Rehabilitation Of Cleft Patient Presenting Esthetic Challenge With Gingival Porcelain And Reverse Extension

Abstract:

Introduction: The ever-emerging field of esthetic dentistry witnesses newer challenges every now and then which includes esthetic rehabilitation of cleft patients as an imperative division of it. This situation is often complicated due to missing, rotated, transposed or mal-aligned teeth quite commonly worsened by skeletal deformities. The science of aesthetics may require derailing and derouting from conventional techniques multiple times.

Aim: To successfully rehabilitate smile of cleft patient presenting with esthetic challenging situations.

Settings and design: This case report describes rehabilitation of a cleft lip and palate patient with a unique approach of extending restoration cervically on the gingival tissues and using gingival porcelain to camouflage the restoration.

Conclusion: Gingival porcelain can present as a boon for the clinicians if the science of colour is understood well. The cervical or reverse extension may also help increase the length of tooth without increasing the display which helps enhance the smile. The restoration gives long term results if the patient cooperation and maintenance of oral hygiene are supporting factors.

Keywords: Smile design, Gingival porcelain, Rehabilitation, Cleft

Introduction:

Cleft lip and palate are, by far, one of the most common orofacial malformations which are observed in the practice of dentistry.\(^1\) The rehabilitation of patients suffering from this deformity requires a multidisciplinary approach. The surgical management of patients having such malformations start as early as six weeks after birth followed by orthodontic or orthognathic intervention and finally esthetic rehabilitation with the means of prosthetic gingival reconstruction in such cases to mimic soft tissues and create illusions.\(^5\) Prosthetically restoring gingival profile also has the advantage of avoiding surgical intervention.\(^6,7\)
Case report:

A 20 year male reported with complain of mal-aligned teeth. The patient reported a history of cleft lip and palate for which he underwent surgical corrections followed by orthodontic therapy, after which the patient was referred for esthetic rehabilitation of maxillary anterior teeth. Intraoral examination revealed absence of bilateral maxillary lateral incisor and right central incisor and left maxillary canine in cross- bite relationship (Fig. 1). Esthetic analysis of the patient revealed medium smile line displaying less than 3 mm of gingiva, hypoplastic central incisors and teeth displaying short clinical crowns. The crown proportions also violate the laws of clinical proportions (Fig 2).

Evidence of cleft palate repair was also observed which was done with a skin graft interposed in the right aspect of anterior maxilla.

Treatment:

Diagnostic impressions were made using hydrocolloid impression material and study casts were mounted on arcon semi-adjustable articulator after recording facebow transfer. A diagnostic mock-up was done to evaluate the position, shape and alignment of future prosthesis (Fig. 4). The distance between the central incisors and canine was not sufficient to accommodate lateral incisor. Thus, there was a need of endodontic intervention or pulp space therapy that allows considerable reduction of central incisor and helps giving an illusion of properly aligned maxillary anterior teeth. On radiographic examination, it was observed that maxillary right central incisor had a tortuous pulp canal and maxillary left central incisor had a fistula communicating with oral cavity which contraindicated root canal treatment of the same. Maxillary right central incisor was treated endodontically and obturated (Fig. 5).

The teeth were then prepared to receive porcelain fused-to- metal restorations with porcelain facing. There was considerable reduction which was done on maxillary right central incisor which allowed for correction of cross- bite and proper alignment of the prosthesis. The reduction on maxillary left central incisor was done more on the facial aspect which allowed for the placement of connector to give an illusion of separation between central incisor and lateral incisor. Following this, the gingival was retracted chemico-mechanically using retraction cord and aluminium sulphate gel and impression was made using addition silicone (Express XT Putty Soft, 3M ESPE, Germany) with double mix single step technique. Subsequently, die was poured, wax patterns were fabricated and casted, and metal try-in was done to confirm the fit in the patient’s mouth.

Build-up and creating illusions with gingival porcelain:

Gingival porcelain is veneering ceramic which can be used for both precious and non-precious metals. It reproduces soft tissue material lost as a result of atrophy or restores pink esthetics. The build-up of “white esthetic region” or the teeth and “pink esthetic region” or the gingival counterpart is carried out simultaneously. The gingival colored opaque is applied 1 mm short of the white portion (Fig 6a). The build-up was done using feldspathic porcelain. The porcelain build-up of white esthetics was extended over the gingival margin in the region of maxillary right and left central incisor to give an illusion of elongation of crowns. Extending the restoration on the gingival contour also gave an illusion of correct zenith which in turn helped in improving the esthetics of prosthesis. The pink porcelain (Add on TT, Ceramico3, Dentsply), predominantly dark pink with brown was then build-up overlapping on the tooth bearing segment of prosthesis. Pink porcelain saturated with purple color was then built in the interproximal region to enhance the separation of appearance of roots (Fig 6b). After the shrinkage in first firing, the white esthetics and pink esthetics were then completed. The gingival porcelain was placed in the interdental region which helped enhance the appearance of teeth being separate (Fig 6c). Also, it compensated for the lost soft tissue structure and helped in making a positive tissue contact. The tissue surface of the extension which was extended on gingiva with respect to maxillary central incisor was then polished to reduce gingival irritation and plaque accumulation (Fig 7). The finished final prosthesis also corrected the cross bite relationship of right maxillary central incisor and left maxillary canine. The tissue surface of the restoration was polished to prevent plaque accumulation and it also allowed for the passage of dental floss (Fig 8).

Many clinicians have been reluctant in using gingival porcelain as the part of prosthesis. More often, it is because of improper color match of gingival porcelain to the gingiva of the patients having melanin pigmentation. The VennDiagram describes the combination of colors which can
be used to simulate the gingiva of patients with melanin pigmentation (Fig 9).

Figure 1: Pre-operative view reveals right maxillary central incisor and canine in cross-bite relationship. Maxillary anterior teeth have short clinical crowns. Skin graft can be observed in right vestibule.

Figure 2: Medium smile line often necessitates careful management especially with respect to gingival contouring.

Figure 3: Anterior teeth are malaligned and widely spaced with missing lateral incisor bilaterally.

Figure 4: Diagnostic mock-up with increasing the cervico-incisal length by increasing on incisal aspect. This mock-up was rejected by the patient.

Figure 5: Radiograph reveals short roots and tortuous canal. 21 reveals fistula communicating with the oral cavity.

Figure 6(a-c): The gingival colored opaque is applied 1 mm short of the white portion (Fig 6a); Pink porcelain saturated with purple color was then built in the interproximal region; The gingival porcelain was placed in the interdental region (Fig. 6c)

Figure 7: Restorations in harmony with smile arc of the patient with correct tooth proportions.

Figure 8: Dental floss on passage reveals the extension of the prosthesis on the gingiva.
Figure 9: Color brown when added to pink porcelain will intensify the color as well as make it appear dark and red. Blue color when added to this combination will reduce the reddishness and make it appear more life-like. In cases where color of gingiva is very dark, a tint of black can be added in place of blue.

Discussion:

Management of cleft palate patient requires interdisciplinary approach on a cosmic ground. When it comes to esthetically rehabilitating such patients, it presents several challenges. Many a times, even after a lot of hardship and efforts to improve esthetics of such patients, all the efforts end in vain due to complicated anatomy or residual defect in maxilla, compromised lip support and many other reasons. These patients, in many instances, require unconventional approach which might even involve violating the conventional laws of fixed dental prosthesis. In this case report, the prosthesis was extended on the gingiva to impart an illusion of correct gingival zenith. This treatment approach could be considered and implemented as the patient had thick gingival biotype which is less prone to recession as compared to thin biotype. This treatment approach should be avoided in thin gingival biotype patients as such gingival biotypes may recess secondary to the prosthesis and may complicate the situation.

A single 6 unit bridge was not considered to help facilitate in maintaining oral hygiene. Two separate bridges allowed dental floss to be passed in between them and aided in cleaning under the prosthesis extending unto the gingival margin. The tissue surface of the prosthesis was polished to prevent plaque accumulation. There should be a positive tissue contact which is mandatory when planning these type of restorations to avoid problems like food lodgement. Patient is able to maintain satisfactory oral hygiene. After six months post-operative, there have been no signs of gingival inflammation or food lodgement.

The length of the restoration could not be extended incisally to correct the proportions as it lead to increased incisal display and also when this attempt was made patient showed extreme unwillingness to such long teeth and disapproved the esthetics.

Extraction of teeth was not considered as it would have lead to more bone resorption in the maxillary anterior segment compromising the remaining bone and complicating the situation even more for future prosthesis if required.

Another treatment approach could have been to lengthen the clinical crown by gingivectomy in conjunction with osseoplasty, if required, and then extending the margins more cervically. Although this approach was also not considered as the teeth had short roots and increasing the clinical crown length would only complicate the issues of crown root ratio more.

Gingival- colored composites can also be considered for such restorations which have an advantage of allowing modifications chair-side but have the possible disadvantage of discoloration with time.

Conclusion:

Esthetic rehabilitation of cleft patients can be done in various ways. A careful diagnosis of the existing condition is required. Sometimes, approaches which are a little different than the usual ones impart results with superior esthetics. So, clinicians should indulge more in thinking or accepting such approaches which would be beneficial for the patient. Also, there has been a reluctance seen in the clinicians to include gingival porcelain as a part of the prosthesis. This apprehensiveness can be attributed to improper color match or difficulty in communicating with the technicians. The Venn- diagram provided in this article can be useful aid for the clinicians, technicians as well as the students to exploit the science of gingival porcelain color match and employ it in fabrication of esthetic restorations.

References:


