



The Operating Microscope in Periodontal Surgeries

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Abstract

Introduction: The evolution of techniques, materials and a better understanding of the etiology, incidence, prevalence and prevention of periodontal diseases, has improved drugs and surgical therapies in Dentistry. The approximation and suturing of blood vessels, the precise millimetric cut, the better coaptation of the surgical flaps and the first intention healing are some of the benefits of magnification. The aim of this literature review was to demonstrate the advantages of using the operating microscope in Dentistry, particularly in Periodontics, with scientific basis.

Methods: The paper selection was performed by electronic search in the PubMed/MEDLINE and SciELO databases, between 2009 and 2019, with the terms of indexation: operatory microscope, periodontal plastic microsurgery and magnification.

Results: The microscope presents excellent approximation for better reproduction of aesthetic and functional details. Additionally, an atraumatic manipulation of the tissues, minimizing bleeding with a clearer and more visible operative field. It enables better blood nutrition of the flaps, approaching the surgical flaps of the surgical wound in perfect juxtaposition. This reduces the surgical waiting period, allowing greater comfort for the patient. There are few studies and much discredit on the subject because the use of the microscope is eminently clinical. Thus, a systematic review is necessary to evaluate this technology, discarding it from empiricism.

Conclusion: Inside the consulted literature the operating microscope should be used to provide greater approximation, greater visual comfort for the operator and better postoperative reestablishment for the patient, especially in periodontal surgeries.

Keywords: Operatory Microscope; Dentistry Clinic; Periodontics; Clinical Practice

Introduction

Magnification is a technological resource for enhancing visual acuity, minimizing ergonomic tiredness and increasing clinical productivity. It can be exercised with loupes, loupes with headlight, magnifying glasses or by the operatory microscope. It is considered a significant advance in the area of Medicine, especially in Ophthalmology; as also; in Dentistry, particularly in periodontal surgeries.

Many instruments have been created to suit the increased magnification provided by the operating microscope. Microsurgical needles, scissors, needle holders, microsurgical knives and forceps had been originated with small dimensions.

It can be done with magnifying glasses and lenses of good quality and origin. However, it requires financial investment and a learning curve with constant training. Control of approach, brightness, operative field and even photographic recording and filming can be offered by this technology.

Subepithelial connective tissue graft surgeries in aesthetic regions have corrected discrepancies in shape and volume of the alveolar ridge, especially in aesthetic areas. Supporting osseointegrated dental implants in prosthetic rehabilitation, such connective tissue grafts, require minimal operative trauma of the donor area and coaptation of the surgical wound edges, for the first intention, in the receiving area.

The advent and use of the operating microscope in surgeries has numerous advantages, such as: a postoperative period with minimal morbidity, patient comfort, control of surgical steps, a greater number of suture stitches, better blood supply to the flaps, surgical refining and a standardized aesthetic result.

Aim of the Study

The aim of this paper was to do a literature review on the use of magnification in Dentistry, particularly in Periodontics, in order to clarify the scientific basis of the operator microscope in periodontal surgery. The negative hypothesis tested is that the operating microscope does not influence periodontal plastic surgery.

Purpose of the Study

The main purpose of this literature review is to disclose the use of the operating microscope in the periodontics, making its use safe, predictable and bringing comfort to the patient and the professional.

Materials and Methods

The article selection was performed by electronic search in the PubMed/MEDLINE and SciELO databases, with the terms of indexing: operator microscope (or operating microscope), periodontal plastic microsurgery and magnification.

There was considered eligible papers published between 2009 and 2019, available online, preferably in English, that had a relationship with the subject of this review. Papers with historical data, classical studies, and publications considered useful and enlightening for this review were added. As exclusion criteria were removed studies not relevant to the subject, with areas of acting and use of magnification inconsistent with the aim, or that maintained financing or conflict of interest, as well as commercial appeal for the technology used that evaded evidence-based science. Thus, 53 articles were selected from the beginning, remaining after exclusion: 35 articles, 4 edited books and 1 book's chapter. Total of 40 references.

Discussion

In 1848, Carl Zeiss [1,2] stood out for the large-scale commercial production of world-class standardized lenses known to the present day. In 1921, Carl Nylén [3] used the microscope in Otolaryngology. In 1960, Jacobsen and Suarez [4], connected a tiny blood vessel. Thus, Medicine has popularized the use of the mi-

croscope in knee arthroscopy, gynecological and plastic surgeries. In 1977, Baumann [5] brought the microscope to dentist clinic. In 1993, Shanellec and Tibbetts [6,7] enumerated indications of the operative microscope in Periodontics, particularly in the so-called periodontal plastic microsurgeries, demystifying them. The terms operating microscope and operator microscope are employed synonymously in this article. Despite numerous controversies in the literature reviewed. The optical microscope was called the operating microscope, because it was used specifically in surgeries. Currently it is used in various dental specialties, may be called operator microscope. How this paper speaks specifically about Periodontal Surgeries, the term was chosen operating microscope, without any harm to understanding [1,8,9].

The evolution of Optics concepts and applications coupled with magnification technology have provided promising advances (Figure 1). Initially in the Medical Sciences, mainly in Ophthalmology, in Vascular Surgeries, as well in Neurology [10,11].



Figure 1: Ergonomic use of operating microscope that provides parallel vision.

Later, Dentistry benefited from the clinical conduct and the change of modus operandi from the techniques already established. Periodontics can enhance the excellence achieved with connective tissue grafts and improve them [12-18]. The convergent vision provided by the magnifying glasses with consequent visual and ergonomic tiredness was rethought (Figure 2). Now the parallel view has brought a new perspective in terms of convenience, performance improvement, postoperative control and better repair prospects to the patient [19]. Specialties, such as: Aesthetics,

Prosthesis, Endodontics, Surgery, Periodontics and Implantology; adopted the operating microscope as an indispensable tool for clinical use.



Figure 2: Use of traditional magnifying glass demonstrates cervical spine fatigue and convergent vision.

Periodontics, particularly, need enhanced visual acuity due to the intrinsic characteristics of careful soft tissue manipulation [20]. The maintenance of intact flaps with minimal trauma and efficiently irrigated is a constant in clinical practice. Millimeters of healthy and decontaminated tissue gain make the difference between the success or failure of a therapy. In this context the microscope is an alternative that has brought greater security in obtaining predictable and successful results. Magnifications of 3X, 5X, 8X, 12X, 20X, 30 X and 40 times may be required with a distance up to 25 cm from object [11]. Operator’s pupils can be adjusted according to anatomical facial features [21]. For this to be achieved, the reduction in the size of the instrument, involved in the operative act, had to have its dimensions reduced. The shiny surface also had to be modified so as not to overshadow the view by the reflection promoted by the light of the microscope. Filters have been designed to prevent polymerization of composites by light source [11,22].

Needle holders, scalpel blades, suture threads, needles and scissors have been modified to meet the requirements of a reduced operating field [23]. For example, hollow handle with 18 cm

long to minimize weight and tactile tiredness [11]. An endoscope device suppresses the use of the traditional clinical mirror number 05, making dentist’s vision easier [1]. Materials commonly employed by jewelers, became part of the instrumental, such as: microforceps, Castroviejo’s microneedle holder (Figure 3), microscissors and periodontal micro instruments [20-22]. Not only did this change but there were also changes in philosophy [24].

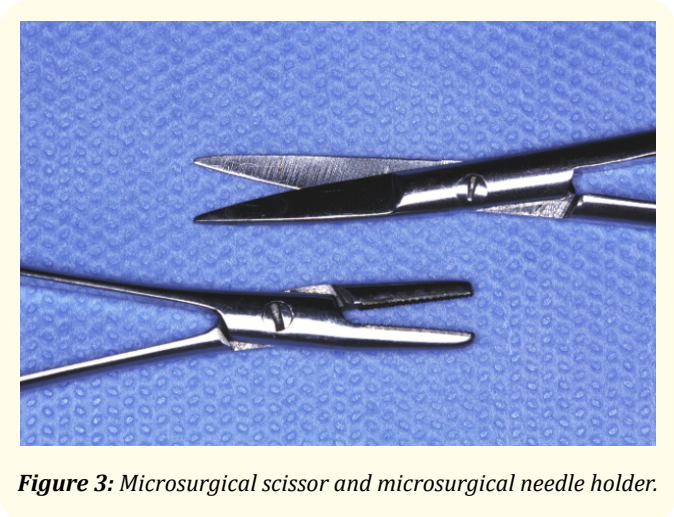


Figure 3: Microsurgical scissor and microsurgical needle holder.

Diagnostic concepts, therapy, surgical intervention, monitoring and prevention were modified using the operating microscope. The current concept of Minimal Intervention in Dentistry has gained its real meaning with magnification [25]. From the moment the magnification scale increases, the criteria for what is healthy and what is irreversibly contaminated also change. The basic principle of what is conservative, on a different scale, can also be applied to the microscope [26]. Only no longer based on subjective criteria, limited by naked vision, but identified on an objective perspective, only previously of responsibility to diagnostic imaging resources [27].

How clinical practice has precedence in foreseeing the suffering and complications of the sequela of periodontal diseases, becomes clear the power provided by the microscope [28]. Photographic evidence and projection of images by microscope-coupled audio-visual resources allow the patient to participate in clinical decisions [29]. Fine surgical manipulation of the flaps provides greater security in maintaining blood supply and less trauma. Approaching the edges of the surgical wound and consequent healing by first intention are greatly facilitated by the microscope [30]. Flaps can be approximated and sutured with needles with fine cuts [31]. As a comparison standard, three or more suture points can be given in a single papilla [32]. The connective tissue donor area also has

benefits with the use of the operating microscope [33]. Surgical cements and bloody areas have long been avoided for the discomfort produced and for being treated with less tissue manipulation, consequently, repair better and exhibit smaller scars [34].

Despite all the advances made, of course there are eminent disadvantages [35,36]. The wide learning curve requires time and constant retraining from professional and staff [1,20]. The expensive costs and changes require expansion of the dental office (Figure 4).



Figure 4: Dental chair-mounted operating microscope.

Despite existing microscope mountings are available for wall mount, ceiling, or on the floor, still proper and ergonomic planning is required [21,22]. Learning how to use film and photography features also requires the use of proprietary editing software [2]. The magnification achieved with the microscope changes the shape and characteristics of the image [22]. Depth and field width are different from conventional view [22]. Hand firmness and tactile acuity require training as the mere rotation of a quarter turn is enough for proper handling of most instruments [38]. But this requires training and no tremors. For this, some factors may influence, such as: caffeine use, nervous system, locomotion problems, use of drugs, degree of anxiety and intimacy with this technology [7,11,20]. Another inconvenient is the lack of knowledge of the dentistry training courses, that are not properly prepared for microscope teaching. Fact that is already surpassed by most medical courses, which has specific disciplines for microscope employment, such as: in vascular surgery for organ transplants, for orthopedic surgical correction of car accident deformities and for vascular neurological surgery [39,40].

Conclusion

Although this systematic review provides a qualitative assessment, the scientific literature lacks a detailed understanding of the decrease in surgical error rates in Periodontics, that demand, of course, other dependent variables. Additionally, more clinical trials and systematic reviews are needed to provide a quantitative assessment of periodontal procedures in operative microscope.

Therefore, the hypothesis tested is null given the significant help of the microscope in periodontal microsurgery.

Conflict of Interest

The author confirm that he has no conflict of the interest in the development of this review literature.

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