



Vary Your Scope

How varioscope technology maximizes system ergonomics during treatment

Working with even the most convenient and ergonomic surgical microscope over a lengthier period of time frequently results in physical discomfort and related complications. With the introduction of the Varioskop™ technology, Carl Zeiss significantly improved operator comfort during surgical procedures.

When using a surgical microscope, comfort during treatment starts with the first look through the eyepieces. The region of interest should always be in focus without compromising a convenient and ergonomically correct working posture – particularly during long procedures. To optimize system design and improve procedural efficiency, manufacturers of surgical microscopes integrated variable focusing systems into the microscope optics which allow a quick set-up of the working distance. These vario objective lenses allow the surgeon to move the

focal plane up and down without the need to change the objective lens – thus saving both time and effort. The term “vario objective” (or varioscope) is taken from the field of photography and technical optics, associated with still and film cameras.



Vario objective lenses are among the most popular, due to their flexibility. The lenses enable the user to adjust the focal length, which then changes the image frame. The result is that within the variable range of the focal length virtually any desired image frame can be set. In addition, lens operation is comparatively easier than with fixed focal length objective lenses. In medicine, varioscope technology has certainly enhanced neuro and ENT surgery. By allowing for the working distance to be variable, these lenses have been a major contribution in the development of surgical microscopy.

In 1990, Carl Zeiss introduced the Varioskop technology for its surgical microscope platform (introduced with the OPMI® CS system). At that time, the Varioskop was a major technological step forward and improved the use of microscopes in surgical procedures, allowing, for the first time, a

continuous extension of the working distance without the need to change the objective lens. How was this possible? The Varioskop objective lens system consists of two lens groups with five lenses that are used to change the working distance. By displacing the upper lens group (comprising of three lenses) along the optical axis relative to the lower lying lens group, the actual working distance can be easily adjusted (see Fig. 1).

The basic rationale behind the Varioskop optics is to provide the surgeon with a comfortable working position, even for surgeries that may last several hours such as paranasal sinus or skull base procedures. During the surgical procedures the working distance needs to be adjusted frequently in order to clearly visualize the more distal areas of the anatomy as the operation progresses. Rather than permanently moving the whole microscope body for refocusing (as was standard procedure with a fixed focus lens), the surgeon can now adjust the working distance with two fingers using the Varioskop optics. High precision focusing and ease of use are the decisive advantages of Varioskop optics over single focus lenses.

The setting of the desired working distance can be adjusted manually or, in most ZEISS systems, via motorized integrated systems. In special cases, the working distance can also be set using a highly precise auto-focus mechanism such as the ZEISS SpeedFokus system. Today, the seamless, motorized adjustment of the focal plane in the working distance (range: 200 to 400+ mm) is now the standard in neuro and ENT surgical microscopes (e.g.,

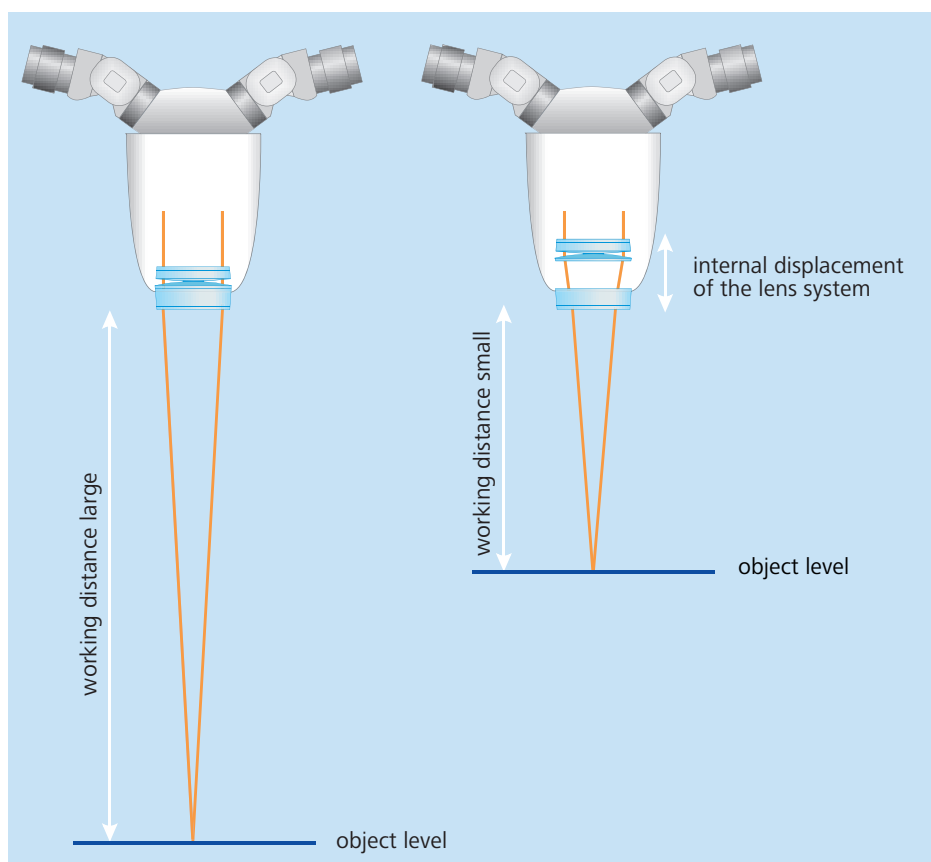


Fig. 1: The working distance can be changed according to the internal displacement of the Varioskop's second lens system.

250 mm for ear applications or 400 mm for larynx applications). Moreover, surgical microscopes with varioscope lenses offer a greater depth-of-field with the same working distance compared to

has equipped the manual system, OPMI® Movena®, as well as the two motorized systems, OPMI® Sensera® and OPMI® Vario® with Varioskop technology, which provides the surgeon with improved procedural efficiency. The latest innovation in this field is the newly developed Varioskop technology in OPMI® Pentero® (range: 200 to 500 mm), meeting the most demanding requirements for longer working distances in spinal and ENT-larynx surgeries. The new motorized Varioskop zoom system provides a longer working range and ergonomics which can be especially critical when using longer instrumentation, or when the patient's anatomy demands it.

Since its introduction, the Varioskop objective lens system has changed the way surgeons perform surgery. By enabling the seamless adjustment of the working distance and focus, surgeons can better focus on their surgical procedures.

“ The Varioskop objective lens system has changed the way surgeons perform surgery.”

exchangeable lenses with a fixed working distance. Varioscope objective lenses have also recently been finding their way into other disciplines, including dental therapy. Here, the varioscope allows the dentist to work in a more relaxed working position – especially important during longer procedures. In the field of ENT surgery, Carl Zeiss