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Dr. Diksha Verma
PG Student, Department of
Prosthodontics, Crown & Bridge,
Jaipur Dental College, Maharaj
Vinayak Global University,
Jaipur, Rajasthan, India

Dr. Sunil Kumar MV
Head of Department,
Department of Prosthodontics,
Crown & Bridge, Jaipur Dental
College, Maharaj Vinayak Global
University, Jaipur, Rajasthan,
India

Dr. Rajesh Kumar
Professor, Department of
Prosthodontics, Crown & Bridge,
Jaipur Dental College, Maharaj
Vinayak Global University,
Jaipur, Rajasthan, India

Dr. Krishan Kumar
Senior Lecturer, Department of
Prosthodontics, Crown & Bridge,
Jaipur Dental College, Maharaj
Vinayak Global University,
Jaipur, Rajasthan, India

Corresponding Author:
Dr. Diksha Verma
PG Student, Department of
Prosthodontics, Crown & Bridge,
Jaipur Dental College, Maharaj
Vinayak Global University,
Jaipur, Rajasthan, India

Guiding Precision: The maxillary palatal ramp in maxillofacial prosthetics: A case report

Dr. Diksha Verma, Dr. Sunil Kumar MV, Dr. Rajesh Kumar and Dr. Krishan Kumar

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Abstract

The incorporation of palatal ramps in maxillofacial prosthetics has shown to significantly enhance the stability and functionality of dental prostheses. This study explores the design, application, and outcomes of maxillary palatal ramps in patients with compromised denture retention and occlusal instability. Through clinical case, the efficacy of palatal ramps in improving masticatory efficiency, speech, and overall patient satisfaction is evaluated. The findings indicate that palatal ramps can play a crucial role in the successful rehabilitation of maxillofacial prosthetics, providing an innovative solution to common challenges faced in prosthodontic treatments.

Keywords: Palatal ramps, occlusal stability, denture stability, masticatory efficiency

Introduction

A Palatal Ramp is a specialized device used in the field of maxillofacial prosthetics. It primarily addresses issues of mandibular deviation that occur after major surgeries like mandibulectomy, which involves the removal of part of the mandible due to cancer or traumatic injuries. Resection of the palate, tongue, floor of the mouth, and mandible is frequently necessary as part of surgical treatment for neoplastic lesions of the oral cavity [1, 2]. Mandibular deviation and changed muscle function result from surgically removing the mandibular continuity. Clinically, it causes malocclusion and facial asymmetry [3]. The position and extent of the excision, the degree of soft tissue and innervation involvement, and the existence of residual natural teeth all affect how much of a deviation there is [3, 4].

It is recommended to restrict such clinical presentation using a corrective device called a "guide flange prosthesis." It can be applied either immediate postoperatively as intermaxillary fixation or within 7-10 days after the resection as removable device, for restoring mandibular function. [4, 5] The earlier the guidance therapy is initiated in the course of treatment, the more successful is the patient's definitive occlusal relationship [1]. An difficulty to achieve normal maxilla-mandibular connections may arise from delays in initiation caused by substantial tissue loss, tight wound closure, and other postsurgical morbidities. The provisional guide plane fabricated will facilitate fabrication of definitive restoration

The primary cause of this mandibular deviation is the pull from the contraction of the cicatricial tissue on the resected side and the uncompensated influence of the contralateral musculature, especially the internal pterygoid muscle. [6, 7] A deviated path of closure can cause uncoordinated masticatory movements, which can lead to dental or soft tissue injuries, facial deformity, altered speech, eccentric occlusion, and a disoriented masticatory cycle. [8] Numerous techniques have been proposed to restore the mandible to the ideal maxilla-mandibular relationship. These consist of mandibular guiding prosthesis, vacuum-formed PVC splints, intermaxillary fixation, and a wider maxillary occlusal table with a double row of teeth [1, 2, 9]. A mandibular guiding prosthesis is a type of maxillofacial prosthesis that is used to keep the jaws (maxillae and mandible) in a functional posture and to enhance speech and deglutition after surgery or trauma to the mandible or nearby structures [10].

Case Report

A 37-year-old female patient reported to the Department of Prosthetic Dentistry of Jaipur Dental College, Jaipur. She was complaining about inability to grind food, dryness of the mouth and disfigured facial appearance following mandibular resection. Patient had undergone segmental mandibulectomy following squamous cell carcinoma of mandible. No intermaxillary fixation was applied at surgical time. Extra oral examination revealed deviation of residual mandible towards right side and loss of functional occlusion on left side with predominant facial defect on right infraauricular region. Intraoral examination reveals missing 44, 45, 46, 47. [Figure 1].

Clinical Procedure

A comprehensive clinical and radiological examination of the patient's oral and maxillofacial anatomy is the first step in the procedure. Primary maxillary and mandibular impressions were made with alginate and poured with Type III dental stone (Neelkanth). A bite registration record is used to mount both casts. Following the mandibular cast's mounting, it was noted that the buccal surface of mandibular teeth was nearly 6 mm lingual to the maxillary palatal surface. [Figure 1]. Further wax was applied to the prosthesis' left side, in the direction of the palatal surface. The mandibular teeth's position dictated the wax's thickness. For retention, a C clasp is positioned on the 25. [Figure 2]. Dewaxing was completed, the entire pattern was invested in, and heat-cured acrylic was

packaged and processed. After recalling the patient, the maxillary prosthesis was placed and its stability was assessed. The prosthesis is then altered to function as a guiding prosthesis by adding self-curing acrylic resin to provide a guide plane or ramp palatal to the maxillary teeth that opposes the mandibular region that was not removed. [Figure 2]. When the ramp closes, the mandibular teeth are guided into the inter-cuspal position. The assistance enables the patient to consistently close into an intercuspal position [Figure 3]. Significant differences in face asymmetry were observed. After the prosthesis was placed, the patient received maintenance instructions and was followed up with on a regular basis. [Figure 4].

Discussion

A palatal ramp is a crucial prosthetic device used in maxillofacial prosthetics to mitigate mandibular deviation often resulting from surgical procedures like mandibulectomy. Constructed from durable materials such as acrylic resin, the palatal ramp is custom-designed to fit the patient's unique oral anatomy, facilitating proper mandibular alignment and function. This prosthesis not only aids in improving mastication and speech but also enhances aesthetic appearance by reducing facial asymmetry. Its ability to guide the mandible towards a more natural position significantly contributes to the patient's overall quality of life, making it an essential tool in the rehabilitation of individuals with maxillofacial defects.



Fig 1: Primary Impressio



Fig 2: Fabrication



Fig 3: a) Pre-Op



Fig 3: b) Final Insertion



Fig 3: c) Post-Op



Fig 4: Extra Oral View

Conclusion

The primary application of a palatal ramp is in patients who have undergone surgical procedures that affect mandibular alignment. The benefits include:

- **Functional Improvement:** Enhanced ability to chew, swallow, and speak, thereby improving overall quality of life.
- **Aesthetic Enhancement:** Reduction in facial asymmetry, leading to improved self-esteem and social interactions.
- **Therapeutic Impact:** The ramp can serve as a therapeutic device, guiding mandibular movements and potentially aiding in the long-term adaptation and rehabilitation of the masticatory system.

Conflict of Interest

Not available

Financial Support

Not available

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