

## PERIODONTAL MICROSURGERY

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**ABSTRACT**

Over the past decade, the field of periodontics has seen increasing surgical refinement of many procedures. Consistent successful periodontal treatment procedures demand clinical expertise that challenges the technical skills of periodontists to the limit of and beyond the range of visual acuity. Periodontal microsurgery is the refinement of basic surgical techniques made possible by the improved visual acuity gained with the use of surgical microscope. The purpose of this paper is to provide a brief review of periodontal microsurgery, the role of magnification systems and the advantages of microsurgery over conventional surgery..

**KEY WORDS:** Magnification Systems, Periodontal Microsurgery, Advantages.

**INTRODUCTION**

Periodontal microsurgery is a technique by which visual acuity is increased using a microscope at magnifications exceeding 10x.<sup>1</sup> Microsurgery offers enhanced outcomes not possible with traditional macrosurgery, especially in terms of passive wound closure and reduced tissue trauma. The three elements, i.e., magnification, illumination and instruments are called the '*microsurgical triad*', the improvement of which is a prerequisite for improved accuracy in microsurgical interventions.

**Magnification Systems**

In dentistry two basic types of magnification systems are commonly used: loupes and surgical microscopes. The former can be classified as

1. Single lens magnifiers/simple loupes
2. Multiple lens telescopic loupes/ compound and prism loupes

**Simple loupes** offer magnification upto 1.5 x only. The disadvantage is that simple loupes distort the image shape and color of objects being viewed.<sup>2</sup>

**Compound loupes** are achromatic. Size, and weight are not significant for 4x & 5x which are commonly used in periodontics. But the disadvantage is limited depths of field and limited access.

**Prism loupes** are the advanced types of loupes available. They produce better magnification, wider depths of fields, longer and larger fields of view than the other loupes. But the disadvantage is increased weight above 4x.

The major disadvantage of loupes is that the clinician's eyes must converge to view on the operate field which can result in eye strain, fatigue and even vision changes when poorly designed loupes are used.<sup>3</sup> But loupes are less expensive and initially easier to use.

**Surgical microscope** is a complicated system of lenses that allows stereoscopic vision at magnifications of approximately 4 to 40 x with excellent illumination of the working area. In contrast to the loupes, the light beams fall parallel on to the retinas of the clinician so that no eye convergence is necessary. Properly equipped operating microscope is vastly superior to magnifying loupes<sup>4</sup>. It is much more expensive and initially more difficult to use<sup>4</sup>. Operating microscopes have rotating variable magnification element that changes magnification to match surgical needs<sup>5</sup>.

Assistant eye piece attachments are available which aid the progress of surgery. Definite visualization of root surface deposits and

irregularities is only possible at magnification and resolutions provided by surgical microscope<sup>6</sup>. With a surgical microscope, the clinician can document periodontal pathology and procedures of all types.

The disadvantages of microscope are

1. Restricted area of vision and loss of depth.
2. Loss of visual reference points
3. A steep learning curve
4. Expensive to buy

### Periodontal Microsurgery-evidence from studies

Most dental treatment, historically, has been rendered with an unaided eye without the use of visual magnification, such treatment is termed macroscopic.

Root Debridement is the most important component of periodontal treatment<sup>7-10</sup>. In periodontics, studies demonstrate that root debridement done without magnification was incomplete. When debrided roots were examined with an aid of a microscope, substantial deposits remained<sup>6</sup>. Magnification greatly improved the surgeon's ability to create a clean and smooth root surface.

Periodontal microsurgery introduces the possibility for considerably less invasive surgical procedures in periodontics by smaller, more precise and reduced size of surgical incisions directly related to less post operative pain.

What appear to the unaided eye as a gentle surgery is revealed under magnification to be gross crushing and tearing of delicate tissues.<sup>6</sup>

### Instruments

A basic set comprises of a needle holder, microscopic scissors, micro scalpel holder, anatomical and surgical forceps and a set of various elevators. An important characteristic of microsurgical instruments is their ability to create clean incisions to prepare the wound for healing by primary intention. Such incisions are established to 90° angles to the surface using a Castroviejo microsurgical scalpel. To permit wound closure,

microsutures in the range of 6-0 to 9-0 with microsurgical needle holders are required to correctly approximate the wound edges. In order to see that there is no damage, the micro instruments are to be stored in a sterile, container or tray. Care should be taken to prevent the tips of the instruments not to touch each other during sterilization procedures and during transportation.<sup>11</sup>

The clinical benefits of a microsurgical approach in periodontal practice are mainly evaluated by case reports<sup>12, 13</sup> and case cohort studies.<sup>14,15,16</sup> The different procedures described apply to the surgical coverage of buccal root recessions and flap closure after regenerative interventions. All of the studies confirmed the beneficial effects of the microsurgical approach. Using microsurgery for a modified or simplified papilla preservation flap, primary wound closure could be noted in 92.3% of all treated sites 6 weeks after the intervention.<sup>14</sup> Historic comparisons with studies performed by the same authors without the use of an operating microscope, showed a clear advantage in the use of a microsurgical approach.

A recently published case-cohort study, evaluating a new flap design for regeneration with enamel matrix derivatives (MIST, minimally invasive surgical technique) combined with microsurgical techniques, confirmed the previous positive results, yielding a primary wound closure of the interdental tissues in all of the treated sites, 6 weeks post-operatively.<sup>17</sup> Concerning the mucosal recessions coverage, a comparison between the two approaches (micro- and macro surgery) has been performed in a randomized controlled clinical trial<sup>18</sup>. The study population consisted of ten patients with bilateral class 1 and class 2 recessions at maxillary canines. In split mouth design, the defects are randomly selected for recession coverage either by a microsurgical (test) or macro-surgical (control) approach. Immediately after the surgical procedures and after 3 and 7 days of healing, fluorescent angiograms were performed to evaluate graft vascularisation. The results at test sites revealed a vascularisation of  $8.9 \pm 1.9\%$  immediately after the procedure. All the differences between test and control sites were statistically significant. The percentage of root coverage in both test and control sites remained stable during the first year, at 98% and 90%, respectively.

**CONCLUSION**

All the above studies have clearly demonstrated that, microsurgical approach, improved the treatment outcomes substantially, and to a clinically relevant level, composed to macroscopic studies.

The operating microscope allows the surgeon to practice enhanced, precise, delicate surgical procedures that have important healing processes and outcomes for patients. Periodontal microsurgery provides a natural evolution in the progression of periodontics. However the choice of micro and macro surgical approaches must be seen in different lights, cost and including treatment outcomes, logistics, cost and patient centered parameters.

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