Case Report

Stent assisted aesthetics crown lengthening in maxillary anterior region: A case report

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ABSTRACT

Gingival display of more than 3mm on maxillary anterior teeth can actually batter an individual's personality whereas 'good bright smile' do reflect their vibrant nature. Central incisor is the dominant component in the anterior dental composition, with ideal height to width ratio of the crown is 10:8. According to this ratio the gingival zenith for lateral and canine is adjusted. In this article, we presented a case of crown lengthening done on the concept of biometrics and proportions by using prefabricated surgical stent. Crown lengthening was accomplished by internal bevel gingivectomy and osseous reduction, considering the concept of biological width. Patient was kept under observation for one year to check recurrence and stability of periodontal status. At the end of one year the results were satisfactory without any sign of recurrence.

Keywords:crown lengthening procedure, gummy smile, surgical stent.

INTRODUCTION

With increase in knowledge on the concepts of human biometrics and proportions, it is now possible to achieve esthetic results by applying these concepts to crown lengthening via surgical procedures. Such interdisciplinary approaches are now used widely for many individual's aesthetics requirements. Excessive gingival display or gummy smile can compromise people's confidence and embarrass them. To achieve a pleasing smile, the upper lip should be neither too high so that to expose the upper gums in excess, nor too low so as to cover more than half of the upper teeth.

The length of the central incisor and the canine must be equal and the lateral incisor slightly below both. The width to length ratios for crown of central incisors should be 80%. Any change in the above proportions can result to a gummy smile where gingiva is exposed more than 3mm.

To overcome these aesthetics issues, crown lengthening procedures have become an integral part of the aesthetics armamentarium and are utilized to enhance the appearance of restorations placed within the aesthetics zone.[1]

Surgical correction to such condition is possible by gingivectomy and osseous surgical procedures. The concept was first introduced by D. W. Cohen in 1962, according to this concept, crown lengthening aimed at removal of periodontal hard and soft tissue to increase the clinical crown height.[2]

Various causes have been reported for excessive gingival display in maxillary anterior region such as; vertical maxillary excess and short upper lip,[3] hyperplasia, passive eruption,[4] upper teeth extrusion and associated with deep bite.[5,6]

Gummy smile correction can be achieved only by gingivectomy procedures alone where the zenith of the gingival margin is repositioned to such a

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place that only 3mm of gingiva is visible in the smile window; but if the result is not achieved then osseous procedures are done, where the margins of the alveolar crestal bone are reduced to 3mm below the new gingival margin.[7]

There are several indications for the procedure, including: 1) Excessive gingival display because of passive eruption of the teeth. 2) Inflammatory gingival enlargement in the anterior gingiva. 3) Fibrotic drug induced gingival enlargement affecting the anterior gingiva. 4) Correction of any disharmony in the zenith line of anterior gingiva. There are several contraindications for the procedure also: 1) an unfavorable postsurgical crown/root ratio. 2) Crown lengthening that compromises adjacent teeth by excessive removal of osseous support. 3) Crown lengthening that may lead to loss of interdental papilla. 4) Medical conditions such as uncontrolled hypertension, bleeding disorders, immunological diseases, or uncontrolled diabetes.

The first step in crown lengthening procedure is determination of biological width. This is done using Williams graduated periodontal probe. Initially the depth of the gingival sulcus is measured by the probe, then the distance between the gingival margins to the alveolar bone is measured by trans-gingival probing under local anesthesia. Then the biological width is determined by subtracting the gingival sulcus depth from the distance of the gingival margin to the alveolar bone.[8]

The next step is the fabrication of surgical stent. Initially mesio-distal width of the central incisor is measured by divider and scale to calculate height of the same tooth by the following formula.[7]

10:8 = Desired crown length : available mesio-distal width

$$\text{Desired crown length} = \frac{10 \times \text{mesio-distal width}}{8}.$$

After calculating crown height for central incisor, height for lateral and canine are determined. Crown height for canine should be same as central incisor and for lateral incisor it should be 1-2mm less than central incisor. Stone casts were prepared and the calculated values were transferred onto the casts by means of marking pencil. Surgical guide stent was prepared by clear acrylic resin on the stone cast by using the markings as a guideline.

CASE REPORT

A 23 year old female patient reported to the department of Periodontology, Yogita Dental College and Hospital, India, with the complain of gummy smile (Fig. 1). The probable reason for excessive gingival display in presented case was slight maxillary excess and altered passive eruption of maxillary anterior teeth. She had no relevant medical, dental and family history. Clinically 2mm of sulcus depth was recorded in upper anterior region and then biological width was calculated by trans-gingival probing under local anesthesia. After the treatment plan was presented to the patient, alginate impressions of the arch was taken for the fabrication of stent in upper anterior region. Stent was prepared by using acrylic resin.

Figure 1. Pre-operative photograph showing gummy smile

Prepared stent was then placed on the teeth and explorer is used to create bleeding point to transfer marking on the gingiva (Fig. 2 and 3). These bleeding point were used as reference for the internal bevel incision placement. Excised tissue was removed to get desired crown exposure.

In order to maintain biological width and prevent recurrence of the condition, osseous reduction was done by using carbide bur (Fig. 4) the amount of osseous reduction was judged by the distance between new gingival margin and

crest of alveolar bone. Recommended distance betweengingival margin and crest of the alveolar bone is approximately 3mm.

Figure 2. Stent prepared on the cast

Figure 3. Stent placed on the teeth to transfer the marking

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Figure 4. Osseous reduction to maintain biological width

After completion on osseous reduction flap was sutured back in original position by using 3-0 silk suture (Fig. 5). Case was reviewed after one week for suture removal. Follow up of one year showed maintained result without recurrence of the condition (Fig. 6).

Figure 5. Simple loop suturing done

Figure 6. One year follow-up

DISCUSSION

Crown lengthening is done for two reasons, one for aesthetics purpose and the other one is for functional purposes. In either of the case the length of the clinical crown in increased there by re-establishing the biological width. Biological width is the sum of the junctional epithelium and the supracrestal connective tissue attachment (average: 2.04mm).[9] For a harmonious relation within the periodontal structures, a 3mm of supracrestal connective tissues must be left between the bone and the

margin, which will facilitate the reformation of biological width and the desired sulcus depth.

Crown lengthening can be limited to soft tissue alone when there is enough gingival preset coronal to the alveolar bone. Without the need of osseous recountouring gingival margins can be ressected and the result can be achieved. But in the majority of the cases gingivectomy as well as bone contouring is required to establish the biological width.[10] In the presented case we treated the gummy smile by using crown lengthening with osseous resection. One year follow up of the case showed no recurrence of the condition and the result is aesthetically acceptable. For crown lengthening procedure the potential complications could be: root sensitivity, possible poor aesthetics due to 'black triangles' interdentally, root resorption and transient mobility of the teeth.

CONCLUSION

Surgical crown lengthening procedure is a delicate procedure and if done skillfully it can bring beautiful results at low costs. A thorough understanding of the anatomical structures involved in the procedure, and the biologic width concept, are essential for the desired outcome of the treatment. If theoretical concepts are not followed then there are higher chances of recurrence of the condition.

REFERENCE

1. Jorgensen MG, Nowzari H. Aesthetics crown lengthening. Periodontol 2000. 2001;27:45–58.
2. Cohen E. Atlas of cosmetic and reconstructive periodontal surgery. 2nd Edn. Hamilton: BC Decker; 2000. pp. 49-58.
3. Reddy PK, Nayak DG, Uppoor A. Aesthetics crown lengthening: A report of 3 cases. Malay Dent J. 2006;1:110-3.
4. Monaco A, Streni O, Marci MC, Marzo G, Gatto R, Giannoni M. Gummy smile: Clinical parameters useful for diagnosis and therapeutical approach. J ClinPediatrDent. 2004;29:19-25.
5. Kim TW, Kim H, Lee SJ. Correction of deep overbite and gummy smile by using a mini-implant with a segmented wire in a growing class II division 2 patient. Am J OrthodDentofacialOrthop. 2006;130:676-85.
6. Lin JC, Yeh CL, Liou EJ, Bowman SJ. Treatment of skeletal-origin gummy smiles with mini screw anchorage. J ClinOrthod. 2008;42:285-96.
7. Diniz DE et al. Surgical crown lengthening: a 12 month study-radiographic results. J Appl Oral Sci. 2007;15:280-4.
8. Ganji K, Patil V, John J. A comparative evaluation for biologic width following surgical crown lengthening using gingivectomy and ostectomy procedure. Int J Dent. 2012;4:1-9.
9. Garguilo AW, Wentez FM, Orban B. Dimension and relations of the dentogingival junction in humans, J Periodontol. 1961;32: 262.
10. Lee EA (2004). Aesthetics crown lengthening: classification, biologic rationale, and treatment planning considerations. PractProcedAesthet Dent. 2004;16:769-78.