EDITORIAL

The Surgical Microscope in Dentistry

It is the dedication to quality and detail paired with the constant quest for excellence and perfection that make our profession so special and exciting. Great new tools are available that keep us pushing the borders for even "more perfect" and longer lasting dental interventions. One of these tools is optical magnification implemented by the use of dental loupes, as discussed in my previous editorial (QI Nov/Dec 2007). Many of our colleagues who have successfully incorporated dental loupes into their daily practice are now taking the next step: the surgical microscope.

Surgical microscopes common in dentistry provide a range of magnifications from 2× up to 20× and even higher. This range allows you to select from various levels of magnification and alternate between them as needed without moving your eyes away from the ocular, as a hand switch is used for control. Advanced models even offer foot or mouth switches to avoid having to move your hand away from the operating area. In contrast to dental loupes, the microscope can focus in on an object within a certain range. This facilitates a steady work posture throughout the entire clinical procedure. All surgical microscopes feature adjustable integrated illumination and many can be equipped with photographic and video camera gear for documentation and educational purposes.

In "macroscopic" dentistry, we are used to seeing our hands while operating with rapid movements. Under high magnification, however, only the tips of our instruments can be seen and rapid movements cannot be visually followed. The most important rule when working under the microscope is to *slow down*. A specially designed microsurgical chair ensures a relaxed and ergonomic work posture and is typically equipped with armrests that help control tremor and prevent rapid and erratic hand movements. Some may comment that "slowing down" your hand movements translates into prolonged treatment time and, therefore, limited economic efficiency. However, those who have mastered the microscope agree that, after the initial training period, they are just as fast with or without the microscope. It seems that under high magnification, your hand motions and movements become more controlled and, therefore, more efficient. A comprehensive hands-on course that is geared toward your area of practice is the best way to familiarize yourself with the microscope and learn basic microsurgical principles that cannot be self-taught.

Endodontic and surgical specialists were among the first in dentistry to incorporate high magnification into their daily practices to significantly improve clinical success. In the meantime, the microscope has become an integral part of endodontic specialty programs. Successful integration has also been reported in periodontics and plastic periodontal surgery, where microsurgical instruments and small suture materials support faster healing times and stunning clinical results. In the current era of esthetic dentistry and increasing patient awareness, the surgical microscope is becoming progressively more popular also among other dental disciplines, including restorative dentistry.

The true meaning of the term "minimally invasive dentistry" makes operating under high magnification almost obligatory. Since a thorough examination is the foundation for all diagnoses, treatment planning, and dental procedures, the surgical microscope is a great diagnostic tool to discover pathologies and lesions that otherwise can not be detected. Caries can be precisely removed without unnecessary sacrifice of intact tooth structure, and adhesive bonding steps can be performed with high accuracy. Close-up inspection of preparation outlines and finish lines is beneficial for all restorative procedures but especially important for bonded restorations that require only minimal tooth preparation (eg, porcelain laminate veneers). Verifying and adjusting the clinical fit of indirect restorations and finishing marginal areas under the microscope significantly improve precision, quality, and ultimately clinical success and longevity.

The surgical microscope is no longer a luxury for a chosen few or limited to highly specialized areas. Most dental disciplines and clinical procedures greatly benefit from the use of high magnification. The range of clinical applications is expanding as dentists become more familiar with high optical magnification and microscopes are improved to meet the needs of the dental practitioner. If dental loupes open exciting new worlds, the surgical microscope can open new galaxies.

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