ALL-CERAMIC FIXED PARTIAL DENTURE FOR CLEFT LIP AND PALATE PATIENT: A CASE REPORT

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ABSTRACT

Patients with cleft lip and palate eventually require definitive fixed or removable dental prostheses for aesthetic and functional demands when they become adults. This case report presents application of a zirconia all-ceramic fixed partial denture utilized as a definitive prosthesis for a bilateral cleft palate and unilateral cleft lip patient after surgical and orthodontic treatments had been completed. The zirconia all-ceramic fixed partial denture provides adequate aesthetics and function.

Key words: All-Ceramic Fixed Partial Denture, Cleft Lip and Palate, Pink Porcelain

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DUDAK DAMAK YARIĞI OLAN HASTADA TAM SERAMİK SABIT BÖLÜMLÜ PROTEZ: VAKA RAPORU

ÖZET

Damak ve dudak yarığına sahip olan hastalar, erişkin yaşlara geldiklerinde, çoğunlukla estetik ve fonksiyonel nedenlerle sabit veya hareketli protez kullanmaya ihtiyaç duyarlar. Bu vaka raporunda, bilateral damak yarığı ve unilateral dudak yarığı bulunan bir hasta, cerrahi ve ortodontik tedavilerin tamamlanmasından sonra daimi protez olarak yapılan zirkonyum tam-seramik sabit bölümlü protez uygulaması sunulmuştur. Zirkonyum tam-seramik sabit bölümlü protez uygun estetik ve fonksiyon sağladığı.

Anahtar Kelimeler: Tam-Seramik Sabit Bölümlü Protez, Damak ve Dudak Yarığı, Pembe Porselen

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**INTRODUCTION**

The restorative dental care and management of cleft lip and palate patients calls for a complex multidisciplinary approach with long-term involvement.\(^1\)\(^2\) Many cleft lip and palate patients who undergo prosthodontic procedures have already undergone one or both of surgical and orthodontic intervention.\(^3\) These patients eventually require definitive fixed or removable prosthesis for aesthetic and functional demands when they become adults.\(^4\) They usually possess a constricted alveolar arch due to the scar after the surgical cleft palate repair in their childhood. Orthodontic treatment, such as arch expansion and monitoring of tooth eruption during adolescence, is usually necessary for subsequent prosthetic rehabilitation.

Many patients with clefts that also affect the alveolar ridge present with either congenital absence of the permanent maxillary lateral incisors, or teeth that are in a rudimentary form, eg, peg-shaped or small crowns and short roots. The maxillary central incisors are often hypoplastic with short roots and are severely malposed. This malpositioning, in addition to the tooth-lip relationship and the extent of hard and soft tissue deficiency, influences the aesthetic appearance and phonetics. Thus, prosthodontists, when rehabilitating these patients, face the difficult decision of whether to use fixed or removable partial dentures. In patients with minimal tissue deficiency, fixed or even resin-bonded prosthesis can be used. The treatment plan provided must bear in mind each patient’s individual needs and demands and the outcome must be functional, aesthetic and should seek to preserve the remaining tissues.\(^5\)\(^6\)\(^7\) Aesthetics are especially compromised in the maxillary anterior portion of the mouth where the pontic-ridge relationship of the deformed area may differ from the dentogingival relationship of adjacent unaltered areas.\(^8\)

The Lava all-ceramic system (Lava\(^9\) All-Ceramic System, 3M ESPE Dental Products, St. Paul, MN), which is a high-strength zirconia system and the CAD/CAM technology used in manufacturing all ceramic crowns and fixed partial dentures (FPDs) for anterior and posterior regions, meet high demands regarding aesthetics and function.\(^9\) Although zirconium-oxide-based restorations for fixed partial denture prostheses are available for use, clinical studies evaluating their longevity and related complications are not adequate.\(^10\) This clinical report describes a zirconia all-ceramic multi-unit fixed partial denture for a bilateral cleft palate and unilateral cleft lip patient after completion of adolescent orthodontic and surgical treatments.

**CASE REPORT**

A 23-year-old woman with bilateral cleft palate and unilateral cleft lip was referred to the Department of Prosthodontics at Ankara University. She had already completed her surgical and orthodontic treatments in the same university and subsequently presented for prosthetic evaluation (Figure 1). Clinical examination of the patient revealed a repaired bilateral cleft palate and moderate tissue deficiency with a fistulae in the palate. This fistulae extended rightwards to the alveolar ridge and this defect caused a space between upper right lateral incisor and canine (Figure 2). The upper left lateral incisor was extracted due to caries related to the loss of dental tissue and the increased mobility caused by weak bone support. The gingival margins of the right lateral incisor were not at the same level with the central incisors and the tissue defect had caused bone and soft tissue loss around this tooth. The root of the right lateral incisor was appreciably curved in a distal direction. Bone grafting and implant placement were not indicated due to the extent of the defect area in the palate. There were no food or liquid leakage into the nasal cavity but the extent of hard and soft tissue deficiency influences the aesthetic appearance and phonetics.

A zirconia all-ceramic fixed partial denture was chosen as a definitive restoration since this system has an acceptable marginal fit, adequate function and excellent esthetic properties. The abutment teeth chosen were both central incisors, both canines and right lateral incisor. After preparation of these teeth, an impression was made using an fabrication tray and two types (light and heavy body) silicone impression material (Zetaplus C-Silicone Impression Material, Zhermack Clinical, Rovigo, Italy). The master cast was transferred to an articulator using an interocclusal record when the molars were in the maximal intercuspal position. CAD/CAM technology was used for the fabrication of the 7-unit zirconium-oxide frameworks. We had to use one more pontic (except the left incisor pontic) to restore the defect area between upper right lateral incisor and canine. We made this pontic like an upper right canine for the best aesthetic results. The fitting accuracy of the frameworks was tested in the patient’s mouth before the ceramic veneer was applied. The frameworks were evaluated intraorally for accuracy of fit after the addition of veneering ceramic (Figures 3 and 4). The gingival margins of the right canine pontic and lateral incisor abutment were not at the same level with the other abutment teeth.
so pink porcelain was used after this level. As the gingival margins were not visible in the smile line, the defect on the alveolar ridge could also be restored by extending the length of the canine pontic with pink porcelain (Figure 5). The completed prosthesis was luted with a resin cement (Clearfil SA Cement, Kuraray America, Inc., New York). To date, the restorations have been in function for 3 years without any complications (Figure 6). The defect area on the alveolar ridge was healthy and aesthetically compatible with the restorations (Figure 7). However, it was seen that pregnancy gingivitis has been developed when the patient came for the control appointment (Figure 8).

**DISCUSSION**

The treatment of patients with cleft lip and palate calls for a complex multidisciplinary approach with longterm involvement. Management should, ideally, begin early and be part of the overall team approach to the care of these patients, with good oral hygiene and dietary advice being given to patients at the outset, and thereafter continually reinforced. Options to patient and practitioner for treatment are numerous, from no restorative intervention – the rehabilitation of function and appearance being provided by surgical and orthodontic means – to the use of various forms of fixed or removable prostheses. Numerous factors affect decisions for the most appropriate restoration. Henry and Tan addressed issues of patient psychology, particularly the age at which patients are receiving prosthetic care, following on a long sequence of surgery and orthodontic treatment. The evolution prosthesis for cleft lip and palate patients must be borne in mind, as tooth tissue and oral health, time and financial cost.
Adolescent cleft lip and palate patients present special prosthodontic problems and demand particular attention to aesthetic considerations. For aesthetic crown and bridgework, metal-ceramic is still the most widely prescribed material among dentists. With growing awareness of aesthetics and biocompatibility, patients increasingly request metal-free solutions. The Lava™ All-Ceramic system has an acceptable marginal fit and excellent aesthetic properties such as opalescence and translucence even after three-year follow-up in this patient. Based on the test results available in the literature, the Lava™ all-ceramic system is indicated for crowns and fixed partial denture restorations in the anterior and posterior areas.\textsuperscript{12,13} Cleft palate patients have a cleft in the upper jaw thus, the bone structure of the upper jaw is weaker than the lower. Also, relapse after orthodontic procedure has been a risk that prosthodontists have had to address. For these reasons, some teeth must be splinted across the cleft in the prosthodontic procedure in order to increase the functional loading capability.\textsuperscript{3} Authors described the use of multiple unit bridges (6-10 units) to replace missing teeth and stabilise the maxillary arch.\textsuperscript{14,15} This patient had a wide space between right lateral incisor and canine because of the alveolar defect. Therefore, one more canine pontic was placed to restore this area. The crown for the right canine abutment was fabricated like an upper first premolar to maintain symmetrical balance. The provisional fixed partial denture had a configuration similar to the definitive prosthesis except for the inciso-gingival length of the right canine pontic. During the provisional phase, aesthetics, phonetics, retention and occlusion were assessed. The patient was not comfortable with the space under the canine pontic which were anatomically proportional in

Figure 5. Esthetics of the completed restorations.

Figure 6. Three year follow-up of the all-ceramic zirconia fixed partial dentures.

Figure 7. Frontal view of the defect area on the alveolar ridge after 3 years with the restorations.

Figure 8. The restorations have functioned favourably without any fracture or colour degradation for 3 years. However, pregnancy gingivitis has been developed.
length with the other abutments. As the gingival margins were not visible in the smile line, the length of the canine was extended with pink porcelain for the final prosthesis. Thus, the defect on the alveolar ridge could also be restored and the gingival margin of the right canine pontic was at the same level with the other abutment teeth.

Prosthetic techniques are being transferred from non cleft lip and palate patients to cleft lip and palate patients and in many cases it is not clear whether this is appropriate. Validation of successful reconstruction in non cleft lip and palate patients needs to be tested in the cleft lip and palate group. The mean survival time for this case report is about 3 years.

CONCLUSIONS

In the prosthodontic treatment of the cleft lip and palate patients, it is imperative to prevent the regression and collapse of the alveolar segments and the teeth after surgical and orthodontic correction. These patients eventually require definitive fixed prosthesis for aesthetic and functional demands when they become adults. This zirconia all-ceramic fixed partial denture has functioned favourably without any fracture or colour degradation for 3 years.

REFERENCES


