WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 5.990
Volume 4, Issue 7, 2191-2202. Case Study ISSN 2277– 7105

LIP REPOSITIONING A TRIBUTE TO DENTISTRY WITH THE LASER ASSISTED CROWN LENGTHENING AND DEPIGMENTATION- A CASE REPORT AND REVIEW

[1]Dr Pratima Srivastava, [2]Dr. Deepa Rai, [3]Dr. Jagriti Gupta,
[4]*Dr. Krishna Kumar Gupta

[1,2]Post graduate Student, Department of Periodontology and Implantology. Sardar Patel Post-Graduate Institute of Dental and Medical Sciences, Lucknow, Uttar Pradesh, India.
[3]Assistant Professor, Department of Oral and Maxillofacial Pathology. Sardar Patel Post-Graduate Institute of Dental and Medical Sciences Lucknow, Uttar Pradesh, India.
[4]Professor & Head of Department of Periodontology and Implantology. Sardar Patel Post-Graduate Institute of Dental and Medical Sciences Lucknow, Uttar Pradesh, India.

Article Received on
10 May 2015,

Revised on 05 June 2015,
Accepted on 01 July 2015

***Correspondence for Author**
Dr. Krishna Kumar Gupta
Professor & Head of Department of Periodontology and Implantology. Sardar Patel Post-Graduate Institute of Dental and Medical Sciences Lucknow, Uttar Pradesh, India.

ABSTRACT

A dazzling and beautiful smile works wonder for anyone's personality. Excessive gingival display during smiling ("gummy smile") is an esthetic issue that affects a considerable part of the population in all over world. This case report presents a case of 22 years, young female who has a chief complaint of a gummy smile, in which esthetic correction was achieved through periodontal plastic surgical procedure. This was accomplished by removing a partial thickness strip of mucosa from the maxillary buccal vestibule and suturing the lip mucosa to the mucogingival line. This resulted in a narrower vestibule and restricted muscle pull, thereby reducing gingival display during smiling. Laser assisted crown lengthening and depigmentation procedure is planned keeping an aesthetic in mind. Crown lengthening procedure is performed to increase the length of the available tooth, the biological width needs to be considered and not encroached upon, as this may lead to periodontal breakdown. This case report describes the successful treatment of excessive gingival display using surgical Lip repositioning procedure which can be used as an alternative treatment modality for treatment of excessive gingival display.

KEYWORDS: Excessive Gingival Display, Gummy Smile, Lip Repositioning, Crown Lengthening, Gingival Depigmentation.

INTRODUCTION

A beautiful smile wins everyone heart and is a key of first impression. Our smile is a mirror of our Persona'.[1] A smile is an important gestural method of communication and is an interaction between the teeth, the lip framework, and the gingival scaffold. The harmony of the smile is determined not only by the shape, position, and the colour of teeth but also by the gingival tissues.[2]

Excessive gingival display (EGD), commonly termed "gummy smile", is a condition in which there is an overexposure of the maxillary gingiva during smiling; in severe cases, the overexposure is present in repositioning of the mouth and lips. It is one of the several developmental or acquired deformities and conditions that manifest in the periodontium.[2]

Gummy smile is governed by various etiological factors, for example jaw deformities, which cause EGD and require a orthognathic surgery.[3] This occurs due to excessive increased vertical height of maxillary arch. The orthognathic surgery is a complicated procedure and requires team work with hospitalization and general anesthesia, while lip repositioning is innovative, effective, less time consuming and is performed under local anesthesia.[4]

Lip repositioning was first described in the medical literature in 1973 by Rubinstein and Kostianovsky. First case of lip repositioning was done by an Indian dentist Gupta et al. in the year 2010.[5] Lips define the esthetic zone and, while smiling, liplines have been defined as low, medium, or high. The lipline is considered low when only part of the teeth are visible below the upper lip, medium when 1 to 3 mm of the marginal gingival is exposed during a smile, and high when more than 3 mm of gingiva is shown.[6]

Crown lengthening is a surgical procedure used to increase the extent of supragingival tooth structure for restorative or esthetic purposes. Crown lengthening involves the surgical removal of hard and soft periodontal tissues to gain supracrestal tooth length, allowing longer clinical crowns and re-establishment of the biologic width.[7] In the present case report crown lengthening, technique is generally used to improve aesthetics and takes the form of a gingivectomy procedure to excise the soft tissue.

Gingival pigmentation results from melanin granules, which are produced by melanoblasts. The degree of pigmentation depends on melanoblastic activity. Although melanin pigmentation of the gingiva is completely benign and does not present a medical problem, complaints of 'black gums' are common particularly in patients having gummy smile.[8]

CASE REPORT

A 22-year-old female reported to the Department of Periodontology and Implantology in premises of Sardar Patel Post- Graduate Institute of Dental and Medical Sciences Lucknow, India, with the chief complaint of a gummy smile and black gums. She reported dissatisfaction with the amount of gingiva exposed while smiling and black gums [Fig-1] . There was no significant medical or family history and the patient was medically sound and fit for the surgical procedure. On clinical examination extraorally, the face was bilaterally symmetrical with competent lips. Intraorally, a severe gingival display was seen during smiling which extended from the maxillary right first molar to the maxillary left first molar. As the patient preferred a less invasive procedure to address her chief complaint, an informed consent was obtained after discussing the alternate treatment modalities, benefits, and possible complications for a lip repositioning procedure.

The treatment suggested and performed were:

- Lip repositioning procedure for correction of a gummy smile.
- Laser assisted crown lengthening in anterior region from first molar to molar in maxilla.
- Laser assisted depigmentation in maxillary arch.

AIM & OBJECTIVE

Lip repositioning technique is performed to minimize the gingival display by limiting the retraction of the elevator smile muscles (eg: zygomaticus minor, levator anguli, orbicularis oris, and levator labii superioris). This is accomplished by removing a strip of mucosa from the maxillary buccal vestibule and creating a partial-thickness flap between the mucogingival junction and the upper lip musculature. The lip mucosa is then sutured to the mucogingival line, resulting in a narrower vestibule and restricted muscle pull, thereby reducing gingival display during smiling.[9] Laser assisted crown lengthening and gingival depigmentation is performed for maintaining the facial aesthetic of a patient to give a beautiful smile.

SURGICAL PROCEDURE

Complete extraoral and intraoral mouth disinfection was done with 2% betadine, followed by infiltration with local anesthesia, (2% lignocaine hydrochoride with 1:80,000 epinephrine).

Thereafter, the surgical area to be operated was demarcated with the help of an indelible pencil also shown in schematic diagram [Fig- 2 and 3]. The surgical area started at the mucogingival junction, which extended 10−12 mm superiorly in the vestibule [Fig-4]. Incisions were made in the above mentioned surgical area and both superior and inferior partial thickness flap was raised from maxillary right first molar to maxillary left first molar. The incisions were connected with each other in an elliptical outline. The epithelium was excised [FIG-5] within the outline of the incision leaving the underlying connective tissue exposed [Fig-6 and 7]. The tissue tags were removed with the help of tissue cutting scissor [Fig-8]. Firstly, the parallel incision lines were approximated and interrupted suture was placed at the midline to ensure proper alignment of the lip midline with the midline of the teeth [Fig-9 and 10], then continuous interlocking sutures were used to approximate both flaps [Fig-11 and 12]. Suture placed are resorbable in nature.

Aesthetic crown lengthening procedure were performed with the help of diode laser from right maxillary central incisor to first molar to left right maxillary central incisor to first molar [Fig-13], Creating a gingival symmetry in the smile line. When a crown lengthening procedure is planned to increase the length of the available tooth, the biological width needs to be considered and not encroached upon, as this may lead to periodontal breakdown. The proportions of crown length are also very important.

Normally, the gingival margin is 1 mm coronal to the CEJ. If it is greater, then the clinical crown is shorter than the anatomical crown and a crown lengthening procedure is required.

Firstly, the measurement of the clinical crown length with the help of a UNC-15 Probe made. The gingival tissue was of thick biotype and had adequate attached gingiva. Therefore, we simplified our procedure by excising 2-3 mm of gingival tissue with the help of diode laser, from the gingival margin in order to maintain a desired aesthetics in the anterior region. The diode laser unit (Picasso AMD LASER with wavelength 810 nm and 400 µm fibre optic tip) was used at energy settings 1.5 watts in Continuous Wave (CW) mode angle at an external bevel of 45 degrees, with small brush-like strokes back and forth with the gradual progression along the same initial laser incision to remove the tissue and tip was kept in continuous motion.[7] A scalloped pattern around the gingival margin was performed. Remnants of the ablated tissues were removed using sterile gauze soaked in saline.

Depigmentation procedure performed at power setting of 1.5 watts initially in Pulsed Wave mode (PW) set at 0.20 ms of pulse duration and 0.10 ms of pulse interval were used. Proper

safety precaution using laser were taken by the operator, patient and assistant. Safety glasses were worn. Plastic instruments were used to avoid reflection of the laser beam as proposed by FDA laser safety rules.

Patient was discharged with all post-surgical instructions and medications for five days which included analgesic (Ibuprofen 600 mg QID daily for 2 days), antibiotic (Amoxicillin 500 mg TDS for five days), along with cold packs extra orally to decrease post-surgical swelling.

Patient was recalled for laser bio-stimulation for 5 days and is on and advice to report department for follow up visit till 6 months. The patient after a week complained of mild tension on the upper lip with no pain [FIG-14]. It was seen later that the suture area healed in the form of a scar [Fig-15 after 3 months], which was not apparent when the patient smiled because it was concealed in the upper lip [Fig-16 after 6 months].

Precautions Taken While Surgery

1. Care must be taken to avoid damage to minor salivary glands in submucosa. Some cases with rare complication reported in the literature are Paresthesia[10] and transient paralysis.
2. Clinicians must look for adequate width of attached gingiva.
3. Do not perform the procedure with patients having vertical maxillary excess, in such cases orthognathic surgeries is the solution.[4]

Figure 1: Preoperative

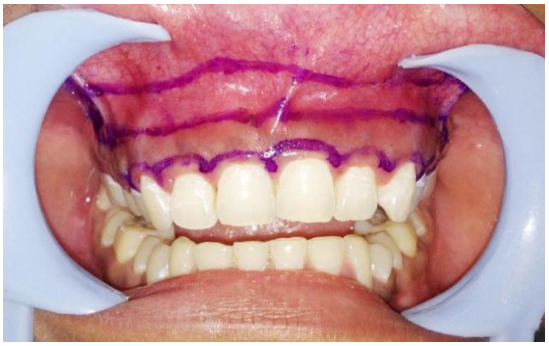

Figure 2: Area Demarcated With Indelible Pencil.

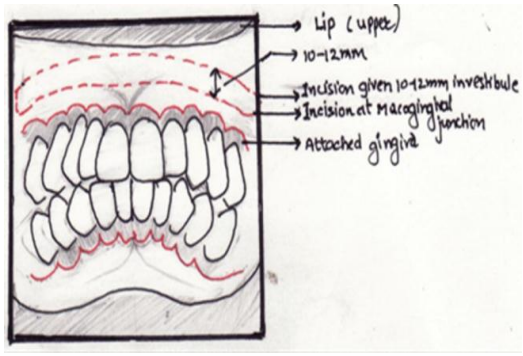

Figure 3: Demarcated Area

Figure 4: The surgical area started at the mucogingival junction, which extended 10-12 mm superiorly in the vestibule and epithelium removed.

Figure 5: Epithelium Removed

Figure 6: Exposed Connective Tissue.

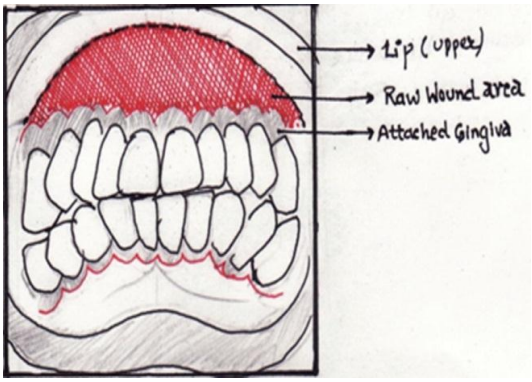

Figure 7: Raw Wound Area.

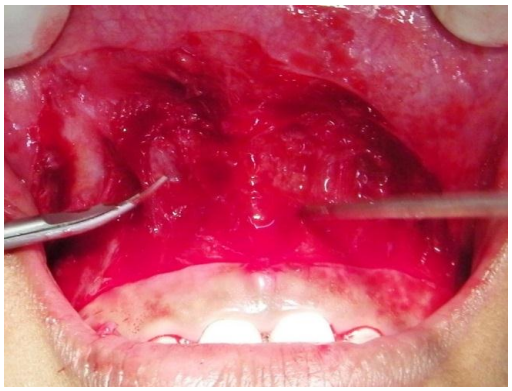

Figure 8: Tissue Tag Removed.

Figure 9: Midline Suture Placed.

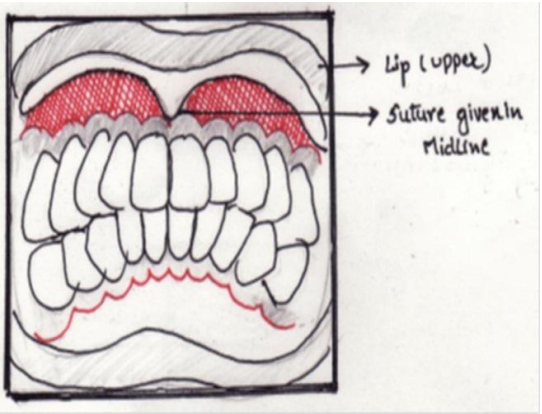

Figure 10: Midline suture (schematic diagram of midline suture).

Figure 11: Continuous Interlocking Suture.

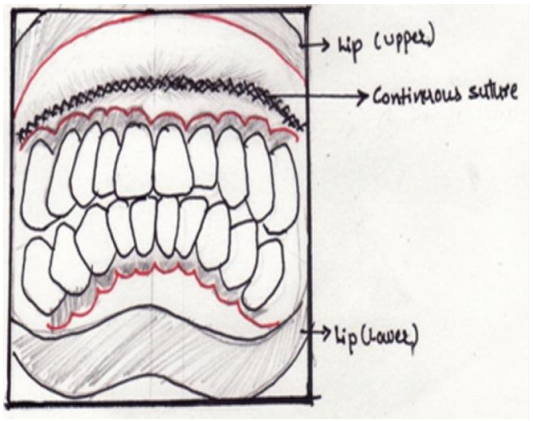

Figure 12: Continuous suture.

Figure 13: Laser Assisted Crown Lengthening and De-Pigmentation Performed.

Figure 14: After one Week.

Figure 15: After Three Months.

Figure 16: After 6 Months.

DISCUSSION

Optimal aesthetics to the goal of periodontal therapy parallels a paradigm shift in all of dentistry. Dental art has long been a part of the quest to enhance the aesthetics of the teeth and mouth. What constitutes a pleasing dentogingival appearance depends on the extent of gingival exposure.The lip repositioning technique is an excellent alternative to more costly procedures with higher morbidity rates.

When a person smiles, greater amount of exposed gingiva (2‑3 mm) can be cosmetically acceptable as long as the gingiva is not unduly conspicuous such as “Gummy smile” appearance, where more than 3 mm of gingiva is displayed during a relaxed smile.[11] In most patients, the lower edge of the upper lip assumes a “gumwing” profile, which limits the amount of gingiva that is exposed when a person smiles. The form of the lips and the position of the lips during speech and smiling cannot be easily changed, but the dentist may, if necessary, modify/ control the form of the teeth and interdental papillae as well as the position of the gingival margins and the incisal edges of the teeth along with repositioning of the lip.[4] It can be done by combining Periodontic and Prosthodontics treatment measures to improve dentofacial aesthetics.

The above case presents the successful clinical outcome of a lip repositioning technique. In the present case the crown length was not appropriate and required crown lengthening with gingival de-pigmentation.

Crown lengthening procedure is carried out for various restorative and esthetic reasons, such as short teeth, excessive gingival display, and uneven gingival contour. An evaluation of clinical and anatomic crown lengths in patients with a high lip line is an important factor. Several procedures have been proposed for crown lengthening. In this case laser assisted crown lengthening has been performed. The thick, fibrous gingival tissue of 2-3 mm was excised in a scalloped pattern with the help of diode laser. When full exposure of the anatomic crown was achieved, there was a dramatic change in aesthetics by the concomitant lengthening of the teeth and reduction of the gingival exposure seen which significantly altered the ratio of crown to marginal tissue in favour of the teeth.

Oral pigmentation occurs in all races of human. The intensity and distribution of pigmentation of the oral mucosa is variable, between different individuals of the same race and within different areas of the same mouth. Several modalities have been suggested for gingival depigmentation varying from Scalpel, Electrosurgery, Cryosurgery and Abrasion techniques with large round burs to Lasers. Melanin pigmentation is frequently caused by melanin deposition by active melanocytes located mainly in the basal layer of the oral epithelium.[8] In comparison with other techniques de-pigmentation with lasers achieves good results. In this case diode laser assisted de-pigmentation has been performed.

The semiconductor diode laser is emitted in continuous-wave or gated-pulsed modes, and is operated in a contact method using a flexible fibre optic delivery system. Laser light at 800 to 980 nm is poorly absorbed in water, but highly absorbed in haemoglobin and other pigments. Diode laser is indicated for cutting and coagulating gingiva and oral mucosa, for soft tissue curettage, and used as low level laser therapy. Tissue penetration of a diode laser is less, while the rate of heat generation is Higher. The diode laser causes minimal damage to the periosteum and bone under the gingiva being treated, and it has the unique property of being able to remove a thin layer of epithelium cleanly. Although healing of laser wounds is slower than healing of scalpel wounds, a sterile inflammatory reaction occurs after laser Use.[12]

Further, post-operatively for 5 days laser bio-stimulation for accelerating healing phase has been performed to patient. Laser bio-stimulation is done by diode laser (810 nm continuous

mode; at 0.1 watt; for ; 1 min for 2-3 times). It effects on macrophages include increased ability to act as phagocytes, and greater secretion of basic fibroblast growth factor. Macrophages resorb fibrin as part of the demolition phase of wound healing more quickly with low level laser therapy, because of their enhanced phagocytic activity during the initial phases of the repair response. More rapid demolition of the wound establishes conditions necessary for the proliferative phase of the healing response to begin.[13]

CONCLUSION

Lip repositioning is an innovative and effective way to improve the gummy smile of a patient. This technique is an easy, less time consuming and cost-effective way to give satisfactory results to the patient.

REFERENCES

1. Grover HS, Gupta A, Luthra S. Lip repositioning surgery: A pioneering technique for perio-esthetics. Contemp Clin Dent, 2014; 5: 142-5.
2. Dayakar MM, Gupta S, Shivananda H. Lip repositioning: An alternative cosmetic treatment for gummy smile. J Indian Soc Periodontol, 2014; 18: 520-3.
3. Ezquerra F, Berrazueta MJ, Ruiz-Capillas A, Arregui JS. New approach to the gummy smile. Plast Reconstr Surg, 1999; 104: 1143-50.
4. Gupta KK, Srivastava A, Singhal R, Srivastava S. An innovative cosmetic technique called lip repositioning. J Indian Soc Periodontol, 2010; 14: 266‑9.
5. Gaddale R, Desai SR, Mudda JA, Karthikeyan I. Lip repositioning. J Indian Soc Periodontol 2014;18:254-8.
6. Ribeiro Vital Noé, Campos de Souza Thiago Veiga, Rodrigues Guilherme Jefferson, Martins Modolo Azevedo Thiago, Silva O Cléverson. Treatment of Excessive Gingival Display Using a Modified Lip Repositioning Technique. Int J Periodontics Restorative Dent, 2013; 33: 309–15.
7. Gokulanathan S, Mathews D, Daniel R, Ahathya R. Crown lengthening using diode laser: A case series. J Indian Acad Dent Spec Res., 2014; 1: 77-9.
8. Gupta KK, Srivastava A, Chandra C, Tripathi V. Lip repositioning with crown Lengthening and gingival Depigmentation: A Case Report. J Periodontol Implant Dent., 2011; 3: 38-42.
9. Rosenblatt Ari, Simon Ziv. Lip Repositioning for Reduction of Excessive Gingival Display: A Clinical Report. Int J Periodontics Restorative Dent, 2006; 26: 433–37.

10. Miskinyar SA. A new, method for correcting a gummy smile. Plast Reconstr Surg, 1983; 72: 397-400.
11. Sheth T, Shah S, Shah M, Shah E. Lip reposition surgery: A new call in periodontics. Contemp Clin Dent, 2013; 4: 378-81.
12. Murthy MB, Kaur J, Das R. Treatment of gingival hyperpigmentation with rotary abrasive, scalpel, and laser techniques: A case series. J Indian Soc Periodontol, 2012; 16: 614-9.
13. Surendranath P, Arjun KR. Low Level Laser Therapy –A Review. IOSR-JDMS., 2013; 12: 56-9.