ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 5, Issue – 1, January - 2022, Page No. : 66 - 72

A novel lip repositioning technique with reversible trial for the management of excessive gingival display: A case Report.

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Citation of this Article: Dr. Basavaraju Mounika, Dr. Sisinty Vidya Sagar, Dr. Juliet Josephin J, Dr. Suryakanth Malgikar, Dr. Bommakanti Revathi, "A novel lip repositioning technique with reversible trial for the management of excessive gingival display: A case Report", IJDSIR- January - 2022, Vol. – 5, Issue - 1, P. No. 66 – 72.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Background: Esthetic demands have significantly increased over the years. A pleasing smile can give utmost confidence to an individual's personality. Excessive gingival display is an esthetic concern for patients. Lip repositioning is a conservative surgical technique used to treat excessive gingival display.

Aim: The aim of the present case report was to reduce the excessive gingival display with trial, and then definitive lip repositioning

Settings and Design: Subject was enlisted from Department of Periodontics, Kamineni Institute of Dental Sciences.

Materials and Methods: Proposed surgical resection to correct the excessive gingival display was marked with a diode laser set. The treatment sequence for the patient consisted of reversible lip repositioning, patient evaluation and approval, and definitive surgical repositioning

Results: The mean pre-operative gingival display on smiling was 7.0 ± 1.5 mm, measured at the central

incisors. The corresponding mean post-operative measurement was 1.5 ± 2.0 mm below the gingival zenith. Thus, a mean reduction in gingival display of 5.0 ± 1.5 mm was achieved.

Conclusion: Lip repositioning using the reversible procedure prior to definitive surgery is currently the paramount way for both the patient and doctor to preview the intended result before moving forward with elective surgery.

Keywords: Esthetics, Excessive gingival display, Gummy smile, Lip repositioning.

Introduction

A smile is an expression denoting pleasure, joy, happiness, or delight. Smiling is something that is understood by everyone irrespective of one's culture, race, or religion[1]. Gingival health and display are significant characteristics of an attractive smile.[2] A high smile line is a challenge well known to any esthetically minded dentist. An esthetically pleasing smile requires gingival health, a proportional amount of gingival display during forced smiling and harmony among the size, shape, position, and color of the teeth[3]. However, a subset of this patient population displays an upper lip that lies far enough above the maxillary gingival zenith that it is labelled as unpleasant .[4,5] This condition is known as Excessive Gingival Display (EGD).

A number of patients who exhibit EGD and have short clinical crown heights may be treated with anterior gingivectomy or crown lengthening only. These are the individuals where the sole etiology is due to altered eruption—passive or active. In these patients, re-establishing correct tooth proportions by raising the gingival zenith can alleviate and sometimes completely resolve the issue. However, if not entirely resolved, additional etiologic factors must be considered. These patients then fall into the category of patients who would be the candidates for surgical treatment.

Conventional lip repositioning has been described in many case reports, however, only few have described the lip repositioning with reversible lip trial procedure [6]. This case report presented here discusses the lip repositioning procedure with novel technique, in addition to the treatment sequence - fully reversible trial lip repositioning.

Case report

A 25-year-old female patient reported to the Department of Periodontics and Implantology, Kamineni Institute of Dental sciences, Narketpally, Nalgonda, Telangana (India), with the chief complaint of excessive display of gums while smiling. There were no significant medical or family history and the patient presented with no medical conditions that could challenge the surgical procedure. On extra oral examination, the facial symmetry was seen to be well maintained. However, the high lip line was noted during smiling, which presented with a moderate gingival display. Intraorally, a moderate gingival display was seen during smiling, which extended from maxillary right first molar to maxillary left first molar. (Figure 1). Measurements such as gingival display, while forced smiling and the upper vermilion lip length were recorded with UNC calibrated probe (Figure 2). There was a 7 mm of gingival display on forced smiling. Informed consent was taken after discussion of the benefits, possible complications, and alternatives to lip repositioning.

Surgical procedure

Lip repositioning is a surgical way to correct gummy smile by limiting the retraction of the elevator smile muscles (e.g., zygomaticus minor, levator anguli oris, orbicularis oris, and levator labi superioris) and yet preserve the labial frenum.

To instigate the procedure, the proposed surgical resection was marked with a diode laser set to a 1-watt continuous wave (Figure 3). The treatment sequence for the patient consisted of reversible lip repositioning, patient evaluation and approval, and definitive surgical repositioning. The infraorbital nerve block (xylocaine 2% with epinephrine 1:80,000) was given. The block was used to avoid thickening of the lips and tissues with anaesthetic fluid, allowing the trial to be a more accurate representation of the anticipated final result. When applied to the tissues, this laser setting does not cut but leaves a dark mark that cannot be smeared or wiped away (the mark will fade if left for 1 to 2 days). Small dashed markings of this type were placed every 3 to 4 mm surrounding the proposed site of tissue excision. The inferior border of this is defined by the mucogingival junction from the mesial aspect of the first molars bilaterally. The superior border is best described as moustache-shaped slightly inferior in the area of the labial frenum, cresting in the area of the canine, and tapering toward the posterior[6]. As a general rule, it has been proposed that the distance between the superior and inferior borders be twice the length of repositioning desired in the smile.[7]

Once the area was marked, sutures were used to complete the reversible procedure. Three to five 3-0 silk sutures were placed approximately at the labial frenum, above both canines and premolars, as required (Figure 4). Suture design for this reversible procedure involved a vertically oriented tissue bite taken at the superior border (movable mucosa) of the excision site followed by a horizontal tissue bite at the mucogingival junction. This allowed the upper border to be drawn down to the mucogingival junction - inverting and tucking behind the tissue proposed for excision [6.] At this point, photographs were taken and the patient was able to evaluate the potential result. Patient was given a chance to view the photographs and use a mirror. Patient was encouraged to point out any concerns and given time to affirm their desire for definitive treatment.

The practitioner may also evaluate the trial repositioning at this time. Primarily, the maximum gingival display is observed, and a more or less aggressive resection can be planned. Additionally, any asymmetry or other anticipated changes to be addressed in the definitive procedure are noted. A partial-thickness incision was made first across the superior border, then the inferior—connecting in the posterior bilaterally (Figure 5A). The epithelium bounded by these incisions was then removed in one to two segments beginning on the side away from the surgeon (Figure 5B). The tissue thickness was approximately 1 mm. Midline tissues were first approximated with a simple interrupted suture to ensure symmetry and proper midline placement. The remaining closure was completed with either continuous interlocking or interrupted sutures using 3-0 chromic gut (Ethicon), or 3-0 silk (Figure 6). To further hemostasis, tissues were compressed with wet gauze for 3 to 5 minutes. Post-operative instructions were then given. A soft diet was recommended for 24 hours. Patient was asked to avoid high smiling for 1 week, to avoid pulling on the lip to examine or display the wound, and to avoid brushing in the area for 3 days and told patient could gently brush after 3 days and was instructed not to use an electric toothbrush or an oral irrigator for 1 week. Nonsteroidal anti-inflammatory drugs were recommended for pain control, and cold pack was given to the patient to use in the first 24 hours following surgery.

Results

Periodic follow-up occurred for suture removal, when necessary, and for photographs up to 6 months (Figure 7

and Figure 8). The mean pre-operative gingival display on smiling was 7.0 ± 1.5 mm, measured at the central incisors. The corresponding mean post-operative measurement was 1.5 ± 2.0 mm below the gingival zenith. Thus, a mean reduction in gingival display of 5.0 ± 1.5 mm was achieved. Patient was satisfied with the treatment.

Discussion

This case report demonstrates the predictable management of excessive gingival display with LRS, including a novel reversible trial repositioning prior to definitive treatment. Successful treatments with variations of LRS were first described in the medical literature in 1973 by Rubinstein and Kostianovsky[8]. In the dental literature, multiple authors have presented case reports of single patient successfully treated with LRS [9, 10]. Excessive gingival display, referred to as "gummy smile," can be a source of embarrassment for some patients. Delayed eruption and tooth malpositioning can be certainly treated with respective surgery and orthodontics; orthognathic surgery can also be performed. The case presented here entails surgical technique to reduce gingival display[11].By contrast, the use of botulinum toxin represents a simple, fast, and effective method for the esthetic correction of a gummy smile; however, the results obtained by this non-surgical approach remains questionable. Surgical intervention by lip repositioning stands as a permanent means of treating a gummy smile [11]. Using a non-surgical approach, Polo reported successful temporary management of patients with a hyper functional upper lip using botulinum toxin type A [12]. Thirty patients with EGD were injected, with effects projected to last up to 32 weeks. He recommended only treating patients with > 4 mm of gingival display, based on patient's reported post-operative satisfaction with the new lip level. Silva *et al.*, in 2012 reported successful management of excessive gingival display using a modified lip repositioning technique. Treatment comprises removal of two strips of mucosa, bilaterally to the maxillary labial frenum, and coronal repositioning of the new mucosal margin. Most of the subjects showed satisfied results in their smile after the surgery[13].

Conclusion

Lip repositioning is an excellent alternative to the more expensive and time-consuming treatment available for excessive gingival display. The authors believe that using the reversible procedure prior to definitive surgery is currently the paramount way for both the patient and doctor to preview the intended result before moving forward with elective surgery. The psychosocial benefits of lip repositioning, especially in light of the minimal risk, are desirable.

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Legends Figures

Figure 1: preop intraoral view of gingival display

Figure 2: measurements with unc 15 probe

Figure 3: markings with diode laser

Figure 4: reversible trial.

Figure 5a: partial thickness incision

Figure 5b:1mm epithelium was removed

Figure 6: continous interlocking or interupted sutures.

Figure 7a: 10 days postop

Figure 7b: three months postop

Figure 7c: six months postop with prosthetic rehabilitation.

Figure 8: preop and postop extraoral frontal view.

Figure 8b: preop and postop extraoral right lateral view.

Figure 8c: preop and postop extraoral left lateral view