

RECREATING AESTHETICS

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Introduction:

The appearance of the gingival tissues surrounding the teeth plays an important role in the esthetics of the anterior maxillary region of the mouth. Abnormalities in symmetry and contour can significantly affect the harmony of the natural or prosthetic dentition. As well, nowadays patients have a greater desire for more esthetic results which may influence the choice of treatment.

Contemporary restorative therapy also encompasses aesthetic treatment where needs are frequently associated with changes in tooth size, shape, proportion, and balance that can negatively affect smile appearance.¹

By altering the inciso-gingival length and mesio-distal width of the periodontal tissues in the anterior maxillary region, the crown-lengthening procedure can build a harmonious appearance and improve the symmetry of the tissues at a sufficient apical distance to allow room for adequate crown preparation and reattachment of the epithelium and connective tissue by relocating the alveolar crest.²

One specific area of concern is excessively short teeth³ where the lack of tooth display and excessive gingival display requiring soft tissue corrective procedures, can present a clinical dilemma for the aesthetic-oriented treatment. Crown lengthening procedures have become an integral component of the aesthetic armamentarium and are utilized with increasing frequency to



FIG 1: Pre operative photograph

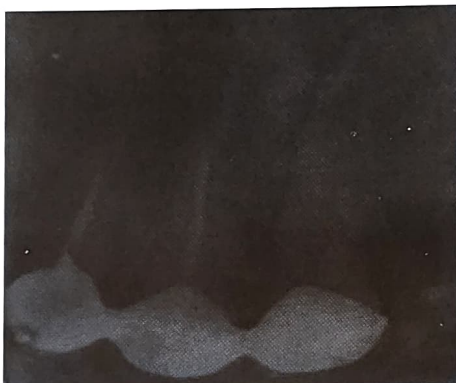


FIG 2: Pre operative photograph

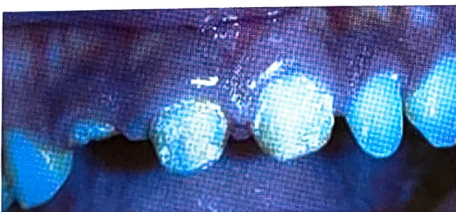


FIG 3a: After removal of FPD 12, 11, 21



FIG 3b: Palatal view after removal of FPD 12, 11, 21

enhance the appearance of restorations placed within the aesthetic zone. The following case report illustrates these concepts.



FIG 4: Obturation with 12, 11

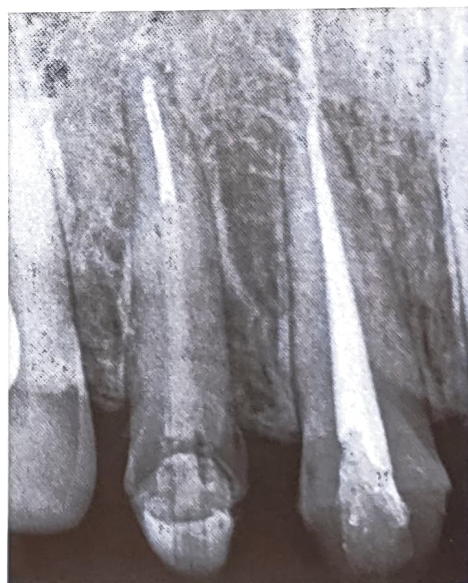


FIG 5: Fibre post cementation with 12

Case Report

A 32 year old male patient reported to the Department of Conservative Dentistry, Endodontics and Aesthetic Dentistry with a chief complaint of ugly smile. He gave history of root canal treatment with few of the teeth 14 months ago and with a fixed prosthesis in the front region. The patient's med-



FIG 6: At the end of phase I & II therapy



FIG 7: Pre operative gingival marking



FIG 8: Periosteal flap raised



FIG 9: Blade no 11 used for reverse bevel incision

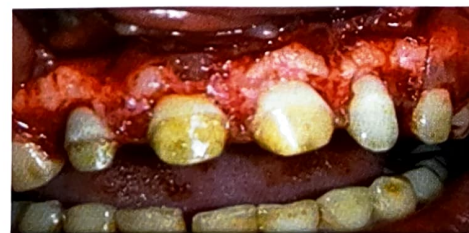


FIG 10: Flap as seen after mucogingival incision



FIG 11: Gingivectomy with 12

ical history was not relevant.

Intra-oral clinical examination revealed the presence of FPD with 12-21 (**Fig 1**). A pre-operative intraoral peri-apical radiograph showed inadequate obturation with 11 and 12 (**Fig 2**).

Treatment plan

Numerous factors have to be taken into account for the formulation of a proper treatment plan while restoring teeth with short clinical crowns, namely, restorability, disease susceptibility, papillary and gingival considerations, tooth esthetics, etc.

A major concern in this case was the poor endodontic treatment and inadequate height of the clinical crown (**Fig 2 & 3**).

The treatment was divided into three phases:- Retreatment phase, Restorative phase, Periodontal phase and Prosthetic phase.

Phase I: Retreatment phase

The crowns were removed with 12, 11 and 21 (**Fig 3a, b**). The gutta percha was removed from the root canals of 11, 12 using xylene as solvent. Cleaning and shaping was done (step back technique) and intra canal medicament was placed for one week. The canal was then obturated with resin sealer and 2% gutta percha using lateral condensation technique (**Fig 4**).

Phase II: Restorative phase

As the height of clinical crown was less with 12, post space was prepared with 12 and glass fibre post was cemented in the root canal of 12 using a dual cure resin for adequate retention of core and the crown (**Fig 5 & 6**).

Phase III: Periodontal phase



FIG 12: Horizontal sutures in place

Crown lengthening with osseous contouring was done with 12, 11, 21, 22 by apical repositioning flap to increase the clinical height of the crown. It is a surgically created flap of gingival tissue that is repositioned apically to maintain or create a functionally adequate zone of attached gingiva.

Markings on the gingiva was made using hematoxylin pencil (**Fig 7**) and a rectangular flap was raised using scalpel blade No 15. The horizontal incision was made first from mesial of 13 to mesial of 23 followed by the vertical releasing incision to complete the parameters of the flap design. Flap was reflected using periodontal elevators (**Fig 8**). Osseous contouring was done in 12, 11, 21, 22 and then the existing attached and free gingiva was detached by giving a reverse bevel incision using blade no 11 (**Fig 9 & 10**) and apically repositioning of the flap was done. Gingivectomy was done on the palatal surface with 12 (**Fig 11**). First horizontal stabilizing sutures were given to stabilize the apically positioned flap (**Fig 12**), sling sutures were given to close the horizontal incision and interrupted sutures were given to approximate the vertical incision (**Fig 13**). Patient was given periodontal pack to aid in healing.

Phase IV: Prosthetic phase

Temporary crowns were given with 12, 11, 21, 22 (**Fig 14**) and final prosthesis was delayed for 6 weeks to aid in better periodontal healing. The sutures were removed 7 days after the procedure.

After 6 weeks, clinical evaluation was done (**Fig 15**) and the crowns were prepared (**Fig 16**) to receive full ceramic crowns (**Fig 18**). Temporization was done (**Fig 17**) till the final crowns were



FIG 13: Sutured flap

➤ clinical section

cemented (Fig 18)

Discussion

Dental patients today are more demanding for a youthful, attractive and a perfect smile. An ideal anterior appearance necessitates presence of healthy and inflammation-free periodontal tissues.

The successful integration of esthetics and function is a result of the meticulous development of clearly defined anatomic parameter and their further incorporation into the final result.⁴ An evaluation of gingival architecture and any subsequent plans for its modification should be considered on the amount of gingival display and ability to achieve a desirable gingival architecture and tooth proportion. For instance, in the presence of a good crown - to - root ratio, esthetic crown lengthening can provide appropriate dimensions of the anterior teeth, along with pleasing gingival symmetry.⁵

Stunning restorations add the final touch to an exquisite smile, but nicely contoured gingival tissue acts as a picturesque frame surrounding a magnificent painting. The properly placed gingival zenith will add symmetry to the entire soft tissue system. The ideal ratio of central : lateral : canine should be 1.6 : 1 : 0.6. The marginal gingival height for the maxillary central incisors is at approximately the same level as the height for the canines, whereas the marginal gingival height for the lateral incisor is slightly lower.

Garguil⁶ described various components of the periodontium, giving mean dimensions of 1.07 mm for the connective tissue, 0.97 mm for the epithelial attachment and 0.69 mm for the sulcus depth. These measurements are today known as the biologic width. Ingbe⁷ observed that the presence of caries or restorations in close proximity to the alveolar crest may lead to inflammation and bone loss due to violation of the biologic width. Hence, they recommended that the restorative margin must be a minimum of 3 mm coronal to



FIG 14: Temporization after surgery



FIG 15: Healing 4 weeks after periodontal surgery



FIG 16: Crown preparations 6 weeks after surgery

the alveolar crest; this margin could be achieved through a surgical intervention known as crown lengthening surgery.

"Crown Lengthening Procedure" is carried out for various restorative and esthetics issues⁸ such as short teeth, excessive gingival display (Gummy Smile), uneven gingival contour and to provide a 'ferrule' for post crown provision. An evaluation of clinical and anatomic crown lengths in patients with a high lip line is important because incomplete anatomical crown exposure may be the principle factor in the esthetics of a case.⁹ Ideally the smile should expose minimal gingiva, the gingival contour should be symmetrical and in harmony with the upper lip, the anterior and posterior segments should be in harmony and the teeth should be of normal length. To obtain optimum esthetic result, the gingival form, tooth anatomy and the relationship of the underlying bone to the CEJ must be completely understood. Precise determination of the location of the CEJ prior to surgery and precise placement of incisions are necessary in order to achieve this goal.

In regions of the mouth where esthet-



FIG 17: Temporary crowns (Facial view)



FIG 17: Temporary crowns (Palatal view)

ics are important, wound-healing after crown-lengthening surgery must be allowed to proceed to completion if optimal results are to be achieved. Any disruption of the wound-healing process can lead to undesirable consequences. After crown-lengthening surgery, the periodontium continues to remodel and mature. Bragger et al reported that gingival recession can occur between 6 weeks and 6 months after the surgery.¹⁰ Hence, if prosthetic reconstructions are planned, recession must be closely observed during the healing phase.

Temporary crowns should be retained until the wounds are completely healed (possibly up to 6 months), after which final crown preparation and insertion can be accomplished. Conventional protocols require a waiting period of 4 to 6 weeks for sufficient healing of the attachment apparatus prior to initiating restorative endeavors.¹¹ If these guidelines are followed, gingival recession may not occur.

Although not an absolute contraindication for periodontal surgery, cigarette smoking can impair wound healing and is detrimental to the success of the surgery.¹² Hence, patients who smoke may experience unpredictable surgical outcomes. Other factors such as patient compliance, oral hygiene and history of



FIG 18: Pre and post operative photographs

periodontal disease can also influence surgical outcome. The clinician should carefully consider these key factors during planning of treatment in esthetically demanding areas.

Conclusion

Human dental anatomy has remained relatively unchanged for centuries. Although the subject of Dental Anatomy is taught in the dental curriculum, much too often clinicians witness restorations of teeth that are not in the so called and well documented "Golden Proportion". Simple surgical procedures like 'crown lengthening' should be considered for complete 'make over' during restorative treatment.

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