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Correction of Gummy Smile by Aesthetic Crown Lengthening and Lip Repositioning Surgery

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ABSTRACT
Introduction: Excessive gingival display while smiling, also known as “gummy smile”, is one of the most common reasons of an unappealing smile witha prevalence of 10–12%. It is described as the exposure of more than 2 mm of gingival tissue while smiling. Common causes include gingival hypertrophy, altered passive eruption,short teeth crowns, vertical maxillary discrepancy and incompetence of the upper lip. Various treatment options include surgical techniques, such as aesthetic crown lengthening, lip repositioning surgery, orthognathic surgery or combinations thereof and non-surgical approaches such as orthodontic therapy and botulinum toxin
Methods: A 24-year-old female patient reported with the chief complaint of gummy smile. Analysis of face, lip, dentoalveolar structures and periodontium was done and diagnosis of excessive gingival display due to hyperactive lip was made. After initial therapy, aesthetic crown lengthening was performed to correct gingival zenith and achieve ideal gingival contours in maxillary anterior teeth. Patient was then recalled after 4 weeks and modified lip repositioning surgery was performed. Follow up was done at14, 30 and 90 days post operatively.
Results: Treatment resulted in significant reduction in the amount of gingival display and high degree of patient satisfaction was achieved as reported by the patient throughout the follow up period.
Conclusion: Excessive gingival display can be a significant esthetic concern for patients. Understanding of the etiology, accurate diagnosis and treatment plan tailored according to the needs and concerns of the patient are critical for achievement of desired results.
Key words- Crown lengthening, aesthetics, plastic surgery, surgery

I. INTRODUCTION:

An appealing smile is imperative for aesthetic appearance of an individual. Attainment of a “perfect smile” is thus becoming an area of increasing interest.[1] The position of the lips and teeth, muscle movements, oral tissue characteristics and gingival outlines, all affect the final aesthetics of a smile.[2,3]Excessive Gingival Display (EGD) while smiling, also known as “gummy smile” is defined as an exposure of more than 3 to 4 mm of gingival tissue while smiling.[4]It is a common nonpathological condition with a 2:1 female predilection.[4,5]With a prevalence ranging from 10.5% to 29%,[6]it affects 7% of men and 14% of women worldwide.[7] Multiple possible aetiologies requiring specific treatment warrants thorough diagnosis of the patient in order to make correct diagnosis and plan appropriate treatment.[8]Diagnostic assessment should include medical history, Facial analysis, Lip analysis: static versus dynamic, Rest position analysis, Dental analysis: crown length and incisal margin and Periodontal examination of the patient.[4]A number of causes, alone or in combination, can result in its occurrence. Various intra-oral causes include altered passive eruption, gingival hyperplasia, compensatory over-eruption with attrition and anterior dentoalveolar extrusion with deep bite. Extraoral causes can be vertical maxillary excess, short upper lip and hyperactive upper lip.[9,10]Skeletal deformities like increased maxillary vertical height require orthognathic surgery.[11-13]Altered passive eruption can be treated by gingivectomy, crown lengthening or apically positioned flap.[11-14] Hyperactive upper lip as the aetiology can be corrected either non-surgically by botulinum toxin injectionsor surgical procedures such as lip repositioning surgery (LRS). The procedure of surgical lip repositioning was first presented by Rubinstein and Kostianovsky 1973. LRS reduces lip mobility while smiling and minimizes gingival exposure[15,16]byrestricting the retraction of the mandibular elevator muscles (e.g., zygomaticus minor, levatorangulioris, orbicularis oris and levator labii superioris).[17]
The following report describes the case of a patient with chief complaint of EGD while smiling and its staged treatment by Aesthetic crown lengthening surgery (CLS) and LRS.

II. CASE REPORT

A 24-year-old female patient reported to the Department of Periodontics, PGIDS with chief complaint of gummy smile. No relevant medical or

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family history was revealed. Periodontal tissues were found to be healthy with adequate width of attached gingiva. High smile line with 5 mm of gingival display was noticed.(Fig1)After thorough analysis, diagnosis of excessive gingival display due to hyperactive lip was made.aesthetic crown lengthening surgery followed by LRS was planned.

TREATMENT

Following thorough Phase 1 therapy, aesthetic crown lengthening was performed to correct the gingival zenith and achieve ideal gingival contours in maxillary anterior teeth.(Fig 2) Patient was recalled after 1 week for follow up and after due assessment, modified LRS was planned for after 4 weeks of initial CLS . After adequately anaesthetizing by infiltrating2% lidocaine and epinephrine between the maxillary premolars on both sides,two parallel incision lines were marked, one in the mucogingival junction, and the other on the vestibular side of the upper lip.[Fig 3(A)] Incision was then made using BP blade no 15. The distance between these two incisions was twice the length of the distance between original lip position and intended lip position. The outlined mucosa was removed by partial thickness dissection [Fig 3(B)] followed by advancement of the mucosal flap and closure with interrupted sutures using 5-0 vicryl.[Fig 3(C)] 400mg ibuprofen was given to the patient immediately after surgery and she was instructed to use a 0.2% chlorhexidine mouthwash twice daily for 2 week. 500mg amoxicillin three times a day for 5 days was also prescribed. Healing was uneventful, as reported by the patient14 days after the surgery.[Fig 4(A)] Further, follow up was done after 30 and 90 days.[Fig 4(B),(C)]Significant reduction in the amount of gingival display was noticed and high degree of patient satisfaction was achieved as reported by the patient throughout the follow up period.

III. DISCUSSION:

Treatment for aesthetic problems such as excessive gingival displayhavebecome common due to increasing awareness among patients.

Lip repositioning surgery is aless invasive, safe andsimple procedure with good prognosis.[9,10,16-20]The original technique followed for lip repositioning included detaching the muscles from the bone toposition upper lip coronally. However, there were reports of relapse after this procedure.It was then Miskinyar et al[19] who suggested myectomy and partial resection of the levator labii superioris instead of complete separation from the bone. This procedure was reintroduced in dentistry after a period of 25 years by Rosenblatt and Simon (2006)[17] and Simon et al. (2007)[20]The technique has also been used to treat excessive gingival display due tovertical maxillary excess along with hyperactive upper lip.[9,10]It was referred to as mucosal coronally positioned flap (MCPF) by Humayun et al. (2010).[10] They also advocated the rule of “Twice the gingival display”. The procedure is advantageous asit is versatileto use and can be modified as per the need.For example, unilateral cutting can be done in cases of asymmetrical smiles. Also, the frenum can be kept intact if required. Reversibility of the procedure also adds to its advantages. Vestibular deepening can be attempted in case of non-satisfaction of the patient.It can also be repeated in case of relapse. Prediction of the final results is possible by the use of a trial step by using only sutures and without operating.[9,10,17,20]Despite its abovementioned benefits,lip repositioning surgery is contraindicated in cases not having adequate attached gingiva and also due to difficult flap design, suturing and stabilization.[17,20] Inadequate attached gingiva also results in a shallower and narrower vestibule,hindering in performance of adequate oral hygiene measures.[21]The major disadvantage of this surgery is relapse, commonly seen during the initial 6–8 weeks.[9,10,15,17,22]Common post-operative complications includepostoperative bruising, discomfort, and swelling of the upper lip, restriction of lip movementand paraesthesia.[9,10,17-20]Rarely, complication such as mucocele resulting from damage to minor salivary glands has also been reported.

IV. CONCLUSION

Excessive gingival display can be a significant aesthetic concern for patients. Understanding of aetiology, accurate diagnosis and treatment plan tailored according to the needs and concerns of the patient are critical for achievement of desired results. Surgical lip repositioning is an innovative and effective procedure with minimal morbidity, lower incidence of complications and shorter recovery time to minimize gingival display by positioning the upper lip in a more coronal position. The long-term stability of the results needs to be seen, but it is a promising alternative treatment modality in aesthetic rehabilitation.

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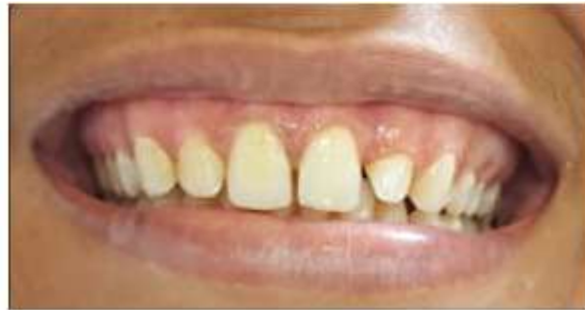

Fig 1- Preoperative picture

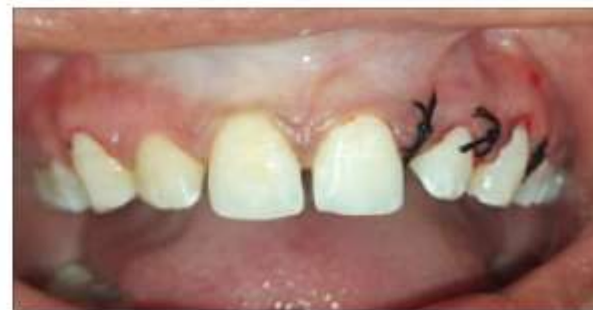

Fig 2- Esthetic crown lengthening-postoperativepicture

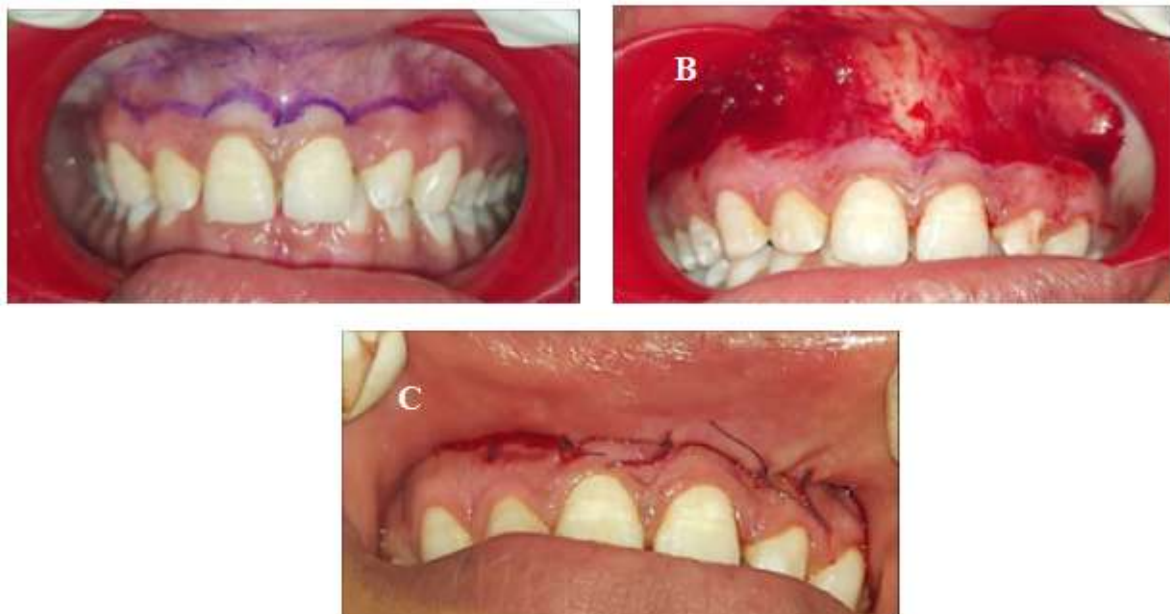

Fig 3 Lip repositioning surgery- intra operative (A) Marking the incision line (B) Epithelium removed, connective tissue exposed (C) Coronally placed flap with sutures in place

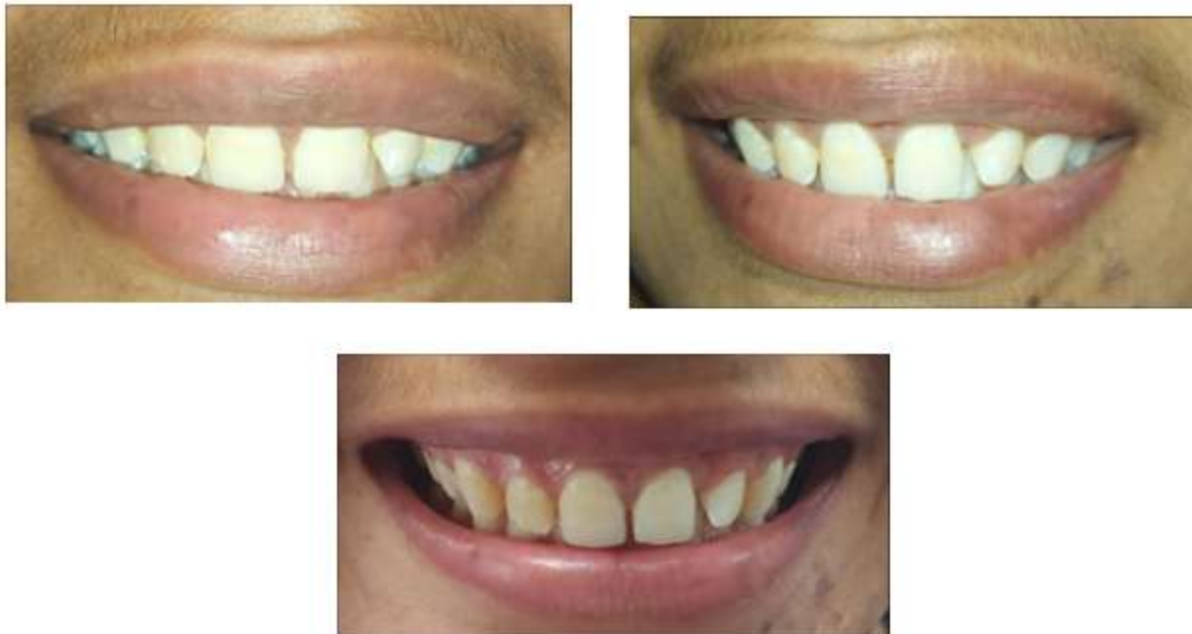

Fig 4- Post operative pictures (A) 14 days follow up (B) 30 days follow up (C) 90 days follow up

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