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Case Report

Prosthodontic-Fixed-Rehabilitation of Cleft-Palate and Cleft-Lip Patients after Bone-Grafting-Surgery: A Report of Case Series

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Abstract

Treatment of patients with Cleft Palate (CP) and Cleft Lip (CL)is challenging. Adult CP/CL patients require definitive prostheses for improving their esthetic and function. Orthodontics treatment is the ideal, gold standard, and the most conservative treatment for these patients. The current study describes the fixed prosthetic rehabilitation of three patients with CP/CL (aged 21-26) after bone-graft-surgery for closure of the cleft. All the patients had missing teeth in the cleft region, and the adjacent teeth were malformed and/or malposed. So that, elective Root-Canal-Therapy (RCT) and fabrication of metal posts were considered. The current manuscript describes young-adult-patients who had not undergone orthodontics treatment in childhood because of financial problems. As the last possible treatment option, Fixed-Dental-Prostheses (FDP)were used because the abutments were periodontically stable and firm. Elective RCT and fabrication of cast-post-cores parallel to the path of insertion of the FDP has not been mentioned in other-published-articles. During at least 4-year follow-ups, the FDPs did not have any problem and the patients were completely satisfied.

Keyword: Cleft Lip; Cleft Palate; Fixed Dental Prosthesis; Surgery

Introduction

The occurrence of congenital CL/CP has several possible etiological factors including deficient diet, psychological stress, radiation during pregnancy, chemical teratogenic agents, infectious diseases (viral origin), and hereditary factors, gene mutation or chromosome aberration [1]. The restorative dental care and management of CL/CP patients calls for a complex multidisciplinary approach with long-term involvement. These patients eventually need definitive fixed or removable prosthesis for esthetic and functional demands.

Many CL/CP patients present with either congenital absence of the permanent maxillary lateral incisors, and/or teeth that are in a rudimentary form, peg-shaped or small crowns and short roots. Congenitally missing of the others anterior teeth are also common in CP patients [2]. In unilateral or bilateral clefts, the lateral incisors are the most frequently missing teeth, although the canines and central incisors may also be affected. When present, these teeth may be malformed and malposed [3]. The maxillary central incisors are often hypoplastic with short roots and are severely malposed. These problems, in addition to the inappropriate tooth-lip relationship and the deficiency of hard and soft tissue, influence the esthetic appearance and phonetics [2].

There are different prosthetic treatment options for CP patients including Removable Partial Denture (RPD), overlay denture, complete denture, implant-supported denture, implant supported RPD, and FDP [4]. In the previous articles, FDP was not frequently indicated for CP patients. Because the abutment teeth have not optimal parallelism and acceptable crowns shape. The current study describes the fabrication of FDP for three CP patients who had undergone palate-closure-surgery at childhood. The patients refused to align the abutment teeth by orthodontic treatment.

Case Series Report

Three CL/CP patients were referred to the Department of Prost-

hodontics of Tehran University of Medical Sciences. One of them was a 26-year-old female patient and the others were 21 and 23-year-oldmale patients. Complete medical and dental histories were taken from the patients. None of these patients had aligned their teeth with orthodontics treatment due to poor economic conditions. All of them had undergone surgery to correct their palatal defect and CL at an early age and had missing teeth in the anterior position of the maxilla (Figure 1 a-c).

Figure 1a-c: Frontal Views of the CP and CL/CP Patients At least One Year after Surgery.

The patients prefer restoring their missing teeth with FDP rather than RPD. Primary impressions were taken and diagnostic models were poured in dental stone, and were mounted in semi-adjustable articulator. The relationship of the alveolar arches, the occlusogingival relation, and diagnostic preparation and modeling in wax were evaluated to determine the size and shape of the future FDPs. The present malpositioned teeth needed elective RCT. Then custom-metal-post and cores were fabricated (Ni-Cr alloy, Jelstar; Jelenko, Armonk, NY) parallel to each other. The posts and cores were cemented with Glass-ionomer cement (Fuji II, GC Corporation, Tokyo, Japan) (Figure 2).

Figure 2: Custom-Metal-Posts and Cores were Fabricated to Align the Malposed Teeth.

As many abutment teeth as possible were prepared according to the biomechanical principles and Ante's law. Two-phase impression was made using putty-Xlight material (A-silicones, Kettenbach, Germany) and FDPs were fabricated. FDPs were temporary cemented with Temp Bond (Kerr Corporation, Orange, CA, USA), to evaluate their prognosis. After 3-months, the FDPs were cemented with Glass-ionomer cement (Fuji II, GC Corporation, Tokyo, Japan). The FDPs provided acceptable esthetic results and the patients' smiles had highly improved (Figure 3 a-c).

Figure 3a-c: Final Restorations were Cemented.

The patients were followed-up every6-monthand the occlusion was meticulously adjusted. During4-year recalls, the integrity of the FDPs, and the health of the soft tissues and abutments remained stable. Oral hygiene was instructed again for the patient with dental-plaque-accumulation.

Discussion

Comprehensive rehabilitation of CL and/or CP patients is complex. These patients may have different dental abnormalities including pseudoprogenia, crossed bite, hypodontia or hyperdontia in the cleft area with ectopical placement of the teeth, open bite, crowded teeth or teeth with diastema and lost middle line [1].

The ideal treatment of the cleft area is closure by bone graft and orthodontics. CP patients who have not received orthodontic realignment and grafting procedures present the greatest prosthodontic challenges [5,6]. According to the previous articles the most common prosthodontic treatment for CP patients is Removable Prostheses (RP). An RP may be considered as a transitional prosthesis by the patients. If the cleft area has not been closed using bone graft, an RP may improve patients' speech and degluti-

tion. Although the RP can provide good esthetics, some portion of the prosthesis may cause irritation at the palate-soft-tissue. The removable nature of these prostheses is also a common patient's complaint [3].

Dental implants could not be used in the patients' alveolar cleft because of the poor bone quality and quantity even after bone grafting for closure of the cleft. Of course, it may be possible to insert dental implants in the site of extracted-abutment-teeth in the future. So that whenever possible the implant-retained prostheses provide greater stability, retention, and chewing efficiency compared with the other types of the conventional prostheses [7]. In the current young-adult-patients, it seems to be too aggressive to extract the intact-abutment-teeth to insert implants. Implant-retained-prosthesis can be considered as the best treatment modality in the future.

Patients always prefer to restore their missing teeth with fixed restorations. In the current patients, the cleft area was completely closed with bone graft. So that nasal reflux was prevented and an RP was not indicated to improve the speech and deglutition. By using pink porcelain in FDPs, the esthetics was improved in the gingival area. FDP enhances patients' comfort, speech, mastication, and overall psychological satisfaction.

Due to extensive required preparation which may cause pulpal exposure, elective endodontic therapy was considered for all the malpositioned teeth. Then casting posts and cores were fabricated to correct the path of insertion and to increase the retention of FDPs [4]. According to the previous articles [3,8], at least two abutments should be used in CP patients. A clinical study [9] showed that inclusion of more than two teeth in each side does not provide any additional advantages on the functional loading capability of the maxilla. In the current patients, the number of abutments were selected considering the crown/root ratio, mobility, stability, and the span of the FDPs.

Some author [10] has reported concerns about the movement at the cleft area and possible loss of cement seal, and subsequent dental caries when the premaxilla segments are being splinted through a long-span FDP. However, passive fitness of the metal framework, well-sealed margins, carefully-adjusted-occlusion, using as many abutments as possible across the arch, and permanent cementation with resin-modified-glass-ionomer-cement may obviate these concerns in the current patients [5]. CL/CP patients require long-term follow-ups and maintenances. Routine maintenances were performed every 6-month during the next 4-years. Probing depths varied between 1.5to 2mm, and there was no gingival recession or inflammation in the region of the prostheses. The prostheses were stable and there was no need to re-cement them. The patients were satisfied and reported no functional or esthetic problems.

Conclusion

This article presented three CP/CL patients who have been treated with fixed restorations after bone-grafting-surgery. This treatment option enhanced the patients 'chewing ability and esthetic satisfaction especially when used with pink porcelain. After4-year follow-ups, RCT and preparation of the adjacent teeth in order to splint the two segments of premaxilla were successful.

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