

## **An Overview on Minimally Invasive Periodontal Advanced Surgical Techniques**

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### **ABSTRACT**

Because of the benefits of Minimally Invasive Periodontal Surgery, minimally invasive periodontal procedures are becoming more accepted than traditional periodontal surgeries. This review article examines the many types of MIPS techniques, as well as recent technological advancements in executing minimally invasive treatments, such as videoscopes and robots, which are becoming increasingly common in MIPS.

**Keywords:** *minimally invasive periodontal surgery techniques, videoscopes, conventional periodontal surgery.*

### **I. Introduction**

Access to the underlying bone defect, pocket eradication, periodontal regeneration, and periodontal care are all goals of periodontal surgery. Traditional periodontal surgery treatments required considerable flap surgery to gain access to the underlying disease location, which exposed bone. Any surgical operation should be simple for the surgeon to execute, take less time, cause less pain and postoperative discomfort, be less expensive, and be more acceptable and useful to the general public. Clinical procedures requiring complicated surgical skills are becoming more common in advanced periodontics.<sup>1</sup> Microsurgery is a minimally invasive periodontal surgical method that involves fewer vertical incisions and smaller surgical sites. The extent to which reduced incision size and less retraction directly correlates with lower postoperative morbidity and quicker healing has been acknowledged by every field adopting these procedures. The British Journal of Surgery described minimally invasive surgical technique as “a surgical technique that employs fewer incisions to conduct a surgical treatment that previously needed bigger incisions and produces similar or superior results compared to the traditional surgical approach” in 1990.<sup>2</sup>

### **II. History**

For the past 25 years, minimally invasive periodontal surgery has been improving. Wickham and Fitzpatrick described the use of additional tiny incisions as a "minimally intrusive method" in 1990. In 1993, Tracker and Sackier refined the concept of minimally invasive surgery, describing it as "the ability to scale down our eyes and extend out our hands to do minute and obviously visible tasks in regions that could already be reached easily by large cuts." Shanelec and Tibbetts presented a continuing training seminar on periodontal microsurgery at the

American Academy of Periodontology's annual meeting in 1996, which inspired the development of emphasis dedicated to demonstrating periodontal microsurgery.<sup>3</sup>

### **III. Goals of minimally invasive periodontal techniques**

Primary closure reduces the amount of time spent in the chair, reduces tissue stress, improves flap stability, reduces pain and suffering for the patient, reduces side effects, and reduces the possibility of scar formation.

### **IV.Characteristics of minimally invasive periodontal surgical techniques**

The MIPST involves placing incisions in such a way that soft tissues are conserved as much as feasible, as well as preservation of the papilla and micro suturing of periodontal tissues. Precision is achieved by the use of a microscope and tiny equipment.

### **V. Techniques**

#### **Modified papilla preservation technique**

Interproximal regeneration treatments are performed using this approach. It is used to seal broad interdental spaces (2mm). The benefit of this approach is that the papilla is preserved and the tissues are closed by primary closure. A horizontal incision is made on the buccal interdental papilla at the base of the defect, and a full thickness flap is raised together with the interdental papilla.It can be done along with vertical incisions if needed, the defect is closed with help of a barrier membrane.<sup>4</sup>

#### **Simplified papilla preservation flap**

An oblique incision is made from the gingival border at the buccal line angle of the affected tooth to the mid proximal region of the papilla below the contact point of the neighbouring tooth in the papilla where the defect is present for limited interdental spaces (less than 2mm).A full thickness palatal flap and split thickness buccal flap is elevated, regeneration and degranulation procedures are performed, interdental tissues are sutured by primary closure.<sup>5</sup>

#### **Whale's Tail Technique**

In 2009, Bianchi and Bassetti described a new surgical technique – the “Whale's tail” technique, which was designed for the treatment of wide intrabony defects in the esthetic zone.<sup>6</sup>This treatment entailed elevating a wide flap from the buccal to the palatal side in order to facilitate access and visualization of the intrabony defect, and it was specifically designed to accomplish regeneration while keeping interdental tissue over grafting material.Instead of using different horizontal and vertical incisions, the modified Whale's tail approach used two

semilunar incisions below the mucogingival line on the buccal surface, which resulted in better approximation of the flap borders.

### **Modified minimally invasive technique**

Cortellini and Tonetti in 2009,<sup>7</sup> suggested a Modified Minimally Invasive Surgical Technique (M-MIST). The main goal was to get as much access to the defect as possible from the buccal side. The procedure begins with a triangular buccal flap that is minimally elevated to reveal the remnant crestal bone. There is no elevation of the palatal flap. The narrow buccal "surgical window" is used for all clinical processes. The granulation tissue is gently dissected and removed from the supra-crestal interdental fibres beneath it without causing them any stress. The roots are sized and planed once the granulation tissue is removed. The buccal flap is repositioned and sutured with a modified internal mattress suture in its original position. This aids in the completion of primary closure. There are some limitations and drawbacks to this technique. It cannot be used in circumstances when there are complicated and extensive flaws on three or four surfaces of a tooth. In cases when the deficiency extends to the apical third or apex of the root, larger flaps must be elevated.

### **Videoscope assisted minimally invasive surgery**

It is done with the use of a videoscope since visualisation of the surgical site is vital when doing surgery. It aids in providing good visualisation and magnification of the surgical site and includes a small digital camera for MIS. Harrel SK et al. did a study in 2014 to evaluate residual abnormalities following non-surgical root planing with local anaesthesia. After a 6-month follow-up, V-MIS was done using the videoscope for surgical visualisation and found a post-surgical rise in soft tissue height with a decrease in recession.<sup>8</sup>

### **Robot assisted minimally invasive surgery**

It is an excellent technology for performing surgery since it generates less tissue stress and improves precision and dexterity. End-effectors and manipulators, which are operated by computer control or tele manipulators, are used by surgeons to perform surgery on patients. In the tele manipulators, the surgeon makes typical movements that are mimicked by the robotic arms, however in the computer controlled method, the physician utilises a computer to direct the movements of robotic arms while performing the surgery.<sup>9</sup>

### **Pinhole Technique**

The pin hole technique, devised by John Chao, is a scalpel-free, suture-free procedure for repairing recessions, in light of the evolving techniques based on the principles of minimally invasive procedures.<sup>10</sup> Using BP blade no.12/knife, Orban's a pinhole incision will be created in the alveolar mucosa immediately apical to the recession defect. Access can be acquired through the pin hole produced with the use of specially built transmucosal elevators, and subperiosteal blunt dissection must be done apicocoronally and laterally until the interdental papilla is reached. Sutures or collagen strips or other bioresorbable materials can be used to keep passive coronal advancement in place.

## **Minimally invasive dental implant placement**

Flapless implant surgery is defined as a ‘surgical procedure used to prepare the implant osteotomy and to place the implant without elevation of a mucoperiosteal flap’. In this approach, the amount of remaining alveolar bone is thoroughly evaluated (using a soft tissue punch or a mini-incision)<sup>11</sup> and sometimes, implant position is predetermined from three-dimensional radiography as well as surgical guides (guided implant surgery)<sup>12</sup> which are used to guide and place the implant in the optimal position based on the presurgical treatment planning.

### **VI. Advantages of MIPS:**

Reduced post-operative healing phase, Reduced post-operative complications like edema, pain, root sensitivity, enhanced esthetic results due to minimal reflection and manipulation of the flaps, minimal manipulation of the papillary tissue, limited or no scarring, Reduced surgical time, Atraumatic, Reduced post-operative complications, Increased patient acceptance.

### **VII. Conclusion**

Microsurgical techniques are creating revolutionary changes in the treatment of periodontal disease making the procedures less painful, more esthetic, less time consuming, thus leading to decreased patient morbidity and better satisfaction.

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