Case Report

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Prosthetic Treatment of Maxillary Defect Associated with Edentulous Status. A Report of Two Cases

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ABSTRACT

Two patients with a completely edentulous maxillary arch and significant palatal defects received treatment with obturators. One patient has a congenital deformity ended by the formation of a cleft extending over the whole maxillary arch, while the other has a palatal defect with subtotal maxillectomy leaving part of the posterior alveolar ridge intact. The clinical treatment steps were described, with special emphasis on using tissue conditioner as a functional impression. In addition, the two- and three-step processing technique was described. The patients were satisfied with the restorations and regained their oral functions.

Introduction

Maxillofacial mutilations or malformations are anomalies that affect partial or significant hard and soft tissue structures of the stomatognathic system. The oral structures affected may include the hard and soft palates, unilateral or bilateral maxillae, premaxilla, the median palatal area, and others. The deficiency can affect internal oral structures such as the tongue and floor of the mouth, either partially or fully, unilaterally or bilaterally [1,2]. Depending on the degree of tissue loss of hard and soft oral tissues, defective oral functions occur, affecting the ability to speak, eat, swallow, and perform other oral functions, as well as facial deformity caused by the involvement of some facial structures and the absence of normal support for the remaining external facial structures [3-5]. Mutilations can be caused by a congenital deformity during intrauterine life or by the surgical excision of a benign or cancerous tumour and the failure of successful reconstructive surgery to correct the ensuing defect. Another cause is an explosive traumatic injury, such as ballistic injury or major trauma from a traffic accident. A way from the causes of the defect; in many instances, surgical reconstruction is not available for large or extensive defects or in the presence of some technical, biological, and pathological limitations. Large defect and the inability to make a full judgment of clearance after the surgical removal of a malignancy or recurrent benign tumors in addition to the inability to correct extensive or late intervention of congenital deformity, presurgical irradiation, and the cost [5,6].

All the above limitations support the prosthetic replacement of extensive maxillary defects alone or in association with partial successful surgical correction to better quality of life [7]. Aramany proposed a simple classification of the remnant deformity after surgical resection, and later other classifications were recommended to add more detail to the deformity in order to improve inter-practitioner communication for case diagnosis and treatment recommendations; however, most practitioners found the later classification difficult to apply [8,9]. Davis and Ritchie devised a congenital deformity classification based on the placement of the cleft relative to the alveolar process, which is similar to the postsurgical categorization of maxillary abnormalities [10].

The Objectives of the Report

The aim of this study was to highlight common prosthetic treatments used to fix craniofacial defects based on personal experience. Two cases with substantial palatal deformity that accompanied completely missing teeth were examined, and treatment was recommended. The presentation covered key treatment processes, including capturing functional impressions, achieving adequate retention force, and addressing patient concerns. These are the primary hurdles in resolving such deficiencies with total tooth replacement.

Presentation of Each Case

The First Case

It had a congenital complete cleft spanning the hard and soft palates, as well as lip anomalies. The maxillary jaw was opposed by a completely edentulous mandibular ridge. The case was treated a long time ago by corrective surgery. However, only the lip defect was successfully closed, leaving unrepaired palatal defects. The patient was in his thirties, Chinese, completely edentulous, and had no medical problems when he arrived at the clinic. He is frustrated by his long-term untreated disease and its complications, which include aesthetic deformity, speech insufficiency, and masticatory problems. The examination focused on the scope of the problematic area, soft and hard tissue conditions, structural physical characteristics, and other tests. A decision was made to prescribe a complete denture and simple obturation of the palatal defect, with the undercut area acting as an extra retentive mechanism to aid in the retention of the prosthesis without the use of alternate options such as implants. The soft and hard tissues at the oral cavity were assessed and palpated as normal. Thick, compressible soft tissues that can help with denture peripheral seal were evident at the defect hole's lateral boundaries. Furthermore, an undercut that can be used to improve denture retention was located in front of the defect (Figure 1). The primary impression was made with thick alginate (Kromopan LASCOD KRM302 100 HR Chromatic) after stabilizing the deep area of the defect and determining the posterior extension of the future denture.

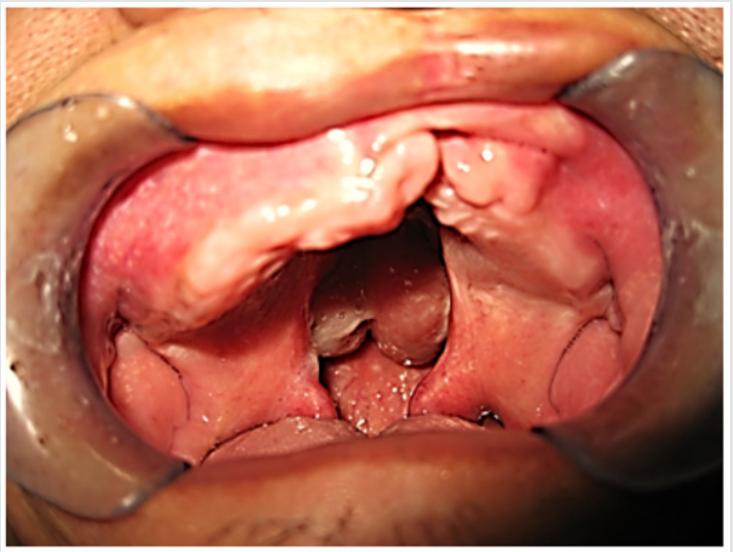

Figure1: The palatal defect.

Furthermore, the two parts of the soft palate were tested for active intra-sealing while the patient conducted specific head movements and swallowing tests. The working model was created by pouring an impression with dental stone (Kulzer 50046287 Modern Materials) (Figure 2). The landmarks depict the several locations where the denture should be securely held in place, like the border of the defect, the front undercut area, and the soft palate maximum extension that was marked off during diagnosis, in addition to the denture borders. One layer of modelling wax (Dengen Dental MO WAX Modelling Wax) was fitted to the defect and palatal area, which was then flasked and processed as a denture base into heat-cured acrylic resin (Paragon Denture Resin). The resulting base was checked for border extensions, defect sealing, and retention inside the patient's mouth. The other steps, like recording the intermaxillary relationship, teeth selection and arrangement, waxing-up, and try-in were done in the normal way. The trial prosthesis was flasked and processed again to finish the denture. The dentures were finished and ready to check again for air and water sealing, retention, speech, swallowing, and aesthetics. Any deficient mechanical properties of the prosthesis can be improved by making a functional relining impression using tissue conditioner material (Dentsply 61605002 Visco Gel Tissue Conditioner), which was subsequently processed normally (Figure 2) [1].

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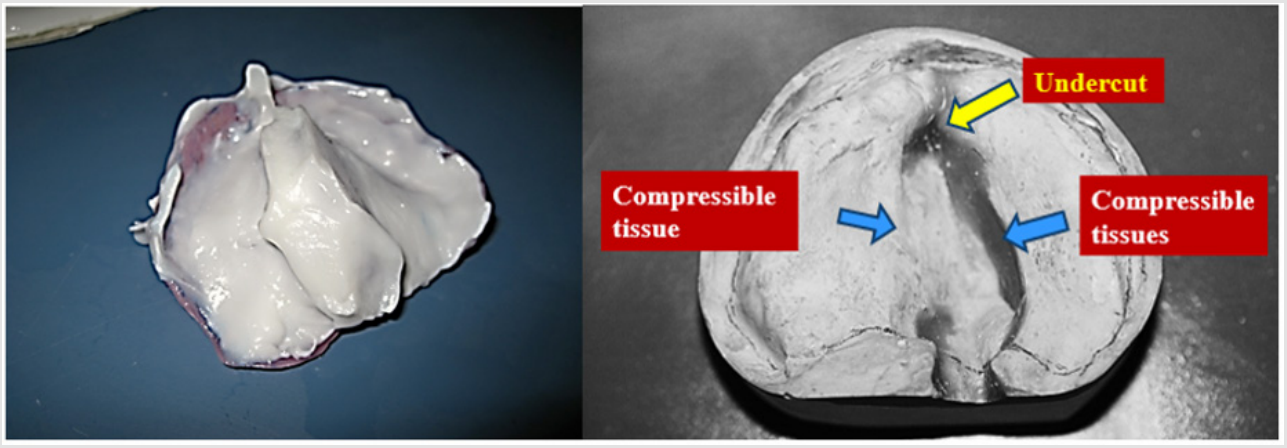

Figure 2: The impression and the working cast and the areas used for enhancing the retention and sealing.

The defective palatal area of the denture was shaped using one layer of modelling wax according to the patient's ability to articulate words and letters and swallow (Figures 3 & 4). In case of difficulty in speech, a tissue conditioner was used instead of wax with a technique that was previously used in palatal augmentation, with no substantial rise in obturator weight [1]. The patient was thrilled with his dentures, and the case was reviewed regularly for minor post-insertion problems and corrected accordingly [3,4].

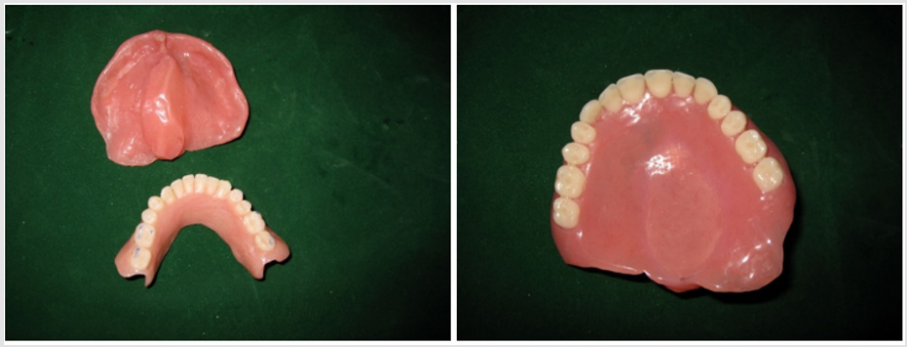

Figure 3: The finished upper denture-obturator with the its lower opposing.

Figure 4: The denture inside the patient mouth.

The Second Case

This case involved an Indian male in his sixties whose maxillary arch was completely edentulous, with a postsurgical palatal deformity caused by a partial maxillectomy for squamous cell carcinoma (SCC) involving the middle of the palate and the alveolar ridge anteriorly (Figure 5). The lower arch was subtotally edentulous, with the remaining canines and first premolars. The patient claimed to be medically normal. The examination revealed that the remaining structures included the right and left posterior alveolar ridges, while the soft palate remained intact and was still connected to the remnants of the posterior hard palate. The case was treated before with a poor-retention complete denture-obturator on the maxillary arch, while on the lower arch, an acrylic removable partial denture was prescribed. The patient's primary problem was that he couldn't utilize the device since the appliance lacks retention in his mouth. Following an examination of the prosthesis and the condition of the patient, it was decided to reconstruct a new denture-obturator to improve retention and other features. The tissue conditioner material was used to create a functional impression on the old, faulty denture (Figure 6). A working cast was made from dental stone. Following the same procedures as in the previous case 1, one layer of modelling wax was applied to the cast and flasked before being processed using heat-cured acrylic resin. The base was finished and checked inside the patient's mouth for retention, extension, and water and air sealing of the defect during speech and swallowing.

Figure 5: The maxillary defect after surgical correction.

Figure 6: The impression of the defect area using the old denture.

When all tests are successful, the next step is to record the intermaxillary relationship and teeth arrangement and then the try-in step. The trial denture-obturator was flasked and processed into acrylic resin using classical technique. The finished denture-obturator was checked for adaptation, and all the tests were repeated to be sure of the proper functioning. The defective area was formed using a softened simple one-layer wax technique, asking the patient to perform functional tests (pronunciation of the most important letters and words and swallowing). The wax former was processed using heat-cured acrylic resin, finished, and then fixed to the defect area using any available material or technique, like auto-polymerizing acrylic resin, heat-cured one, or light-cured resin. The devices were inserted and checked as usual for air and water sealing, retention, occlusion, functional insufficiency, and the support area was examined for any soreness (Figure 7). The patient was informed to return back for any complaint or painful spots to be corrected immediately.

Discussion

The two- or three-step techniques for processing the void or hollow obturator are well-established methods for successfully regulating the thickness of the acrylic resin over the defect area and reducing weight to the greatest extent possible. In this report, tissue conditioner material was successfully used to manufacture the obturators. It served as a functional impression to create the prosthetic base and a functional palate cover for the defective area [1,2]. Two critical elements in treating large midpalate region deformities or holes are achieving a proper appliance seal during both static and functional conditions and defining the appropriate extension of the bulbous component within the defect. This extension should improve nasality while keeping patients comfortable. Several studies advocate increasing retention and nasality by building the bulbous region as broadly as feasible within the defect area to reduce nasality [11,12]. However, extensive experience treating such defects has revealed that problems with retention, air and water sealing, food regurgitation, discomfort, and the need for continuous cleaning of the nasal portion of the obturator were significantly worse when compared to using a shorter extension within the defect that maintained effective sealed margins. The maximum benefits of obturators are gained when sealing and retention are performed well. The nasality in the two discussed cases was not a complaint for the patients. They were more concerned about retention, stability, and air and water seals during function.

The introduction of the intraoral scanner is also an excellent advantage for teaching the new practitioners detailed examination and diagnosis [13,14]. However, additional training in functional impression techniques and designs is essential for accurately identifying the various hard and compressible tissues that play a crucial role in the support and sealing capabilities of obturators and dentures as a whole.

Conclusion

Restoring the completely edentulous defect using the two- or the three-step technique was deemed successful because it can be rectified at any time of the treatment process. Starting by making the base, and testing it on the patient helps support a successful prosthesis at the end without wasting time and inducing patient and dentist frustration. Additionally, using functional impression materials such as tissue conditioner was particularly advantageous for recording the biomechanical characteristics of the supporting area, articulating different letters, and contouring the palate to enable easy speech intelligibility and swallowing for the patient. This method provided a simple and safe technique for the learning practitioner to solve more sophisticated defects in the maxillofacial region.

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