

Frequently Asked Questions about the Dental Microscope

Hidde Doornbusch, DMD / Kasper Veenstra, DMD

Since gaining our first experience with the dental microscope in 1996, we have attended many courses and congresses on this topic – among them, at the Microscope Training Center directed by Dr. Syngcuk Kim at the University of Pennsylvania, Philadelphia, USA. Over time, we have gained a profound understanding of microscopes in dentistry which led us to start our own practical course on dental microscopy which has been running since 1998. During our courses we are confronted time and time again with many questions on microscopy. The following represents the most important questions, e.g., those where the answers epitomize the basics for understanding the benefits of a dental microscope.

What is the added value of a microscope for dentistry in general?

With a microscope, dental procedures can be performed more accurately and more reliably using variable and adjustable magnifications and shadow-free light due to a coaxial radiating light source.

In general, magnification can be set to between 4x and 24x, thereby expanding the diagnostic options due to better lighting and sight. For example, most fissure caries and microfractures cannot be seen with the naked eye. With the aid of a microscope it is even possible to view down to the apex of a straight root canal.

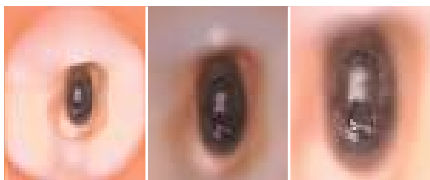


Fig. 1: Different magnification levels

Additionally, clinicians will experience an increase in their job satisfaction. Many procedures are simplified and accelerated greatly, as much better visibility is provided with the microscope. Treatment results become more predictable. For

example, the outline preparation and assessment for a crown preparation becomes much simpler. Making a cast impression is also no longer problematic. Moreover, working with a dental microscope improves ergonomics. The microscope allows for the best possible working posture. Neck and back injuries can be prevented. Existing injuries may, in some cases, disappear suddenly.

The dental microscope works according to the telescope principle, whereby the furthest point of view is at infinity. Therefore, the eyes do not accommodate and converge, which means that fatigue rarely occurs.

Furthermore, patients can be better counseled and educated. With a video camera attached to the dental microscope, the images can be recorded directly. This greatly simplifies the counseling of patients because, as we all agree, sometimes an image says more than a thousand words.

What is the added value of the dental microscope for endodontics?

During root canal treatment most procedures take place inside a tooth. Treatment is often performed with a basic knowledge of the dental pulp and x-ray findings. The dental microscope,



Fig. 2: Perforation sealed with mineral trioxide aggregate (MTA) during root canal treatment

however, displays a large part of the pulp chamber. The big advantage is that the dentist can now see what is being treated and where.

Enhanced visualization significantly simplifies work, especially for complicated treatments. In particular, this applies to the complete removal of the pulp roof, especially if it is partially attached to the pulp floor. Likewise, it is easier to locate canal entrances that are difficult to access and to display the links between the canals as well as perforations, bends, split or oval canals. It also enables the identification of fractures.

Root canal instruments that have broken off as well as old root canal filling material can also be removed more easily. The treatment of an open apex and the complete filling of canals are both simplified when utilizing the microscope - especially in cases with deep splits. This can occur regularly in upper and lower premolars.

The assessment of filing quality can be improved. For example, it can be seen clearly if a 0.6 hand file is worn down very quickly which can result in the complete loss of its filing capacity. Defects in rotary files can be traced at an early stage resulting in the likely prevention of a number of fractures.

Do you have to get use to operating a dental microscope?

Absolutely. At first, people are mainly

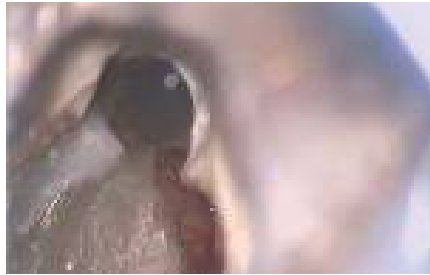


Fig. 3: Vital pulp in the 4th canal

surprised about the level of detail and the things that previously remained unseen. Treatment might be slightly slower in the beginning.

However, after initial training, the speed and efficiency of treatment improves, until the working pace almost resumes its previous speed. Eventually, almost all treatments can be performed more predictably and faster with a dental microscope.

Are special instruments required for working with a dental microscope?

Working with a dental microscope requires instruments designed to keep fingers from getting in the way – in other words, hand spreaders instead of finger spreaders, rotary files instead of hand files as well as microsurgery instruments for apex resections.

Drills with longer shanks are more convenient as it is easier to see down them.

What accessories does a dental microscope include?

With a dental microscope it is possible to record videos or take still images since it provides adaptable and integrated mounting options for video cameras as well as digital and SLR cameras. A printer can then be used to print images of the case and treatment situation.

A co-observation tube attached to the microscope housing, or a monitor connected to the dental microscope, allows the assistant to follow the procedures by viewing the magnified details directly through the microscope or on the monitor.

We have been using a microscope since 1996, when we began performing endodontic treatment. Shortly after, we started using a microscope during all our general procedures. Even though a practical training regimen is recommended at the beginning, you will see impressive results within just a few hours of practice with a dental microscope!

Image courtesy: Dr. Hidde Doornbusch and Dr. Kasper Veenstra, Hoogezand, The Netherlands



Dr. Hidde Doornbusch received his DMD degree from the University of Groningen, The Netherlands. He carried out research at the University Hospital Groningen and at the University of Groningen, Department of Oral Surgery. He was a general dental practitioner in Hoogezand, The Netherlands, with a part-time practice in endodontics. Dr. Doornbusch attended the Microscope Training Center at the University of Pennsylvania, USA. Since 1996, he used a microscope for all dental procedures in his general dental practice but had a special interest in endodontics. He invented a guidance system for safely preparing a root canal for a root post. Dr. Doornbusch was President of the European Society of Microdentistry (ESMD) and gave master classes for AMED. He published several papers regarding the dental microscope. Dr. Doornbusch unfortunately passed away in October 2007.



Dr. Kasper Veenstra received his DMD degree from the State University of Utrecht, The Netherlands. He practices dentistry at his general dental practice in Hoogezand, The Netherlands, and has used a dental microscope there since 1996. He attended the Microscope Training Center at the University of Pennsylvania, USA. Dr. Veenstra gives hands-on courses on the use of a dental microscope. He is a clinical instructor at the University of Groningen for endodontic students and gives master classes for AMED. He is member of the Executive Committee of ESMD and Chairman of the Foundation for Postgraduate Courses in the North of The Netherlands.

Dr. Veenstra can be reached at K_Veenstra@beterlichtenzicht.nl | www.beterlichtenzicht.nl