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Prosthetic Rehabilitation of Cleft Lip Palate with Andrews Bridge Modified as Obturator Prosthesis: Case Report

SUMMARY

Background/Aim: *Congenital defects such as cleft palate and lips require a long-lasting and multidisciplinary approach. In cases when surgical and orthodontic treatment is not feasible, prosthodontic management of these patients is advocated. Prosthetic rehabilitation of cleft palate in concerning of achieving aesthetic and function (such as swallowing and speech) outcomes is very demanding.* ***Case report:*** *Material and method: After performing the necessary surgical procedures and orthodontic treatment, 24-years-old male patient was sent to the Department for Maxillofacial Prosthetics of Istanbul University. Followed the clinical examination, the necessary periodontal and conservative therapy was performed. After radiographic evaluation and dental cast analysis prosthetic rehabilitation was performed. The prosthetic rehabilitation of cleft palate was accomplish with conventional fixed partial denture whose number of included abutment were defined by biomechanical principles. Additionally removable partial denture were manufactured for closing oro-nasal defects and lip supporting.* ***Conclusions****: The prosthetic rehabilitation resulted with functionally and aesthetically content prosthesis. With achieving proper swallowing Quality of Life of the patient was enormously enhanced.*

Key words: Cleft Palate, Defect, Congenital, Andrew's Bridge

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CASE REPORT (CR)
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Introduction

Cleft of lip and palate is a type of craniofacial malformation that occurs by not fusing of two sides of maxilla during the embryonic stage[1]. The incidence of 9.92 per 10,000 live births classifies the cleft lip palate one of the most frequent congenital anomalies[2]. Clinically is presented as an irregular and incomplete maxillary growth and oro-nasal communication, accompanied with agenesis or malformation of the teeth which affect the function of swallowing and speaking.

There are various classifications of cleft lip palate. According to Veau's (the most commonly used) classification, all cleft lip palates can be evaluated in four main groups[3-5].

I. Clefts of the soft palate

II. Clefts of the soft and hard palate, up to the incisive foramen

III. Clefts of the soft and hard palate extending unilaterally through alveolus

IV. Clefts of the soft and hard palate extending bilaterally through alveolus[1].

Rehabilitation of cleft lip palate is a very challenging task and require a multidisciplinary approach since the neonatal period. The aim of rehabilitation besides reestablishing aesthetic is to improve the function of speech of the patient and achieve adequate nutrition[6]. Due to a long and stressful treatment period, the patient should also be supported psychologically. Therefore the multidisciplinary approach including plastic surgeons, dentists, and psychologists will be beneficial[7].

The ideal treatment of cleft lip palate is surgical bone grafting and orthodontic positioning of the teeth. Surgical treatment most often consider shifting of retruded premaxilla in protruding position or achieving of complete closing of oro-nasal communication with bone grafting.

With orthodontic treatment the discrepancy in the size of maxillae and mandible should be corrected as much as possible, adjustment of the teeth should be performed in mixed dentition stage and in permanent dentition stage as well[8-10].

If this ideal treatment, don't result with satisfying outcomes, prosthetic restorations are required[11]. This demands can be fulfilled with removable, fixed or removable-fixed prosthetic restorations depend on multiple factors related to the patient[7,12].

During prosthetic rehabilitation, numerous factors influence the prosthetic choice, starting from the number of teeth in the mouth and their position, presence and size of the defect, bone deficiency, the presence of keratinized tissue[10,12]. The absence of vertical dimension, occlusal instability and lack of anterior guidance are just some of factors to take in concern during prosthetic treatment planning[9,13].

To restore maxillary defects and replace missing teeth, treatment of choice is removable dentures. To overcome the lack of retention and stability as a soft tissue irritation, one of the most common disadvantages of this kind of prosthesis, it is favorable using of overdentures in cases where it is possible[14,15].

The fixed partial denture system named Andrew's bridge was introduced in 1965 by Dr James Andrews, later 1975 for the first time is used for rehabilitation of cleft palate patients[16]. By combination of fixed and partial dentures (overdenture), disadvantages of each prosthetic system becomes overcame. Due to fixed extra-coronal bar system vertical movement of dentures base during masticatory function is minimalized so and irritation of soft tissue and function becomes improved. Access for cleaning of this kind of prosthesis and abutement teeth and satisfying lip support, especially needed in clef lip patients also make this kind of prosthesis favorable[6,17,18].

In this paper is presented case report of a male patient with bilateral cleft lip palate with mobile premaxillae, rehabilitated with fixed full crowns and obturator modified removable-fixed prosthetic restoration (Andrew's bridge).

Case Report

A 24 year-old male patient with bilateral cleft lip palate was referred to Department of Prosthodontics Clinic for prosthetic treatments after being treated surgically and orthodontcally (Figure 1). Following the dental history analysis, clinical examination and radiographic evaluation was completed. Bilateral cleft lip and palate with alveolar involvement and mobile premaxilla were observed. Open bite and nonexistence of anterior guidance were noticed.

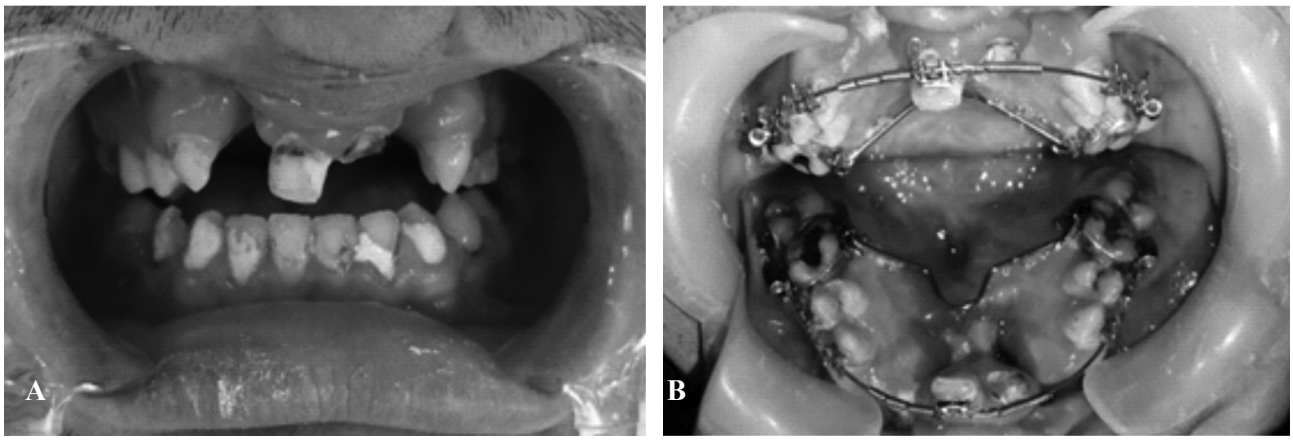

Figure 1. A) Preoperative intraoral view, B) Intraoral view with fixed appliances

Initial impressions were taken with (Cavex Cream Alginate, Cavex Holland BV) and diagnostic casts poured with vacuum-mixed stone type IV (Everest Rock, Kavo Dental GmbH) and mounted in a semi-adjustable articulator (Artex, Amman Girrbach) using a face-bow transfer. To fulfill functional rehabilitation of the patient, upper and lower teeth were included within treatment. In the lower jaw 35, 34, 33, 32, 31, 41, 42, 43, 44 and 45 numbered teeth (according to FDI notification system) were prepared to receive metal fused porcelain crowns. Due to the absence of maxillary lateral incisors, carious destruction of central incisors, mobile premaxilla, and presence of the defect in this region, an Andrew's bridge restoration is planned. Due to severe mobility of the pre-maxillary region, central incisors couldn't be included in fixed restorations. They were prepared to receive primary telescopic crowns. Tooth preparation was held to the 15, 14, 13, 23, 24 numbered teeth to treat with metal fused porcelain restorations.

Following the tooth preparation, defect areas were blocked out with gauze to prevent the escape of the impression material to the oro-nasal cavities. The

retraction cords were placed and impression was taken with poly vinyl siloxane silicone (Elite HD; Zhermack) impression material. Master cast were poured with gypsum type IV (Everest Rock, Kavo Dental GmbH). The wax prototype of the restoration of the abutment teeth was made and connected with prefabricated castable plastic bar attachment (OT Bar Multiuse, Rhein 83). The bar of Andrew's bridge was located 2-3 mm above the primer telescopic crowns of the central incisors to provide optimum hygiene. Following the wax prototype production, the structure was casted in Co-Cr alloy (Wironium; Bego, Herbst GmbH & Co KG). All laboratory steps were held by a trained dental technician.

During metal trial, proper fitting of metal framework and relationship of bar attachment and primer telescopic crowns of first incisors and surrounding soft tissue were checked and porcelain color was selected.

The Andrew's bridge restoration was composed of two parts; the tooth supported fixed metal framework with a bar and a removable denture covering and supporting the defect areas. In the following session, porcelain trial was performed (Figure 2) and functional impression for obturator part of removable prosthesis was taken and the removable part of Andrew's bridge was then fabricated using heat cured acrylic resin (Rapid Simplified; Vertex Dental).

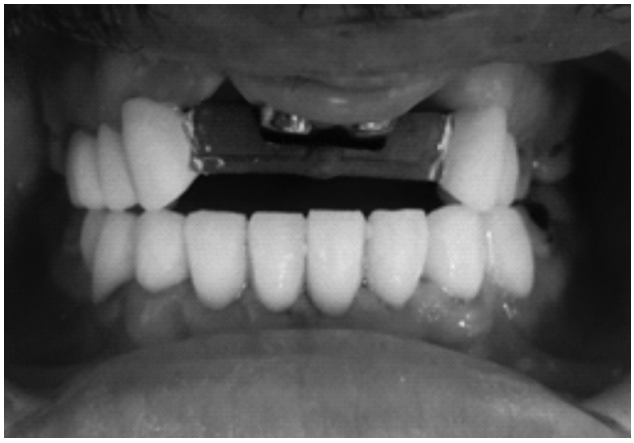

Figure 2. Porcelain trial

The cementation of the fixed part of the bridge was performed with glass ionomer cement (GC Fuji II - GC Corporation). After cementation of fixed part of the dentures the removable polished denture was inserted intraorally. Intraoral evaluation the removable denture part's was tried to evaluate the ocllusion and the soft tissue support, especially the lip support and the aesthetics (Figure 3 and Figure 4). During this trial it is observed incompletely obstruction of the defects of maxillae and it was relined with tissue conditioner (Visco-gel, De Trey/ Dentsply, Weybridge) (Figure 5). The patient was instructed to maintenance the oral hygiene.

Figure 3. Completed definitive prosthesis

Figure 4. Completed definitive prosthesis

Figure 5. Tissue conditioner applied on removable denture, part of Andrew's bridge

Periodically recalls were performed after 24 hours, 3 days, 1 week, 1 month, 3 months and 1 year and any prosthetic and periodontal failures or soft tissue injury wasn't noticed. Patient's satisfaction and challenging treatment demands were fulfilled.

Discussion

Cleft lip palate is a very common congenital anomaly. The treatment of this anomaly begins since the neonatal period and involves experts of different medical disciplines. Early treatment is oriented in the direction of choosing feeding problems and improving the function of breathing and phonation[2,6].

The ideal treatment of cleft lip palate is surgical bone grafting and orthodontic positioning of the teeth. One of the goals of this treatment is to achieve a complete closure of the defect and a continuous tooth arch without using prosthetic restorations[6]. Still, in most of cases patients need prosthetic rehabilitation.

During prosthetic rehabilitation, numerous factors influence the prosthetic choice, starting from the number of teeth in the mouth and their position, presence and size of the defect, bone deficiency, the presence of keratinized tissue. The absence of vertical dimension, occlusal instability and lack of anterior guidance are just some of factors to take in concern during prosthetic treatment planning[10,12].

In the neonatal period different removable prosthesis and obturators are used for improving functions of feeding or as pre-surgical additional treatment. Post-surgical and post-orthodontic, prosthetic treatment in cases when is needed can be fulfilled with removable, fixed or removable-fixed prosthetic restorations depend on multiple factors related to the patient[7,12].

To overcome the lack of retention and stability as a soft tissue irritation, it is favorable using of overdentures in cases where it is possible[14,15]. This kind of dentures combines the advantages of the partial removable prosthesis and fixed dental prosthesis because it minimizes the vertical movement of the denture base during the masticatory function, facilitates access for cleaning of the abutment teeth, and, by providing maxillary lip support, improves facial appearance[14,15].

The Fixed partial denture system named Andrew's bridge was introduced in 1965 by Dr James Andrews, later 1975 for the first time is used for rehabilitation of cleft palate patients[17,18]. In this case report premolars and canines form each side was used as an abutment for extra coronal bar attachment retained partial removable prosthesis. This removable prosthesis was extended to close oro-nasal communications and missed incisors were attached to fulfill aesthetic and improve function of phonetic.

Multiunit fixed dentures enhance functional loading by splinting tooth across the cleft area. In the present case central incisors were not included in splinting due to the mobility of premaxilla.

Disadvantages of a removable partial prosthesis as lack of stability and aesthetics also and interferences to speech become overcome by using fixed partial removable prosthesis. Lip support in the patient with cleft palate is deficient in most of cases. Removable partial bar retained prosthesis used in frontal region of the maxilla of this case for restoring residual alveolar defect improved also the support for the lips.

Conclusions

In this case report the cleft lip patient was rehabilitated with Andrew's bridge which was obturator modified. Prosthesis fulfilled esthetic and functional demands requested in this cleft lip palate case but still required lifelong follow up.

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