes while maintaining overall continuity, yet typically preserves facial form and functional movements of the jaw. Discontinuities in the main body of mandible can affect facial form and alter mandibular movement due to the loss of muscle attachments on one side while preserving attachments on the opposite side.[13]

- **GLOSECTOMY:-**

The prosthodontic treatment goals for total glossectomy rehabilitation focus on reducing the oral cavity size, directing the food bolus with a tongue prosthesis, protecting the mucosa, developing contact for speech and swallowing, and enhancing appearance and psychosocial adjustment. The construction process involves using a maxillary tray for mouth registration, mouth preparations for the framework, creating a wax pattern, casting in chrome cobalt alloy, and suggesting the creation of three prosthetic tongues for speech and swallowing purposes. These steps are crucial in providing comprehensive rehabilitation for patients who have undergone total glossectomy surgery.[14,15]

VIII.RETENTION OF PROSTHESIS

- **Mechanical Retention:**
  - Eyeglasses, magnets, snap buttons, straps, and adhesives can be used for retention.
  - . A combination of anatomical, mechanical, and adhesive retention methods is effective for treating extensive facial defects.

Permanent Mechanical Retention:

- Properly designed clasps provide stability, splinting, bilateral bracing, and reciprocation.[16]

- **Adhesives:**

Various types of materials such as silicone, acrylic resin emulsion, and pressure-sensitive tape are employed for retention purposes..[17]

- **Extraroral Retention:**

Anatomic retention using hard and soft tissues is crucial for successful prosthetic outcomes.

IX.IMPACT OF ENDOOSSEUS IMPLANT IN MAXILLOFACIAL PROSTHESIS

- **Auricular Prostheses:** Implants in temporal bone for retention, hygiene challenges reported.
- **Nasal Prostheses:** Implants in maxilla superior surface for retention, U-shaped bar design.
- **Orbital Prostheses:** Implants in supraorbital or lateral rim, avoid medial placement.
- **Mandibular Defects:** Implants in grafted bone post-tumor surgery for dental prosthesis.
- **Hard and Soft Palate Defects:** Implants resist mastication forces, four suggested for maxilla support.[18-21]

X.SUMMARY:

Patients with intraoral or extraoral defects seek treatment to regain comfort, function, and a natural appearance. The Maxillofacial Prosthodontist is responsible for creating prosthesis that did not compromise the lingering tissue. As the anatomy changes, there is increased demand on these structures.End-osseous implants can provide stability, retention, support for prosthesis when present anatomy cannot fulfil these roles. Prosthodontic

rehabilitation of any maxillofacial defect is complex and time-consuming, but with meticulous treatment planning and attention to detail, it can be one of the most rewarding procedures in prosthodontics. The combination of science and art in dentistry.is crucial in designing prostheses. A skilled prosthodontist who uses creative skills, analytical thinking, and core aim of construction of denture significantly aids In the rehabilitation of many patients, rehabilitating individuals with acquired or congenital defects is a rewarding aspect of prosthodontics.

REFERENCES:

[1]. Thomas D Taylor, editor. Clinical maxillofacial prosthetics. Carol stream, Illinois: Quintessence Publishing Co; 2000.
[2]. Phasuk K, Haug SP. Maxillofacial prosthetics. Oral and Maxillofacial Surgery Clinics. 2018 Nov 1;30(4):487-97.
[3]. Glossary of Prosthodontic Terminology 1999
[4]. Obturator prosthesis design for acquired maxillary defects Ronald P. Desjardins, D.M.D., M.S.D.* Mayo Clinic and Mayo Foundation, Rochester, Minn.
[5]. Chalian, V. A., Drane, J. B., and Standish, S. M.: Maxillofacial Prosthetics. Baltimore, 1971, The Williams & Wilkins Company.
[6]. John Beumer III,Thomas A Curtis, David N Fritell. Maxillofacial rehabilitation Prosthodontic and surgical considerations. St.Louis: C.V. Mosby; 1979
[7]. Adelusi EA. Classification of mandibulectomy/mandibular defects. World J Oral Maxillofac Surg. 2019; 2 (3). 2019;1032.
[8]. Cantor R, Curtis TA. Prosthetic management of edentulous mandibulectomy patients. Part I. Anatomic, physiologic, and psychologic considerations. The Journal of prosthetic dentistry. 1971 Apr 1;25(4):446-57.
[9]. LaVelleW ,HardyJ. Palatal lift prostheses for treatment of palatopharyngeal incompetence. J Prosthet Dent 1979;42:308-12.
[10]. Ashok Jhanji, Steve T. Stevens. Fabrication of one piece hollow obturators.J Prosthet Dent1991;66:136-8.
[11]. Paprocki GJ, Jacob RF, Kramer DC. Seal integrity of hollow bulb obturators. Int J Prosthodont 1990;3:457-9.
[12]. L.Kirk Gardner, Gregory R. Parr and Arthur O. Rahn. Simplified technique for the fabrication of a hollow obturator prosthesis using vinyl polysiloxane. J Prosthet Dent 1991;66:60-3
[13]. Robert L. Schneider, Thomas D Taylor. Mandibular resection guidance prostheses: A literature review.J Prosthet Dent1986;55:84-86.
[14]. Moore D. Glossectomy rehabilitation by mandibular tongue prosthesis. J Prosthet Dent 1972;28:429-32.
[15]. Robert E McKinstry, Mohamed A. Aramany,Quinter C.Beery, Frank Sansone.Speech consideratins in prosthodontic rehabilitation of glossectomy patients. J Prosthet Dent1985;53:384-9.
[16]. J.J.Gary and M. Donovan. Retention designs for bone anchored facial prostheses. J Prosthet Dent 1993;70:329-32.
[17]. C. J. Andres, S. P. Haug, C. A. Munoz, and G. Bernal, "Effects of environmental factors on maxillofacial elastomers: part I-literature review," Journal of Prosthetic Dentistry, vol. 68, no. 2, pp. 327–330, 1992.
[18]. Tolman D and Desjardins R. Extra oral application of osseointegrated implants. J Oral Maxillofac Surg 1991;49:33-7
[19]. Holgers K, Tjellstrom A, Bjursten L, Erlandsson B. Soft tissue reactions around percutaneous implants. Int J Oral Maxillofac Implants 1987;2:35-8
[20]. Nishimura R, Roumanas e, Moy P, Sugai T. Nasal defects and osseointegrated implants: UCLA experience. J Prosthet Dent 1996;76:597-600.
[21]. Keller E, Desjardins R, Eckert S, Tolman D. Composite bone grafts and titanium implants in mandibular discontinuity reconstruction. Int J Oral Maxillofac Implants 1988 ;3:261-4
[22]. Brown K.Peripheral considerations in improving obturator retention. J Prostet Dent 1968;20:176-9.