

## Chapter 19

# Current Approaches to Periodontal Surgical Flaps

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### Introduction

Regardless of the different objectives of the various periodontal procedures, such as guided tissue regeneration (GTR) or crown lengthening, there are a few recurring decisions the surgeon has to make regarding flap design.

- 1) To preserve or remove the dental papilla?
- 2) How large a flap access is required?
- 3) To maintain the gingival level, or else apically or coronally reposition it?

### Approaches to the dental papilla

In the classical Widman and Modified Widman flap approach (MWF) (Widman 1918), the interdental papilla is removed. This leads to recession following surgery which can be useful in reducing the probing pocket depths. In crown lengthening and apically flap surgeries, we may even carry out judicious gingivectomies to help apically position the flap.

The requirements for achieving predictable success in GTR surgery are of course quite different. Membrane exposure is the most common complication after GTR procedures and leads to an increased risk of infection and reduced success rates (Becker *et al* 1988, DeSanctis *et al* 1996, Mombelli *et al* 1993, Nowzari and Slots 1994). The most common

area for these exposures is at the fragile papilla area (Takei *et al* 1985). The inadvertent loss of the dental papilla from a MWF makes good primary closure at the papilla area extremely challenging, which means the membrane is exposed even without soft tissue dehiscence.

The modified papilla preservation flap (MPPF) and the simplified papilla preservation flap (SPPF) were designed to help achieve good primary closure. These flap designs also reduce risk of tissue dehiscence by reducing the tension of the closure at the papilla areas (Cortellini *et al* 1995, Cortellini *et al* 1999).

The modified papilla preservation flap is used when the interdental space is at least 2 mm wide. An initial cut is made on the buccal of the interdental papilla, and the entire papilla is then raised palatally/lingually. This papilla is thus 'preserved'. In areas where the interdental papilla is less than 2 mm however, there is a high risk of tearing the entire papilla as one tries to raise it towards the palate/lingual. The simplified papilla preservation flap was designed to address this challenge. In this flap design the papilla is cut diagonally dividing it into two triangles, one attached to the lingual and the other buccal. In this way the papilla can be raised with less risk of tearing it, half to the buccal and half towards the lingual.

There is usually a small circumference of inflammation around where the suture passes

through the flap. The suture should therefore not be placed too close to the papilla tip. The tension of the suture should also be controlled so that the suture does not strangulate the papilla, causing necrosis. It has been shown that using a finer suture material, 5-0 to 7-0 as opposed to 3-0, leads to a reduced risk of the suture tearing the flap if overtightened (Burkhardt *et al* 2008).

In the MPPF and SPPF, an internal mattress suture, placed a distance away from the crucial fragile dental papilla area, is used to pull the papilla tips together, so that they may be sutured without tension. Thus, the flap tension is taken up by this internal mattress suture at an area of the flap that is unlikely to dehisce.

### Approaches to flap extension

With improved illumination, magnification and introduction of materials like Emdogain, new flap designs were proposed with minimal extensions and access. The limited elevation of the flaps in Minimally Invasive Surgical Technique (MIST) enabled the flap closure to be more stable, hence making the blood clot more stable and increasing the prognoses of regeneration (Cortellini and Tonetti 2007). A further modification to the MIST (Modified Minimally Invasive Surgical Technique, or M-MIST) was proposed such that only a buccal triangular flap is elevated, while the papilla and the lingual tissues are left in place (Cortellini and Tonetti 2009).

Interestingly, in a small study of 45 patients, intrabony defects treated with M-MIST alone showed percentage radiographic bone fill of  $77\pm 19\%$ , comparable to intrabony defects treated with M-MIST and Emdogain and Emdogain + bone graft combination (Cortellini and Tonetti 2011).

### Approaches to managing the post-surgical gingival level

Limiting the surgical flap to within the attached gingiva makes for a more stable closure. This is done by not extending the flap beyond the muco-gingival junction. By keeping the attached gingiva fixed to bone, the chance of recession after surgery is reduced.

The corollary is that should one desire to change the level of the gingiva during the surgery, the flap should be extended beyond the muco-gingival junction, so that it may be mobilised. If the mesio-distal extension of the flap is short, you may also have to place vertical releasing incisions.

Unlike coronally positioning a flap where the flap can be fixed onto the neck of teeth, in order to fix the flap in an apical position, a partial thickness flap may have to be made nearer to the sulcus, leaving the periosteum on bone, in order that the flap may be anchored by it in an apical position (Carnio and Miller 1999, Nabers 1954).

In ridge augmentation procedures, in order to achieve primary closure of the wound, the buccal flap is often coronally positioned. It has been shown that by placing a single vertical releasing incision, the buccal flap may be advanced 1 mm. This increases to 2 mm if two vertical releasing incisions were placed. However, by adding in a periosteal releasing incision, the flap may be advanced by 5.5 mm (Park *et al* 2012).

### Conclusion

A considered and well managed periodontal flap can significantly affect the eventual outcome of periodontal surgical therapy. Mastering a variety of flap management techniques, together with knowledge and understanding of the science behind wound healing will enable a surgeon to achieve consistent and predictable outcomes for

patients, with minimal pain and morbidity.

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