



## **Lip Surgeries in Periodontics: A Review**

**Pallavi Kalariya<sup>a\*≡</sup>, Khushboo Durge<sup>b°</sup>, Pavan Bajaj<sup>b#</sup> and Bhairavi Kale<sup>b°</sup>**

<sup>a</sup> Sharad Pawar Dental College and Hospital, DMIMS (Deemed To Be University), Sawangi (Meghe), Wardha-442001, Maharashtra, India.

<sup>b</sup> Department of Periodontics, Sharad Pawar Dental College and Hospital, DMIMS (Deemed To Be University), Sawangi (Meghe), Wardha-442001, Maharashtra, India.

### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

**Purpose:** The goal of this presentation is to describe and assess the many types of operations that can be used to treat excessive gingival display and puffy lips.

**Methods:** Aesthetic dentistry is swiftly becoming as one of dentistry's most innovative and challenging fields. Patients are becoming more conscious of their physical appearance, and the grin has gotten a lot of attention as a result. Lip operations are becoming more popular among the general public. Various lip surgeries and their modifications have been described in this article, as well as their surgical techniques, indications, and post-operative care. Lip repositioning and lip reduction are discussed in this article. Lip repositioning is a less expensive and time-consuming option for excessive gingival show than more expensive and time-consuming procedures. Lip repositioning has psychological benefits, especially when compared to the low risk. Lip reduction surgery, on the other hand, strives to achieve a balanced relationship between the upper and lower lips that is proportional to the rest of the face, as well as typical lip competence and the appearance of lips that are larger or fuller than desired.

**Keywords:** Lip repositioning; lip reduction; lip surgery; gummy smile.

<sup>≡</sup>BDS Intern;

<sup>°</sup>Assistant Professor;

<sup>#</sup>Associate Professor;

<sup>\*</sup>Corresponding author: E-mail: [pkalariya99@gmail.com](mailto:pkalariya99@gmail.com);

## 1. INTRODUCTION

Patients are becoming more sensitive about their personal appearance, and the smile has received a lot of attention. Aesthetic dentistry is quickly becoming one of the most innovative and difficult branches in dentistry. Aesthetic dentistry must be founded on ethical values and a realistic approach to comprehensive oral health in order to achieve ideal aesthetics. All aesthetic dentists must have a good understanding of the concepts behind the discordant interaction between the 'pink' and the 'white.'

In terms of materials, procedures, and conceptual understanding, aesthetic dentistry is always changing. The periodontal viewpoint of aesthetic dentistry has acquired widespread recognition in this setting throughout the years. Dentogingival structures that are neglected can have a serious negative impact on aesthetics, forcing dentists to devise techniques to correct this difference in order to achieve a more aesthetic smile [1]. In this smile improvement has been prioritized in treatment planning.

Enormous progress made in the field of periodontal tissue biology, combined with a greater understanding of the processes involved in surgical wound healing has greatly influenced the evolutionary direction of periodontal plastic surgical procedures with growing emphasis on cosmetic dentistry. Originally, periodontal plastic surgery [2] was referred to as mucogingival surgery. The original concept of mucogingival surgery [3] addressed only three problems: a shallow vestibule, aberrant frenum and problem associated with attached gingiva. Periodontal plastic surgery, although it includes those areas, encompasses a much broader range of treatment varying in complexity. These procedures are not only capable of enhancing the beauty of a patient's smile, but also may create restorative opportunities.

Gingival and periodontal problem can certainly compromise aesthetics in multiple ways. These problems may manifest as 'too much or too little' of the gingiva leading to gummy smile or denuded roots [4]. Furthermore, hyperpigmentation of the gingiva can severely compromise the aesthetic appearance of an individual [5]. Melanin pigmentation is generally concerned physiologic but if it is excessive it can certainly take away the smile from persons face. Other problems like a deficient ridge can severely compromise aesthetics following

restorative procedures, therefore this aspect has become even of greater significance with the advent of endosseous implants [6]. In cases of absence of interdental papilla with opening of so called "black triangles" or "black spaces" both esthetic and functional problems can develop. These concerns have given rise to numerous preventive and therapeutic approaches to enhance aesthetics, by covering the denuded root surfaces [7], augmentation of deficient ridge [8], depigmentation as well as other mucogingival procedures [9], creating or reconstructing the lost papilla [10] & many other disciplines. Therefore, a precise implementation of these procedures in this emerging field of perio-esthetics mandates a complete understanding of all periodontal principles and its applications to achieve a perfect esthetic therapeutic outcome.

The existence of an uniform, sharp, pointed leukokeratotic plaque over the lower border of vermilion ,integrating smoothly into the proximal surface of the skin with an uneven proximal boundary, has been described as lip epidermization [11]. The teeth, structure of lip, and scaffolding of gingiva are three fundamental components of an aesthetic or appealing smile.

In order to enhance or offer better aesthetics, a study of the literature on the present status of perio-esthetics with relation to various aesthetic difficulties and the principles involved in the therapy of frequent aesthetic periodontal abnormalities observed in clinical practise was attempted.

## 2. TYPES OF LIP SURGERIES

1. Lip repositioning
2. Lip reduction

## 3. LIP REPOSITIONING

Once smile is said to be pleasant when there are completely exposed upper teeth and there is visibility of 1mm of buccal gingival tissue. Meanwhile, there is a condition named 'gummy smile' where there is excessive gingival display characterized by (> 3mm)of excess exposure of maxillary gingiva while smiling [12]. Etiology includes vertical excess of the maxillary tissue, or deformity in soft tissue in which there is top lip hypermobility, short top lip , passive eruptive change or above combination [13] .Identifying right cause is important for the formulating an correct treatment plan. Various techniques have been reported such as injection of botulinum

toxin [14], elongation of lip associated with rhinoplasty, lip muscles detachment, myectomy and removal of a portion, and repositioning of lip. For hypermobility of the upper lip, the lip repositioning approach is a potential substitute to conventional traumatic surgical techniques.

### 3.1 Aesthetic Smile

The connections between the three basic components of a smile are the fundamentals of a smile:

1. The teeth
2. The lip framing &
3. The gingival scaffold is the third component of the gingival scaffold.

Lip lines are categorised as mild, medium, or high [15].

- Just a fraction of the teeth are visible under upper lip's inferior border in the normal low lip line.
- A broad expanse of gingiva extends from the lower edge of the top lip to the gingival free edge at high lipline.
- When patient smiles, a minimal visibility of 1–3 mm of gingiva is disclosed from the apical extent of the free gingival edge to the lower border of top lip.
- Tjan et al. [16] found - 20.5 percent inhabitants had a low lipline, sixty nine percent had a medium lipline, and 10.5 percent had a high lipline. Peck et al. [17] discovered link between gender and grin style, females (2:1) preferring gummy grins and men preferring low liplines (2.5:1).

Lip length, age, race, and sex, often known as the acronym LARS [18,19], all impact tooth exposure in this relaxed position.

The extent of the top lip ranges between 10 and 36mm, and those with long maxillary lips have more mandibular teeth than maxillary teeth. The second half of the LARS factor, age, increases the amount of tooth visible in the same manner that lip length does.

- Visibility of maxillary incisor teeth (inversely proportional to age)
- Visibility of mandibular incisor teeth (directly proportional to age).

As a result, a young person will have more maxillary teeth than mandibular teeth, but an

older person would have more mandibular teeth: Race and sex are ranked third and fourth, respectively. From Caucasians through Asians to Africans, there is a decrease in maxillary tooth visibility and an increase in mandibular tooth visibility, with the last ingredient being the individual's sex. Males' maxillary lips are usually longer than females', resulting in an average maxillary tooth display of 1.91 mm for men and 1.91 mm for women.

### 3.2 Indications of Lip Repositioning

1. Excessive gingival display of non-skeletal origin
2. Excessive gingival show of up to 7 mm

### 3.3 Contraindications of Lip Repositioning

1. Periodontal surgery is the same as any other periodontal surgery.
2. The maxillary anterior sextant has insufficiently connected gingiva.
3. Severe maxillary vertical excess.

### 3.4 Surgical Procedure for Lip Repositioning

From first tooth on right side of maxilla to first molar on left side of maxilla, a local anaesthetic is injected into mucosa of vestibule and lip. The incisions on the dry tissues are outlined using a marking pencil. From the right initial molar's proximal line angle to the left initial molar's proximal line angle, incision of varying thickness is created at the mucogingival junction. A another partial thickness incision is performed in the labial mucosa, 10 to 12 mm apical to the MGJ, parallel to first.

At each first molar, the incisions are joined to form an oval contour. Within the contour of the incisions, the epithelium is removed, exposing the underlying connective tissue. Damage to any small salivary glands in the submucosa is avoided at all costs. To stop the bleeding, a local anaesthetic and electrocoagulation are utilized [20]. At the midline, interrupted stabilising sutures are used to approximate the parallel incision lines.

### 3.5 Complications of Lip Repositioning

Overall, there have been little negative effects documented.

1. Bruising, pain, paresthesia, momentary paralysis, and swelling of the upper lip may occur after surgery [21].
2. Mucocele formation

### 3.6 Clinical Studies

By re-establishing the vestibule's depth, most of these surgical methods attempt to reduce gingival display. The first report outlines a surgical technique that was indicated in the absence of dental alveolar abnormalities and attempted to reduce the activity of the elevator muscles [22]. Other writers advocated for partial levator labii superioris muscle excision [23].

According to Humayun et al. [24], a mucosal coronally positioned flap (MCPF) was used to treat excessive gingival display caused by vertical maxillary excess and hypermobility of the upper lip with an average gingival display of 2 to 4 mm. In comparison to orthognathic surgery, the authors found that MCPF is less intrusive, has fewer postoperative problems, and provides a speedier recovery, with satisfactory stability at the one-year follow-up. By re-establishing the vestibule's depth, the majority of these surgical methods attempt to reduce gingival display.

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The use of a mucosal coronally positioned flap (MCPF) for the management of excessive gingival display associated with vertical maxillary excess and hypermobility of the upper lip with an average gingival display of 2 to 4 mm was described by Humayun et al [25]. In comparison to orthognathic surgery, the authors found that MCPF is less intrusive, has fewer postoperative problems, and allows for a speedier recovery.

Al-Dary [26] used LASER to present an alternate way for treating excessive gingival display. The author found that by putting the upper lip in a more coronal position, this treatment reduces gingival display.

According to Silva et al [27], treating over gingival show using a modified lip repositioning approach resulted in great patient satisfaction and predictable outcomes that were stable for 6 months after surgery.

According to Noe Vital Ribeiro et al [28], the modified repositioning of lip approach is more conservative and provides good aesthetic results after a 6-month follow-up period. Panduric et al. [29] used LASER to execute a reversible trial for lip realignment. The location of the lip to be obtained after the surgery was outlined with a LASER and stabilised with a single stitch at the midline. The author found that the reversible experiment with LASER was beneficial and resulted in improved patient acceptability and satisfaction.

### 4. LIP REDUCTION

A beautiful smile is a significant part of a person's appearance. Several components work together as a unit to produce an aesthetically acceptable smile; any change in any of these components results in an unpleasant smile. A high smile line is a difficulty that any aesthetically conscious dentist is familiar with. When patients smile, around half of them display some gingiva above the central incisors [30]. These individuals may be self-conscious of their smile and shun social engagement as a result, suffering the same psychosocial consequences as patients with non-intact anterior dentitions or otherwise unpleasant smiles. The function of periodontal plastic surgery has grown in prominence as a result of the increased desire for aesthetics. Lip repositioning is a cost-effective and time-consuming alternative to more expensive and time-consuming therapies for excessive gingival display. Lip repositioning has desirable psychological advantages, especially considering the low risk [31].

The lips have a crucial role in the appearance of the face. Lips are a crucial feature for expressing expressions, feelings, and beauty, and people - especially those of the feminine sex - pay special attention to lip care because they are a major element for conveying expressions, emotions, and attractiveness [32]. Large lips are still found from time to time, mainly in African and Asian individuals. Lips that are too big may be a result of inheritance or a congenital disease. Congenital etiologies including double lip, labial "pits," neoplasm, and ethnic differences, as well as acquired causes like trauma, infections, neoplasms, and syndromes like Melkersson-Rosenthal syndrome and Ascher syndrome, are all linked to excessively big lips [33]. When you smile, the surplus tissue produces an accessory lip that you can see. As a result, extremely big lips are a rare but substantial cosmetic surgery

issue. Lip reduction surgery aims to establish a harmonious connection between the top and lower lips that is in proportion to the rest of the face, as well as normal lip competence.

#### 4.1 Histological Background

FJ Jr. Stucker [34] was the first to describe reduction cheiloplasty. In the case of a african rhinoplasty patient, an additional surgery is performed.

#### 4.2 Surgical Procedure

In order to treat hypertrophic lips, the literature recommends removing a horizontal wedge of soft tissue from the top and low lips. Hence Lip reduction treatments have traditionally concentrated on shrinking both the upper and lower lip without taking into account the relative volume balance between two lips [35].

#### 4.3 Modification

The 'bikini lip reduction' is a revolutionary depletion method. The procedure decreases lip size and also restores a pleasing lip shape and an adequate volume proportion in middle of top and low lips. The procedure consistently produces both smaller and more visually pleasing lips since it is founded on a study of aesthetics. Patients will be told to rinse for one minute by using 0.2 percent Chlorhexidine gluconate [36] before to surgery. Complete asepsis and infection control will be stressed in the surgical procedure. After that, surgical gauze will be used to fully dry the operative region. Adjuvant pinch method with tissue forcep will be used to examine the excessive mucosa. Marker pencil will be used to indicate any excessive mucosal region. After adequate aesthetic analysis, it will be elliptical in form, thin in the centre and broader at the perimeter, emulating the perfect architecture of a lip. Infraorbital, mental, and oral commissure blocks will be delivered after topical anaesthetic.

The mucosal tissue will be excised using a no. blade 15 while the upper lip will be compressed in middle of the fingers of the left arm to minimize blood. The incision will be slightly bevelled so that trapezoidal tissue wedge is excised [37]. Fine needle tip electrocautery will be used to achieve hemostasis. A similar procedure will be used to remove the lower lip, which will be followed by meticulous hemostasis. The top and bottom lips will be sealed with a

dense layer of 4-0 interrupted sutures, followed by cutaneous layer of 4-0 interrupted sutures [38]. There will be no need for dressing.

#### 4.4 Post-Operative Care

Antibiotics and analgesics must be provided to all patients, and they must return after one week for suture removal. Clinical and radiographic evaluations are performed on patients who have been followed up on [39]. During the post-surgical period, NSAIDS Tab. Ibugesic Plus (Ibuprofen 325 mg + Paracetamol 400 mg), t.i.d, and systemic antibiotic Cap. Mox (Amoxicillin 500 mg), t.i.d will be provided. Patients at the treated locations will be told not to clean their teeth for the first three weeks after surgery. For two weeks, all patients will be told rinsing with 0.2 percent gluconate of chlorhexidine (Hexidine-ICPA).

Till the next 2-3 days, patients will be encouraged to keep their lips closed. For the next 4-5 days, the patient will be on a liquid diet. After 1 week, 3 weeks, and 3 months, the patient will be summoned for reevaluation. Scaling and polishing will be done during each recall visit. Clinical parameters taken before surgery will be repeated three weeks and three months thereafter. Because it is based on a bikini, Fanous et al [40] presented a novel approach for lip reduction named "bikini lip reduction."

In Van der Woude syndrome, Chen et colleagues [41] conducted an inverted T lip reduction to eliminate aesthetic malformation of the lower lip pits and protrusion of the lower lip in order to restore the lower lip. Two groups of raters assessed the aesthetic outcomes. The first group comprised of ten medical experts, whereas the second group consisted of ten laypeople. The results were graded using a three-point scale: three for good, two for fair, and one for poor. Inter-rater consistency was examined and the concluding findings was compared based on each patient's mean score. Both groups of assessors gave using an inverted-T the highest appealing outcome. The findings show that is a straightforward, safe, and successful procedure for achieving a superior cosmetic result in Van der Woude syndrome lower lip restoration.

Moor et al [42] evaluated surgical techniques for correcting lip deformities due to silicone over injection adapted a technique of wedge incisions and series of z plasties to produce normal lip volume. This was a safe simple and effective procedure.

Racial features and inheritance are the major etiologies of huge lips. Hypertrophic or large lips are a rare issue seen nearly exclusively in African and Asian individuals [43]. The most common procedure described in the literature entails removing a horizontal soft tissue wedge from high and lower lips only for the goal of lowering volume of labial. Lip bikini reduction is a method focused on cosmetic considerations, provides a little and additional beautiful complex of the labial by reducing volume of lip while preserving harmonic Lips' dimensions in relation to each other [44]. However, because this process appears to be in its early stages and there are few case reports that support the effectiveness of these cosmetic operations, long-term clinical trials are required to evaluate the efficacy of these procedures when examined over time.

## 5. CONCLUSION

We live in a culture where beauty is valued above all else. More than just repairing teeth, restoring and increasing your quality of life is a part of restoring naturally attractive, confident smiles. An individual's aesthetic regeneration is built on the cornerstone of optimal periodontal health. Aesthetic dentistry is concerned with the appearance of a person's teeth and smile [45]. Aesthetics is about beauty, not just for dentists that specialise in restorative dentistry. Lip replacement that is aesthetically pleasing and closely resembles the original lips in shape and hue has become a norm in periodontal dentistry [24]. As a result, the same standards that apply to dentures also apply to all cosmetic endeavours.

"A smile is the window to your heart, if your eyes are the windows to your soul."

The dental structures, the structure of lips, and the scaffolding of gingiva combine to form a grin, which is an essential nonverbal mode of communication. A average grin line associated with low GD is regarded the best appealing in the western world. A "gummy smile" is defined as a state in which an excessive amount of gum is seen while smiling. Surgical lip repositioning has recently been discovered to be a successful method for reducing gingival presentation by moving the top lip to a more coronal position. This procedure is a simple, quick, and cost-effective way to provide the patient with satisfying outcomes.

Excess gum tissue visible during the grin, primarily owing to a small upper lip, will result in an ugly smile. Gummy smile surgery sourced by a short upper lip with periodontal plastic operations such lip relocation might result in a good clinical and cosmetic result. Lip repositioning for patients with a tiny top lip and reduction of lips operations for patients with bulky lips have recently advanced, allowing the cosmetic surgeon to present the patient with a charming smile.

Recognizing distinct perio-aesthetic issues and devising a treatment strategy to address them are requirements for aesthetic success. As a result, a thorough grasp of all periodontal plastic surgery concepts and their application to produce optimum aesthetics is required for a precise implementation of these treatments in this new discipline of 'perio-aesthetic.' Perio aesthetics is a multi-faceted strategy to improving the aesthetics of one's smile while also protecting long-term dental health. Getting the ideal aesthetic effect is both difficult and gratifying.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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