Digital surgical microscope helps improve ergonomics, treatment, patient communication, and more.

By Dr. Fred S. Margolis

The benefits of using a surgical microscope are numerous, both for the patient and the practitioner. Increased illumination and magnification have been key for endodontists for a long time, but now more general practitioners are taking advantage of this technology.

This article will take a look at some of the benefits that one GP experiences by using the CamSight™ Digital Surgical Scope (www.camsight.com).

Dr. Harvey Apotheker conceptualized the use of the microscope for use in dentistry in 1981.¹ “The newest addition to vision enhancement...in dentistry is the operating microscope. In some medical subspecialties—such as otolaryngology, ophthalmology, plastic surgery, and neurosurgery—extensive microsurgical training is required to perform procedures at acceptable standards of precision.”² As of 1998, the American Academy of Endodontics has had a requirement that all post-graduate endodontic students from accredited programs must become proficient in the use of the microscope.³

There are four advantages that the Digital Surgical Scope (DSS) and the use of captured images have for our everyday practice of dentistry: ergonomics, treatment outcomes, communication and documentation, and education.

1. Ergonomics

There are currently 80 articles in PubMed on “Back Pain in Dentists.” Why? Because to do the intricate work that is demanded of us, most of us literally “bend over backwards” for our patients. Since the invention of CamSight’s Digital Surgical Scope this is no longer necessary. Use of the DSS affords the dentist the opportunity to sit in an upright position when performing his/her dentistry. The operator—and, in some cases, the assistant—has the ability to “have a neutral balanced posture, which has been shown to help prevent ergonomic problems that seem to be an occupational hazard.”

The dentist and assistant can sit upright while using the DSS (Fig. 1), which reduces tension, fatigue, and stress of the lower back and neck muscles.³ Longer procedures can be performed and the dentist can work longer hours per day without the stress and strain on his or her body (Figs. 2, 3).

2. Treatment outcomes

Due to the increased illumination and the magnification of up to 15X digital zoom plus 10X optical zoom and high resolution (available on the model the author currently uses), the ability to visualize the surgical field is vastly improved com-

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> According to microscope manufacturers, most current instrument sales are to general practitioners, who are using them for a wide variety of procedures. The microscope has the potential to enhance a dentist’s vision to unprecedented levels, according to Friedman, Mora, et al. Dentists have begun to learn that lighting of the operating field is just as important as magnification.

The Digital Surgical Scope can enhance the vision in dentistry just as it has in other medical specialties, such as otolaryngology, ophthalmology, plastic surgery and neurosurgery. During the 1990s many restorative dentists and periodontists followed the endodontists’ lead and began to incorporate the microscope into their everyday practice. Dr. Glenn A. van As has stated: “The greatest increase in new users of the Digital Operating Microscope has been from those clinicians familiar with using medium-powered loupes routinely.”

It has been reported in the literature that as magnification increases during procedures, there is an increased risk of strain to the neck and shoulders, which can result in discomfort and fatigue. Proper use of the microscope, including adjusting the microscope’s position and maintaining a comfortable working posture, can help prevent these issues. A good working posture is critical to maintaining the health and comfort of the practitioner, allowing for long periods of time spent at the microscope without discomfort.

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**POSTURE CAN BE CRITICAL**

(2) This is an example of poor working posture, which can cause soreness, injury and fatigue. (3) Good working posture not only improves and maintains a practitioner’s health, but also allows for comfort and efficiency during long procedures.
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...fication is incorporated, procedural errors decrease significantly and the inclusion of a microscope resulted in fewer errors than when a set of loupes was used.¹

3. Communication/documentation
The increased communication fostered by use of the DSS is in several different categories. First is communication with your assistant. The DSS that I use in my everyday practice—CamSight—allows practitioners and assistants to visualize the treatment being performed more easily than with traditional methods (Fig. 1). The assistant now has an unobstructed view of the operating field—the same view as the operator. This allows the assistant to become more aware of the operator’s needs; such as more light or readying for the next instrument to pass. With CamSight the dentist and/or assistant can zoom in or out, focus, and adjust the intensity of the operating light coming through the camera’s lens. This can be done by hand controls or foot controls.

The next benefit deals with the patient and/or parent. Just as digital radiographs have allowed the magnification of the image to allow better viewing of the teeth and supporting structures, so has the digital operating microscope when used with a computer monitor (Fig. 4). As a pediatric dentist, one of my challenges is to communicate with the patient’s parents. I have used the live videos to illustrate tooth brushing and flossing techniques for the parents and children. Our office’s Web site (www.kidsmyl.com) has two videos to help introduce our new patients and their families to our practice. One is on the “First Visit” and the other is on “Laser Dentistry,” and they’re excellent behavioral and practice management tools, in addition to great education tools about our practice and practice philosophies.

The third area of communication would be for treatment planning and documentation. With the DSS you have the ability to show patients their oral structures magnified to illustrate a fractured tooth or restoration, a periodontal problem, or an oral lesion. These can be illustrated to the patient in real-time or recorded and shown at a subsequent visit. In the same

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way, these images can be used to show the patient his/her condition prior to and after the completion of your procedure. Lastly, the images can be stored and filed with the patient’s name and date of the procedure for future reference and documentation. Depending on the computer software in your office, you may be able to store these images in your patient’s electronic chart. Additionally, you can use the digitally captured images for a consultation. In today’s world of cyberspace, I have had dentists send me e-mailed questions and photos literally from around the world. What a great tool we now have to quickly capture magnified images and instantly send them to dentists throughout the world!

4. Patient/student ed
CamSight allows me to illustrate various procedures either as individual digital photos or videos. Just by depressing a foot pedal I can take and record these images for diagnostic and educational purposes. Many of my special needs patients, of all ages, love watching their dentistry performed on the computer monitor (non-threatening procedures are shown to the patient!). I use CamSight for my autistic patients as part of their conditioning program to allow them to watch the dental procedures in real-time.

“IT CAN GREATLY ASSIST GPs IN THEIR DAY-TO-DAY DENTISTRY.”

Additionally, it is helpful with educating dental students. Digital Optical Microscopy allows the dental educator to use the digital images and videos as an educational tool. I have used video clips in lectures for many years to enhance the presentations. These videos also can also be sent live via broadcast teleconferences anywhere in the world or archived for future use. These videos can be transferred to DVD, edited, and utilized for patients’ and/or dentists’ education. The author also uses the CamSight for his over-the-shoulder presentations at his office. So whether you’re talking about better health for the practitioner, better care for the patient, or any number of ways to improve communication and education, the DSS can greatly assist GPs in their day-to-day dentistry.

References