Periodontal Approaches to Esthetic Dentistry: A Review on Current Trends

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ABSTRACT

Aim: The present review is to discuss the current trends in periodontal approaches for improving the esthetics in dentistry.

Background: Esthetics is an essential component of today's dental care. A growing awareness of esthetics has fueled an increase in esthetic demand in dentistry in recent years. The ultimate goal in modern dentistry is to attain “white and pink esthetics” in the esthetically important zone.

Review results: Current evidence-based periodontal approaches for improving esthetic dentistry are discussed. The periodontal management of esthetics is mainly focused on proper assessment of the case scenario including the associated mucogingival deformities and selection of a proper technique for the correction of the same.

Clinical significance: There is a drastic increase in esthetic demand for the dental procedures in recent years. With the evolution of innovative techniques, clinicians can fulfill the patient's esthetic demands. Thus it is important to be updated in this field about the current innovative approaches.

Conclusion: Newer procedures are being developed all the time and are gradually being integrated into periodontal practice. The practitioner should be mindful that novel approaches are sometimes presented without appropriate clinical research. Our ongoing progress toward better therapeutic approaches should be guided by critical analysis of freshly offered methodologies.

Keywords: Esthetics, Mucogingival surgery, Periodontal plastic surgery.

The Journal of Contemporary Dental Practice (2022): 10.5005/jp-journals-10024-3304

INTRODUCTION

The term “Esthetics” has a predominant importance since ancient times. The phrase “esthetics” comes from the German and French words “estheticch” and “esthetique,” and means exactly “the science of sensory perception.” The divine Greek art in various subjects like sculpture, music, architecture, human body, and face was developed after studying the concept of beauty and the divine proportions associated with esthetics and harmony. The principles of golden proportions of teeth and the anterior esthetic region were developed by Levin in 1978.¹ In the modern society, a pleasant smile is considered as a symbol of beauty, a quality of supremacy, and well-being. The American Academy of Cosmetic Dentistry, in 2013 and 2015, reported that 86–89% of dental patients sought treatment to improve physical attractiveness and dignity.²

“Garber and Salama” stated that the harmony between the teeth, lip framework, and gingival scaffold is the essential of dental esthetics and an ideal smile.³

As reported by Creagh et al., an interdisciplinary approach for the management of soft and hard tissues is essential to create an esthetic smile and functional harmony.³

Gingival esthetics is related to various factors which include gingival biotype, crown width, and crown length, position of tooth in the arch, papilla height, gingival width, etc.

In the last few decades, great interest was developed in the field of periodontal plastic surgery for improving esthetics along with optimal health and function.² The desire for esthetics in periodontal treatment has arisen as a result of improved awareness in intraoral appearance and cosmetic considerations. Thus different surgical techniques are introduced for improving esthetic outcome and functional restoration.⁴

Contemporary dentistry not only offers us with superior materials and technology, but it also assures that the procedures are performed with the least amount of error, uneasiness, and the highest level of safety possible. The present review mainly focuses on the current trends in periodontal approaches to esthetic dentistry, its advantages, disadvantages, limitations, and recent advances.

Periodontal Esthetic Approaches

“Friedman” coined the phrase “mucogingival surgery” in 1957.⁷ At the era, “mucogingival surgery” referred to surgical treatments aimed at preserving gingival tissue, removing abnormal frenulum or muscle attachments, and deepening of the vestibule. Periodontal plastic surgery is defined as the surgical procedures performed to correct or eliminate anatomic, developmental, or traumatic deformities of the gingiva or alveolar mucosa. The major goal of periodontal therapy is to restore periodontal health and, as a result, to maintain patient’s functional dentition throughout his or her lifetime.² Periodontal surgery is now provided in two forms: open periodontal surgery and regenerative surgery. Gingivectomy, open flap surgery to reduce pockets without employing regenerative treatments, and resective osseous surgery are examples of the
Periodontal Approaches to Esthetic Dentistry

Flowchart 1: Etiology, selection criteria, and treatment options for depigmentation

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**Gingival Depigmentation**

A darker gingival color than normal is referred to as “gingival hyperpigmentation.” Pigmentation is caused by biological processes such as melanin, oxyhemoglobin, low hemoglobin, bilirubin, and iron, as well as pathological illnesses and situations. Furthermore, environmental risk factors such as cigarette smoking, both actively and passively, lead to gingival hyperpigmentation. Gingival depigmentation is a periodontal plastic surgery treatment that uses a range of techniques to eliminate or minimize gingival hyperpigmentation (Table 1).

**Recent Advances in Gingival Depigmentation**

**Plasma Therapy**

Plasma therapy as a unique approach for gingival hyperpigmentation and gummy smile is currently being researched. Plasma is the fourth state of matter, which is made up of partly ionized gases with free electrons and is created at low temperatures. The release of oxygen radicals is thought to be part of the mechanism of action. It also generates ozone. Plasma treatment, as well as newer noninvasive techniques including formulations that diminish melanin pigmentation and lighten the color of skin and oral epithelium, like Kojic acid, Placental extract, and Vitamin C derivatives, are gaining popularity these days.

The surgical procedure with scalpel is still the first and most popular technique for gingival depigmentation among the various techniques available.

**Gummy Smile Correction**

A nice grin is viewed as a sign of beauty and well-being in modern generation. A range of factors, such as tooth structure and gingival level, may have an impact on the overall smile esthetics. Periodontal plastic surgery to improve esthetics has got a lot of attention in the previous decade. Excessive gingival display on smiling is a common issue that impairs smile attractiveness. This problem is usually associated with altered passive eruption (APE) of teeth, which can be caused by developmental or genetic causes that causes an excessive quantity of soft tissue to remain on the enamel surface.

Two different types of altered passive eruption have been found. Type I features a gummy grin with short crowns, but type II has a gummy grin and gingival dimension is normal. Subclasses A and B have been offered as possible choices based on the proximity of the osseous crest to the tooth of the CEJ. The level of osseous crest to the CEJ is greater than 1 mm in subcategory A, allowing sufficient place for the connective tissue to be implanted in the root surface, but this space is insufficient in subcategory B, limiting a proper biological width. Apically positioned flap combined osseous resective surgery and gingivectomy are two therapy options for type I. On the one hand, APE type II with excessive maxillary process growth and, on the other hand, APE type I with excessive maxillary process. The periodontist faces a challenge when it comes to type II APE since bone excision in the anterior teeth is a difficult and time-consuming surgery (Table 2).

**Various Treatment Modalities**

- Gingivectomy
- Lip-repositioning with myotomy
- Injection botulin toxin
- Hyaluronic acid fillers

**Lip-repositioning**

The lip placement approach entails cutting a band of tissue and establishing a split-thickness flap between the mucogingival junction and the upper lip musculature to keep the elevator smile muscles from retracting. The mucogingival line is then able to attach to the lip mucosa, resulting in a shorter vestibule and less muscular strain, as well as a reduction in gingival show when smiling.

A lot of alterations to the lip-repositioning technique have been introduced over years. All of these changes were made to avoid the most common complication of lip-repositioning surgery: “relapse.” Relapse was detected in 8% of the cases that were treated.
### Table 1: Various treatment modalities in gingival depigmentation

<table>
<thead>
<tr>
<th>Treatment modalities in gingival depigmentation</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Procedure</th>
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<tbody>
<tr>
<td><strong>Scalpel surgical</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
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<tr>
<td>It is also called as split thickness epithelial excision technique</td>
<td>• Healing with this technique is faster in comparison to other surgical techniques. • Although lower cost and lower rate of recurrence</td>
<td>• Associated with pain, postoperative discomfort, intra- and postoperative bleeding and requires placement of periodontal dressing. • Thinner gingival biotype and narrow papillary areas contraindicate the use of this technique.</td>
<td>• The surgery began at the distal end of the both sides of the pigmented area and progressed to the midline. • The pigmented epithelial layer is removed. • Periodontal dressing can be placed, if needed.</td>
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<tr>
<td><strong>Free gingival grafting</strong></td>
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<tr>
<td>In this technique, an unpigmented free gingival autograft harvested from the patient’s palate is placed on the prepared recipient site.</td>
<td>• This technique masks the pigmented gingival area rather than eliminating it.</td>
<td>• Need of two surgical sites • Postoperative discomfort due to pain, technique sensitivity • Ghost-like appearance of the treated site due to hypopigmentation is the drawback of this technique.</td>
<td>• This involved preparation of a recipient bed in the esthetic pigmented region, by removal of the surface epithelium. • A 1–2 mm thick epithelialized nonpigmented palatal graft is then placed over the recipient bed and immobilized with interrupted and sphen suture.</td>
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<td><strong>Acellular dermal matrix allograft (ADMA)</strong></td>
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<tr>
<td>It can be used as a safe substitute for free gingival autograft in the treatment of gingival hyperpigmentation.&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Benefits of elimination of second surgical procedure for donor site • Decreased postoperative complications • Availability of unlimited amount of graft material • More satisfactory esthetic results than the FGG</td>
<td>• Technique sensitive, expensive and requires clinical expertise</td>
<td>• Two vertical incisions are made on the right side of non-pigmented tissue both distally and one mesially to the pigmentation using scalpel blade • A horizontal sulcular incision is made and a partial thickness flap containing the pigmented area is elevated • The ADMA is trimmed to fit the recipient site and suturing is done</td>
</tr>
<tr>
<td><strong>Electrosurgery</strong></td>
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<tr>
<td>In this technique, heat generated by transmission of high-frequency electrical energy to the tissues leads to either cutting or coagulation of tissue.&lt;sup&gt;3&lt;/sup&gt;</td>
<td>• Bleeding control • Tissue contouring and less scar tissue formation</td>
<td>• Pain and patient discomfort during the initial healing period is more with this technique • It requires more clinical expertise than the scalpel surgical method • Prolonged or repeated application can induce heat accumulation and undesired tissue destruction. • Contact of the electrosurgical tip with the teeth, periosteum, or alveolar bone can cause their damage.</td>
<td>• Epithelial excision is done with the electrosurgery unit using the loop electrode • Care should be taken not to expose the bone on the attached gingiva and not to remove excessive tissue on the marginal gingiva</td>
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<td><strong>Laser</strong></td>
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<tr>
<td>Laser therapy has optimal efficacy in the treatment of gingival hyperpigmentation.</td>
<td>• Lasers exhibit enhanced hemostatic activity, good visibility at the surgical site and fewer postoperative complications such as pain, bleeding, edema, infection, and impaired wound healing. • It is an effective and safe treatment modality with ease of access to interdental papilla and low rate of recurrence.</td>
<td>• Requires sophisticated equipment, occupies large space and is expensive. • Inappropriate application may damage gingiva and underlying alveolar bone which, in turn, can cause gingival recession, gingival fenestrations, and delayed wound healing.&lt;sup&gt;4&lt;/sup&gt;</td>
<td>• Er, Cr:YSGG • The Er,Cr:YSGG laser (2780 nm-Waterlase-Biolase technology, Germany) was set at 100 MJ, frequency of 15 Hz, total power of 1.75 W, 10% water and 20% air. • Handpiece was used in a non-contact mode by sweeping motion, and was held 1 mm away from the tissue in defocused mode. • The tip movement was apico-cervical, from the mucogingival junction to 1 mm distance to free gingival margin, then tip is moved towards mesial or distal direction. • Diode laser • Diode laser (810 nm) set at a power of 1 W, fiber 320 μ • Continuous-wave with contact mode is used. • Tip is moved in a forward and backward motion to prevent damage to the tissue. • Tip movement is moved apico-cervically • Papillary edges and free gingival margins are left intact in order to avoid unwanted destruction of these sites.</td>
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Cryosurgery
Cryosurgery is most widely accepted method of gingival depigmentation. It involves freezing of gingiva with the application of different materials, i.e. cryogen such as liquid nitrogen at very low temperatures. Liquid nitrogen, tetrafluoroethane (TFE) can be used.

- It is an inexpensive method with long-term superior esthetic results, rapid healing, and low recurrence rate.
- Lack of bleeding, pain and scar formation, application without regional anesthesia, sutures or drugs
- Ease of application of cryogen at papillary areas and need of no complicated instruments.

Disadvantages:
- Postoperative swelling
- Difficulty in controlling the penetration depth constitutes the disadvantages of this technique
- Pigmented area is isolated and air dried.
- Topical anesthesia is given.
- A freezing zone is continuously maintained for 30–40 s in each area by rolling the dampened swab continuously at the site.
- This technique is continued along the pigmented gingiva.
- The procedure will take about 15–20 minutes

Radiosurgery
It is a novel therapeutic modality for the gingival depigmentation that utilizes radiofrequency.

- The latent heat of radiosurgery retards the development and migration of melanocytes, which makes it a more efficient method of depigmentation than the conventional methods.
- Radiosurgery produces coagulation, thereby reduces the bleeding but it requires at least two sessions of treatment
- Papillary areas can be easily depigmented with radiosurgery.

Disadvantages:
- Multiple settings, technique sensitivity, and more expense are the limitations of this technique
- Operating settings for this procedure is power setting of 11 in the fully rectified cut mode for thick, hard gingiva and a power setting of 7 in partially rectified coagulation mode for gingiva exhibiting softer consistency and areas near alveolar mucosa.
- Ball tip and tapping electrodes provide controlled penetration into the gingival tissue and therefore complete scaling of the pigmented areas is not needed.

Tiny electrodes (preferably a 2 mm ACE electrode) provides access to narrow areas like the interdental papillary region allowing a more delicate procedure to be performed.
### Table 2: Techniques for Gummy smile correction

<table>
<thead>
<tr>
<th>Gummy smile correction</th>
<th>Procedure</th>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection botulin toxin</td>
<td>The area is decontaminated by alcohol and 3 units of botulinum toxin type A (Allergan) 2 was injected at both sides into the “Yonsei point” (the point of confluence of three muscles—the levator labii superioris, the levator labii superioris alaeque nasi and the zygomaticus minor) which is located 1 cm lateral to the ala horizontally and 3 cm above the lip line vertically. It will target these 3 muscles which are responsible for upper lip elevation during smiling, in a single injection.</td>
<td>Noninvasive Immediate result</td>
<td>Faster relapse Can affect the pronunciation of few letters due to some asymmetry in the upper lip</td>
</tr>
<tr>
<td>Lip repositioning</td>
<td>The surgical approach is based on the modification technique of Rubenstien and Kostianovsky and Rosenblatt and Simon • A single partial thickness elliptical incision is created with no. 15 blade. • The lower incision always coincided with the mucogingival line to avoid any loss in attached gingiva and is deep enough to remove the epithelium by keeping the underlying connective tissue intact. • The position of the upper incision is determined by the preoperative measurement of the amount of excess gingival display where the distance between the two incisions is double the gingival display. • The strip of outlined mucosa is removed leaving behind a bed of connective tissue. • The muscle fibers are pushed upward with a periosteal elevator leaving the underlying periosteum intact. • The displaced muscle fibers are then trimmed near the upper incision line to eliminate any remaining pull. • Continuous sutures are used throughout the periosteum to create a physical barrier and prevent the muscles from reattaching at the same points of insertion. • 5–0 polyglycolic resorbable sutures are used</td>
<td>Immediate correction of Gummy smile</td>
<td>Invasive Technically sensitive Chance of relapse is more</td>
</tr>
</tbody>
</table>

If there is an inadequacy of attached gingiva, lip relocation is not indicated since it can affect flap architecture, durability, and suturing, as well as potentially cause vertical maxillary excess.\(^9\)

**Injection Botulin Toxin**

A gummy smile induced by a hyperactive muscle was treated with botulinum toxin. Because of the simplicity and reliability of application, as well as the immediate results and the fact that it is a more conservative approach than surgical operations, it is the therapy of choice.\(^12\) Botox is injected between the upper lip and the nose to paralyze the muscles that contract and elevate when you smile, allowing you to smile without exposing your gums. The benefit of this method is that it does not require surgery. The disadvantage is that the effects are not permanent and must be repeated every 4–6 months to maintain them.\(^13\)

**Hyaluronic Acid Fillers**

Hyaluronic acid (HA) fillers have numerous advantages that make them a popular injectable filler. Because of its low immunogenicity and relative ease of administration, HA has become the most commonly used injectable fillers today for the correction of gummy smile.\(^14\)

**Recent Advances in Gummy Smile**

**Laser-assisted Lip-Repositioning**

The procedure was accomplished by laser-assisted removal, through scraping a strip of mucosa from the maxillary buccal vestibule and suturing the mucosa of the lip to the mucogingival junction. This technique resulted in shortened vestibule and restricted the muscle pull of the elevator muscles of the lip, thereby reducing gingival display when the patient smiles. Laser-assisted lip-repositioning surgery can be a viable, minimally invasive alternative to orthognathic surgery.

**Frenectomy**

The frenum connects the lips to the periosteum and the movable mucosa. This is a little strip of mucous membrane that contains muscle fibers. The main role of the frenulum is to keep the upper and lower lips, as well as the tongue, in place. The mandibular labial, lingual, and maxillary labial frenum are the three frenas that are commonly present.\(^15\)

In periodontal therapy, frenectomy is suggested when the frenum exerts strain on the gingival border and prevents proper oral hygiene. The treatment is utilized when the frenum prevents the closure of a diastema during orthodontic therapy. “Frenectomy” is a surgical procedure to remove the frenulum, as well as its connections to the underlying bone, which may be necessary to close the diastema between the maxillary anterior teeth. The procedure of moving the frenulum to a more apical position is known as “frenotomy.”

To avoid tooth separation, frenectomy should be performed after the canines have erupted.\(^15\) The labial frenal attachments categorized as mucosal, gingival, papillary, and papilla penetrating\(^15\) (Flowchart 3).

The treatment options can be surgical as well as laser-assisted frenectomy (Table 3). For oral soft tissue surgery, laser-assisted surgery has become a popular option. To accomplish frenectomy and produce excellent perioperative outcomes, the laser is a viable substitute for conventional surgery.\(^19\) Indeed, multiple studies now back up its benefits, which include reduced bleeding.
Flowchart 3: Etiology, diagnosis, indications, and treatment options for aberrant frenum

Aberrant Frenum

- **Etiology**
  - The maxillary labial frenum is a post-eruptive remnant of the ecolabial bands that connect the upper lip tubercle to the palatine papilla.
  - No bone is deposited inferior to the frenum when the two central incisors erupt widely spaced. An aberrant frenum attachment develops in the V-shaped fissure between the two central incisors.
  - When the mandibular frenum is coupled with a decreased vestibular depth and an inadequate width of the connected gingiva, it is considered abnormal.

- **Diagnosis**
  - Blanch Test
    - On applying stress on the frenum and watching for movement of the papillary tip or a blanch caused by ischemia in the area.
  - Large, thick frenum with no visible zone of attached gingiva along the midline, or the interdental papilla changes when the frenum is expanded, it is considered pathologic.
  - Mandibular lingual frenum that inhibits the tongue from touching the maxillary central incisors, with/without speech difficulties

- **Indications**
  - A high frenum attachment associated with an area of persistent gingival inflammation that has not responded to root planing and good oral hygiene
  - A frenum associated with an area of recession that is progressive
  - A high maxillary frenum and an associated midline diastema that persist after complete eruption of the permanent canines

- **Treatment options for aberrant frenum**
  - Conventional/Classical frenectomy
  - Miller’s technique
  - V-Y plasty
  - Z plasty
  - Modified frenectomy technique by (Bagga et al. 2006)
  - Frenectomy using electrocautery
  - Frenectomy using LASERS

### Table 3: Variant surgical techniques for frenectomy

<table>
<thead>
<tr>
<th>Variant surgical techniques</th>
<th>Indications</th>
<th>Advantages/disadvantages</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classical technique</strong> 17</td>
<td>Advocated in the midline diastema cases with an aberrant frenum to ensure the removal of the muscle fibers which were supposedly connecting the orbicularis oris with the palatine papilla</td>
<td><strong>Advantage</strong>&lt;br&gt;Easy to perform.&lt;br&gt;<strong>Disadvantage</strong>&lt;br&gt;Scar tissue formation, loss of papilla and high relapse rate</td>
<td>• The frenum was engaged with a hemostat which was inserted into the depth of the vestibule.&lt;br&gt;• Incisions were placed on the upper and the undersurface of the hemostat until the hemostat was free.&lt;br&gt;• The triangular resected portion of the frenum with the hemostat was removed.&lt;br&gt;• A blunt dissection is done on the bone to relieve the fibrous attachment.&lt;br&gt;• The edges of the diamond shaped wound are sutured by using 4-0 black silk with interrupted sutures.</td>
</tr>
<tr>
<td><strong>Miller’s technique</strong> 17</td>
<td>Suggested for situations of postorthodontic diastema.&lt;br&gt;• After the orthodontic movement is complete and about 6 weeks before the appliances are removed, this operation is best performed.&lt;br&gt;• This not only allows for healing and tissue maturation, but it also allows the surgeon to preserve a periodontal dressing with orthodontic appliances.</td>
<td><strong>Advantage</strong>&lt;br&gt;It is pleasing to the eye and requires just minor surgical intervention.&lt;br&gt;• After healing, a continuous collagenous ring of gingiva across the midline provides a bracing action that is superior to the “scar” tissue, avoiding orthodontic relapse.&lt;br&gt;• The interdental papilla is not lost because the transseptal fibers are not damaged surgically.&lt;br&gt;• Obtains orthodontic stability without sacrificing esthetics.&lt;br&gt;<strong>Disadvantage</strong>&lt;br&gt;Technique sensitive</td>
<td>• A horizontal incision was made to separate the frenulum from the interdental papilla.&lt;br&gt;• A laterally positioned pedicle graft (split thickness) was obtained and it was sutured across the midline.&lt;br&gt;• A periodontal dressing is placed, if needed.</td>
</tr>
</tbody>
</table>
Z plasty: Hypertrophic frenum with a low insertion, which is associated with an inter-incisor diastema. In cases of a short vestibule. 

**Advantage**
This technique achieved both the removal of fibrous band and the vertical lengthening of the vestibule.

**Disadvantage**
Technique sensitive

V-Y plasty: Used for lengthening the localized area, like the broad frenum in the premolar-molar area. Also employed in a case of a papilla type of frenum attachment.

**Disadvantage**
It fails to provide satisfactory esthetic results in case of a thick hypertrophied frenum.

Paralleling technique for frenectomy: Pathological frenum attachment

**Better patient perception in terms of postoperative pain and speech when compared with conventional technique**

Modified frenectomy technique by Bagga et al.: Wide, thick hypertrophied frenum with high abnormal attachment when esthetics are of utmost concern for patient

**Advantage**
- Increase in attached gingiva in previously frenum-covered areas, great color match, healing by primary intention, minimum scar formation, and prevention of coronal reformation.
- Appropriate in cases when anterior esthetics are the most important factor.

**Disadvantage**
Only performed in circumstances where the gingiva is sufficiently adherent.

The length of the frenum was incised with the scalpel and at each end, limbs at between 60° and 90° angulation, incisions were made in equal length to that of the band.

By using fine tissue forceps, with care not to damage the apices of the flaps, the submucosal tissues were dissected beyond the base of each flap, into the loose non-attached tissue planes.

Thus, double rotation flaps which are at least 1 cm long were obtained.

The resultant flaps which are created are mobilized and transposed through 90° to close the vertical incisions horizontally.

Absorbable 5-0 vicryl sutures are placed, first through the apices of the flaps, to ascertain the adequacy of the flap repositioning and then they are evenly spaced along the edges of the flaps, to close the wound along the cut edges of the attached mucoperiosteum and the labial mucosa.

The frenum was held with the hemostat and an incision was made in the form of V on the undersurface of the frenal attachment.

The frenum was relocated at an apical position and the V-shaped incision was converted into a Y.

Then it was sutured with 4-0 silk sutures.

The frenum was retracted and two paralleling incisions were placed on the side of ridge of the frenum with a number 11 blade.

After initial incision, deep dissection of the muscle fibers was done to eliminate all the attachments.

Incised frenum was removed by giving releasing incision on the top and bottom of the frenum.

After frenum excision the wound was closed with suture to attain primary closure.

A V-shaped full thickness incision is placed at the gingival base of the frenum attachment with an external bevel. Tissue along with periosteum is separated from underlying bone. The initial incision results in a V-shaped defect on the gingival side. Fibrous tissue attached to the lip is dissected with scissors, and undermining of the labial mucosa is done.

An oblique partial thickness incision is placed on the adjacent attached gingiva beginning 1 mm apical to the free gingival groove and extending beyond the mucogingival junction.

Partial thickness dissection from the medial margin is carried out in an apico-coronal direction to create a triangular pedicle of attached gingiva with its free end as the apex and its base continuous with the alveolar mucosa.

Alveolar mucosa at the base is undermined to facilitate repositioning of the pedicle without tension.

A similar procedure is repeated on the contralateral side of the V-shaped defect, resulting in 2 triangular pedicles of attached gingiva. These two pedicles were sutured with each other at the medial side and laterally with the adjacent intact periosteum of the donor site by 4-0 silk suture completely covering the underlying defect created by the initial frenum excision.

(Contd...)
lower operative time, fewer pain and analgesics intake, and less functionality impairment while eating and speaking.\textsuperscript{16}

**Recent Advances in Frenectomy**

Modified frenectomy technique which is indicated in hypertrophic frenum with diastema includes placing a primary incision in the palatal surface at a 5-mm distance from the tip of the papilla and then sulcular incisions are made around the tooth, and the papilla is transposed to the buccal via a papilla preservation flap. After eliminating the frenal attachments completely from the bone, the flap is repositioned and sutured to the palatal surface. Afterward, the frenum is classically cut and sutured. By this approach, the position of the frenum is changed apically without invading the papilla. The advantage of this technique is to minimize the surgical scar on the buccal surface, preserved papilla, and yielded optimal esthetic results.\textsuperscript{17}

**Papilla Reconstruction**

For several patients, the loss of the interdental papilla, also known as the black triangle, is a serious esthetic issue (Flowchart 4). Papillary reconstruction is one of the most difficult techniques in perioesthetic surgery to perform, with a very low success rate. Nonsurgical procedures including forced eruption, gingival grafting, and porcelain veneers have all been utilized with success (Table 4). The surgical management of the missing interdental papilla is critical because it has minor vascular availability in the embrasure space at the base of the papilla. “Beagle’s procedure,” “Modified Beagle’s technique,”\textsuperscript{21} “Robert Azzi technique,”\textsuperscript{22} “Han and Takei methodology,” “Connective tissue grafts,” and biomaterials are the various approaches that have been used in surgical management.\textsuperscript{23}

Han and colleagues\textsuperscript{21} described a strategy for gaining papillary height utilizing a semilunar pedicle graft and pouch, but without bone support, this procedure could only minimize the interdental space.

Due to the obvious availability of tissue factor that is gradually released from the fibrin matrix and speeds up the repair process, platelet-rich fibrin (PRF) has received much interest in recent years as a reliable biomaterial for osseous and gingival recession problems.\textsuperscript{24}

Amniotic membrane (AM) has also been successfully used in the repair of anterior papillary recession. Adapting such membranes during surgery, however, is a difficult task.

The tube grafting process necessitates a high level of technical precision. It does, however, result in predictable rebuilding of the interproximal papilla when done correctly. The tube approach helps to alleviate problems such as insufficient flap thickness, blood supply, and flap retraction.\textsuperscript{25}

**Recent Advances in Papilla Reconstruction**

Injecting dermal fillers in gingiva resulted in a volume raise of papilla height. The use of dermal fillers is a minimally invasive way to optimize gingival contours. It is a noninvasive approach which reduces patient’s postoperative discomfort with marked variations in the volume of interdental papilla before and after the procedure.\textsuperscript{21}

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**Table 3:** (Contd...)

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<th>Variant surgical techniques</th>
<th>Indications</th>
<th>Advantages/disadvantages</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frenectomy by using Electrocautery\textsuperscript{20}</td>
<td>• In patients with bleeding disorders, where the traditional scalpel approach carries a higher risk of difficulty attaining hemostasis. • In noncompliant patients, electrosurgery is advised.</td>
<td><strong>Advantage</strong> • Less bleeding and eliminating the need for sutures. • Curved electrodes improve visibility, making them more efficient and effective at removing soft tissue. <strong>Disadvantage</strong> • Burns, the risk of an explosion if combustible gases are used. • Interference with pacemakers and the production of surgical smoke.</td>
<td>• After the area was anesthetized, the frenum was held with the hemostat. • Then by using a loop electrode tip, it was excised. • As there is minimal procedural bleeding, there was no need of sutures. • Healing is by secondary intention, as the wound edges are not approximated with sutures</td>
</tr>
<tr>
<td>Frenectomy by using Lasers\textsuperscript{20}</td>
<td>An aberrant frenal attachment where minimal procedural bleeding is needed or on patients demand.</td>
<td><strong>Advantage</strong> • Bloodless surgical field • No need for suturing because healing is by second intention. Postoperative pain and swelling are less intense or even absent. <strong>Disadvantage</strong> Can be a bit expensive</td>
<td>• The labial frenum was sprayed with topical spray and infiltration is given. • The laser tip is activated before performing the procedure. After setting the power, the tip is used in contact mode. • The incision started with the frenum from the attached gingiva and interdental papilla on the labial surface between the central incisors extending upward from inner side of upper lip to the depth of vestibule ending in a rhomboidal area causing separation of the fibers. • Hemostasis was optimal and no sutures were given. • Safety measures were taken for the dentist, assistance, and the patient by wearing the protective goggles.</td>
</tr>
</tbody>
</table>
Table 4: Various techniques for papilla reconstruction

<table>
<thead>
<tr>
<th>Variant techniques</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Indication/contraindication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nonsurgical</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correction of traumatic oral hygiene procedure</td>
<td>Cost-effectiveness, less stressful and immediate results with high satisfaction.</td>
<td>Less predictability and minimal results.</td>
<td>Indicated in mild papillary loss</td>
</tr>
<tr>
<td>Prosthodontic approach</td>
<td>Noninvasive, easy maintenance, splinting on the teeth can be done, more economical.</td>
<td>Required patient's cooperation, food impaction and place of bacteria growth, possibly can damage or change the color of prosthesis. Various materials that can be used are: Auto and heat polymerizing acrylic resin, rigid, flexible material, copolyamide, soft silicone material.</td>
<td>Indications Bone defect interdental region with a gap between the contact point and alveolar crest &gt;5 mm, and in patients unable to undergo repeated surgical procedures. Contraindications Patients with poor and unstable periodontal health, poor oral hygiene, patients with high caries risk.</td>
</tr>
<tr>
<td>Orthodontic approach</td>
<td>Minimally invasive</td>
<td>Time-consuming</td>
<td>Indications For diastema closure Periodontally healthy individuals Contraindications Periodontally compromised individuals</td>
</tr>
</tbody>
</table>
One of the most prevalent esthetic and functional concerns is gingival recession. The gingival boundary migrates apically past the cementum-enamel junction, exposing the tooth's root surface. Apart from esthetic issues, gingival recessions have been linked to functional issues including dentinal sensitivities, gingival inflammation, root caries, alveolar bone loss, plaque retention, and tooth loss due to root exposure. Several techniques employed for recession coverage like “free gingival graft,” “free connective tissue autograft,” “pedicle autografts,” and “coronally positioned flap” include semilunar pedicle, “laterally positioned pedicle flap,” “double papilla flap procedure,” “subepithelial connective tissue graft (SCTG), pouch and tunnel technique (i.e., coronally advanced tunnel technique), pinhole surgical technique, vestibular incision subperiosteal tunnel access ("VISTA"), and guided tissue regeneration (GTR). In free graft procedures, soft tissue from the tuberosity area, edentulous ridge, and palatal area is taken and transplanted over a recession defect. This method differs from pedicle grafts due to the necessity for two surgical sites, the lack of graft blood supply, and the graft’s reliance on the recipient site’s vascularization. Two of the most common free graft procedures are free gingival graft and a subepithelial connective tissue graft (Table 5).
CAF has been combined with “ADM grafts,” “enamel matrix derivatives,” “platelet rich fibrin,” and collagenous membrane in current procedures.\(^\text{11}\)

SCTG plus CAF may be regarded the “global standard” method for the treatment of single and multiple GR, based on the results of individual trials and accessible pooled estimations. Furthermore, data show that when compared to other surgical methods, SCTG produced greater gingival margin stability/some degree of creeping attachment over time. Alternative soft tissue grafting materials include ADM (primary) and XCM (secondarily).\(^\text{13}\)

Millers class I and II recession defects treated with a subepithelial connective tissue showed 95\% root coverage.\(^\text{34}\) Root coverage and keratinized tissue gain were improved with subepithelial connective tissue transplants. Overall, we may call it the global standard strategy for dealing with recession-related difficulties based on various comparative studies.

**Guided Tissue Regeneration (GTR)**

A membrane is positioned between the recession defect and visible bone on one side, and the coronally advanced flap on the other side in the guided tissue regeneration procedure. Nonresorbable materials like polytetrafluoroethylene and resorbable materials like collagen and allograft are widely used as GTR membranes.

Despite some positives, such as better esthetics, the elimination of the requirement for a secondary donor area, and the realistic possibility of true periodontal attachment regeneration, this
### Table 5: Techniques for root coverage

<table>
<thead>
<tr>
<th>Treatment Options for Root Coverage</th>
<th>Advantages</th>
<th>Limitation</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pedicle flap procedures</strong>&lt;sup&gt;28&lt;/sup&gt;</td>
<td>Long-term predictability and satisfying esthetic results in cases of relatively shallow single or multiple recession defects (&lt;5 mm). It is relatively easy and not time-consuming. Excellent esthetic results and avoids the need for a second surgical site.</td>
<td>They are contraindicated in cases with an inadequate width of the keratinized gingiva, in subjects with a shallow vestibule, or with a high insertion of the frenulum. Applicable only for single-site recession, as there is a possible risk of gingival recession, dehiscence, or fenestration at the adjacent donor site. Adequate amount of keratinized tissue at the neighboring donor site and a deep vestibule are needed.</td>
<td>The recipient site is prepared first. The epithelium is removed around the denuded root surface. The exposed connective tissue will be the recipient site for the laterally displaced flap. A full thickness/partial thickness flap is raised. A vertical incision is made with a blade no. 15 from the gingival margin to outline a flap adjacent to the recipient site. Slide the flap laterally on to the adjacent root, making sure that it lies flat and firm without excess tension. A suspensory suture is made around the involved tooth to prevent the flap from moving apically. Protect the flap and the donor site and periodontal pack can be placed, if needed.</td>
</tr>
<tr>
<td><strong>Laterally positioned flap procedure</strong>&lt;sup&gt;29&lt;/sup&gt; First introduced by Grupe and Warren in 1956</td>
<td>Relatively easy and not time-consuming Produces excellent esthetic results and avoids the need for a second surgical site</td>
<td>Applicable only for single-site recession, that there is a possible risk of gingival recession, dehiscence, or fenestration at the adjacent donor site, and that an adequate amount of keratinized tissue at the neighboring donor site and a deep vestibule are needed.</td>
<td>Two horizontal incisions are made on the interdental papilla, parallel to the cemento-enamel junction of the tooth to be treated with no. 15 blade. Two releasing incisions are made obliquely at the line angles of the adjacent teeth, and these incisions are extended beyond the mucogingival junction. Partial thickness flap on the mesial and distal portions are elevated and the root planing is done on the exposed root surface. Root conditioning is performed using tetracycline hydrochloride (250 mg, pH 1.8) for 5 minutes. De-epithelialization of the flap is done and rotated to cover tetracycline treated root surface. The other pedicle flap which is un-de-epithelialized is kept in position to cover the previous flap. Interrupted suturing (5-0 vicryl) is done across the medial area of the two papilla flaps.</td>
</tr>
<tr>
<td><strong>Double papilla preservation</strong>&lt;sup&gt;29&lt;/sup&gt; Introduced by Cohen and Ross to overcome the limitations presented by the laterally positioned flap regarding adequate width and height of keratinized gingiva</td>
<td>Simplicity of the technique</td>
<td>Color mismatch between the donor and recipient tissues. Increased discomfort and the potential for postoperative bleeding from the donor area because of the large wound that heals by secondary intention.</td>
<td>After local anesthesia, exposed root surface is planed thoroughly. Then horizontal incision is given extending from the line angle of adjacent teeth on either side of the recession at the level of CEJ. Two vertical incisions are made to extend well into the alveolar mucosa at the distal terminal of horizontal incision. A split thickness flap is elevated without disturbing perioisteum. Root biomodification with citric acid is done for 5 minutes. The amount of donor tissue needed is accurately determined by using a foil template. The area between first and second premolar which have greater thickness is selected to harvest the donor tissue. The graft is placed on the recipient bed and suturing is done. Periodontal dressing is placed at the surgical site.</td>
</tr>
<tr>
<td><strong>Free gingival grafts</strong>&lt;sup&gt;31&lt;/sup&gt;</td>
<td>Simplicity of the technique</td>
<td></td>
<td></td>
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</tbody>
</table>
Subepithelial connective tissue graft\textsuperscript{31} Introduced by Langer and Calagna in 1980

- Maintains a blood supply to the graft and therefore has good predictability.
- Provides good esthetics with preservation of the original flap tissue.
- Donor site wound is less hemorrhagic and painful and can be healed by primary intention.
- Can be applied both for single and multiple recessions.

Subepithelial connective tissue graft\textsuperscript{31} was first introduced by Langer and Calagna in 1980. The connective tissue graft is harvested from palate using trap-door technique utilizing a horizontal incision 3–4 mm away from the gingival margin from the first molar to canine with two vertical incisions on the either end of the first incision, creating a door. The door is then undermined and opened using a sharp dissection. The underlying connective tissue is then harvested using a periosteal elevator, and the door was then sutured using 4-0 silk sutures. The procured graft from the palate was secured over the recipient site using vicryl 4-0 sutures.

Variations of the Coronally advanced flap\textsuperscript{31}

- Can be applied both for single and multiple recessions.
- High predictability of root coverage.

- Not recommended in cases with inadequate attached gingiva and inadequate vestibular depth

Semilunar coronally advanced flap

A semilunar incision is made following the curvature of the gingival margin. Perform a split-thickness dissection coronally from the incision, and connect it to an intrasulcular incision. The tissue collapses coronally, covering the denuded root. It is then held in its new position with moist gauze. Many cases do not require sutures or periodontal dressing.

Modified coronally advanced flap (Zucchelli's technique)

- Prevents scar formation in the treated site.

- Not recommended in cases with inadequate attached gingiva and inadequate vestibular depth.

Gingival recession can be treated with the pinhole surgical technique, which is a minimally invasive procedure. Unlike soft-tissue grafting, this procedure begins with the creation of a pinhole in receding gum tissue.\textsuperscript{36} After infiltration local anesthesia, small horizontal incision of 2–3 mm was placed in the height of the mucobuccal fold. A set of special instruments is used to gain access through this pinhole incision placed in the alveolar mucosa to elevate the mucosal tissues in apicocoronal direction. All the muscular and fibrous adhesions are freed away using the instrument through the single pinhole incision, and the supraperiosteal closed blunt dissection is done till the interdental papillae. When there is complete passive mobilization of the entire mucogingival tissues is made until the tissues advance coronally to glide over the receded part of the tooth. To stabilize the advanced tissues, collagen membrane is used which is introduced into the pinhole and positioned at interdental papillae until there technique has a number of drawbacks like membrane exposure. When compared to other standard root coverage procedures, several studies\textsuperscript{35} have demonstrated that GTR does not give an additional therapeutic benefit for root coverage.

**Pinhole Surgery Technique**

Gingival recession can be treated with the pinhole surgical technique, which is a minimally invasive procedure. Unlike soft-tissue grafting, this procedure begins with the creation of a pinhole in receding gum tissue.\textsuperscript{36} After infiltration local anesthesia, small horizontal incision of 2–3 mm was placed in the height of the mucobuccal fold. A set of special instruments is used to gain access through this pinhole incision placed in the alveolar mucosa to elevate the mucosal tissues in apicocoronal direction. All the muscular and fibrous adhesions are freed away using the instrument through the single pinhole incision, and the supraperiosteal closed blunt dissection is done till the interdental papillae. When there is complete passive mobilization of the entire mucogingival tissues is made until the tissues advance coronally to glide over the receded part of the tooth. To stabilize the advanced tissues, collagen membrane is used which is introduced into the pinhole and positioned at interdental papillae until there
is sufficient fullness in the papillary tissues for self-holding the mucogingival tissue complex. Gentle digital pressure is applied to the flap for 5 minutes and the entry incision is left to heal by first intention without sutures or periodontal dressing or tissue adhesives.¹⁶

**Vestibular Incision Subperiosteal Tunnel Access (VISTA)**

It is performed by tunneling knives to elevate the mucoperiosteal envelope (partial-thickness flap) to the level of the MGJ at each gingival recession site, excluding the interdental papillae, and then suturing the graft, either SCTG or ADMG. It stabilizes the gingival margin’s coronal position, limiting relapse during the early stages of recovery. Because there are no vertical incisions, no flap to raise, and minimum sutures, it is a minimally invasive procedure. As there is subsequent epithelialization of the graft, there is no compromise of blood circulation, resulting in normal healing and minimal postoperative discomfort in the recipient site. It also enhances the KT width and exhibits excellent cosmetic outcomes.

**Acellular Dermal Matrix (ADM)**

When compared to a CAF alone, the application of the acellular dermal matrix provides denser peripheral region and a higher percentage of root coverage. The procedure’s only drawback is that despite identical root coverage rates, the acellular dermal matrix technique is less effective than the SCTG technique in widening the attached gingiva.

**Enamel Matrix Derivative (EMD)**

EMD contains amelogenins of various molecular mass that are thought to play a function not only in enamel creation but also in periodontal tissue production, according to several authors. In terms of amount of root coverage, gain in attachment, and enhancing the apico-coronal dimension of the keratinized tissue, topical treatment of EMD enhances the success of coronally positioned flap.³⁷ Researchers have been looking for alternate treatments for gingival recessions due to the necessity to avoid donor areas. One of the unique approaches used was porcine xenogeneic collagen matrix (CM).

**Recent Advances in Gingival Recession**

**Platelet-rich Fibrin Matrix**

The preparation and usage of platelet-rich fibrin, an autologous leukocyte-platelet-rich fibrin matrix generated from centrifuged blood without the addition of anticoagulant or bovine thrombin, is a recent invention in dentistry.³⁷ Furthermore, using PRF to treat gingival recession has various advantages, including avoiding a donor site surgical procedure, advanced tissue healing for the first 2 weeks after surgery, and a significant reduction in patient discomfort during the early wound healing period (Table 6).³⁸

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**Table 6: Review of literature of different periodontal esthetic procedures**

<table>
<thead>
<tr>
<th>Periodontal esthetic surgical techniques</th>
<th>Methodology</th>
<th>Results and follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GINGIVAL DEPIGMENTATION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gingival depigmentation using diode laser vs Er,Cr:YSGG</td>
<td>Walid et al. 2021 evaluated the efficiency of depigmentation, patient perceptions, and the recurrence rates of physiological gingival pigments during a 2-year follow-up after ablative depigmentation using two laser wavelengths: diode 940 nm and Er,Cr:YSGG 2780 nm.</td>
<td>Both lasers efficiently removed gingival pigments with comparable clinical outcomes and overall positive patient experience.</td>
</tr>
<tr>
<td>Gingival depigmentation using conventional surgical vs diode laser</td>
<td>Nagati et al. 2017 compared the clinical effectiveness and patient comfort of surgical scraping and diode laser technique used for gingival depigmentation for a follow-up period of 6 months.</td>
<td>Diode laser treatment exhibited better long-term stability of gingival color, with a lower incidence of re-pigmentation and 2-year follow-up.</td>
</tr>
<tr>
<td>Gingival depigmentation using surgical scalpel, rotary abrasion and diode laser</td>
<td>Murthy et al. 2017 compared the depigmentation using rotary abrasion, surgical scalpel and diode laser</td>
<td>There was no statistical difference in postoperative re-pigmentation and clinical efficacy among the subjects between surgical scraping and diode laser technique at 6th month follow up. Diode laser technique provides better haemostasis and good visibility at the surgical site. The postoperative patient comfort is better at the surgical sites treated with diode laser than surgical scraping method. Hence, both the techniques are used for depigmentation procedures depending on the severity and gingival biotype and patient acceptance and 6 months follow-up.</td>
</tr>
<tr>
<td><strong>GUMMY SMILE CORRECTION</strong></td>
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<td></td>
</tr>
<tr>
<td>Gummy smile correction using lip-repositioning vs Botulinum toxin</td>
<td>Makkeiah et al. 2022 evaluated the effectiveness of both injection botulinum toxin type A (botox) and surgical lip-repositioning in the correction of the gummy smile due to hyperactive upper lip according to the resulting smile and the patients' satisfaction.</td>
<td>The patients rated the effects of BTX-A as highly favorable. If we take into consideration that BTX-A had a temporary effect while the surgical procedure (lip-repositioning) had a relapse likelihood of more than 80% because the lip reverted back to its original position with almost complete relapse after 6 months and not to mention the risks affiliated with the surgical procedures.</td>
</tr>
</tbody>
</table>

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Gummy smile correction using laser-assisted lip-repositioning with smile elevator muscle containment and crown lengthening for gummy smile

Effectiveness of different modalities of lip-repositioning surgery for the management of patients complaining of excessive gingival display: A Systematic review and meta-analysis

PAPILLA RECONSTRUCTION

Papilla reconstruction
The comparison of papilla preservation technique and semilunar incision with subepithelial connective tissue graft in dark triangle treatment.

Entire papilla preservation technique in the regenerative treatment of deep intrabony defects: 1-year results

FRENECTOMY

Diode laser vs scalpel technique

Diode Laser vs Scapel Technique vs Electrocautery

GINGIVAL RECESSION COVERAGE PROCEDURES

Comparison between connective tissue grafts combined with either double pedicle grafts or coronally positioned pedicle grafts: A clinical study

The case report showed an excellent result when treated by a combined approach of an innovative procedure with laser-assisted lip-repositioning aimed at maintaining the traction and containment of the smile elevator muscles along with crown lengthening procedure by gingivectomy.

Almost 83% of patients with "frenectomy + full-thickness flap + myotomy" modality had satisfaction with the LRS outcome. Gingival display within the 6 months after LRS could be reduced with all modalities. Descriptively, the greatest reduction was observed in patients with the modality not including the frenulum.

Both techniques had positive effect on papilla reconstruction and the outcome was the same in both groups.

Tunnel-like "EPP" technique may limit the risk of wound failure particularly in the early healing phase, thereby preventing exposure of regenerative biomaterials, possibly enhancing stabilization of blood clot in deep intrabony defects and leading to optimal clinical outcomes and 1-year follow-up.

This comparative study indicates that diode laser treatment for frenectomy provides better patient perception in terms of pain compared to scalpel technique.

According to present clinical study, all 3 methods can be used successfully to treat abnormal frenal attachment. As with scalpel technique, there was more intraoperative bleeding and postoperative pain was noted. With the use of electrocautery, there was more postoperative pain, swelling, delayed healing period was noted. Diode laser provides better patient comfort in terms of minimal intraoperative bleeding, pain, swelling, epithelization, infection and reduced operative time. However, there is a need for further longitudinal studies with larger sample size to establish the exact efficacy of laser technique over the conventional scalpel technique for frenectomy procedure.

In this study, very high percentage of root coverage (88 and 84%) was obtained with CT grafts and both types of pedicles to cover the graft were effective in obtaining comparable coverage. Based on this study, it can be said that whenever an increase in keratinized tissue is required the CT graft can be obtained with either a double pedicle graft or an overlying CFP.

(Contd...)
Table 6: (Contd...)

<table>
<thead>
<tr>
<th>Periodontal esthetic surgical techniques</th>
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<th>Results and follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>The use of platelet-rich fibrin vs subepithelial connective tissue graft in treatment of multiple gingival recessions: A randomized clinical trial</td>
<td>Oncu et al. 2017 evaluated the clinical effectiveness of platelet-rich fibrin (PRF) membrane used in combination with a modified coronally advanced flap (MCAF) and compared it with the use of a subepithelial connective tissue graft (SCTG) in combination with a MCAF in treatment of Miller Class I and II bilateral multiple gingival recessions</td>
<td>Localized gingival recessions could be successfully treated with MCAF + PRF as well as MCAF + SCTG. The PRF technique has the bonus advantage of being more comfortable during the postoperative period</td>
</tr>
</tbody>
</table>

**FUTURE ADVANCES IN ESTHETICS**

**Digital Smile Designing (DSD)**

The digital smile design is a useful diagnostic tool that helps dentists perceive and measure dentogingival anomalies. The concept of digital smile design appears to be a valuable technique for achieving a desirable outcome. It includes both photography and videography protocols for obtaining high-quality images for effective diagnosis and planning.

Photoshop CS6 (Adobe Systems Incorporated), “Microsoft PowerPoint” (Microsoft Office, Microsoft, Redmond, Washington, USA), “Smile Designer Pro” (SDP) (Tasty Tech Ltd), and “Aesthetic Digital Smile Design” (Aesthetic Digital Smile Design) are examples of DSD software (ADSD—DrValerio Binii).

The current trend in periodontal plastic surgery is to combine periesthetic surgery with mock-ups, waxing, and digital tools to create a perfect smile. Using the well-known digital smile design technology, the pink and white aesthetic appearance is improved and this helps in the overall assessment and planning for patient-friendly surgical approaches that are simple to perform for professionals.

**CONCLUSION**

Nowadays there is hype in the field of periodontal plastic surgery for improving esthetics along with optimal health and function. Contemporary dentistry not only offers us with superior materials and technology, but it also assures that the procedures are performed in a minimally invasive manner with focus on ideal function and highest level of esthetic concern. Mucogingival surgery evolved into periodontal esthetic surgery. Mucogingival surgery’s goal is to generate a prognostic value, whereas periodontal esthetic surgery’s goal is to achieve both a functional and an attractive result. In periodontics, mucogingival operations are the standard of care. Newer procedures are being developed all the time and are gradually being integrated into periodontal practice. The practitioner should be mindful that novel approaches are sometimes presented without appropriate clinical research. Our ongoing progress toward better therapeutic approaches should be guided by critical analysis of freshly offered methodologies. Future studies should be focused on minimally invasive approaches for achieving excellent esthetic outcomes and functional harmony.

**REFERENCES**


