Case Report

Esthetic management of a patient with cleft lip and palate

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ABSTRACT

Esthetic rehabilitation of cleft lip and palate patients presents a myriad of challenges and requires interdisciplinary coordination. In the present case report, a 22-year-old male patient with a cleft palate and alveolus was treated. Comprehensive multidisciplinary treatment planning and management, along with a clinician-friendly process of smile designing and of creating mock-ups using digital technology, helped overcome the esthetic challenges faced in this case.

Key words: Cleft lip and palate, Digital smile designing, Interdisciplinary treatment

The prevalence of cleft lip and palate (CLP) is about one in every 800 births. Its etiology cannot be narrowed down to a single factor. It may be hereditary or seen in children of mothers with known malnutrition, irradiation, psychological stress, teratogenic agents, viral infections, etc [1]. CLP patients present with a myriad of problems from feeding at birth to skeletal, dental, and functional problems. Often these patients require psychological counseling due to the stigma that they face [1,2]. Skeletal growth deficiency impacts the dental arch causing severe crowding, constricted maxilla, missing teeth, and anterior and posterior cross-bite. In adolescence, the ongoing mandibular growth leads to increased severity of skeletal malocclusion. Stomatognathic functions such as mastication and speech are also affected [3]. The treatment of this condition requires a multidisciplinary approach with surgeons, orthodontists, prosthodontists, speech therapists, psychologists, nursing, and other specialists to correct functional and esthetic problems beginning at birth [1,3]. Facial appearance plays an essential role in a person's psychosocial development, and the smile is one of the most important facial expressions, communicating different emotions and ideas of human beings [1,2]. Thus, esthetic and prosthetic rehabilitation for such patients becomes the most integral part of surgical and orthodontic correction [1,4].

The present case report discusses the esthetic phase of management of a patient with a CLP.

CASE REPORT

A 23-year-old gentleman reported to the department with a complaint of irregularly placed upper and lower front teeth. He gave a history of being born with the left-sided unilateral CLP. He also reported to have corrective surgery for the same at 6 months and 1.5 years of age. There was no history of associated syndromes nor relevant medical history. The patient gave a history of recently completed orthodontic treatment. Maxillary arch expansion had been carried out using a quad helix to correct the cross-bite.

On presenting to the clinic after orthodontic treatment, extraoral findings revealed an operated cleft lip scar and associated contracture on the left side of the lip (Fig. 1a). The patient had a straight profile and incisal exposure at rest was 0 mm (Fig. 1a). A low lip line with 4 mm upper incisor exposure on smiling was noted (Fig. 1b). Functional examination revealed nasal respiration, disturbed bilabial, and labiodental pronunciation (e.g., v, b, and f), normal deglutition, and a maximum mouth opening of 36 mm with a forward path of closure. Intraoral examination revealed good oral hygiene status. Oral mucosa, gingiva, and tongue appeared normal. Dentoalveolar cleft was noted with respect to 22 region, missing 22, reverse overjet and anterior open bite with respect to 21 and 23, and gingival recession with respect to 41. Fig. 2 shows the intraoral photographs at the time of presentation.

Smile analysis (Fig. 3) showed an occlusal cant on the left side. There was a low lip line and upper incisor exposure on smiling was 4 mm. There was no gingival display on smiling. Intraorally, 11 had an edge-to-edge relationship, 21 was in cross-bite and an open bite was noted in the 21–23 region. Twenty-one had a distal angulation. Twenty-two was missing. The gingival zenith of 12 was 3 mm lower than that of 11. The gingival zenith of 13 was 1 mm lower than that of 11, and 2 mm lower than that of 23.

The treatment plan involved the replacement of 22, establishment of visual dental symmetry on smiling, correction

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of open bite, establishing positive overjet, gingival correction for the maxillary anteriors, and periodontal therapy for the lower anteriors. After digital smile designing, the following treatment plan was suggested to the patient: establishing visual symmetry, 2 mm and 1 mm crown lengthening with respect to 12, 13, respectively, single crown with respect to 11, increase in crown length incisally by 1 mm and establishing overjet, fixed dental prosthesis (FDP) with respect to 21, 22, and 23, incisal increase in crown length of 21 and 23 by 2 mm and 3 mm, respectively, and periodontal therapy with respect to 41. A digital mock-up of the proposed result was shown to the patient (Fig. 4).

Crown lengthening followed by direct composite veneering was carried with respect to 12. Crown preparation was done with respect to 11, 21, and 23 (Fig. 5a). Acrylic temporary crowns were provided to the patient for a week to get accustomed to. Speech and functional movements were analyzed, and the temporary crowns were adjusted accordingly. The patient was also requested to provide feedback for any modifications desired in the permanent crowns. Finally, an all-ceramic crown was fabricated with respect to 11. An all-ceramic FDP was fabricated with respect to 21, 22, and 23. A modified sanitary pontic design was chosen for 22 to permit easy maintainability (Fig. 5b). Postoperatively, a positive overjet and overbite of 1 mm were established. Speech and function had improved (Fig. 5c).

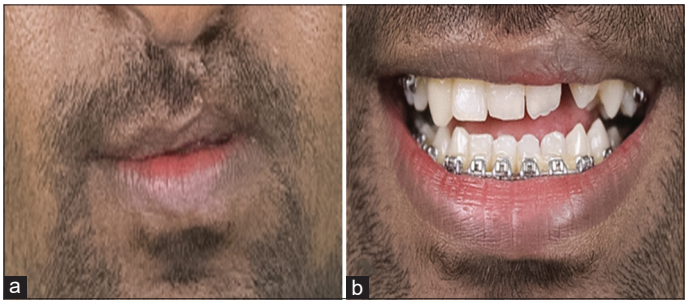

Figure 1: (a) Operated cleft lip scar with associated contracture; (b) Incisal display on smiling

Figure 2: (a-e) Intraoral findings of the patient

DISCUSSION

The majority of CLP patients have altered facial appearance and speech. According to the available literature, the facial and smile proportions in patients with CLP are significantly altered from the normal population [5]. The macro and micro esthetics of the smile are affected in individuals with CLP. This is due to different factors, including the relationship between the teeth, lip, and philtrum morphology; alveolar process deficiency; and soft-tissue variations caused by intraoral and extraoral surgeries in the cleft region. Hence, achieving ideal esthetic proportions in patients with considerable defects is not possible. Establishing visual symmetry rather than the norm in such cases is much more pertinent, as in the present case.

Malocclusions and congenitally missing anterior teeth are common findings leading to an unesthetic appearance. Missing or malformed lateral incisors are the most associated finding with unilateral or bilateral clefts involving the alveolar. Bone support of teeth adjacent to the cleft is usually compromised. Edentulous spaces in which teeth are congenitally missing can be closed orthodontically or surgically during an orthognathic procedure. In such cases, tooth replacement is not necessary. This is often associated with a discrepancy in the gingival margin level making a crown lengthening necessary. However, most patients with CLP do not have much lip elevation, even on a high smile, this gingival complex irregularity may not be noticeable, and periodontal surgery may be avoided [6].

When the edentulous cleft site is not closed orthodontically or surgically, prosthetic rehabilitation is required. Alveolar bone grafting is carried out during the mixed dentition phase before the eruption of the canines. This permits the eruption of an impacted tooth into the region of the cleft. Alveolar bone grafting unites the dental arches and makes tooth replacement in edentulous areas a routine dental procedure. As elaborated by Reisberg, the options for tooth replacement include a fixed or removable dental

Figure 3: (a-c) Digital smile analysis and designing

Figure 4: (a) Pre-operative status and (b) digital mock-up of the patient

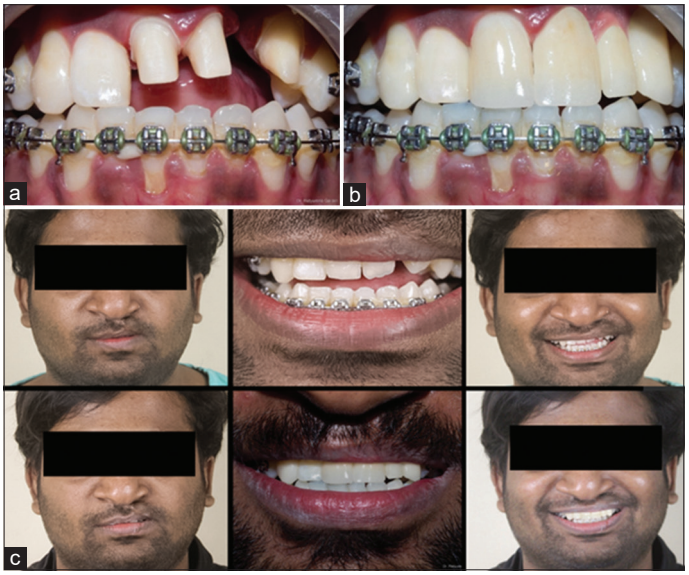

Figure 5: (a) Crown preparation; (b) final restorations in place; and (c) pre-operative status and post-operative results

prosthesis, a hybrid prosthesis, or a dental implant [7]. A removable partial denture is most often used as a temporary form of tooth replacement. Although it can provide good esthetics, portions of the prosthesis rest on soft tissues of the palate and cause irritation. There may be movement of the prosthesis during function. These are used as a definitive means of tooth replacement only in cases with multiple teeth missing and an edentulous space too long to be spanned by a fixed restoration [1,7]. FDP provides a more natural tooth replacement. If the abutment teeth need no other restoration, a resin bonded FDP can be used [8]. This is a conservative restoration requiring very little tooth preparation with excellent appearance and function. Alternatively, a conventional FDP can be used, offering excellent function and esthetics. Its long-term success is more predictable. If an adequate volume of bone exists in the edentulous space, tooth replacement can be achieved using dental implants [1].

Scar tissue and deficiency of palatal and alveolar bone structure cause a relapse of orthodontic treatment in CLP patients. It has also been shown that late secondary bone grafting which was expected to increase the stability of the treatment could not stabilize the maxillary transverse dimension obtained by expansion. Therefore, permanent retention is strongly recommended for these patients. It requires either a removable palatal prosthesis or a fixed bridge spanning the cleft [1]. In the present case, the patient reported have not undergone alveolar bone grafting at the time of the cleft repair due to inadequate soft tissue to support the bone graft. Thus, for the reasons previously stated, an FDP was chosen to rehabilitate the patient.

CONCLUSION

CLP patients might suffer from unfavorable smile esthetics and low self-esteem, leading to difficulties in social interaction. The treatment for patients with CLP is challenging and necessitates interdisciplinary involvement. Facial appearance is a key element in the psychosocial development of such individuals and their rehabilitation should be conducted with a view to enhance their functional and esthetics characteristics, and consequently their quality of life.

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