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While taking care of others, **you should remember to take care of yourself**

Self-care is one of those things that is essential, but we often do not take enough time for it, or feel that we do not have enough time or knowledge. However, taking care of yourself—your body, health and mental well-being—is most important not only in order to feel better but also in order to perform better in the long run and to be able to help others better.

Back pain is one of the most common problems among dental professionals. The results of a study conducted in 2015 showed a 70.0% incidence of back pain among dentists, lower back pain predominating in 47.6% of cases.¹ Such findings demonstrate a high prevalence of lower back pain among dental professionals.

Unfortunately, the importance of ergonomic working posture is usually not the focus of dental students and young practitioners. Dr Ali Nankali in his article “Back pain—a clinician’s nightmare” (page 42) emphasises that many young clinicians are aware of their incorrect posture and positioning, yet they do not know how to correct it: “The lack of confidence does not allow them to challenge their habits on their own, and so they often seek help” and “Many dentists who do not know how to manage back pain try to work in a standing or a different sitting position, which, unfortunately, is reported to lead to more intense pain, especially in the upper and lower back areas”.

Another study, conducted by Swedish researchers between 2012 and 2014, concluded that “understand-

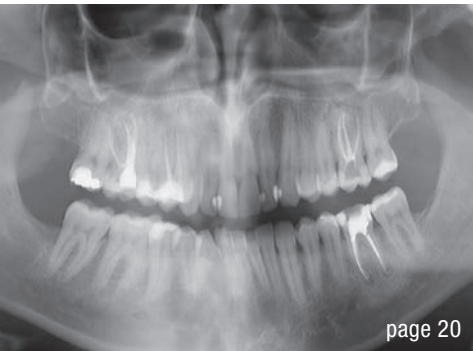
ing the relationship between working conditions and well-being is crucial to being able to design specific interventions for oral healthcare providers which will improve their working conditions and health”.² The lead author of the study, Dr Charlotte Wåhlin from Linköping University, recommends that dental professionals use ergonomic exercises in the daily practice to prevent work-related disorders.

Undeniably, offering high-quality treatment to patients should be the focus of every dental professional, but it should never come at the expense of their health or well-being. Therefore, striking a balance between self-care, including correct working posture, atmosphere at work, and physical and mental health, and professional performance is crucial for obtaining the best results in the long term.

Magda Wojtkiewicz
Managing Editor

References

1. Gaowgzeh RA, Chevidikunnnan MF, Al Saif A, El-Gendy S, Karrouf G, Al Senany S. Prevalence of and risk factors for low back pain among dentists. *J Phys Ther Sci.* 2015 Sep;27(9):2803–6. doi: 10.1589/jpts.27.2803.
2. Wåhlin C, Lindmark U, Wagman P, Johnston V, Rolander B. Work and health characteristics of oral health providers who stay healthy at work—a prospective study in public dentistry. *Eur J Physiother.* 2021 Apr 6. doi: 10.1080/21679169.2021.1905876.



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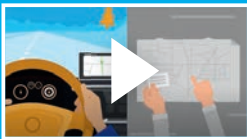
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Slow down everyone—dentistry does not need to be done at speed

Part 2: The cornerstones of Slow Dentistry are beneficial for every dentist

An interview with Prof. Katalin Nagy, honorary global Ambassador for Slow Dentistry, Hungary

By Monique Mehler, Dental Tribune International



These days, there is a growing emphasis on quality over quantity, that is, preferring an object or service that is worthwhile rather than a quick and easy fix. As Dr Miguel Stanley explained in Part 1 of this series ([roots magazine 1/21](#)) this is what Slow Dentistry—a more patient-oriented and wholesome approach to dentistry—is built on. It also seeks to bring the focus in dental care back to clinical excellence rather than single-minded emphasis on profit. In this interview, Slow Dentistry Honorary Global Ambassador for Hungary Prof. Katalin Nagy speaks about why dental practice makes different demands in the twenty-first century.

Prof. Nagy, Slow Dentistry has come a long way. How did you observe the process?

Besides my academic career, I have been practising as a dentist for more than 40 years. I clearly remember that, at the very beginning when I opened my private office in Hungary, people used to measure the success of a dentist according to the number of patients who were

queueing up in the waiting room. Then again, if a dentist could treat them in a very short time, he or she was considered a very good dentist. I know that it was almost half a century ago, but I still remember that, and it was obvious that we had a very long way to go. You can imagine the changes that have happened in my country since then, changes that were even more evident when SARS-CoV-2 began spreading everywhere in the world, but the changes started before that.

Is Slow Dentistry only important when it comes to specialties like endodontics or oral surgery, for example, or would any general dental practitioner benefit from this approach?

I would emphasise that the cornerstones of Slow Dentistry are beneficial for every single dentist, as well as dental hygienists and dental assistants. These cornerstones not only describe the rights of patients, but also help dental professionals to be able to maintain long-lasting quality work in a safe environment, which will elevate the standard of their private practice and boost their businesses probably more than advertising—what they have been paying for over the years.

The necessary time for patient appointments is vital for successful treatment, well-being, understanding and safety. Do you think patients realise that they have this power?

I think that, most of the time, patients in my country are still not completely aware of their rights. Sometimes, they choose a dentist according to the interior design of their dental offices (which I also find important) as an inaccurate measure of the quality of treatment.

Ten years ago, after spending a long time in dental schools, also overseas, I introduced a subject into the dental undergraduate curriculum called communication in dentistry. Communication needs not only skills but also time for patients and professionals. The idea of Slow Dentistry has helped me to reinforce this initiative of teaching communication in dental schools, which allows



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Slow Dentistry brings to light that all the extra time a doctor spends with a patient is time dedicated to understanding underlying health issues, to reaching an accurate diagnosis, to planning the best treatment, to spot-on execution, to less stress, to better and safer dentistry.

us to have the necessary and appropriate discussion before and throughout the treatment procedure.

Currently, you are the Slow Dentistry honorary global ambassador for Hungary. How did that come about, and what do you aim to accomplish through this role?

If you consider where Hungary started half a century ago, you would understand the great importance of this role. Also, dental tourism is very popular in our country. Patients arrive from another country for full-mouth dental treatment and typically remain for seven to ten days. I am very sceptical about the quality of the long-term success of those treatments.

I would like to introduce a collaboration between Slow Dentistry and the Hungarian Dental Association through which we could grant the Slow Dentistry badge to those dental offices which are working strictly according to Slow Dentistry's principles. It could be a great help for both Hungarian and foreign patients in choosing their dentist in order to receive quality treatment in the safest environment.

Dr Miguel Stanley, who founded Slow Dentistry and wrote in Part 1 of this series that "The general public currently has no idea of their rights at a dental appointment." What is your take on this?

Throughout my career, I have been able to work in different countries. Dental education has always been famed in our country, and there is a high percentage of practical learning opportunities for our students. After graduation, practitioners tend to forget what they learned about quality and safety and how to apply this. Slow Dentistry summarises and structures those most important rules

"Communication needs not only skills but also time for patients and professionals."

that we have learned over the years and which every single dental professional can follow.

I am also hoping that, after easing of COVID-19 lockdown restrictions, we as Hungarian dental professionals can invite Dr Stanley to a meeting to convey these extremely important messages of Slow Dentistry to our audience, because I believe that a personal discussion with Dr Stanley, who has amazing communication talents, always gives a unique and irreplaceable boost.

Editorial note: Visit www.slowdentistry.com for more details.

about



Prof. Katalin Nagy has received university training and specialty qualifications in oral surgery, prosthodontics and implantology. Her main field of research is oral cancer. Prof. Nagy is currently adviser to the Hungarian health minister on dental issues, being president of the Hungarian Dental Association, and she is head

of the Department of Oral Surgery at the University of Szeged, as well as the owner of two private dental offices in Szeged and Budapest in Hungary.



Comparative evaluation of the accuracy of the AirPex and DentaPort ZX apex locators in detecting working length: An *ex vivo* study

Dr Rosalba Diana, Dr Raffaella Castagnola, Dr Mauro Colangeli, Claudia Panzetta, Dr Luca Marigo,
Dr Nicola Maria Grande, Dr Filippo Cardinali & Dr Gianluca Plotino, Italy

Introduction

During root canal therapy, shaping, cleaning and disinfection depend on accurate measurement of working length.¹ Incorrect evaluation of working length can compromise the clinical outcome of the root canal therapy.² The ideal end point of a root canal therapy has been debated by many authors.^{3,4} Clinically, when canal preparation and filling are located within 2mm from the radiographic apex, in the region of the apical constriction, a higher success rate of the root canal therapy

is achieved.^{5,6} However, the apical constriction, usually the narrowest part of the root canal, is not easy to detect.⁷ Similarly, the cementodentinal junction, the transition between the pulpal and periodontal tissue, is considered the ideal end of a root canal therapy,^{8,9} but it is variable and cannot be clinically detected.^{4,7}

Radiography, the anatomical average length of teeth, tactile sensation and moisture of a paper point are different methods used to determine working length.⁹ Radiography has been used for many years, but it has

the limitation of providing a 2D image of a 3D complex structure. The use of radiographs alone in working length determination led to over-instrumentation in 33% of molars and 56% of premolars.¹⁰ The introduction of electronic apex locators (EALs) into clinical practice allowed, when used with appropriate radiographs, the determination of a more predictable and accurate working length,^{11,12} and a substantially lower number of radiographs are necessary when using EALs, consequently reducing patient exposure to X-ray radiation.¹³ Vieyra et al. showed that Root ZX located minor foramina 68% of the time in premolar and anterior teeth compared with radiographs, which did so 20% and 11% of the time in anterior and premolar teeth, respectively.¹⁴

In the last decades, different generations of EALs have been developed. Several studies have been conducted on different EALs to evaluate their accuracy under different conditions.^{15–18} The DentaPort ZX (J. Morita) is a third-generation EAL based on dual frequencies (8 and 0.4kHz), and it is considered the gold standard EAL to which any new device should be compared. Several *ex vivo*¹⁹ and *in vivo*²⁰ studies have clearly demonstrated its precision. Among these studies, as an example, Connert et al. showed that, in a comparison of nine apex locators using micro-CT, the DentaPort ZX was the most accurate at detecting apical constrictions and major foramina, having an accuracy of 99% and 100%, within a tolerance of ± 0.5 mm or ± 1.0 mm, respectively.¹⁵

AirPex (Eighteenth, Changzhou Sifary Medical Technology) is a new wireless apex locator that is charged on a charging base. It weighs 15 g, and its dimensions are $4.8 \times 2.8 \times 1.6$ cm. In the literature, no data is yet available on this EAL. Thus, the aim of the present *ex vivo* study was to compare the accuracy of the AirPex and the DentaPort ZX EALs in determining working length in extracted teeth.

Material and methods

In this study, 15 single-rooted teeth, extracted for periodontal or orthodontic reasons, were selected. The teeth were placed in a 5.25% sodium hypochlorite (NaOCl) solution for 2 hours in order to remove organic residue. The remaining tissue was removed from the external root surfaces using a periodontal scaling instrument. Finally, the teeth were stored in normal saline (0.9% sodium chloride) before testing.

To rule out previously treated root canals, open apices, resorbed roots, teeth with two canals or teeth filled with amalgam or composite, two digital radiographs in both buccolingual and mesiodistal projections were obtained. After standard access cavity preparation, the

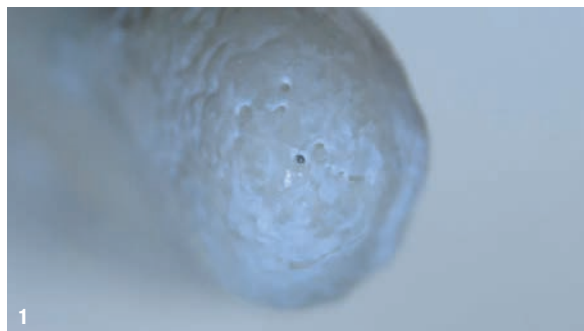


Fig. 1: Determination of the actual working length under a stereomicroscope at 20 \times magnification. As a particular detail, a grey spot shows the file on top of the major apical foramen.

patency of the apical foramen was assessed with size 10 and 15 K-files (Dentsply Maillefer). Samples in which a size 20 K-file reached the apex were ruled out and substituted.

The actual working length (AWL) was determined by introducing a size 10 K-file into the canal until its tip emerged in the apical foramen under 20 \times magnification using a stereomicroscope (Zeiss Axiophot, Carl Zeiss) linked to a digital camera (Moticam Pro SMP, Motic; Fig. 1). With the aim of reducing the risk of stopper movement, two silicone stoppers were positioned on the file. After the removal of the file, the distance between the stoppers and the file tip was measured to establish the AWL.

The roots of each tooth were immersed in a plastic box filled with alginate, leaving the most coronal 5 mm uncovered. Alginate was useful for obtaining an environment as analogous as possible to the oral one. The wire of the EAL was connected to the file inserted into the root canal, while the lip clip was immersed in the alginate.

AirPex (Fig. 2) and the DentaPort ZX (Fig. 3) were used according to the manufacturer's instructions. When the AirPex was used, a size 10 K-file was inserted gently until



Fig. 2: The AirPex apex locator. **Fig. 3:** The DentaPort ZX apex locator.