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RESEARCH ARTICLE

LIP REPOSITIONING SURGERY ALONG WITH ESTHETIC CROWN LENGTHENING FOR THE TREATMENT OF GUMMY SMILE:A CASE REPORT

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Abstract

Excessive gingival display is an aesthetic concern that may be addressed with a variety of methods. Lip repositioning is a treatment option for people who are concerned about their appearance. Excessive gingival display, commonly known as "gummy smile," is characterised by a gingival display of more over 3mm when smiling. A patient with a gummy smile was treated with lip repositioning surgery in the current case report. Our goal was to present lip repositioning as a viable treatment technique for reducing gingival display and asymmetry with a simple and conservative surgical procedure, strong long-term durability, and little recurrence.

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Introduction:-

Smiling is something that everyone understands, regardless of culture, colour, or religion. A smile is a basic form of communication that involves the correlation of the teeth, the lip framework, and the gingival scaffold.¹The most essential aesthetic goal in orthodontics is to create a perfect smile, which can best be summed up as acceptable positioning of teeth and gingival scaffold within the dynamic display zone; thereby, it is justified to assess smile as an important criterion for diagnosis and orthodontic treatment planning.²A great smile is an ideal balance of pink gingiva and white teeth. From the inferior border of the upper lip to the gingival margin of the upper central incisors, a typical smile contains 1–2 mm of gingival display. Gingival display of more than 4 mm is visually unappealing to the majority of patients and is referred to as excessive gingival display (EGD) resulting in a gummy smile (GS).³

The etiology of EGD is various:

1. Plaque or drug-induced gingival enlargement,
2. Altered or delayed passive eruption,
3. Anterior dento-alveolar extrusion,
4. Vertical maxillary excess,
5. Short upper lip,
6. A hyperactive upper lip,
7. or a combination.

EGD treatments include procedures such as orthognathic surgery, orthodontic treatment, detachment of lip muscles by myectomy and/or myotomy,^{4,5} lip elongation associated with rhinoplasty,⁶ lip repositioning⁷, and botulinum toxin-A injections⁸.In our report, we used lip repositioning, a minimally invasive surgical procedure for the management of excessive gingival display. As an alternative to invasive surgeries, it provides low morbidity, low incidence of complications, and rapid recovery. The primary disadvantage of the procedure is relapse.

A correct diagnosis of the etiology is important for the appropriate treatment plan to be opted.⁹Lip repositioning aims to reduce gingival display by limiting retraction of the elevator smile muscles (zygomaticus minor, levatorangulioris, orbicularis oris, and levator labii superioris), likely to result in a relatively narrow vestibule and restricted muscle pull, and hence reducing gingival display while smiling.¹⁰

Contraindications of lip repositioning include the presence of a minimal zone of attached gingiva, which can create difficulties in flap design stabilization and suture, and severe vertical maxillary excess.¹¹

Case Presentation:

A 21-year-old female patient reported to the Department of Periodontology at the Coorg Institute of Dental Sciences in Karnataka (India) with the chief complaint of increased gum display. There was no relevant medical or familial history, and the patient was medically sound and suitable for surgical intervention. The face was bilaterally symmetrical with inadequate lips on clinical inspection extraorally. The patient was undergoing orthodontic therapy. During the clinical assessment, 6 mm of gingival display in the medial line was confirmed, leading to the diagnosis of the excessive gingival display. After the patient denied orthognathic surgical therapy in preference of a less invasive method, a lip repositioning technique was suggested. After addressing the alternative treatment methodologies, advantages, and potential risks of a lip repositioning surgery, informed consent was obtained. The patient's expectations were addressed, and a realistic outcome, including the potential of a complete or partial relapse, was offered. A complete blood evaluation was performed, and the results were within the usual range.



Figure 1:- Pre operative.



Figure 2:- Pre operative.

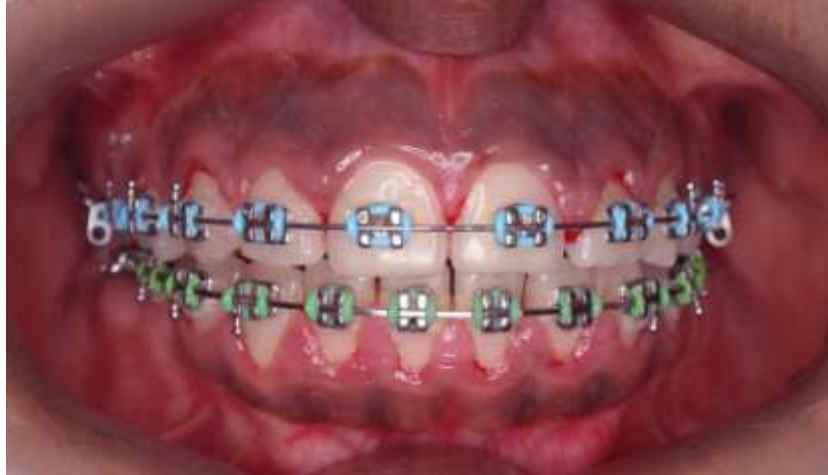


Figure 3:- Pre operative.

As a result, surgery was scheduled as follows:

- 1) Crown lengthening: Crown lengthening from the upper right first premolar (14) to the upper left first premolar (24) to restore tooth size.
- 2) Surgical lip repositioning: - Lip-repositioning surgery to limit upper lip hypermobility during smiling.

Following strict aseptic measures, the surgical method was carried out. Draping was done after standard skin preparation with a 10% povidone-iodine solution. By combining 2 % lignocaine with 1:100,000 epinephrine, local anesthesia was achieved in the maxillary right premolar to left premolar area.

Because the clinical crown length was short, crown lengthening was performed from 14 to 24 by gingivectomy technique (without osseous recontouring because probing depth was 4–5 mm) with a 15C Bard-Parker blade, followed by gingivoplasty to reduce the extra bulk of the tissue and establish appropriate contour for a proper smile line. The gingival display during smiling was decreased to around 4 mm after crown lengthening.



Figure 4:- Immediate post operative after crownlengthening and gingivoplasty.



Figure 5:-Immediate post operative after crownlengthening and gingivoplasty.

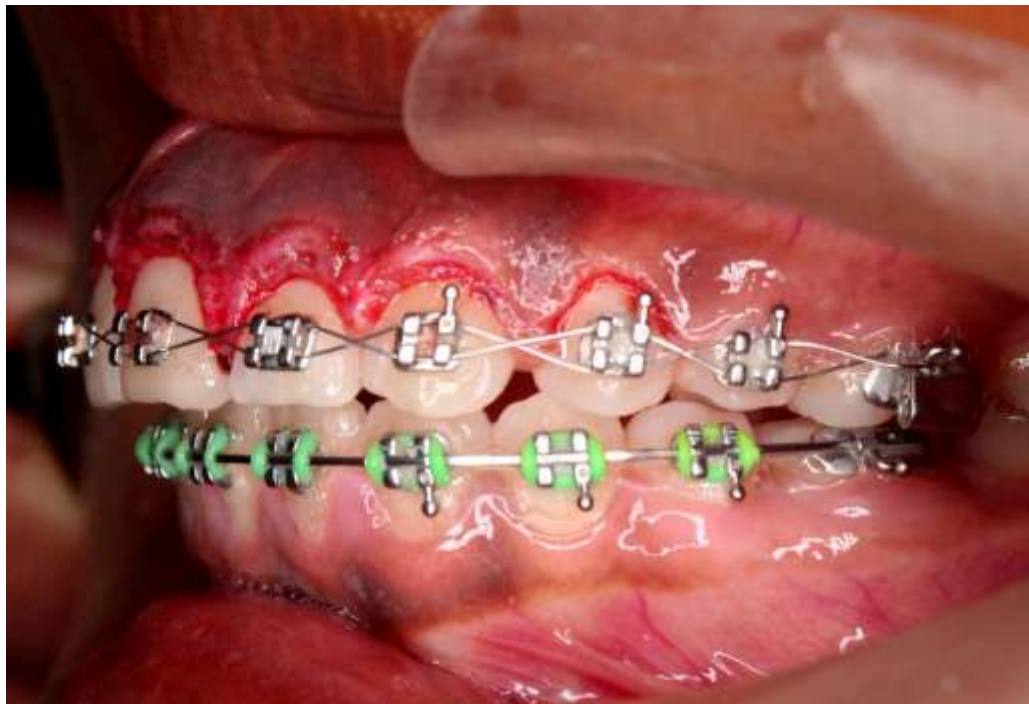


Figure 6.:-Immediate post operative after crownlengthening and gingivoplasty.



Figure 7:- 2 weeks after crown lengthening and gingivoplasty.

The outline was marked, and the operation began with 15 no. Bard-parker blade. Following the mucogingival junction, a partial-thickness incision is made using a Bard-Parker blade stretching from the right first premolar to the left first premolar. Following the initial incision, a second (horizontal) incision was created, which was parallel to the first incision and linked by an elliptical pattern. The partial-thickness flap was removed, exposing the connective tissue beneath. Hemostasis was obtained. To establish appropriate alignment of the midline of the lip to the teeth, an interrupted suture using 3-0BBS silk suture at the midline is given at first followed by approximation of margins of parallel incisions. To approximate flap boundaries, several sutures were placed on either side of the midline suture. Following surgery, nonsteroidal anti-inflammatory medications and oral antibiotics were administered. Mild discomfort and swelling were the only post-operative side effects, which subsided after a week. The wound healed well, with a scar at the suture line. The patient was observed for a period of 6 months.



Figure 8:- pre operative before lip repositioning procedure.



Figure 10:-



Figure 11:- Outline of the incision was marked.



Figure 12:- partial-thickness flap removed, exposing the connective tissue beneath.



Figure 13:-excised tissue



Figure 14:- Suturing with 3-0 BBS.

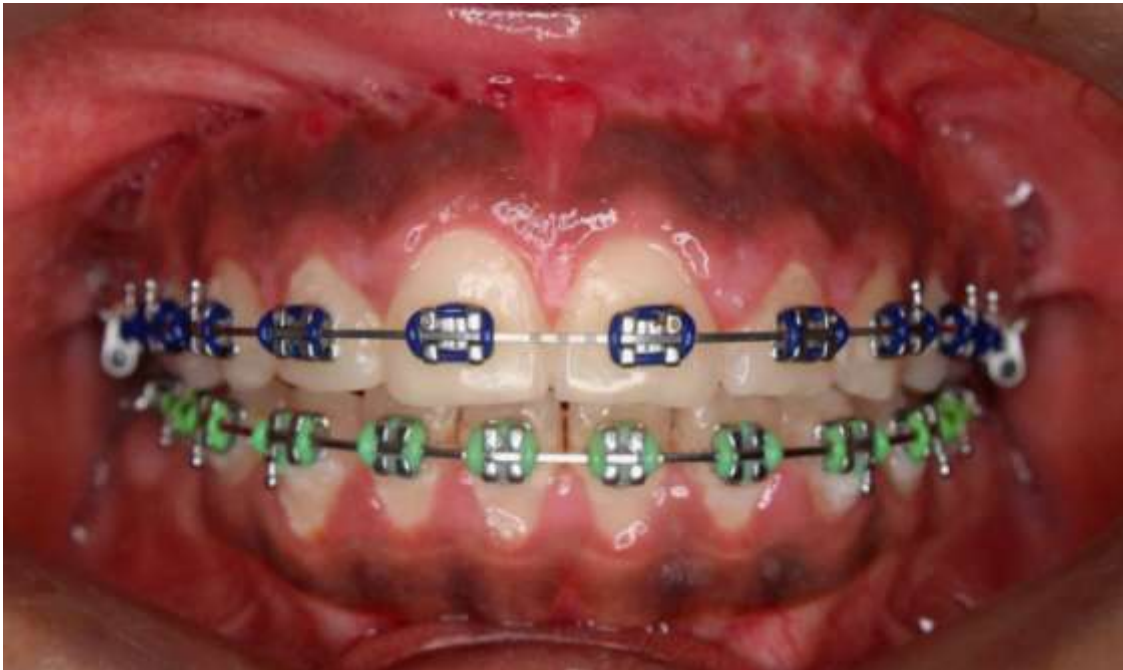


Figure 15:- Sutures removed after 2 weeks.



Figure 16:- Healing after 3 months.



Figure 17:- Post operative smile after 3 months.

Discussion:-

The crowns of the maxillary central incisors and 1 mm of pink attached gingiva are visible when a person smiles. Cosmetically, 2–3 mm of exposed gingiva can be acceptable if it is not extremely noticeable, such as the "Gummy smile" appearance, which shows more than 3 mm of gingiva during a relaxed smile. This aesthetic appeal repair should take place within the confines of the "cosmetic zone." The midline of the face, the location of the incisal margins, and the gingival margin are key markers in an aesthetic evaluation of the dentogingival complex. The case previously described in the literature has shown the successful outcomes of this technique for the correction of the excessive gingival display.^{12,13} We presume that the lip repositioning technique when compared to alternative treatments, not only increases patient compliance (cost-effective, least time consuming) but also provides good healing results. Besides that, we believe that this technique has an advantage over others because it is simple, effective, requires minimal instrumentation, is less time consuming, is less invasive (when compared to a few

techniques), is cost-effective, and is simple to perform, leading to improved postoperative results, faster healing, and patient satisfaction.

Silva *et al.* in 2012 reported a case series of 13 patients in which modified lip repositioning technique was used wherein EGD improved from 5.8mm+- 2.1mm to 1.4+- 1.0mm which resulted in high level satisfaction and predictable outcomes that are stable in short term¹⁴. Jacobs *et al.* in 2013 did a study on 7 patients with laser assisted lip repositioning technique which brought the EGD from 5.3+_ 1.1mm to 1.1 +_ 2.5mm. the results proved excellent alternative to more costly and time consuming treatments for EGD with follow up of 3 years.¹⁵ The lip repositioning procedure was effectively reduced the EGD, and this resulted in much faster results than other treatment alternatives. The patient was found to have much lower morbidity than possible procedures. After the measurements, a trial step was used using sutures without cutting to give the patient an estimate of the final results, which increased the patient's treatment motivation compared to other treatments. However, it was seen that the results were not permanent in the long term. After this period, the efficacy of LRS seems to decrease progressively, and an approximately 25% relapse may be expected after 12 months.¹⁶

In our case report, a 21-year-old female patient who was undergoing orthodontic treatment had reported to the department of periodontics and implantology, Coorg Institute of dental sciences virajpet, Karnataka. In clinical examination, the patient had a maxillary gingival appearance of around 6 mm when she smiled. The patient has skeletal class II div 1 malocclusion (vertical maxillary excess degree II). Orthognathic surgery or/and orthodontic therapy are required, instead, the patient preferred a less invasive, less morbid approach. The goal was to reduce Gingival Display (GD) in the shortest amount of time and with the least amount of invasive surgical procedures possible. VME classification was given by Garber *et al.* and simplified the selection of the treatment technique appropriate for this classification.¹⁷ Intraoral and extraoral examinations of the patient were performed. Face symmetry and proportions were ordinary in both frontal and lateral views. A periodontal examination was performed. The patient's probing depths were about 4mm. Her gingival phenotype was medium. The clinical crown length was short with the abnormal bulkiness of the gingiva. At the same time, she had an adequate width of the attached gingiva. The keratinized attached gingiva width ranged from 8 to 12 mm, and the thickness was 1-2 mm.

In the first appointment crown lengthening of 2mm was done from 14 to 24 followed by gingivoplasty to reduce the extra bulk of the gingival tissue. The patient was recalled after 2 weeks for evaluation and the lip repositioning surgical procedure.

The region healed satisfactorily at the second appointment, two weeks after crown lengthening, and the probing depth is lowered to 2 mm. starting with the second step of the treatment, lip repositioning surgery, the coronal incision was a partial-thickness incision positioned on the mucogingival junction line. It was extending between, the mesial side of the right premolar to the mesial side of the left premolar teeth. The mucosa was stretched while an apical incision was performed in a single line parallel to the coronal incision. The labial frenulum was also included in the incision line. The little salivary glands in the submucosa were retained, and the underlying connective tissue was kept intact when the epithelial tissue was removed. Starting with the initial midline suture, the mucosal flap was sutured with simple interrupted sutures made of 3-0 silk. The length and thickness of the lips increased immediately after the procedure, and the look of the gums when smiling varied between 3-4 mm. The patient was educated about postoperative care and potential complications. Until the next day, the patient was told to avoid trauma, soft food, and ice application. Limiting facial movements like laughing and chatting was also recommended. For the next 10 days, the patient was instructed to squish gently with 2% chlorhexidine gluconate instead of brushing her teeth. Antibiotics and analgesics were prescribed as part of the post-operative treatment plan.¹⁸ One week later, the patient was contacted for follow-up, and no issues were seen besides edema and soreness; the area was cleansed with saline. Two weeks later, the sutures were removed from the region. There was a tiny scar on the suture line during the three-month check, but it did not show up when the patient smiled. Swelling, bruising, certain restrictions in lip mobility and paraesthesia are all common postoperative complications. Mucocele is an uncommon condition.^{4,5,19,20} Various writers have proved that this surgery has an excellent prognosis and is also safe and easy.

It has a low morbidity rate, a low rate of complications, and a quick recovery time when compared to invasive operations. Predictable effective results can be attained in circumstances where the indication is appropriate. More inquiry and research, as well as larger sample sizes and longer follow-up durations, are required to correctly evaluate this approach and its effect.

Conclusion:-

The EGD was successfully reduced by the lip repositioning surgery, yielding much faster outcomes than conventional treatment options. The patient's morbidity was found to be significantly lower than that of other treatments. Because of its less invasive technique and low postoperative consequences, it benefits both professionals and patients. This approach is significant because dental aesthetic procedures have elevated Periodontics to a new level beyond hardcore Periodontics.

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