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## Review Article

# Periocover: The lesser known periodontal flaps

Ibrahim Fazal<sup>1,\*</sup>, Khadijathul Irfana D<sup>1</sup>, Shahaziya Faruk<sup>1</sup>

<sup>1</sup>Dept. of Periodontology, Ramaiah University of Applied Sciences- Faculty of Dental Sciences, Bengaluru, Karnataka, India



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### ABSTRACT

Surgical cleansing of the defect and the root surface can re-establish periodontal health when proper plaque control is established. However, different surgical techniques have been advocated to conservatively treat intrabony defects. Conservative surgery involves various surgical approaches which aim at gaining access to the root surface and accomplish the removal of residual debris with no active removal of bone and most often no resection of soft tissues. The underlying objectives towards the procedures aim to facilitate visual access with minimal reduction in the shape and anatomy of the soft or bone tissues along with alteration in the shape and outline of the soft and, occasionally hard tissues, in order to achieve controlled pocket depth reduction. Minimally invasive periodontal surgical approaches and microsurgical techniques are currently being evaluated and may show advantages in wound-healing outcomes and less recession and patient morbidity. In this manuscript, we intend to discuss about certain flaps like saddle flap, laterally stretched flap, book flap and bridge flap along with incisions which are less discussed and have been recently incorporated in the practice with simple and better results.

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## 1. Introduction

Surgical cleansing of the defect and the root surface can re-establish periodontal health when proper plaque control is established.<sup>1</sup> However, different surgical techniques have been advocated to conservatively treat intrabony defects. Conservative surgery involves various surgical approaches which aim at gaining access to the root surface and accomplish the removal of residual debris with no active removal of bone and most often no resection of soft tissues.<sup>2</sup> The main goal of periodontal therapy is to arrest the destructive outcome of this disease. It has been broadly accepted that probing pocket depth reduction via various treatment protocols not only improves the prognosis of the individual teeth but also improves the oral health as a whole. Periodontal surgery

includes access flap procedures, resective procedures, and regenerative procedures. The underlying objectives towards the procedures aim to facilitate visual access with minimal reduction in the shape and anatomy of the soft or bone tissues along with alteration in the shape and outline of the soft and, occasionally hard tissues, in order to achieve controlled pocket depth reduction.<sup>3</sup> In recent years a lot of modifications in periodontal surgical techniques has been possible with development of new instrumentation and the use of illumination and magnification. Minimally invasive periodontal surgical approaches and microsurgical techniques are currently being evaluated and may show advantages in wound healing outcomes and less recession and patient morbidity.<sup>4</sup> In this manuscript, we intend to discuss about certain flaps and incisions which are less discussed and have been recently incorporated in the practice.

\* Corresponding author.

E-mail address: [ibrahim.f.dhinda@gmail.com](mailto:ibrahim.f.dhinda@gmail.com) (I. Fazal).

## 2. SaddleFlap Technique

### 2.1. Introduction

Coronally advanced flap is the common treatment in the presence of adequate width of keratinized gingiva for an optimal root coverage. The underlying principle is coronal shifting of the gingiva over the previously denuded root surface which helps to achieve improved clinical characteristics.<sup>5</sup> A split–full-split thickness envelope flap was hence, presented as a modification of Coronally Advanced Flap in multiple Gingival Recession management. Subsequently, a laterally repositioned, trapezoidal designed Coronally Advanced Flap was also raised using two horizontal beveled and two oblique vertical releasing incisions to bring about complete root coverage in isolated Gingival Recession defects.

### 2.2. Methodology<sup>6</sup>

Prior to the procedure, a strict asepsis environment was achieved and 24% ethylenediaminetetraacetic acid was applied over the exposed root surface in order to condition the root followed by a saline rinse.<sup>7</sup> In the interproximal region, two coronal stops for sutures were placed to bond the teeth with light-cure composite without a primer application. This facilitates easy composite clearance at suture removal stage and apical relapse of marginal tissue during initial stages of healing is prevented.

Subsequently after the administration of Local anesthesia the saddle flap design began with an intrasulcular incision at the recession site, followed by the horizontal saddle incision in the adjacent teeth.

Teeth on either side of the recession site were included to facilitate tension-free coronal repositioning. The submarginal part was accomplished by marking Gingival Recession Depth from proximal CEJ of the recession site, on both mesial and distal surfaces extending over the attached gingiva of adjacent teeth in a saddle-like fashion.

A split-thickness oblique incision was extending 2 mm submarginally over the adjacent teeth was performed from this point. Both the oblique incisions were connected with the full thickness sulcular incision over the recession site.<sup>8</sup> The wing of the flap demarcated the surgical and anatomical papillae. From a point coronal to the denuded root surface, the elevation was carried out with a blunt elevator raising a full-thickness flap. (Figure 1b)

Over the oblique incisions, scalpel held was parallel to the long axis of the tooth and was used to dissect the tissue in split-thickness technique, to avoid bone exposure.

Beyond the Muco-gingival Junction, split-thickness elevation was done (Figure 1a). Once the coronal mobility was deemed adequate, each surgical papilla was exactly repositioned in the interdental area over the previously de-epithelized anatomical papilla, and the sling sutures were given with 5–0 expanded polytetrafluoroethylene over the

composite stop in the interproximal region.

### 2.3. Advantages of the technique<sup>6</sup>

1. Saddle flap maintains papillary integrity.
2. Unnecessary denudation of the bone is prevented.
3. This technique not only allows improved visualization. and access of the treated site but also judicious flap elevation.
4. An easy flap adaptation is also achieved.
5. The surgical modification also showed improvement in clinical parameters and aesthetics.

## 3. Book Flap Technique<sup>9</sup>

### 3.1. Introduction

The “book flap” technique is a method of interpositional bone grafting for an alveolar process that is too thin to host a dental implant. The vascularized bone flap opens like a book, with the facial bone outfractured at the alveolar crest, rotating about its base. The rationale for using the book flap is the blood supply to the outer cortex to remain interrupted. This maintains vitality of the bone and decreases the subsequent subtraction remodeling. The book flap technique does not necessarily require a second bone harvest site but bone substitutes, such as xenografts and allografts, can be used to fill the gap.

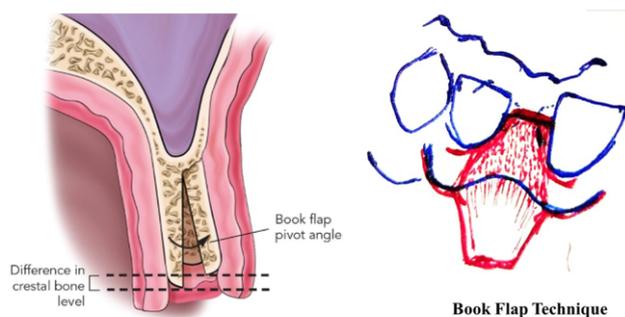
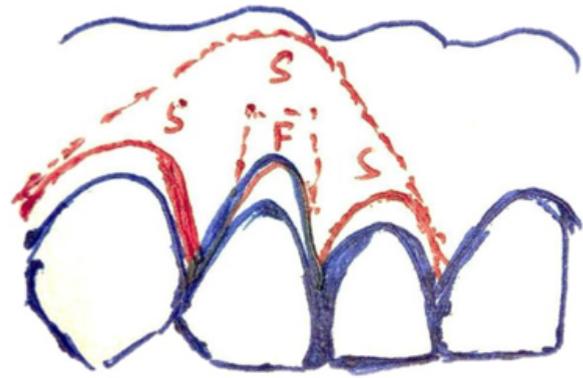
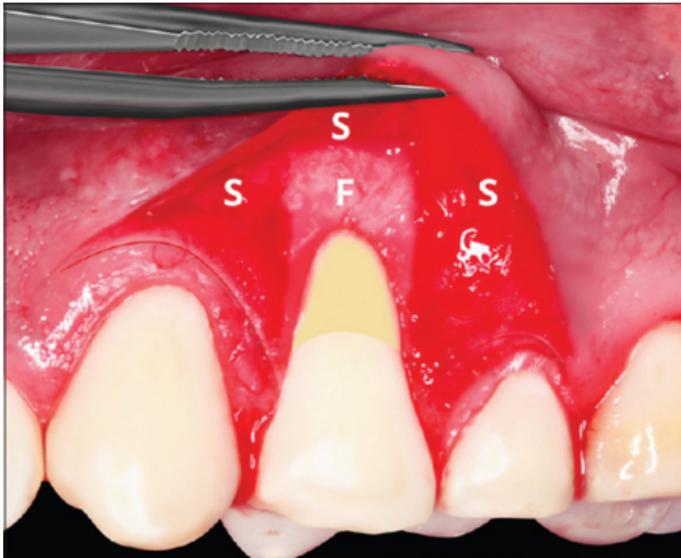


Fig. 2:

### 3.2. Technique

The interpositional graft technique requires a minimum of 3 or 4 mm of remaining alveolar width. An osteotome can be used to create an osteotomy but a piezo knife is also used for thin alveolus. A thin alveolus will almost always lose height in the splitting process, which must be taken into consideration. Sites at which this technique can be used efficiently are the canine and bicuspid locations in the maxillary arch along with splitting.

This technique out fractures the buccal plate, which is easily done in the maxilla but not so easily done in the mandible, where the increased bone stiffness makes



**Saddle Flap Technique**

**S: split thickness Flap**  
**F: Full thickness Flap**

**Fig. 1:**

it difficult to create a greenstick fracture without flap detachment. The incision is made palatocrestally from behind the papilla bilaterally.

Only sufficient reflection of the crestal bone is performed to allow determine the width of the alveolar crest and the extent of dehiscence in the facial plate. The osteotome or piezo knife is used to create lateral vertical osteotomies at the margins of the defect. Blind vertical osteotomies, at about 1.5 to 2 mm from the adjacent tooth roots to preserve subpapillary and root coverage bone, are made to a depth of about 10 mm.

These 2 cuts are connected across the alveolar crest by sectioning it with an osteotome inserted vertically to a depth of approximately 10 mm. A 2-mm thickness of palatal bone should be maintained.

The buccal plate is then gently out fractured 2 to 4 mm at the alveolar crest, rotating at the depth of the alveolus akin to opening a book on its binder. Intervening bone graft material or an implant fixture must be placed, or else the segment will simply collapse. After grafting, the wound is closed without stripping or advancing the buccal mucosa crestally.

Primary closure should be the goal. If some of the wound remains unclosed, a collagen membrane can be placed submucosally on the grafted alveolar crest; this may cause slight resorption of the graft. When primary closure can be attained, a collagen membrane is unnecessary.

**4. Advantages**

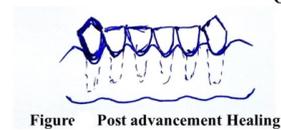
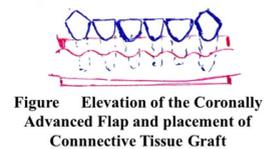
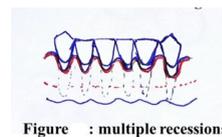
1. This is a much simpler procedure and provides a more abundant blood supply to the mobilized bone flap
2. It can be used in most cases of maxillary buccal wall extraction defect and in many cases can be done on the same day as dental implant placement.

3. Healed extraction site several months old in which the facial plate has resorbed
4. It also may maintain its bulk better than alternative augmentation procedures, such as guided bone regeneration and veneer block grafts.

**5. Lateral sliding Bridge Flap**

*5.1. Introduction*

Marggraf<sup>10</sup> proposed the double lateral sliding bridge flap technique in an attempt to cover gingival recession in multiple teeth with or without adequate attached gingiva. A recent innovation added to the technique was the use of platelet-rich fibrin (PRF).<sup>11</sup> which is a concentrated suspension of the growth factors found in platelets. The platelet-derived growth factor and transforming growth factor promoted regeneration of tissue by modulating and upregulating mechanisms.



**Fig. 3: Lateral bridge flap technique**

### 5.2. Technique<sup>12</sup>

Under local anesthesia, an arch shaped or semilunar incision is given in the vestibule at a distance measuring twice the amount of gingival recession plus 2 mm ensuring a wide flap necessary for a sufficient blood supply. A split thickness flap is then elevated in the apicocoronal direction and connected with the first incision so that the two flaps communicate with each other. 10 ml of blood is then centrifuged and a Platelet Rich Fibrin is obtained in a collagen membrane carrier placed over the sites of denuded root surfaces. The entire flap is then coronally positioned to cover the membrane and sling sutures are placed. A periodontal dressing is given over the surgical site to ensure stability and unintentional healing. (Figure 3)

### 5.3. Advantages

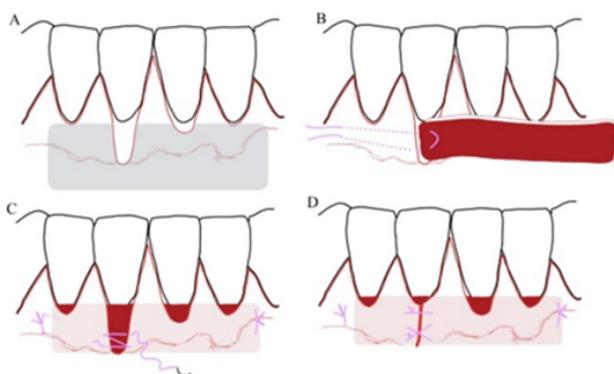
1. The flap covers the denuded root surface of multiple teeth
2. The Flap is supplied by plasmatic circulation from capillaries in adjacent gingiva
3. The growth factors help in establishing a connect and facilitate healing

## 6. Laterally Stretched Flap

### 6.1. Introduction

The Laterally Stretched Flap as proposed by Nelson Caranza<sup>13</sup> is an alternative to Laterally Displaced Flap for deep and narrow recessions.

**Figure Laterally Stretched Flap Technique**



Ref: Nelson Carranza

**Fig. 4:** Laterally Stretched Flap Technique: **A:** The partial thickness where tunneling apically extended approximately 5 mm past the MGJ; **B:** A CTG is inserted with sling sutures placed at the lateral ends of the envelope; **C:** The approximation of the lateral edges of the recession made with simple or double sutures; **D:** Final suture of the lateral edges of the recession

### 6.2. Technique<sup>14</sup>

After local anesthesia, intracrevicular incisions are made involving the tooth with the recession, and at least one adjacent tooth to either side. A partial thickness envelope is then performed with tunneling instruments involving one or two teeth adjacent to the tooth with the deep narrow recession. The envelope may be extended in order to treat the adjacent teeth with minor recessions or thin biotypes with a larger connective tissue graft and a tunnel technique. In areas of very thin tissue, where the instrument may be seen through the tissue by translucency, a full thickness envelope flap is elevated. Once the receptor site is prepared, a graft that extends at least 5 mm Laterally and 5 mm apical to the deep recession is harvested from the palatal area.

A modified single incision technique with a uniform thickness of approximately 1.5mm is preferred. The graft is then inserted and held in place with sling sutures at the lateral ends of the envelope as defined for the tunneling technique. (Figure 4)

The lateral edges of the recession are further approximated with simple sutures without disturbing the underlying graft, with an aim of reducing the surface of the graft exposed and also to stabilize the wound.

### 6.3. Advantages

1. The use of connective tissue grafts thickens the gingival biotype and improves long-term result.
2. A simple technique with very low morbidity and high esthetic outcomes and improves graft vascular supply and wound stability.

## 7. Conclusion

In present-day practice, the incessant hunt is not only towards the reconstruction of biological and functional aspect but the patient-oriented esthetic acceptance is also taken into consideration. The clinical performance may vary significantly according to the type of surgical flap adopted. The main objective of periodontal surgery is to access difficult to reach sites by direct vision and effective debridement, and to enable efficient self-performed plaque control and acceptable professional supportive therapy. The surgical intervention improves the clinical parameters for long-term maintenance of the affected teeth. Unfortunately, due to lack of literature related to access flap or pockets reduction surgical procedures, modified techniques are less researched about and with variety and diversity of cases different innovative techniques are used to improve clinical outcomes and increase the durability of results, specially with aesthetic regions. Saddle technique, which is discussed in the article is a modified Coronally Advanced Flap which provides good root coverage using a simple modification in the incision design. Double Lateral Sliding Bridge flap along with Platelet Rich

Fibrin in a collagen membrane is also a modified surgical technique found to have satisfactory results. The use of Platelet Rich Fibrin and barrier materials in clinical practice has shown beneficial outcomes and holds promise for further procedures in the future. The book flap technique has been useful in providing an adequate bone mass and is a more precise technique. It also may maintain its bulk better than alternative augmentation procedures, such as guided bone regeneration and veneer block grafts. Lateral Stretched Flap + Connective Tissue Graft demonstrated to be a promising technique for the treatment of narrow deep recessions. The lack of vertical incisions and an envelope approach renders a more stable wound with minimal scar formation and ensures patient comfort.

Hence with advent in periodontology, the new era demands more precise yet simple surgical intervention techniques to treat periodontal loss in an innovative and much smarter way ensuring minimal altered effects and patient satisfaction.

## 8. Conflict of Interest

The authors declare that there is no conflict of interest.

## 9. Source of Funding

None.

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## Author biography

**Ibrahim Fazal**, 3rd Year Post Graduate  <https://orcid.org/0000-0003-1618-883X>

**Khadijathul Irfana D**, 2nd Year Post Graduate

**Shahaziya Faruk**, 1st Year Post Graduate

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