Shifting borders for a successful “endo”
The International Dental Show makes it visible

Current trends in endodontics—mechanical preparation—opportunities for specialisation—the latest status in endodontics—modern diagnostics and therapy concepts—a key theme of IDS

The scientific and technological progress in the field of endodontics has considerably improved the chances of long-term tooth preservation and also turns this specialised field into a relevant part of prophylaxis-oriented dentistry. Because the success rates are significantly higher today than twenty years ago. Whereby the methodical spectrum ranges from the conserving therapy with manual or mechanical root canal treatment, disinfection and obturation, to the possibly necessary root canal revision, through to minimally invasive, microsurgical concepts for the treatment of specific endoperiodontal lesions. The International Dental Show (IDS) from 21 to 25 March 2017 will present the entire palette of endodontic instruments and materials necessary for this purpose.

Getting to know the root canal system: Glide path and diagnostic tools

This begins with systems for the production of the gliding path as a basis of every successful endodontic treatment. To this end both hand files and chelation gels as well as machine-driven alternatives are available. A trend towards the use of a single rotating single-use file is noticeable, because modern instruments made of nickel titanium display high resistance to breakage, can reduce the treatment time and are thus also advantageous from an economic point of view.

In this stadium of the treatment the dentist already gets a precise picture of the anatomy of the root canal—not least thanks to a multitude of diagnostic aids. For the visual examination with the bare eye, the dentist can use a magnifying glass for the inspection, whereby today extremely lightweight high-tech models enable a particularly relaxed view even in the case of very small-structured areas. If necessary, the practitioner chooses a colour corrected lens system and a correction to suit his spectacles.

The endodontic X-ray—more and more frequently in the form of a digital 3-D X-ray—delivers essential additional information on the precise course of the root canal. In the further process, X-rays frequently serve the purpose of determining the exact length, whereby the combination with an electro-metrical determination with an endometrical device proves to be helpful in many cases. Electrical resistance represents the actual measuring sizes here. In the case of more recent endometrical devices, a reference point between the foramen physiologicum and the foramen apicale is determined. The actual measurement of the resistance is thus only dependent on the conductivity of the canal wall dentine. State-of-the-art developments work according to the principle of the impedance quotient measurement: These apex locators determine the alternating current resistance in the case of two different frequencies (multi-frequency technology). For practical use, devices that communicate the message “apical section reached!” or “Beware, danger of over-instrumentation!” using acoustic and/or optical signals are recommended. Modern apex locators work in both dry and moist root canals and are in some cases even available in compact small formats.

Less and less filing needed to achieve the goal

In order to prepare the root canal, sequences of co-ordinated filing are required—however this is tending
to become less all the time or—an important development of our era—only one sequence of filing is needed even. Depending on the individual case and personal experience, the practitioner decides between classic rotating filing with a high degree of flexibility and if necessary increased breakage resistance (continually rotating movement) and an effective and simple process (reciprocal file movement).

Depending on the filing system, classic endo motors can be implemented or advanced systems that can work either continually or reciprocally. Alternatively to the usual touch-screen operating surface, in some models it is possible to steer them per Bluetooth via an app from the iPad Mini. This can make the storage of filing sequences, the graphic representation of treatment scenarios to the patient much easier.

With the subsequent rinsing of the treated canals (i.e. with NaOCl, EDTA) numerous details have been optimised over the past years—one of them: The formation of and the related limited flow of fluid around it is avoided by activating the rinsing fluid. This is made possible by a pressure/vacuum rinsing or by combined vibrating and swaying movements with selectable sequences. The suitable devices normally comprise of a handpiece (possibly cordless) and special inserts/attachments. In some cases these can be bent to suit the canal anatomy and then inserted. This can lead to the achievement of the desired clean surface with open dentine tubules.

The next partial goal is the hermetic sealing of the canal system. Usually this is carried out using gutta-percha, whereby both systems for the lateral condensation or the multi-fill technique as well as for the one post, two material method (flexible plastic carrier + heated gutta-percha) can be implemented. Thanks to the obturation options available today, they can frequently be carried out in such a forward-looking way that a possible revision is even facilitated.

**Strongly co-decisive: Posts and coronal provision**

Finally, the quality of the coronal restauration also plays a decisive role for the overall success of the “endo”. If after the preparation a small amount of natural tooth substance remains (i.e. no more cavity wall or at the most one single wall), it is worth considering implementing a post to stabilise the tooth, if necessary after applying a dentine pin (usually 2 mm high). There is a wide selection here: Posts made out of zirconium oxide fibreglass with a 10–20% resin content, out of different fibreglass/resin compositions, out of pre-silanized fibreglass reinforced composites, etc. and in different geometrical executions, for example conical, cylindrical, optionally with an activated thread or with a separate head (two-piece), conically cylindrical or with a double taper design with a slightly less conical lower third. Several posts behave like a chameleon and display a colour coding at room temperature to enable a safe recognition, only to take on the colour of the natural tooth at body temperature.

Last, but not least: After the "endo" is before the "post-endo". The final coronal care has to be hermetically sealed and must remain stable long-term. Here the practitioner can choose between the conventional prosthetic materials, classic filling materials and (except for the formation of posts) bulk filling composites.

**Borderline: Special area endo/perio lesion**

The endoperiodontal lesions generally constitute a significant borderline case because in the individual cases the therapy is strongly dependent on the cause. If it is primarily due to a periodontal inflammation, both endodontic treatment and a curettage will be required. However, if the cause of the disease in the respective tooth is primarily endodontic, root canal treatment could suffice and a curettage should not be carried out. Comprehensive probing and a high-performance microscope aid the differential diagnosis.

Whereas in the case of endodontic treatment a host of individual decisions have to be taken. Manual or mechanical production of the glide path? Preparation with multi-filing or one-time filing systems? Root post or not? Restauration of the crown using composites or prosthetics? A series of predecisions could be taken at the International Dental Show in Cologne from 21 to 25 March 2017, because the different processes, products and ultimately an abundance of endo experts will be available.

"The desire to preserve one’s own teeth up until an advanced age is growing within the population. Thanks to the progress of the past years, there have been shifts in the borders in the field of endodontics: What was considered to be a healing attempt or even a "risk" five or ten years ago, has often become a challenge today that can be mastered. As the leading trade fair for dentistry and dentist technology, IDS, from 21 to 25 March 2017, shows which innovations are carrying on this trend—the entire spectrum of modern endodontics and the current therapy and diagnostic developments," said Dr. Martin Rickert, Chairman of the VDDI.

IDS (International Dental Show) takes place in Cologne every two years and is organised by the GFDI, the commercial enterprise of the Association of German Dental Manufacturers (VDDI) and staged by Koelnmesse GmbH, Cologne.