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LightWalker: a "Magic Wand" for the 21st Century Dentist

Revolutionary SWEEPS™ for Superior Endo Treatments

The New LA&HA Master's Program

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March, 2017

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An Exciting New World

Nina Malej Primc
Dental Program Director

We live in an exciting age in which technology is rapidly changing the world as we know it, and there's no question that the world of dentistry is also undergoing rapid changes. The more that dental professionals succeed in the goal of improving patients' lives, the more the expectations of patients increase even higher. They seek and expect excellent results, and demand procedures with little or no pain.

Laser systems are quickly becoming as common as smartphones in the daily life of dentists. As with all devices that we depend on daily, it's quality that truly matters the most – quality that goes hand in hand with ease of use, wrapped in the world's best technology. Fotona's dental lasers have long been acclaimed as world-class dental systems, especially because of their legendary quality and patented VSP (Variable Square Pulse) technology. "Modern dentistry is simply not modern without an advanced laser such as Fotona's LightWalker", according to Dr. Matjaz Lukac, CEO of Fotona in our LA&HA interview. He describes it as a "magic wand" for the 21st century dentist.

In this issue of the LA&HA magazine, we'll take you on the road of learning through several in-depth articles and clinical cases. We'll also present more insights into recent innovations, such as Fotona's newly developed endodontic SWEEPS technique, designed to generate shock waves in spatially confined reservoirs, such as root canals, by accelerating the collapse of vapor bubbles in the dental irrigant.

Because sharing knowledge is what we passionately believe in, we further pursue this mission through the LA&HA Master's Program in Laser Dentistry and other professional training courses at the new LA&HA Institute – a modern facility designed for continuous training and education on the safe and effective use of lasers in dentistry. What's more, the LA&HA Institute is also actively involved with research into new medical applications as well as organizing professional events for the exchange of scientific information.

Welcome to an exciting new world of laser education!

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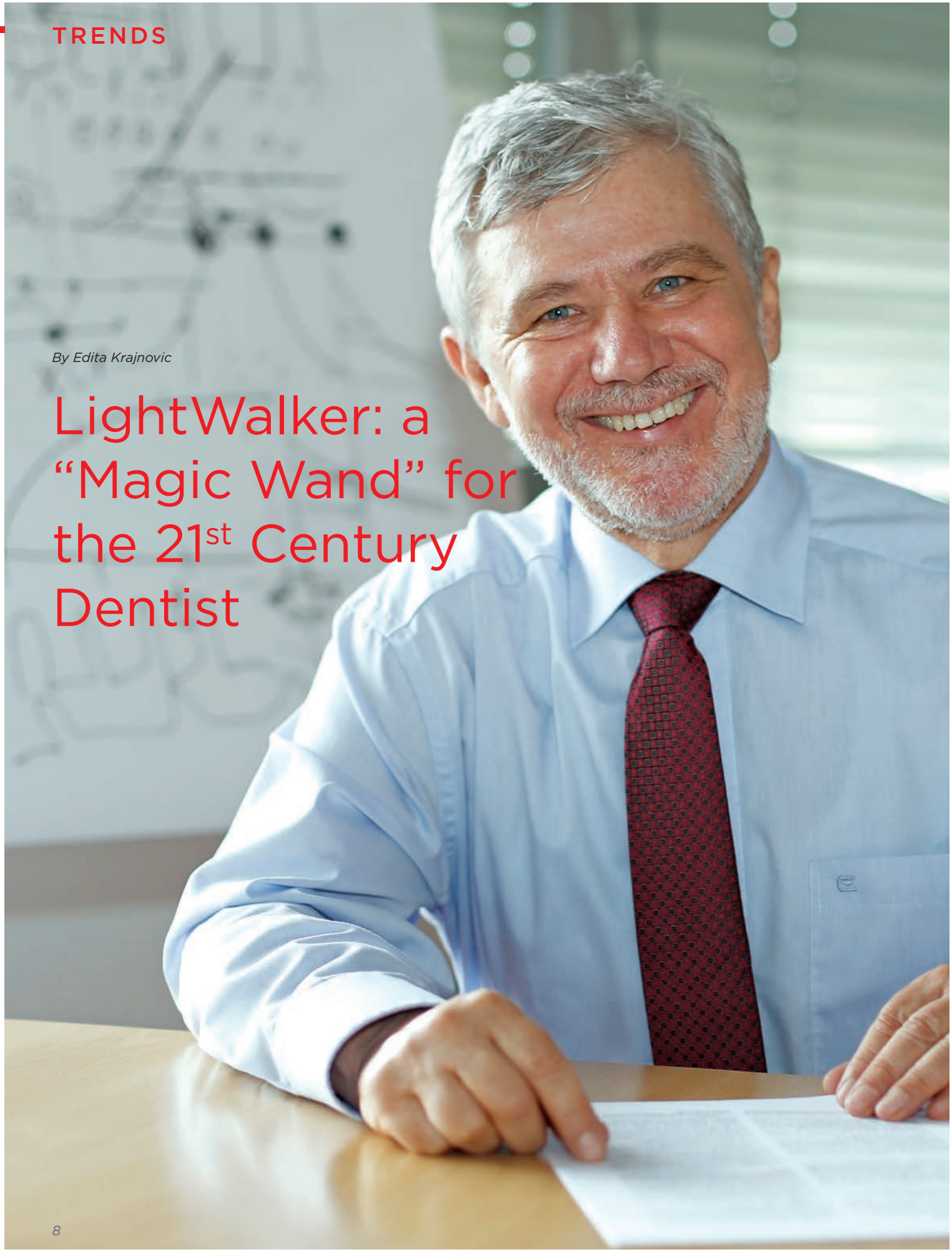


By Edita Krajnovic

LightWalker: a "Magic Wand" for the 21st Century Dentist

It's been six years since Fotona introduced its revolutionary LightWalker laser to the world. To assess its impact on modern dentistry and also learn more about the latest technology in dental lasers, we sat down with Dr. Matjaz Lukac, CEO of Fotona. "Our goal" he says "is to change the world of medicine by developing ultra-performance laser systems that are also ultra-reliable at the same time".

Looking back, has LightWalker impacted modern dentistry since its launch in 2011?

Modern dentistry is simply not modern without an advanced laser such as Fotona's LightWalker. Nobody likes the drill or the shot – and with LightWalker both are avoided. Practitioners can now explain to young children that this "walking light" simply shines on their tooth and makes the tooth bugs disappear. With LightWalker, periodontal pockets can be reduced in a manner that was not possible before. Root canals can be disinfected with superior results and with less inflammation and post-op discomfort. Patients can leave the dental office not only with more beautiful teeth, but also more beautiful skin after having been treated by their dentist for small facial imperfections. And at night, they and their spouses can even sleep better after having received the non-invasive, patient-friendly NightLase treatment for reducing snoring and the effects of sleep apnea. LightWalker has definitely become a "magic wand" for the 21st century dentist.

Fotona's dental lasers are generally acclaimed as world-class dental systems, especially because of their now legendary VSP (Variable Square Pulse) technology.

We are hearing a lot about the new ASP technology, recently made available to LightWalker lasers. Can you explain what it is?

All lasers are not created equal. Fotona's dental lasers are generally acclaimed as world-class dental systems, especially because of their now legendary VSP (Variable Square Pulse) technology, a solution that provides nearly square-shaped laser pulses with adjustable duration. Fotona recognized very early on that it is not only the laser wavelength and energy that define a laser's efficacy and safety – even more important is the laser's characteristics in the "temporal domain", that is, how the treatment laser energy is delivered in time to the tissue. For example, for cold ablation the energy must be delivered in short pulses, while for coagulation longer pulses are needed. With Fotona's square-shaped laser pulses, the pulse durations are adjustable and well defined, thus avoiding the sub-optimal slow rise and even longer fall in pulse power associated with standard laser technologies. With ASP technology, Fotona has made a revolutionary step forward with respect to controlling laser pulses in the temporal domain. ASP stands for Adaptive Structured Pulse technology, which signifies that it is now possible to adapt the temporal envelope and structure of laser pulses to exactly match the requirements of the laser-tissue interaction for a particular treatment. The output of the recently introduced ASP-powered LightWalker is now even more exactly tailored to the requirements of specific procedures. And what is particularly exciting is that with ASP technology, Fotona's LightWalker platform is so universal that it can accommodate an even wider spectrum of future dental needs and developments.

How will practitioners benefit from the ASP technology?

The ASP-powered LightWalker already features a new and improved QSP (Quantum Square Pulse) mode that introduces into dental practice what has not been possible until now: a truly optimized Erbium laser performance with regard to all three basic requirements in hard tissue dentistry: ultra-fast procedures with minimal heat deposition and maximum comfort for the patient. And during this year's

With ASP technology, Fotona has made a revolutionary step forward with respect to controlling laser pulses in the temporal domain.

IDS, Fotona is introducing a revolutionary new SWEEPS (Shock Wave Enhanced Emission Photoacoustic Streaming) mode, developed to further improve the cleaning and disinfecting efficacy of LightWalker's laser-assisted PIPS® endodontic procedures. It is well understood that although the PIPS® irrigation is very effective, its cavitation dynamics is still much slower than what it could be if not slowed down by the friction on the root canal walls. With the specially adapted SWEEPS pulse structure, a faster photoacoustic collapse can now be produced even in narrow root canals, resulting in the emission of a large number of enhanced pressure waves throughout the canal. This is a very exciting development. With SWEEPS-supported endodontics, you not only improve the streaming of irrigants throughout the complex root canal system, but also enhance the direct removal of the smear layer and disinfection, potentially eliminating the need for the use of aggressive irrigants.

At the 50th anniversary of Fotona, you stated 'The secret to our success is each and every employee's identification with Fotona and its passion for perfection'. How do you achieve such a high level of engagement?

The most innovative devices, those that are on the edge of what technology today can deliver, usually require high maintenance and servicing. Fotona is changing this paradigm. Our goal is to change the world of medicine by developing ultra-performance laser systems that are also ultra-reliable at the same time. We do not stop at improving the lives of doctors and patients. It is equally important to us that our employees, partners and customers feel appreciated and respected, and that they know they are all members of Fotona's global family. Who is your safety net in this occasionally crazy world? On whom do you rely on the most? On your family! Although it is technology that brings us together, it is quality of life that really matters at the end of the day. This is why we, the Fotona Family, enjoy this common exciting ride of making the world a better place as 'One Family Together', as we like to say.

For more than 50 years, Fotona has been one of the leading developers and producers of innovative laser systems. Looking ahead, what can we expect at the century milestone?

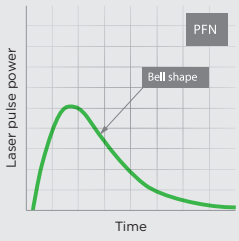
Since its beginning, Fotona has been an active and passionate participant in the exciting development of laser photonics. We were one of the first to realize the potential of laser holography, or of free air laser communication. It was Fotona's technology that enabled the world's first live optical video transmission of TV signals during the Olympic Games in 1984. That same year, we developed our first medical laser for use in ophthalmology, and then proceeded into dentistry, dermatology, surgery and gynecology. Nobody knows what the future will be like, but I am confident that Fotona will continue to play an important role in enriching global society with our ultra-performance medical devices.

ASP POWERED

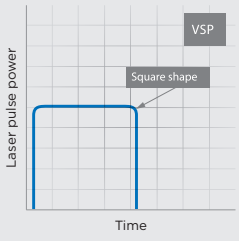
New Revolutionary
Adaptive Structured Pulse
Technology

ASP - The Third Generation Technology

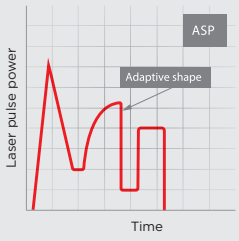
LightWalker™ and its groundbreaking ASP (Adaptive Structured Pulse) technology represent a cosmic shift forward for the medical and aesthetic laser industry. This third-generation technology combines the unsurpassed range of pulse duration modes of Fotona's VSP (Variable Square Pulse) technology with the revolutionary capability of ASP technology to adapt the temporal structure of laser pulses to the bio-photonic dynamics of laser-tissue interaction.



Standard PFN Technology



Fotona VSP Technology



Third Generation Fotona ASP Technology

By Matjaz Kljajic

The LA&HA Institute: the "Living Room" of the Fotona Family House

Music school is where one goes to learn how to play a musical instrument. But where does one learn how to operate a complex device such as a medical laser?
"Lasers are like a living being and one has to learn how to work with them" explains Dr. Masa Gorsic Krisper, head of the new LA&HA Institute. The best place to educate yourself is at one of the most advanced institutes in the world, located right next door to Fotona's European headquarters.

Dr. Gorsic Krisper, how was the idea of the LA&HA Institute conceived?

The seed for this magnificent facility was planted in 2007 when the Laser and Health Academy (LA&HA) was born. Since day one, LA&HA's mission has been to support innovation, development and education through workshops designed to improve the knowledge and skills of Fotona laser users. Throughout the years, the activities of LA&HA expanded enormously. In order to continue to improve the quality of our services, we had to expand our activities and invest in a new laser training and research center.

What knowledge and experiences do clinicians obtain from the Institute?

Medical professionals recognize the benefits of having access to world-class theoretical and practical medical training, and they are also aware that continuous training and education on the safe and effective usage of lasers in medicine and dentistry are a must. The Institute offers numerous possibilities for leading workshops and other educational events of all sizes, even up to 100 participants. With the help of live video transmission from the LA&HA Institute's laser room – or from remote locations anywhere in the world – each participant has equal access to observe live procedures up-close.

But perhaps even more important is that all participants have the chance to directly work with the lasers themselves to gain highly valuable hands-on experience. In this respect, it is a great asset for our Institute that we can offer our workshop attendees a complete laser training lab for demonstration and hands-on work.

In addition to all this, the LA&HA Institute is a place for continued research on new applications, as well as organized meetings for the exchange of new ideas and best practices. So we are here to support the medical laser community in every way possible.

Who are the attendees of LA&HA Institute trainings and events?

In the past we have organized 60 workshops for more than 250 attendees from 55 countries around the world. This number stands for our 'old' facilities, and now, with our modern Institute we expect the numbers to grow immensely. Living proof that we are doing a good job is that we have many repeat clients, including one clinician who came to our workshops more than 5 times!

The LA&HA Institute is a place for continued research on new applications, as well as organized meetings for the exchange of new ideas and best practices.

If you have a Rolls Royce in a garage, you need to get the driving license. This is what we do: educate you for using our laser systems.

What thoughts went into the architecture and the design of the training center?

Our goal was to place the world's best-made and highest-performance laser devices in the type of environment they truly deserve – a beautiful, modern and futuristic institute incorporating modern architectural design, and to fulfill all of the special requirements of this type of working environment.

What differentiates the LA&HA Institute from other similar institutions?

We see the Institute playing a key role in supporting LA&HA's mission, which is to serve as a global platform for the exchange of knowledge among peers and the promotion of evidence-based laser medicine and dentistry among practitioners and the general public. The Institute offers access to the latest innovations in lasers, laser handpieces and applications, in a modern and at the same time welcoming environment. The workshops and research are led by highly educated and experienced staff. At the Institute's official opening, many attendees said that it's the most state-of-the-art laser facility they have ever seen. We are positive that the majority of Fotona users are starting to feel our 'One family together' moto. I personally see the LA&HA Institute as the 'living room' of our big Fotona family house.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Nd
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MSP
SP
LP
VLP
QSP
mJ
Power
20,0
W
TeGI
20
3
6
Comfort
More

By Sasa Gnezda

An interview with Nina Malej Primc about an Intense 200 Hours of Hands-on Clinical Training

The New LA&HA Master's Program

For the past several years Nina Malej Primc, dental program director, has observed a growing level of interest and demand for dental laser education in the dental market. Although there have been a number of educational programs available for some time, they all have failed to completely meet the expectations of many Fotona customers. "They are seeking a comprehensive educational program to understand clinical treatment results based on Fotona's technology solutions," says Malej Primc. So in order to give practitioners from around the globe the best knowledge and experience possible and to provide essential insights into best practices, the Master's Program in Laser Dentistry at the LA&HA Institute was born.

In the beginning of 2016, LA&HA offered a comprehensive Master's Program in Laser Dentistry. How challenging was it to start such an ambitious project?

It has indeed been challenging, but the LA&HA Institute is well suited to provide such expert knowledge thanks to its strong cooperation with many experienced international lecturers and the support of Fotona. Even though there was high demand in the market for comprehensive dental laser education, we couldn't believe that so many participants would already join us in the first year. It also surprised us that only 10% of the participants were new to lasers – all the others had already used a Fotona dental laser. They felt they needed to gain deeper knowledge about this amazing technology that enables such a broad range of applications.

What are the key benefits of this Program?

I would say there are three key benefits. First, we organize 200 hours of active training led by high-level industry experts and skilled professionals in multiple fields of dentistry. Second, this is a module-based training program in a supportive and highly functional educational setting with the most efficient and up-to-date laser technologies available. And third, participants take part in hands-on clinical training sessions with close supervision at the state-of-the-art LA&HA Institute and other well-equipped partnering dental education centers.

How does the Program look in practice?

The program consists of theoretical lessons, hands-on activities, individual study, as well as the observation and performance of live clinical operations. Participants can finish the LA&HA Master's Program within one year, in five modules, for 3-4 days at a time. There is also an option to extend attendance over a maximum of three years. After each module, the participant's learning improvement is assessed by examination. By the end of the program, all participants are required to perform and present their own 20 laser-assisted clinical cases from among all dental specialties.

Was it a rocky start?

Not at all! The first Module was organized in Ljubljana for 11 international participants and it had an excellent atmosphere! Due to new applications that were received during the year, an additional Module 1 was also organized in Helsinki, Finland. In September, Module 2 was held in Rome, Italy. Two months later, Module 3 was held in Zurich, Switzerland. Another Module 3 was held in the beginning of January 2017 in Ljubljana – at the new LA&HA Institute and at a local clinic. Also, Module 4 was held in Ljubljana this January and it brought together the entire larger group of participants all at once. I dare say that we – the organizers, lecturers and participants – had an amazing first year! And we believe that many more amazing years are yet to come.

Participants take part in hands-on clinical training sessions with close supervision.

What do participants learn during the 5 different Modules?

There's a very strict and tough module program with an exam at the end of every day. This way we can discuss eventual mistakes or disagreements immediately on the next morning. I consider this method as highly educative and the participants like it too.

The first module of the Master's Program lasts for 3 intensive days and presents a comprehensive overview of laser physics, laser interactions with different biological tissues, laser safety, operating a dental laser device and performing selected treatments. The second 4-day module is undertaken in cooperation with LA&HA's partnering dental education centers and gives detailed insights into the proper use of Fotona lasers in conservative and restorative dentistry, endodontics, and pediatric dentistry. The third module also lasts for 4 days and is a continuation of the second module, with further detailed insights into the proper use of Fotona lasers in periodontics and soft-tissue surgery, implantology, orthodontics, and photobiomodulation. Module 4 of the Master's Program (3 days) covers facial and oral aesthetic laser treatments. The fourth module is designed to broaden the participants' knowledge with extra treatments that are available only with Fotona laser systems. Last, but not least, Module 5 consists of more personalized training that is tailored to the specific needs of each participant.

When can we meet the first graduates of the Program?

Currently we have 27 participants included in the program that started in 2016. The first graduation is planned for May 2017. We are proud that the first generation of LA&HA Masters has come from across Europe, Asia and Australia. It's unbelievable how we have become such good friends. We also believe that some of the first-generation participants will become potential future trainers as well.

What are the participants saying? How useful is this training for them?

Much of the feedback that the participants provide to us tells us that the modules are very well organized. The students are also happy to learn both theoretical as well as practical aspects of using the laser. They are extremely satisfied with our new LA&HA Institute and the hands-on training facilities, the live patient demonstrations and on-line training support. They also applaud the instructors, who are in their opinion very experienced, knowledgeable and offer not only a lot of information, but also tips and tricks regarding their day-by-day practice. They like that there is a lot of attention to detail.

What in your opinion will stick with them the most?

Beyond the advanced training facilities, the useful and interactive training, the high-profile instructors, what the participants value the most is the friendly, relaxed and welcoming atmosphere. They enjoy the training environment and see the program as a life-changing

experience that they would recommend to anyone who wants to learn more about new dental laser technologies. I see how participants have bonded during the courses. They say they truly felt like being part of a close-knit family. This also underlines Fotona's moto 'One family together'. With each training experience we create a small family within our family!

Is there an anecdote or a funny story from the trainings?

On the first day of Module 3 in the LA&HA Institute I had an introductory lecture with an explanation of the module program. The program for the first day was on the slide and there was no exam mentioned. I was curious, if participants would notice. Even before I finished commenting the slide, a lady doctor rose her hand: "Nina, something is missing in the program. Exam. We want an exam at the end of the day!"


EXPE


E R T S

By Anisa Faganelj

An interview with Prof. Dr. Aslihan Usumez DDS, PhD, Bezmialem Vakif University, Department of Prosthodontics, Istanbul, Turkey, on New Research on Bond Strength and Microleakage

Better, Stronger and Longer-lasting Restorations

About Aslihan Usumez

Dr. Usumez is a 1996 graduate of Hacettepe University Faculty of Dentistry. In 1997 she started her PhD education in Prosthodontics and completed her PhD thesis "Evaluation of bonding Porcelain Laminate Veneers to acid etched or Er,Cr:YSGG laser etched teeth surfaces" in 2001. She was appointed as "Assistant Professor" in 2003, as "Associate Professor" in 2005 and as "Professor" in 2010. She completed her MSc in "Lasers in Dentistry" in RWTH Aachen University in 2012. She was awarded as the "Young Scientist of 2008" by The Turkish Dental Association. She has published over 60 scientific articles in journals, received oral and poster presentations awards and travel stipends from international congresses. She is currently the head of the Department of Prosthodontics in Bezmialem Vakif University, Faculty of Dentistry, Istanbul.

The quality of treatments in a dental clinic using a laser will forever surpass the quality in the same clinic before using the laser.

When did you first become interested in laser dentistry and what inspired you to make it the focus of your academic research?

It began back in 1999 when I was working at the Oklahoma University Health Sciences Center. One day I attended a lecture by Charles Arcoria, who was in Oklahoma City speaking about dental lasers, and this topic immediately caught my interest. During my PhD, I planned to perform a study on dental lasers, and then decided to base my PhD thesis on a specific laser topic — about the etching of enamel surfaces and the bonding of Porcelain Laminate Veneers, which was later published in the Journal of Prosthetic Dentistry.

You've conducted some studies on the bond strength and microleakage of dental composites. Can you tell us something about how lasers may influence these factors with typical cavity preps?

Firstly, when working with lasers on dental hard tissues, it is essential to choose the right parameter settings. This is the most important factor that will influence the final results, although other factors such as water spray will influence the results as well. We can also say that when performed in the right way, you will certainly achieve exceptionally good results in terms of bond strength and low microleakage between composite and hard dental tissues, and this will increase your level of proficiency with the Er:YAG laser for cavity preparation.

When performed in the right way, you will certainly achieve exceptionally good results in terms of bond strength and low microleakage between composite and hard dental tissues.

From your research, how do hard-tissue treatments with LightWalker's QSP Er:YAG mode compare to laser treatments using standard Er:YAG?

We did several research projects with the QSP mode of LightWalker. I can say that we achieved outstanding results for the etching of enamel and the bond strength of orthodontic brackets to enamel. In another study, we also achieved especially good results for the etching of dentin. From studying atomic force microscopic pictures, we realized that the surface was perfect for bonding. Readers can find more details of this study in the one of the upcoming issues of the Journal of Orthodontics.

In your opinion, how would you summarize the main benefits of choosing a laser system that also includes a second complementary wavelength, such as Nd:YAG?

Being a prosthodontist as well as a laser dentist, I can list several advantages of a second complementary wavelength such as Nd:YAG. With the Nd:YAG laser I can perform: hypersensitivity treatment of dentin before or after crown cementation, gingival troughing before taking an impression, bleaching of enamel, soft-tissue surgeries with fast healing and without bleeding, treatment of hyperpigmented gingiva, and fast wound healing in mucosa and also aphthous lesions.

I would further add some specific applications for the prosthodontic area like intraoral welding of alloys as well as applications in the treatment of temporomandibular joint disorders. I can shortly summarize that the quality of treatments in a dental clinic using a laser will forever surpass the quality in the same clinic before using the laser.

By Keith Bateman

An interview with Maryland dentist Steven Pohlhaus, DDS, FAGD on the advanced capabilities of LightWalker lasers in the field of dentistry

The Best Treatment Platform Possible

Dr. Steven Pohlhaus, DDS, FAGD from Maryland, USA, has been using a LightWalker laser system for quite some time now, and is, overall, more than satisfied with its benefits. He recently shared his experiences as one of the main instructors at the Academy of Clinical Technology (ACT), a three day intensive LightWalker training session in Las Vegas, Nevada.

About Steven Pohlhaus

Dr. Steven Pohlhaus, DDS, FAGD from Linthicum, Maryland, has been practicing dentistry for over twenty years and laser dentistry since 2004. He has devoted his career to introducing his patients and colleagues to the benefits of lasers. Dr. Pohlhaus has been lecturing on the topic of dental lasers since 2005 and is a trainer for Tecnology-4Medicine's "Laser Essentials" course for new owners of the LightWalker Laser. He is a member of the faculty at the University of Maryland Dental School in the Department of Oncology and Diagnostic Sciences.

> The LightWalker allows me to rapidly and efficiently cut tooth structure, performing the large majority of my operative dentistry and cavity preparations without using a high speed drill and without having to give shots.

In what ways has working with the LightWalker laser system transformed your daily experience as a dentist?

The LightWalker allows me to rapidly and efficiently cut tooth structure, performing the large majority of my operative dentistry and cavity preparations without using a high speed drill and without having to give shots. Patients appreciate the lack of a drill and the reduced need for local anesthetics, and I and my staff appreciate the ability to perform minimally invasive dentistry on a daily basis. One of the unexpected benefits of the LightWalker is being able to quickly remove veneers. From a personal perspective, I would emphasize that after working with the LightWalker, I cannot imagine working again without a dental laser.

How would you describe your experience in using LightWalker for performing endodontic treatments?

LightWalker's PHAST™ technology allows me to perform less invasive endo efficiently and more effectively than traditional methods. This advanced system has also allowed me to perform many more root canals in my practice rather than referring these cases to specialists. The many technical and clinical advantages of LightWalker have given me the confidence that I am doing the best endo treatment possible.

LightWalker's PHAST™ technology allows me to perform less invasive endo efficiently and more effectively than traditional methods. This advanced system has also allowed me to perform many more root canals in my practice rather than referring these cases to specialists.

Are you also performing periodontal treatments as well?

Since implementing the LightWalker into my practice we have significantly increased the treatment of periodontal disease. The unique capabilities of the Lightwalker's dual Nd:YAG and Er:YAG wavelengths provide the ability to comprehensively attack pathogens, and the photobiomodulation or LLLT effects of these two wavelengths work together to effectively treat this widespread disease.

How would you summarize the advantages of Lightwalker's advanced technology in a nutshell?

The precise pulse characteristics of the LightWalker allow me to pristinely cut dentin and enamel with amazing speed. LightWalker's PHAST™ technology is the combination of specific, unique advanced developments in dental laser technology. These include industry leading pulse durations, pulse shape, and preferred wavelengths effectively delivered to target tissues, combined with advanced and proven clinical protocols developed by leading visionary dentists.

By Anisa Faganelj **An interview with Harvey S. Shiffman, DDS**

LightWalker: an Amazing Tool for our Laser-focused Practice

About Harvey S. Shiffman

Dr. Shiffman was born and raised in New York and is a graduate of Georgetown University School of Dentistry. He then completed a general practice residency at Georgetown University Medical Center with an emphasis on treating medically compromised patients. Dr. Shiffman completed his certification with the Academy of Laser Dentistry in three types of Laser systems, bringing new technology to the practice. Dr. Shiffman was recently awarded a Fellowship in the Academy of Laser Dentistry. He is personally involved in the use and development of cutting edge technology and has performed thousands of Laser procedures in the last 10 years. Dr. Harvey Shiffman's Laser Dental Center is a Boynton Beach, Florida dental practice.

We use the LightWalker for everything, including restorations with little to no anesthesia, endodontics, periodontics, snoring and sleep apnea, and even intraoral facial rejuvenation.

When and why did you decide to start using Fotona lasers in your clinic?

We were early adapters of laser technology for dental use. It makes the patient experience better and more comfortable, with less fear of the drill. After several years of hard and soft-tissue use and experiencing a support failure with another laser company I happened to attended a program at the ALD and went to listen to a lecture on PIPS. I was amazed at the technology and the LightWalker's performance vs the other hard-tissue lasers on the market at the time.

What do you think about the versatility of possible treatments with LightWalker?

The LightWalker is an amazing tool for us in our laser-focused practice. It will clean the area, as well as cut, and it can remove infected tissue and stimulate bone and tissue growth. We use it for everything, including restorations with little to no anesthesia, endodontics, periodontics, snoring and sleep apnea, and even intraoral facial rejuvenation.

What about your colleagues? Are they eager to learn about laser treatments?

I discuss lasers at all opportunities with my colleagues in my part time position as an adjunct professor at Nova Southeastern College of Dental medicine, as well as at every other available opportunity. I've also been very active in an internet discussion group where we have great conversations about laser treatments. Many newcomers are in doubt before taking their first steps into the world of laser dentistry. They like to check the protocol or parameters before treating a patient. I comment, answer or reply in that group many times a day.

What trends in laser treatments do you foresee in upcoming years?

I think the Future will bring new and interesting pulse modalities for faster cutting, as well as more soft-tissue developments and additional aesthetic treatment options that will be similar to what the LightWalker already offers, like SmoothLase™, NightLase® and LipLase™. These procedures were developed as an alternative for dental practitioners who want to expand their aesthetic options. They are done completely intraorally and nothing needs to be done outside on the face. The end result can be amazing. LipLase, which is actually a lip enhancement procedure, stimulates the development of collagen in the lips for more volume. We can even change the shape of the lips. SmoothLase is a method of facial rejuvenation that prevents wrinkles, helps smooth out wrinkles and tightens aging skin. NightLase is already a well-known, non-invasive antisnoring treatment. So, I believe that offering this type of treatment portfolio to dentists is what we can expect to see more of in the future.

The Future will bring new and interesting pulse modalities for faster cutting, as well as more soft-tissue developments and additional aesthetic treatment options.

By Sasa Gnezda

An interview with two participants in the LA&HA Master's Program: Hisham Abdalla, DDS, and Johnny Chan, BDS, BSc (Dent)

Fotona Shattered my False Impression of Dental Lasers

About Hisham Abdalla

Dr. Hisham Abdalla graduated with honors from Charles University in Prague with a Medical University Doctor of Stomatology degree. He is an international citizen who chose Auckland, New Zealand to be home, where he became the first practitioner to use multiple lasers in dentistry. Dr. Abdalla is an internationally respected speaker, author and educator in the fields of laser dentistry, minimally invasive high-tech dentistry and cosmetic dentistry. He is a founding member of the NZ Academy of Cosmetic Dentistry, a founding member and past Vice President of the NZ Institute of Minimal Intervention Dentistry and several other organizations.

Chan: "A year after using the Fotona laser daily, I would not practice dentistry without it."

About Johnny Chan

Originally from Hong Kong, Dr. Chan moved to Australia in 1988, and after completing his HSC, he began dental training at the University of Sydney. In 1997, Dr. Chan graduated with double degrees: a Bachelor of Dental Surgery and Bachelor of Science, dental research. In 2007, Dr. Chan opened his Dental Surgery in Nowra NSW. As well as General Dentistry, Dr. Chan provides orthodontics; prosthodontics, implants and oral surgery treatments. Dr. Chan has recently obtained his Postgraduate Diploma of Implantology from Charles Sturt University with distinction.

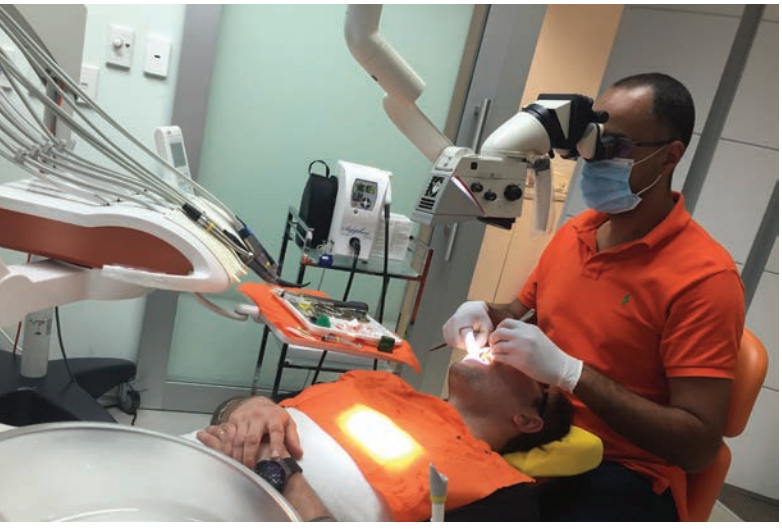
What was your first impression of dental lasers? When did you start practicing with them?

Chan: Prior to mid-2015, my impression of dental lasers was that they were expensive machines for performing a limited range of endodontic and periodontal procedures. They also seemed not very effective, since otherwise most endodontists and periodontists would surely have them in their offices. My only experience with a laser at the time was a diode laser that I had had for about 4 years.

Abdalla: I've been practicing with lasers for 18 years, actually since I've graduated – you could say I was lucky to start with it right up front! I've also been teaching since 2002 at all sorts of levels – conferences, one-on-one trainings, specialist trainings, etc.

How did you first learn about Fotona's lasers?

Chan: I came across Fotona's laser in mid-2015 during a dental event. I was attracted to it because of its ability for helping to reduce snoring (NightLase®). However, I still had that impression of "expensive machine for doing limited procedures" in my mind. After discussions with the Fotona representative and a few other ex-



perienced dental-laser users, as well as some Internet researching, I found out that the Fotona laser is quite different from what I had expected. Firstly, it is the only dual-wavelength (Nd:YAG and Er:YAG) laser that can do both hard-tissue and soft-tissue procedures. It can also be used for other treatments such as snoring reduction and facial aesthetic procedures. Thirdly, it seems very reliable with hardly any hardware or repair issues reported. Fourthly, it is a popular brand in Europe and the US, from a company that has a long history of making lasers. And finally, it also costs less when buying one machine instead of two. So Fotona broke through my false impression of dental lasers and I decided to give it a try.

Has it lived up to your further expectations?

Chan: A year after using the Fotona laser daily, I am very satisfied with it and I would not practice dentistry without it. My patients felt more comfortable with the treatments and are happier. My staff and I are excited and confident that our clinical procedures are being performed as optimally as possible because of the laser.

Abdalla: What I've learned is that there are very few lasers or laser companies that go to the extent to which Fotona does for their customers, starting with the science, but also with the thinking and the intention and the intelligence that they put into their lasers. I've had and have worked with many other lasers, but my LightWalker ATS is really in a category of one. There are parts of the LightWalker ATS that you can compare to certain other lasers, but as a whole it's incomparable. You will know what I'm talking about when you get to experience it, but just remember that it is a unique category in today's world amongst all dental lasers. And that's a fact, not just an opinion.

What is your experience with Fotona's training, such as the LA&HA Master's Program?

Chan: When I invested in my Fotona's laser, I also attended workshops organized by Fotona in Australia, as well as the LA&HA Institute Master's program, to further my knowledge of laser treatments. The workshops and the Master's program were very informative. They included everything from basic laser science to advanced laser usage, including advanced protocols that probably only Fotona lasers can do, such as the snoring and facial aesthetic protocols. This new knowledge helped me to raise my daily clinical work to the next level. On top of that, I had also made new friends from around the world along the way.

Abdalla: "Regardless of how great the technical training is, if you don't feel like you belong, the rest doesn't matter – you just won't absorb it."

Abdalla: I'm currently taking the second part of the new LA&HA Master's training program. The learning that we're getting in the LA&HA Master's program, the advanced training, it's a mastermind, with clear and specific instructions for how to work with very powerful, scientific applications. Doing three days of physics for the LA&HA Master's is a bit challenging for a lot of us, but nevertheless, it's a critical part of the mastery training. That's the whole point of it: the learning, the applications, and the comradery really open up this window of growth for everybody, making it a totally unique experience. My colleagues and I have previously trained with Master's training programs at Universities and with other so-called Master's trainings, and we've never seen anything this comprehensive and strategically planned out.

What was the main benefit of the Program for you?

Abdalla: The feeling that you get, the experience that we've all had, is one of belonging, it's being part of a family, of being welcomed into what they call the Fotona family. Before I knew what they were talking about, I could just feel it. You definitely feel that you're welcome, you belong, this is your team, your tribe. And that is very important, because regardless of how great the technical training is, if you don't feel like you belong, then the rest doesn't matter – you just won't absorb it.

Would you recommend it to your colleagues?

Abdalla: Since we are the first group in the LA&HA Master's program, it's our job now to help spread the word, and I look forward to actively contributing towards this new program, which is something I take very seriously. Although it's new, it's got a big future. The groups are growing already, we've already got people signed up from all over the world for the next program, and I really hope that I will see you at some of the future LA&HA Master's trainings.

By Sasa Gnezda

An interview with Dr. Kresimir Simunovic, DMD, MSc

A Smarter Way of Treating Patients and Building your Practice

About Kresimir Simunovic

Dr. Simunovic is a graduate from the Faculty of Dentistry at the University of Zurich, Switzerland. After practicing general dentistry for 2 years in private practice he joined Zurich University's Faculty of Dentistry. He received his Doctorate Degree from the same faculty in 1991. The following year he became an assistant at the Department of Oral Dental Surgery. In 1997 he established his own dental office focusing mainly on laser-assisted general and aesthetic dentistry, periodontology and oral dental surgery. He is a Board Member for Dentistry of EMLA, an international associate member of the Chicago Dental Society, and member of various Swiss dental societies, among which the Swiss Society of Oral Laser Application. He is a LA&HA Expert Clinical Lecturer.

The future is now. The new LightWalker digitally controlled handpiece (X-Runner) brings a new dimension into the laser-assisted therapeutic tissue approach.

You have been involved in laser dentistry since the early 1990's. How would you compare the art of laser dentistry back then with the way things are now today?

Just two words: totally different! In the early 1990's we already had an efficient, but unfortunately anecdotal-based approach to laser dentistry. From this promising start the emerging field moved forward through many years of experimental approaches, leading to extraordinary and objective clinical outcomes. Today, we are living and working in a very privileged era of almost completely evidence-based laser-assisted dentistry, with an exceptionally wide application field. The scientific background and technology have progressed significantly in the past decade, with major impacts on our clinical applications, representing a true historical milestone. I consider it to be a totally new and exciting point of view for everyday clinical experience in the dental profession. Today, there are no alternatives in dental medicine that are more efficient than the laser for oral hard- and soft-tissue removal and for decontamination. The harmony between settings, the fundamental play of pulse durations and the combination of two leading wavelengths, Er:YAG and Nd:YAG, offer a unique biological, minimally invasive approach to soft and hard oral tissue treatments.

You have given many presentations around the world on the topic of laser dentistry. What would you say are some of the most common misconceptions that dentists have about using lasers in dentistry?

The need for an investment in additional basic knowledge and a completely new and different perception of tactile and visual feedback create some degree of insecurity in dentists who are not yet experienced with a laser. Questions we often have to deal with include "Why should I change my in-office treatment protocols, which have worked very well in past decades?" The goal of our presentations and workshops is to show a different way of treatment with laser dentistry. Once our colleagues commit to taking their first steps, they never go back. Seriously!

From a business perspective, how would you make the case that it's a smart financial decision for a dentist to invest in a laser system?

The decision is inherently smart, but it has to be considered as a long-term investment, both financially and in terms of personal education. This aspect is often the primary obstacle that has to be discussed and redefined. Dental office devices of this investment level require an almost immediate financial return from the point of view that most of our colleagues are very often both clinicians and entrepreneurs at the same time. Starting with a laser means, at first, a greater investment in time at chair side and in personal and team education, but with the benefit of receiving better, long-lasting profit and an enduring personal and professional enthusiasm in the near future.

What are some of the features of your Fotona LightWalker system that you appreciate the most?

The LightWalker generation represents a remarkable, and indeed a historical step forward in science and technology for laser-assisted dentistry. The ergonomic benefits, due to the completely new and easy-to-maneuver OPTOflex articulated arm, the interactive adjustable panel with fast menu access and easy, complete clinical guidance, and the choice of ready-to-use Nd:YAG fibers for both sizes at the same time, are truly unique features, which allow for comfortable and efficient chair-side work, fully focusing on the patient's need, considered as a pillar of evidence-based dentistry. The improved quality of pulses, including QSP, and the extended range of settings, allow an even more precise and energetically optimized approach to treating tissue, as in PIPS™, at very low, almost athermal energy levels, and in the extended TwinLight® protocols for endodontics and periodontology, as well as in other emerging protocols such as TouchWhite™ for bleaching and snoreplasty.

Where do you see the future headed with dental laser technology?

Actually, the future is now. The new LightWalker digitally controlled handpiece (X-Runner) brings a new dimension into the laser-assisted therapeutic tissue approach. It allows a faster, extremely precise and accurate ablation for more extensive hard- & soft-tissue preps, and marks the beginning of a new era of implant surgery, from complete guided implant settings in the near future to surgical release and maintenance. Looking slightly further ahead, my father, one of the pioneers in LLLT (Low Level Laser Therapy), and I are both looking forward to more improved and evidence- based photobiomodulation and analgesia procedures with both Er:YAG and Nd:YAG.

By Matjaz Kljajic **An interview with German Dentists Frank Herdach, DDS, Alexandra Deutsch, DDS and Alexander Kelsch, DDS**

Herdach&Deutsch: "More and more patients who are afraid of dental treatments come to us especially on account of laser treatments."

Laser: Efficiency and 'Fun Factor' Increased

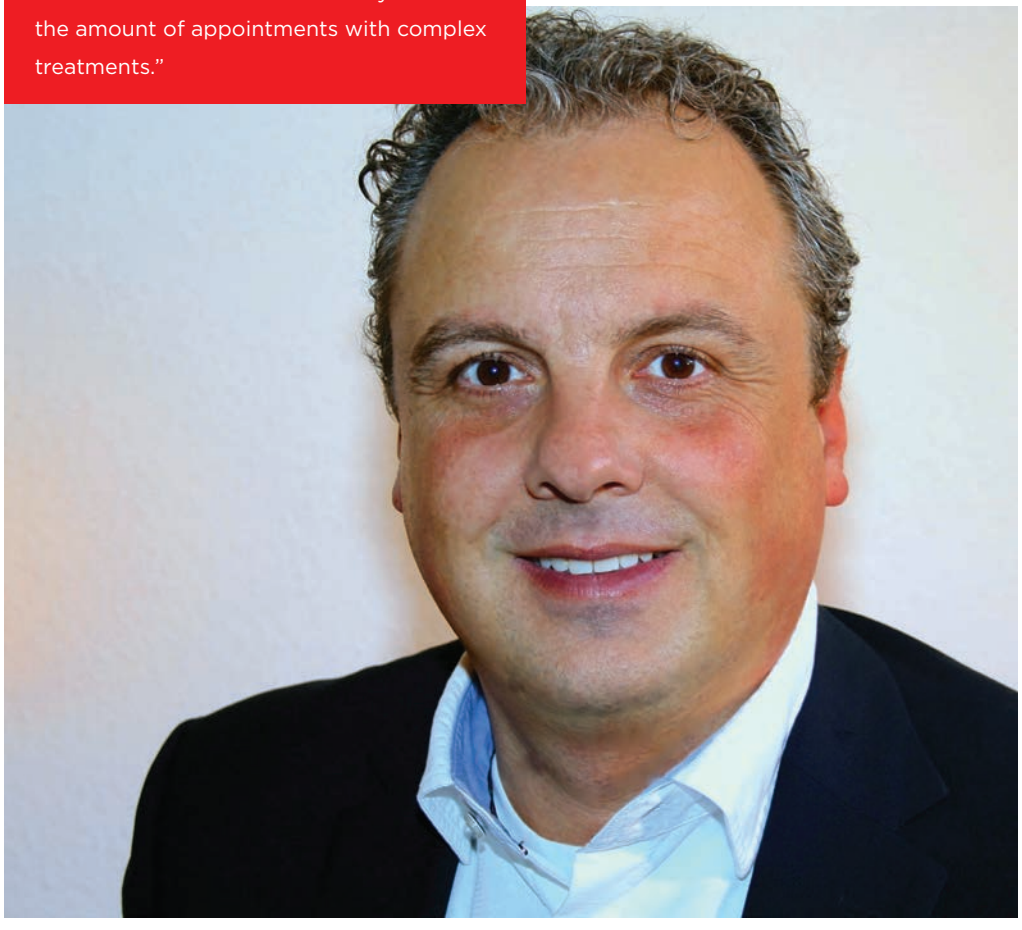
About Alexandra Deutsch

Dr. Alexandra Deutsch graduated from the Eberhard Karls University of Tübingen, Germany, at the Center for Oral and Maxillofacial Surgery. Her postgraduate training was in Orthodontics with a focus on invisible dental corrections, aesthetic orthodontics. Dr. Deutsch is a certified Laser Safety Officer of the German Society for Laser Dentistry, with expert knowledge in health service facilities and a special emphasis on applications of laser technology in dentistry. She also worked for eight years as a medical technician in the University of Würzburg's Clotten microbiological laboratory in Freiburg and in the bacteriology laboratory in Herman. She is a member of various German and international societies.

About Frank Herdach

Dr. Herdach received his license to practice dentistry from the Eberhard Karls University of Tübingen, Germany, where he spent five years as a research assistant at the University's Center for Dental, Oral and Maxillofacial Surgery. He is a certified implantologist and endodontist and has completed 3 years of postgraduate training with the German Society of Prosthetic Dentistry and Biomaterials to qualify as a specialist in Prosthodontics DGPRO. Dr. Herdach is also an investigator for clinical trials in STZ–DCTC Tübingen and the Robert Bosch Hospital in Stuttgart. He has published articles on topics including emergency dental medicine, laser dentistry, Cerec 3D, implantology, and prophylaxis. He is a member of several German societies.

Dr. Kelsch: “The efficiency of my daily routine has significantly been improved and we were able to considerably reduce the amount of appointments with complex treatments.”



About Alexander Kelsch

Dr. Kelsch received his degree in dentistry from the University of Heidelberg, Germany, in 1995 and opened his own dental practice in Karlsruhe–Neureut in 1998. He has been active in laser dentistry since 2011 and a dedicated user of Fotona’s LightWalker laser system since 2012, acquiring a second LightWalker for his practice in the following year. Dr. Kelsch is also a trainer and lecturer in the fields of laser dentistry and implantology. He conducts regular workshops throughout Germany as well as at his private practice in Karlsruhe–Neureut.

How did you decide to buy a Fotona laser?

Herdach&Deutsch: We were invited to a laser workshop in a dental office. During the event the dentist introduced the laser and some real treatments using the laser. Everybody was impressed by the effects the laser caused in the different tissues. Finally a lecture about the economics of the device closed this very impressive event. We decided immediately to buy our first laser on the same day.

Kelsch: For years I was not really interested in dental lasers. I therefore was not really aware of the latest impressive developments. In the end, my sales representative Mr. Marcus Dahlinger had to slightly push me to attend a first laser workshop, where I was able to receive all necessary information. I first began using a diode laser unit, but soon had to admit that I was fascinated by the application areas and possibilities of the LightWalker. Finally, I could not resist and had to place an order!

What do you see as the main benefits with using a laser?

Herdach&Deutsch: The main benefit is the improvement of several treatments, e.g. the non-contact removal of dental hard tissues and bone, the immediate coagulation, and the improvement of healing. The effect of decontamination during an endodontic treatment, or the possibility of immediately performing an impression after uncovering an implant, are very important advantages in our daily routine.

Kelsch: To keep it brief: with my laser everything is much easier! The efficiency of my daily routine has significantly been improved and we were able to considerably reduce the amount of appointments with complex treatments. Additionally, the LightWalker has shown the greatest effects on me and my team. Out of all dental units and devices I have used throughout the past 17 years in my dental practice, the LightWalker has definitely shown the most positive effect on the "fun factor".

From the first day on, my staff was thrilled by the amount of treatment opportunities offered by the two wave lengths. As a consequence of this enthusiasm, my team is highly motivated to explain and recommend the benefits of a laser treatment to our patients.

How has your everyday work changed with LightWalker? And how well do patients accept the new form of treatment?

Herdach&Deutsch: More and more patients who are afraid of dental treatments come to us especially on account of laser treatments. Some patients who have not seen a dentist for many years overcome their resistance and visit us because they have heard or read about our dental laser office. We can see a very high level of acceptance among patients. As a result these patients bring other patients to our office and the laser is used more and more. After a few years, we decided to buy a second and a third laser system – since we are two dentists, our laser treatments overlapped often and we lost time with waiting for the laser to be free.

Kelsch: After a short introductory period, using the LightWalker became a daily routine. This unfortunately led to another problem: very often the patient was seated in the wrong room (the one not being equipped with a LightWalker) which forced us to re-arrange the appointments.

The only solution to this problem was the purchase of an additional LightWalker. Now, after just one year, we are able to use the laser right when we need it. Our patients highly appreciate this new flexibility.

Furthermore, the laser has extended the range of treatments offered in our practice – referrals to other specialists have become less frequent. In the end, our enthusiasm for laser dentistry is positively received by our patients. Of course this has also had a significant effect on the increased revenue of the practice.

Do you meet with other "laser dentists"? Do you still learn new laser procedures?

Dr. Kelsch: In the past, trainings were a necessary evil. Now, my attitude has totally changed. Henry Schein hereby offers a unique training program, which has now been expanded to a quality circle. I personally regard other laser users as particularly cooperative and helpful among each other. As a consequence, all events are very interesting, giving me new aspects and ideas for alternative treatment methods that I can implement into my practice routine. Laser dentistry is alive and remains very exciting!

An interview with Damir Snjaric, DMD, PhD, M.Sc. *By Romana Pahor*

A Sculptor of People's Smiles

About Damir Snjaric

Dr. Snjaric graduated in 1999 from the University of Rijeka's Medical faculty, School of Dental Medicine, where he became an assistant at the Department of Dental Pathology. He attended post-graduation studies at the University of Zagreb's Faculty of Dentistry, where he received his MSc degree in 2005. Since 2007 he works in a private dental practice and in 2012, he received a PhD from the University of Rijeka. Since 2014 he has also worked as an associate at his alma mater's School of Dental Medicine in the Department of Restorative Dentistry and Endodontics. He is a member of various dental societies. Dr. Snjaric uses dental lasers on a daily basis in his clinical practice and promotes laser-assisted dentistry as a lecturer and trainer.

The Twinlight concept in endodontics and periodontics changed my practice.

You have been working as a dentist since 1999. How you got to where you are now?

As a young teenager I wanted to become a sculptor. I graduated as a doctor of dental medicine at the Medical faculty of Rijeka. Dentistry was very interesting to me so I embraced this mixture of medicine, craft, art, psychology, trade and engineering. I was offered a job at the faculty, where destiny led me toward scientific activities. So I did my postgraduate studies in Zagreb for a Master of Science, where I learned the importance of methodology and a systematic approach. Eventually, research and clinical work guided me to my PhD, so today you may find me at the faculty with my students, as well as in a lab, but most frequently in my office with my patients. Along the way, I didn't forget to play, dream, have fun and stay creative. This approach brought dental lasers into my practice. So, I finally became a sculptor of people's smiles!

What inspired you to immerse yourself into the world of medical lasers?

We all have to admit that lasers are appealing, especially to boys. Just the idea of having a laser in my office was enough to get 'the juices flowing'. But humor aside, I had some contact with dental laser technology in the late 90's, and my colleagues from the Department of Oral medicine used a couple of old devices for LLLT procedures, so I was intrigued by the concept for years. Also, I was not satisfied with my clinical results in some cases and was looking for better tools. My idea was to learn more about dental lasers, but also about optical magnification, as a way to improve my performance. The tipping point for me was a symposium I attended in Zagreb in 2011, where I gained a more comprehensive level of insight about contemporary dental laser technology, and at that point the love was born. A few days later, a diode laser device entered my office, and soon after I began to work with Fotona lasers in 2012. Dental lasers have been my 'secret weapon' ever since.

What are the key advantages that laser technology has brought to your practice?

From a clinical point of view, the effects and possibilities of combined wavelengths still amaze me: better disinfection, precision, healing and biostimulation, with less operative and postoperative pain. Some procedures are significantly shorter when we use lasers, while some are not, but the treatment quality is unquestionably enhanced with dental laser applications. Another set of advantages is more psychological in nature. It adds a dash of prestige when you use advanced technologies in your office. Laser technology really gives me a more effective alternative to conventional methods and an opportunity to transcend my image from a socially feared dentist to a 'cool' guy treating people with amplified light. And by having fun along the way – who needs more?

Which procedures do you perform with your Fotona lasers?

It would be easier to list the procedures that I still do without lasers! I still perform crown and inlay preparations without lasers. Also, for some precise flap designs and soft-tissue grafting, I still require a scalpel. Needless to say, with restorative, endodontic, periodontal, surgical and implant dentistry, I can hardly imagine working without performing at least minor interventions with my LightWalker. Cavity preparations, endo

irrigation and disinfection, periodontal therapy, all kinds of incisions and excisions are procedures that I perform on a daily basis with my Fotona laser device.

Which treatments do you particularly like to perform with your LightWalker?

The Twinlight concept in endodontics and periodontics changed my practice, no doubt. Although I enjoy doing prosthetics and implantology, my belief is that a strong foundation is the key to success, so I am very meticulous about conservative therapy. Therefore, my LightWalker is always beside me. I do a lot of endodontic treatments, so there is no day without PIPS and other LAI procedures. During the years I have used LightWalker in endodontics, I have learned how to play with settings and fiber tips so that each Preciso, Xpulse and PIPS tip type has found its place and purpose. I love the way I can perform the soft-tissue therapies, both with Nd:YAG and Er:YAG. Cutting, contouring and shaping procedures are so easy and precise, while healing is superb. My latest enthusiasm is for the NightLase anti-snoring therapy.

What advice would you give to a professional who is considering the possibility of incorporating laser technology into his or her practice?

Education, experience and a rational understanding of basic laser clinical application principles are the keys to success. The learning curve is long, so patience and discipline along the way are required. Once you know the indications and how to perform therapies with different laser wavelengths, fiber tips and settings, you'll begin to enjoy your everyday practice and forget about the overall investment. Lasers provide well to those who respect them, but isn't this the same story with other areas in life?

> The Dark Age of dentistry is in the past – the future is light!

What do you think about the future of lasers in dentistry?

Dental lasers are here to stay. They actually arrived a long time ago, but a bright future for lasers in dentistry depends on three factors: research, education and development. Studies and research are required to fully establish laser technology in the still surprisingly conservative environment of dentistry. We have a lot of work in this field, but things are changing fast. Constant education through pre- and postgraduate curriculum/courses should provide trained professionals with a vision of lasers as integral devices for every contemporary dental office. Further development should be the result of cooperation between laser engineers and dentists, where engineers should try to seek out the best possible device properties for optimal performance. I've noticed that these mentioned factors have become more and more respected over time, so I am very optimistic and ambitious. There are so many possibilities. The Dark Age of dentistry is in the past – the future is light!

By Matjaz Kljajic **An interview with Prof. Dr. Roeland De Moor, DDS, PhD, MSc**

I am a Convinced Laser User

About Roeland De Moor

Prof. De Moor is a graduate from Ghent University in Belgium, where he completed a 4-year specialist programme in Paediatric Dentistry, and also one in Restorative Dentistry and Endodontology. After being in private practice for 15 years, he opted for a full-time position at Ghent University, where he was appointed as "ordinary full professor" in 2015. He is head of the department and the research cluster of Restorative Dentistry and Endodontology. In 1998 Prof. De Moor founded the Ghent Dental Laser Centre. Research is focused on minimally invasive procedures in both restorative dentistry and endodontics and here laser technology is a main topic. Together with G. Olivi and E. DiVito, he is an author of the book 'Lasers in Endodontics'.

Fotona is a top market player with the PIPS® approach and its specific pulse generation.

You are a well-known and highly respected endodontist in Europe and beyond. When and how did you decide to pursue research with lasers in endodontics?

I always had a higher focus on research in endodontics than in restorative dentistry. As a kid I had been intrigued by light and its impact in art and the environment, and later with my studies at university, also its influence in medicine. After my studies, I finished a 4-year specialist programme in Paediatric Dentistry and Traumatology, and also one in Restorative Dentistry and Endodontics. My interest in traumatology brought me to endodontics – and the search for profound three-dimensional disinfection brought me back to light and lasers. At the beginning of the nineties, lasers in dentistry, and especially in Belgium, were not widespread. My international search brought me back home to Flanders/Belgium and to Bob Geerts (High Tech Laser) and Peter Verheyen (SOLA). We had long discussions. At the end, I became convinced and made my first personal steps with the Nd:YAG and the Er:YAG. Our first international scientific report on the use of lasers in dentistry education at Ghent University dated from 1998. Clinically we started using lasers in the mid 1990's with a focus on cavity preparation, determination of pulp vitality and root-canal disinfection. In this period we founded the Ghent Dental Laser Centre (GDLC), which will be officially celebrating its first 20 years in 2018. With the purchase of a Fidelis-laser at the end of the 1990's I started my independent endodontic research. Through Peter I came in contact with Andreas Moritz and the Vienna group, and later on I also met Sam Namour (WFLD). All were key players in the laser world from the beginning. We became good friends and thanks to them, I continued my journey into the world of lasers in dentistry and became what I am today: a convinced laser user.

Why did you choose to use Fotona lasers?

Proverbs always express a certain truth based on common sense and experience. In this respect, an import one for me is "never throw the baby out with the bathwater". We made our very first purchase together with the department of Paediatric Dentistry (Luc Martens and Rita Cauwels, today opinion leaders on the use of lasers in Paediatric Dentistry) after doing serious market research as we had to convince our authorities at the University Hospital. So our choice was very objective, as the motivation had to be based on price, quality, performance and the reliability of the technology. We ended up choosing the Fotona Fidelis Erbium laser and went for the combined option with Nd:YAG. I followed the evolution in the technology, and at the end of the last century, cavitation with erbium lasers had caught my attention. The phenomenon of bubble formation and cavitation had proven its efficacy in other fields and I became eager to see how this approach was going to be incorporated for dental use. Today, Fotona is once again a top market player with the PIPS® approach and its specific pulse generation. And today, in the endodontic field, it is offering a device that certainly makes a difference in endodontic disinfection. So I am happy to have kept my baby.

What is the most exciting discovery in your laser research?

"The power of the bubble": the idea that a phenomenon is induced and started far away from where it can be active is fantastic. And that's the kind of magic of the PIPS® approach. Bubble generation with erbium lasers can be very powerful. The introduction of cavitation for endodontic disinfection has opened new perspectives. Our most recent findings in this field demonstrate that laser-activated irrigation, respecting a number of settings, can be associated with negative pressure. In this respect, if we could arrive at bubble generation on the nano-level, a new world for laser disinfection would reveal itself.

Can you tell us about your experience and upcoming plans as a lecturer on the topic of lasers in endodontics?

I've been lecturing worldwide in the field of lasers in dentistry for more than 15 years. If there is one discipline with a bias against lasers, then it is certainly dentistry. Fortunately, with the evolution of laser and fibre technology it is clear that there is objective evidence of the value added in laser disinfection. With research being published in high ranking journals with high impact factors, the opinion is clearly changing. Over the past five years, especially thanks to "the power of the bubble", more lecturing invitations have come from endodontic societies. Last year I was invited by the AAE (American Association of Endodontists) and other endodontic societies (also this year) e.g. Italy, Germany, France, Lebanon, Belgium, Scandinavian countries, Lithuania, Switzerland, Greece. This year there will be two invited scientific presentations on lasers in endodontics (Laser-activated irrigation, Laser-induced disinfection with vapour nanobubbles and the role in nanotechnology) during the ESE (European Society for Endodontics) meeting in September 2017. I will also be lecturing on lasers in endodontics as an invited speaker during the laser symposium at the IADR (International Association for Dental Research) meeting in Vienna at the end of September 2017.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By Prof. Dr. Matija Jezersek

In spatially confined root canals, single laser pulses do not result in the emission of shock waves in laser irradiated irrigants. Additionally, the amplitude of pressure waves cannot be increased by increasing the laser pulse energy. The new SWEEPS Er:YAG laser modality promises to further enhance the efficacy of the standard PIPS laser-induced irrigation procedure.

Revolutionary SWEEPS™ for Superior Endo Treatments

SWEEPS is an innovative technique designed to accelerate the vapour bubble collapse and consequently to generate shock waves in spatially confined reservoirs, such as root canals.

The ability to clean, debride and disinfect dental root canals is limited by the complex anatomy of the dental root-canal system. One of the main problems in endodontics is the specific fluid dynamics of irrigants in a confined canal space, which hinders deep penetration of the irrigant into the dentine [1]. Different agitation techniques have been introduced with the goal of improving the efficacy of irrigation solutions, including agitation with ultrasonic devices [2]. However, the effectiveness of the ultrasonic method has been found to be limited to the vicinity of the ultrasonic needle, which makes this method relatively ineffective [3].

Photon-induced Photoacoustic Streaming

In recent years a more effective photon-activated irrigation method has been introduced with a goal to overcome this problem [4]. This photon-induced photoacoustic streaming (PIPS) technique is based on placing a laser fiber tip into the pulp chamber filled with an irrigation fluid, and emitting a pulsed laser light into the fluid [5]. If the laser light is sufficiently absorbed by the fluid, the fluid is locally and instantly heated over its boiling point and a vapor bubble starts to develop at the fiber tip's end [7] Fig. 1). The vapor bubble first expands and then collapses, triggering the growth of a second bubble. This turbulent photo-acoustic agitation of irrigants moves the fluid three-dimensionally throughout the root-canal system, actively pumps the tissue debris out of the canals, and helps to clean and disinfect not only the main but also the lateral canals [6]. The clinical safety and efficacy of the PIPS irrigation technique has been investigated and confirmed by many studies [7].

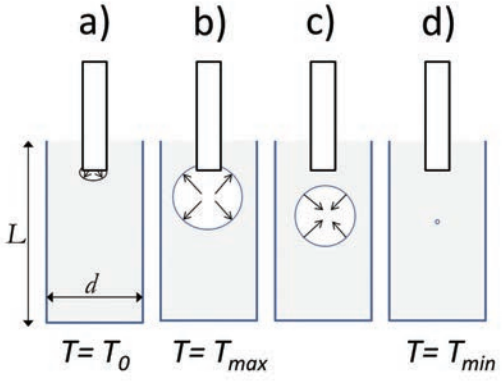

Fig. 1:
Cavitation bubble oscillation sequence following the emission of a single Er:YAG laser pulse. A vapor bubble starts to expand when a laser pulse is emitted at T=T0 (a) until the bubble reaches its maximum size at T = Tmax (b), after which the bubble starts to collapse (c) until it reaches its minimal size at T = Tmin (d) and rebounds. In narrow root-canal like reservoirs, the bubble collapse is too slow to result in the emission of shock waves.

Can PIPS be Improved?

When performing laser-activated endodontics, it is desirable to be able to increase the amplitude of generated pressure waves, with a goal to not only turbulently spread irrigants throughout the root canal system, but also to directly remove the smear layer and disinfect the root canal walls. So can the efficacy of the PIPS technique be further improved? If the PIPS technique could be enhanced by generating shock waves in the root canal, this would result in shear flows that are more effective at removing particles from the root canal surface. Additionally, since in the narrow root canal the emitted shock waves would reach the smear layer at supersonic speed, this would enhance the bactericidal effect of the technique and further increase its cleaning efficacy.

In spatially confined reservoirs such as root canals, however, cavitation pressure waves cannot be increased, nor can shock waves be generated, by simply increasing the energy of a single PIPS Er:YAG laser pulse. Measurements show that within the range of laser pulse energies used in endodontics, an increase in the PIPS laser pulse energy actually results in a lower amplitude of the pressure wave. This is due to an increase in the size of the cavitation bubble relative to the dimensions of the canal, which leads to prolonged bubble oscillation times at higher laser energies. It is only by optimally shaping the laser pulse emission temporally using a new technique called SWEEPS (Shock Wave Enhanced Emission Photoacoustic Streaming) that it is possible to achieve an amplification of the photoacoustic streaming effect.

SWEEPS: Shock Wave Enhanced Emission Photoacoustic Streaming

The new SWEEPS modality for Er:YAG laser (Fotona LightWalker) has been developed especially to improve the cleaning and disinfecting efficacy of the PIPS procedure [9, 10]. SWEEPS is an innovative technique designed to accelerate the vapour bubble collapse and consequently to generate shock waves in spatially confined reservoirs, such as root canals. The SWEEPS technique consists of delivering a subsequent laser pulse into the liquid at an optimal time from when

the initial bubble is in the final phase of its collapse (see Fig. 2). The growth of the subsequent bubble exerts pressure on the collapsing initial bubble, accelerating its collapse and resulting in the emission of primary and also secondary shock waves (Fig. 3). This newly introduced modality resembles to some extent the technique used in extracorporeal shock-wave lithotripsy, where appropriately timed ultrasonic waves are utilized to effectively break kidney stones.

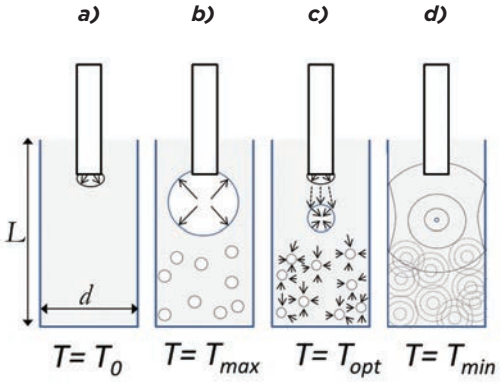

Fig. 2:
Cavitation bubble dynamics sequence during and following the emission of a SWEEPS laser pulse pair. A vapor bubble starts to develop at the fiber tip's end following the emission of the initial laser pulse (a). The initial vapor bubble first expands together with accompanying smaller secondary bubbles until it reaches its maximum volume (b). During the initial bubble's collapse a subsequent vapor bubble starts to grow following the emission of the subsequent laser pulse (c). When the growth of the subsequent bubble is properly timed, the pressure waves caused by the subsequent bubble force the initial bubble and secondary bubbles into a violent collapse, resulting in the emission of shock waves (d).

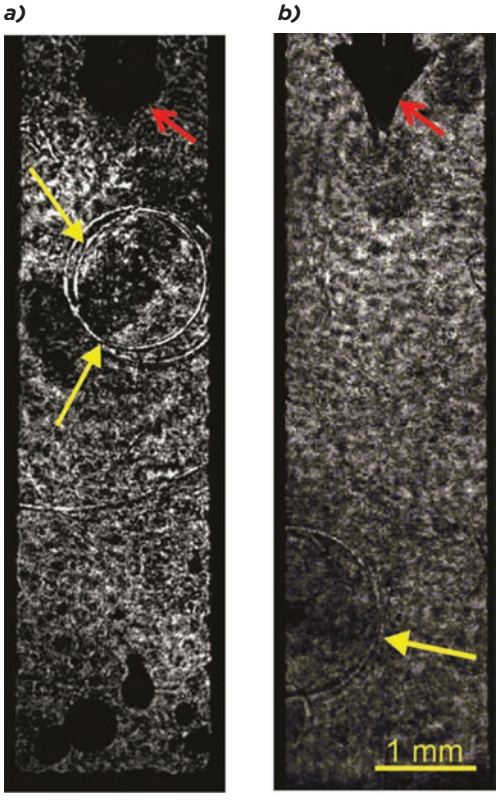

Fig. 3:
***a)** Primary shock wave emission following the SWEEPS-accelerated collapse of the initial bubble [10]; **b)** Secondary shock waves are also emitted along the wall canals as a result of the collapse of secondary bubbles, which are generated deeper in the canal during the initial bubble's growth and collapse. Yellow (long) arrows point to the emitted shock waves and red (short) arrows show the growing bubble of the subsequent laser pulse.*

Amplified pressure waves travelling at supersonic speeds can be created in root canals during laser endodontic procedures using the new SWEEPS Er:YAG laser modality.

Generating SWEEPS laser pulse pairs with equal individual pulse energies represents a significant technological challenge. For this reason, a whole new level of power generation technology [11] is needed to generate the new SWEEPS pulse effect. Fortunately, the recently introduced 3rd generation Fotona ASP (Adaptive Structured Pulse) technology provides the critical requirements that are necessary to optimize the performance of the Er:YAG laser's pulse structure to perform the SWEEPS procedure [10]. The ASP technology also enables an Auto SWEEPS Er:YAG laser modality where the temporal separation between the pair of laser pulses is continuously swept back and forth, thus automatically creating conditions for shock wave emission regardless of the root canal cavity dimensions.

A study of the potential apical irrigant extrusion during the SWEEPS laser irrigation has also been carried out. Irrigation using two standard endodontic irrigation needles (notched open-end and side-vented) was compared with the SWEEPS laser irrigation procedures. The SWEEPS irrigation procedure resulted in a significantly lower apical extrusion compared to the conventional irrigation with endodontic irrigation needles, in agreement with previous reports on laser induced irrigation [12].

Conclusion: efficiency improved

In spatially confined root canals, single laser pulses do not result in the emission of shock waves in laser irradiated irrigants. Additionally, the amplitude of pressure waves cannot be increased by increasing the laser pulse energy. However, amplified pressure waves travelling at supersonic speeds can be created in root canals during laser endodontic procedures using the new SWEEPS (Shock Wave Enhanced Emission Photoacoustic Streaming) Er:YAG laser modality. This new modality promises to further enhance the efficacy of the standard PIPS (Photon Induced Photoacoustic Streaming) laser-induced irrigation procedure.

References:
1. Peters OA, Peters CI, Basrani B. Cleaning and shaping the root canal system (Chapter 6) In: Hargreaves KM, Bermann LH. Cohen's Pathways of the Pulp 2016 11th edn Elsevier 209-279.
2. Cameron JA. The use of ultrasound for the removal of the smear layer. The effect of sodium hypochlorite concentration; SEM study. Australian Dental Journal. 1988;33(3):193-200.
3. Lukač N, Gregorčič P, Jezeršek M. Optodynamic Phenomena During Laser-Activated Irrigation Within Root Canals. International Journal of Thermophysics. 2016;37(7):1-8.
4. Peters OA, Bardsley S, Fong J, Pandher G, Divito E. Disinfection of root canals with photon-initiated photoacoustic streaming. J Endod. 2011;37(7):1008-12.
5. DiVito E, Peters OA, Olivi G. Effectiveness of the erbium:YAG laser and new design radial and stripped tips in removing the smear layer after root canal instrumentation. Lasers Med Sci. 2012;27(2):273-80.
6. Koch JD, Jaramillo DE, DiVito E, Peters OA. Irrigant flow during photon-induced photoacoustic streaming (PIPS) using Particle Image Velocimetry (PIV). Clin Oral Investig. 2016 Mar;20(2):381-6.
7. Arslan H, Akcay M, Ertas H, Capar ID, Saygili G, Mese M. Effect of PIPS technique at different power settings on irrigating solution extrusion. Lasers Med Sci. 2015;30(6):1641-5.
8. Lukac N, Zadravec J, Gregorcic P, Lukac M, Jezersek M, Wavelength dependence of photon-induced photo-acoustic streaming technique for root canal irrigation, J Biomed Opt, 2016.
9. Lukac N, Jezersek M, Amplification of pressure waves with the synchronized delivery of Er:YAG pulses; to be published.
10. Lukac N, Tasic B, Jezersek M, Lukac M. Photoacoustic Endodontics Using the Novel SWEEPS Er:YAG Laser Modality, J. LA&HA - J. Laser Health Acad 2017; 2017(1): 1-8.
11. Lukac N, Lukac M, Jezersek M, QSP Mode Characteristics of 3rd Generation ASP Powered Er:YAG Dental Lasers, J. LA&HA - J. Laser Health Acad 2016; 2016(1): 1-5.
12. Snjaric D, Apical Irrigant Extrusion during Laser-Activated Irrigation Compared to Conventional Endodontic Irrigation Regimens - Preliminary Study Results, J. LA&HA - J. Laser Health Acad 2016; 2016(1): 54.

By Dr. Evgeniy Mironov and Prof. Dr. Matija Jezersek

Working in QSP mode allows the dentist to perform procedures with an unprecedented level of finesse even at higher speed, and with the added advantage of decreasing the heat deposition as well of the noise and vibration level of each procedure.

ASP-Powered QSP: Fast & Precise Cavity Preparation with Minimal Discomfort and Less Heat Deposition

Utilizing this 3rd generation ASP technology, it is now possible to adapt the temporal structure of laser pulses to the bio-photonic dynamics of laser-tissue interaction.

When performing minimally invasive medicine, it is possible to optimize an Erbium laser's parameters such that the laser cutting is fast, the cuts are sharp and precise, the procedure is quiet (and with minimal vibrations imposed on the treated tissue), and the amount of residual heat that remains in the tissue following the laser irradiation is minimal. However, these choices involve tradeoffs to a certain extent, as parameters which may be optimal for one requirement, such as achieving the fastest ablation, may not be optimal when another requirement such as minimal vibration and noise are required.

Adaptive Structured Pulse (ASP) for temporal shaping

This challenge has been overcome by the latest ASP (Adaptive Structured Pulse) technology from Fotona, which allows for temporal shaping of laser pulses. Utilizing this 3rd generation ASP technology, it is now possible to adapt the temporal structure of laser pulses to the bio-photonic dynamics of laser-tissue interaction.

An example of such adaptive structuring is the new and improved QSP (Quantum Square Pulse) temporally shaped pulse modality that results in higher Er:YAG laser performance with regard to all basic requirements for cavity preparations: fast and precise ablation with minimal heat deposition, minimal vibration and minimal noise for maximum patient discomfort [1, 2].

In the QSP mode, a longer laser pulse is divided, i.e. quantized, into several short pulses (pulse quanta) that follow each other at an optimally fast rate (Fig. 1).

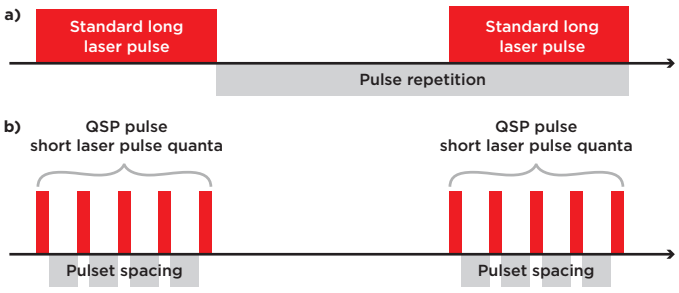

Fig. 1:
a) *Standard laser pulse;*
b) *QSP pulse: a long laser pulse is quantized into several pulslets (pulse quanta).*

This enables the QSP mode to deliver short, high finesse pulses with the efficiency of long duration laser pulses, without sacrificing the high precision that is provided by short duration pulses. One of the major advantages of the QSP mode is that it significantly reduces the undesirable effects of laser beam scattering and absorption in the debris cloud during hard tissue ablation [3]. Namely, when an ablative laser light pulse is directed onto the tissue, the ablation of the tissue leads to the emission of ablated particles above the tissue surface, forming a debris cloud (Fig. 2). With QSP mode, the duration of the pulse Quanta is shorter than the time required for the ablation cloud to develop, thus avoiding the effects of scattering. At the same time, the spacing between pulse quanta is longer than the debris cloud decay time. This ensures that the subsequent pulse quanta do not encounter any cloud remains from the previous

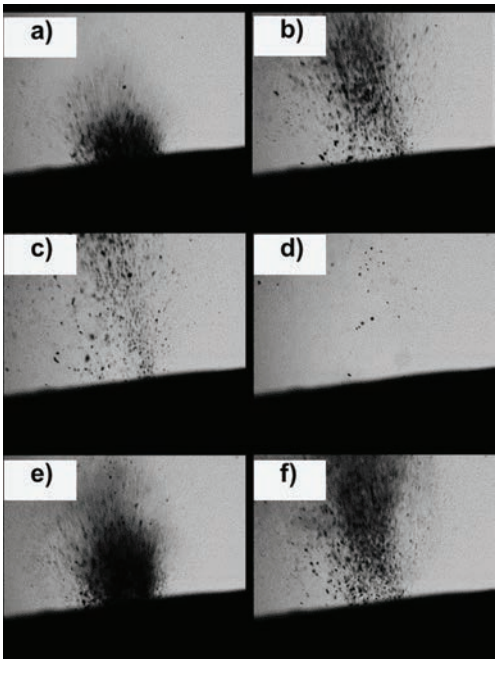

Fig. 2: *Temporal sequence of an ablation cloud forming above an enamel surface during two consecutive pulse quanta within a QSP mode Er:YAG laser pulse. Figures 2a and 2e show the instances in time immediately after the emission of two consecutive micro pulse quanta within a QSP Er:YAG pulse. During the time in between the emission of individual micro pulse quanta (Figs. 2b-2d), the ablation cloud of a preceding pulse quanta (Fig. 2a) has sufficient time to disperse, and therefore does not interfere with the radiation of the succeeding pulse quanta (Fig. 2e).*

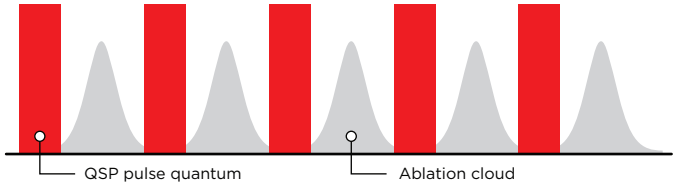

Fig. 3: *Pulslet spacing with QSP mode.*

The new ASP-powered QSP mode excels in the preparation of hard dental tissues.

Benefits of QSP mode

The clinical benefits of the QSP mode are easily recognizable [4, 5]. The margins of preparations for fillings or surface modification are clearer and sharper than with any other operational mode used to date. This is of primary importance when working close to the pulp or near the gingiva. QSP is also a safe and reliable mode in class II cavity preparations where the neighboring teeth should be kept intact. According to SEM micrographs, QSP-treated surfaces appear to have the high quality required for high bond strength [4], in addition to being free of a smear layer. The dentin surface appears clean, regular and flat with wide-open tubules with no difference between inter-tubular and peri-tubular dentin. The enamel surface also appears clean and homogeneous with a well-defined micro-roughness.

As well as being an optimal mode for procedures that require high finesse (i.e. tissue treated with high spatial precision, small or moderate pulse energy and short-duration laser pulses at high repetition rates), the QSP mode also guarantees high speed with the procedure [1, 2]. The speed of cavity preparations is significantly increased when compared to "single" (non-quantized) laser pulses at the same total energy setting (Fig. 4). Speed of preparation is important in pediatric dentistry and with anxious patients, and QSP mode is the method of choice if we require short preparation times without sacrificing finesse. Also, the vibration amplitudes generated with this mode are lower than in other currently available laser operating modes [2], which notably increases the level of comfort of the procedure [7] (Fig. 5). And finally, the amount of heat deposition is also smallest when QSP mode is used [2] (Fig. 6).

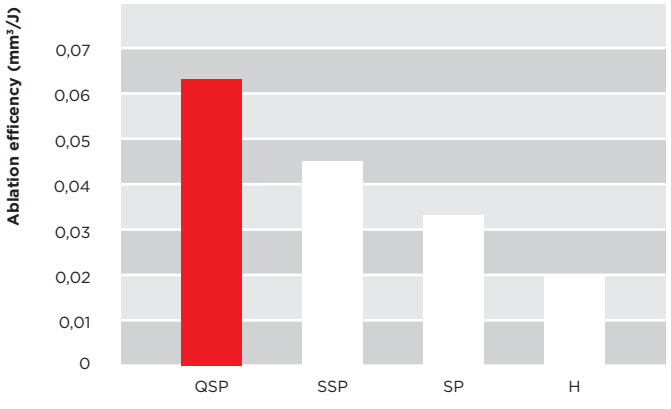

Fig. 4: *Comparison of ablation efficacy in enamel for different Erbium laser modes [1, 2]. QSP, SSP and SP are Fotona's LightWalker Er:YAG laser modes, and H is Biolase's iPlus Er,Cr:YSGG laser mode.*

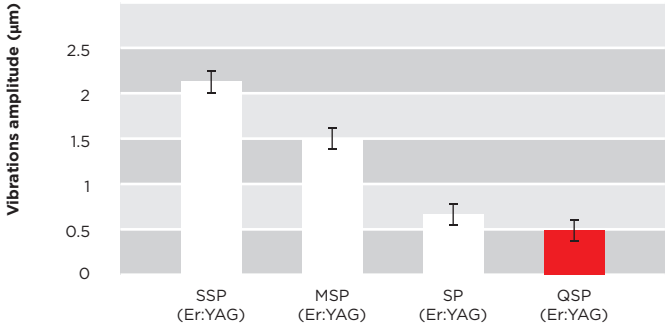

Fig. 5: *The level of vibrations during hard-tissue laser cutting for different Erbium laser modes [2]. QSP, MSP, SSP and SP are Fotona's LightWalker Er:YAG laser modes.*

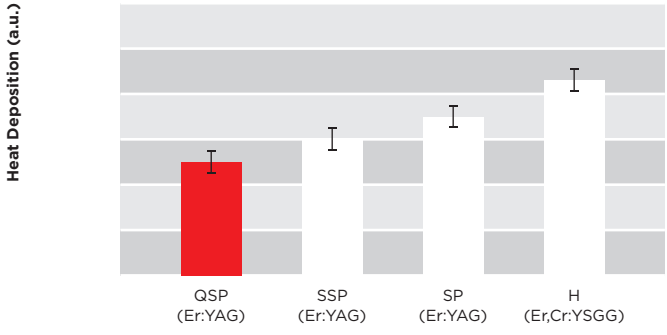

Fig. 6: *Heat deposition during hard-tissue cutting for different Erbium laser modes [2]. QSP, SSP and SP are Fotona's LightWalker Er:YAG laser modes, and H is Biolase's iPlus Er,Cr:YSGG laser mode.*

In conclusion, the new ASP-powered QSP mode excels in the preparation of hard dental tissues. Working in QSP mode allows the dentist to perform procedures with an unprecedented level of finesse even at higher speed, and with the added advantage of decreasing the heat deposition as well of the noise and vibration level of each procedure.

References:
1. Lukac N, Lukac M, Jezersek M. QSP Mode Characteristics of 3rd Generation ASP Powered Er:YAG Dental Lasers, LA&HA - Journal of Laser and Health Academy. Vol. 2016, No.1 (2016): 1-5.

2. Lukac N, Suhovrsnik T, Lukac M, Jezersek M. Ablation characteristics of quantum square pulse mode dental erbium laser. J of Biomedical Optics 21(1)(2016); 015012.

3. Gutknecht N, Lukac M, Marincek M, Perhavec T, Kazic M, A Novel Quantum Square Pulse (QSP) Mode Erbium Dental Laser. LA&HA - Journal of Laser and Health Academy. Vol. 2011, No.1: 15–21.

4. Lukac M et al, "Minimally invasive cutting of enamel with QSP mode Er:YAG laser", J. Laser Dent., 22(1):28-35 (2014).

5. Mironov E, Mironova Z, Quantum Square Pulse Er:YAG Lasers in Clinical Practice, Int.. Mag. of Laser dentistry 3/2012: 34–37.

6. Mironov E. Clinical Experience with a Quantum Square Pulse (QSP) Er:YAG Laser. JLA&HA Vol. 2012, No.1: 80–85.

7. G.G. Zhegova et al, "Perception of pain of Er:YAG dental caries treatment in adolescents- a clinical evaluation", J of IMAB, 20(1): 500-503 (2014).

By Jason Pang, BDS

NightLase® offers a gentle, noninvasive treatment that decreases the volume of snoring as well as mild-to-moderate sleep apnea.

NightLase® Puts Snoring to Bed

Hundreds of patients have already received a NightLase treatment, with 75% - 85% success rate for appropriate cases.

While patients often avoid dental treatment, the NightLase® procedure actively draws them in to the dental office. It's a treatment that patients actually want and need that can benefit not only the patient, but also their family. Often wives are calling to make appointments for their husband, or vice versa. Sometimes children even call on behalf of their parents. The treatment allows spouses to sleep in the same room, or families to bunk together on vacations or camping trips. It's also effective for patients who dislike or cannot tolerate sleeping with a continuous positive airway pressure (CPAP) device.

The NightLase procedure is performed typically using the Fotona LightWalker Er:YAG and Nd:YAG laser. Treatment typically includes three 20-minute visits spaced three to four weeks apart. Performed with patients sitting in a dental chair, they report a warm, prickly feeling at the back of the throat, like they've eaten spicy food. Hundreds of patients have already received a NightLase treatment, with 75% - 85% success rate for appropriate cases. Snorers or anyone with mild-to-moderate sleep apnea are candidates, but patient selection is critical.

A new step added in NightLase treatment

The original NightLase treatment is done with only the Er:YAG laser, but recently a new step with Nd:YAG laser using the Genova handpiece for photobiostimulation and post-treatment healing has been added. The laser's gentle heating stimulates collagen remodeling, which firms up areas where constriction can result from sagging structures such as the tongue, soft palate, and uvula. It also helps to treat the structures in the throat to open up the airway. By reducing or eliminating snoring, NightLase also improves the quality of a patient's sleep. During the treatment anesthesia is not used, because the patient must be able to feel the warm sensation during treatment to prevent burns that could result in ulcers and delayed healing.

Some patients experience a more than 50% reduction in snoring after just one treatment. Because results last anywhere from 9 to 15 months, yearly maintenance treatments are recommended.

No anesthetic, no pain, no downtime

Any qualified doctor or dentist can perform the treatment, although proper patient evaluation requires certain tools, including a peak flow meter, a cephalometric x-ray, and a sleep study (usually conducted by a sleep specialist). With NightLase, there's no anesthetic, pain or downtime. NightLase laser therapy treats the cause of the respiratory structures' vibrations with no cutting or burning, no pain and nothing to wear. Patients can go right back to work after treatment. They feel a slight tingling or dryness in the back of their throat for a couple days, but they can eat, drink and speak normally.

Fig. 1: *SnoreLab reports before and after NightLase. Severe sleep apnea case was treated with a stronger protocol; patient is very happy.*

Some patients experience a more than 50% reduction in snoring after just one treatment.

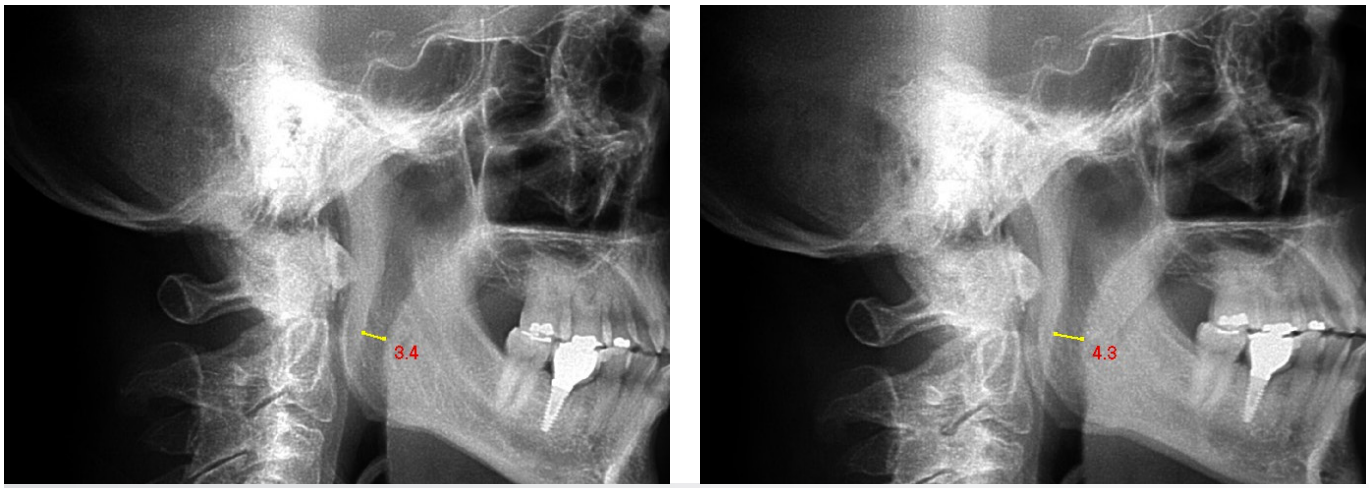

Fig. 2: *CBCT before and after NightLase treatment and patient comment.*

Patient says

"I'm sleeping so much better and even managed to go camping without waking everyone up. It's great and I think that it would be worth it at twice the price."

"It's been 5 months since the treatment was done and as long as I don't drink or sleep on my back I don't sore anymore."

By Stefano Benedicenti

There are two primary methods of influencing tissue with laser energy — photochemical and photothermal interaction. The most frequently used mechanism of photon energy conversion in laser medicine is photothermal (cutting, vaporization, coagulation, and ablation). However, at low light intensities, photochemical conversion of the absorbed energy prevails.

Nd:YAG Laser: an Appropriate Wavelength for Biomodulation

Nd:YAG laser, because of its high penetration, seems to be an appropriate wavelength for biomodulation.

Photobiomodulation (PBM) is the term applied to the manipulation of cellular behavior using low-intensity light sources. In clinical applications, photobiomodulation is used to induce wound and bone healing, for pain reduction and anti-inflammatory effects. In order to produce photobiomodulation, it is necessary to avoid a tissue temperature rise of more than 4-5°C. Since the cells being targeted lie deep within the tissue, absorption and scattering in overlying structures have a very significant effect on photon distribution. A method of delivering photons to individual cells, deep within tissue, in a uniform and predictable manner, has been lacking. The output of most clinical lasers is Gaussian in spatial profile; cells in the center of the beam are irradiated at a very high fluence, while those on the periphery of the beam receive a very low dose. As a result, cells at the beam center may be overstimulated far above the recommended range of 3–10 J/cm2 and therefore inhibited, while those on the periphery receive insufficient energy to produce any effect.

A significant step forward

As a result of these problems, a new flat-top Nd:YAG handpiece (Genova HP, Fotona, Slovenia) was developed that provides homogeneous irradiation over a 1 cm2 surface with a constant irradiation area (spot size) irrespective of the tip distance (from 1 to 10 cm) from the target tissue. This makes the application more repeatable and far less operator-sensitive.

The following cases illustrate the dental applications of the new handpiece according to the therapeutic protocols described in the textbook Atlas of Laser Therapy, 3rd edition. The laser was used in MSP mode. An average power of 0.5 watts and a repetition rate of 10 pulses per second were used in each case, and irradiance was calculated as 0.5 W/cm2. Therapy sessions occurred every other day, with the total number varying in accordance with clinical judgement and the characteristics of the particular tissue.

Case 1: Patient with aggressive localized periodontitis

A 52-year-old female presented with aggressive localized periodontitis. After stabilization of the acute inflammation, the patient was checked and a deep infrabony defect was evident on the distal side of tooth #23 (*Fig. 1*). The flap design aimed also to correct the pre-existent gingival recession (*Fig. 2*). A debridement of the granulation tissue was done and a graft with inorganic bovine-derived hydroxyapatite was placed (*Fig. 3*).


Fig. 1

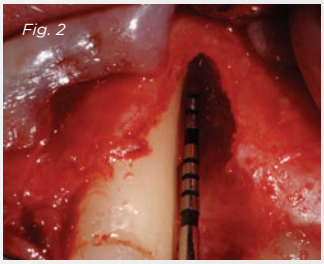
Fig. 2

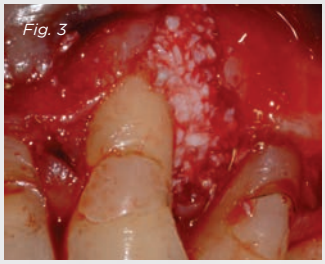
Fig. 3

After the surgery (*Fig. 4*), the area was irradiated with Nd:YAG laser (LightWalker ATS, Fotona, Slovenia) with the Genova handpiece every other day for ten days (five sessions) with the following parameters: 0.5 W, 10 Hz in MSP mode, and 60 seconds per point (*Fig. 5*). The healing was uneventful, with minimal pain and swelling. A control after six months showed a good stability of both the bone graft and the soft tissue (*Fig. 6*).

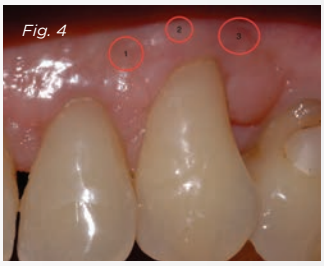
Fig. 4


Fig. 6


Fig. 5

Case 2: Treatment of severe gingival recessions

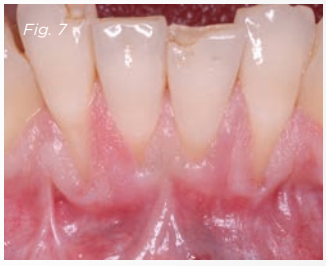
Fig. 7


Fig. 8

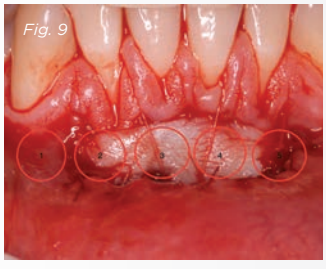
Fig. 9


Fig. 10

A 41-year-old male patient presented with traumatic severe gingival recessions on the lower incisors. After a careful consultation, the patient was scheduled for the mucogingival surgery (*Fig. 7*). Due to the lack of keratinized tissue and the shallow vestibule, the only possible treatment was to harvest a free gingival graft for the root coverage procedure. The recipient bed was created with a partial-thickness flap and all of the epithelial part was removed (*Fig. 8*). The graft was stabilized on the area with a tight suture in order to avoid the formation of a thick layer of exudate, which could jeopardize the final outcome of the procedure (*Fig. 9*). Biomodulation was performed every other day for 14 days (seven sessions) with the Genova handpiece in MSP mode, 10 Hz, 0.5 W, and 60 sec per point. After the initial phase of 14 days and for the whole maturation stage of 42 days (*Fig. 10*), the graft appeared successful and the root coverage was achieved.

Case 3: Patient with an implant fracture

A 65-year-old female patient showed a fracture of an implant in the frontal area and missing teeth from 12 to 22 (*Fig. 11*). At the time of the implant placement, the buccal bone displayed an insufficient thickness, resulting in an improper aesthetic contour. Thus, a regenerative procedure with bone substitute (inorganic bovine derived hydroxyapatite) and an absorbable collagen membrane was performed (*Figs. 12–13*).

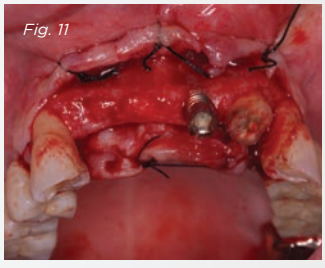
Fig. 11


Fig. 12

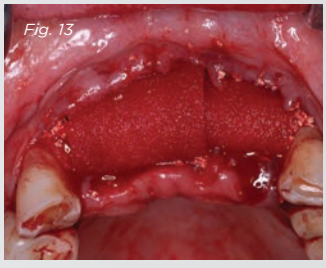
Fig. 13

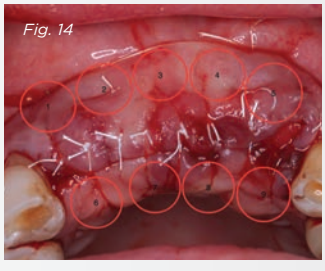
Fig. 14

Suture was done carefully to prevent complications during healing. Biomodulation was performed to speed up bone healing and graft integration. The Genova handpiece was applied every other day for ten days (five sessions) at 0.5 W of power, MSP mode, 10 Hz, and 60 sec per point (*Fig. 14*).

After three months, the tissues appeared healthy and thick, and simultaneously with the second stage surgery, temporary crowns were placed (*Figs. 15 & 16*). At six months after implant placement, the tissues could be considered stable to deliver the final prosthesis (*Fig. 17*).


Fig. 15


Fig. 16


Fig. 17

With the new flat-top Genova handpiece, it is possible to irradiate a target surface with a homogenous energy density, using relatively high-power densities, in less time and without risk of overstimulating central cells.

Three main conclusions

Within the limitations of the available research and case studies, it can be concluded that:

1. Nd:YAG laser, because of its high penetration, seems to be an appropriate wavelength for biomodulation.

2. With the new flat-top Genova handpiece, irradiation is homogenous compared to a conventional handpiece with a Gaussian output profile. Using relatively high power densities, biostimulation may be applied in less time and without risk of overstimulating central cells if proper parameters are used.

3. Homogeneous irradiation is developed over a 1 cm2 surface with a distance from the target tissue of 1 to 10 cm, making the application repeatable and not operator-sensitive.

Fotona
choose perfection

Fotona NightLase® Therapy

NIGHTLASE®

Fotona's NightLase® therapy is a non-invasive, patient-friendly laser treatment for increasing the quality of a patient's sleep. NightLase can reduce the effects of and decrease the amplitude of snoring by means of a gentle laser treatment of the mucosa tissue.

Simple, Safe and Effective

Fotona's patented laser modality optimizes the length of laser pulses, allowing for the safe penetration of heat into the oral mucosa tissue. It is gentle enough to be used on the sensitive tissue inside the mouth, but strong enough to provide clinically efficacious heating.

With proper training NightLase has a high success rate in producing a positive change in sleep patterns. Research has shown that NightLase can reduce and attenuate snoring and provides an effective, non-invasive way to lessen the effects of snoring.

A Patient Friendly Solution

A full course of NightLase consists of three separate treatment sessions over a two month period. The final results of the treatment have been shown to last up to a year, and the therapy can be repeated.

Patients find NightLase to be a highly comfortable and satisfying solution. NightLase requires no device to be worn during sleep and involves no chemical treatment. It's a gentle and easy way for your patients to regain a good night's rest.


CLIN
C


ICAL
ASES

By Dr. Antonis Kallis

The Er:YAG laser is the first choice and an ideal tool for performing any cavity preparation without anesthesia and with great precision and safety.

Er:YAG – Your First Choice in Cavity Preparation

All patients were pleasantly surprised with the use of the laser and felt very happy and comfortable during the procedure.

Er:YAG laser energy is highly absorbed by water molecules, rapidly heating a small volume. The vaporization of the water creates high subsurface pressure and leads to an explosive removal of the surrounding mineral. The water content in carious tissue is higher than in healthy tissue, so for the same settings, the laser ablation rate will be higher in carious tissue than in healthy tissue. As we move in to dentin, we lower the energy and frequency settings, since ablation is faster in dentin because of its higher water content. Even lower parameters are required for the final modification to create a retentive surface for the filling material.

No Need For Acid Etching

A 35–year–old female visited our dental clinic complaining about sensitivity to cold food. After examination we noticed the need to replace four old fillings and make two new for the neighboring teeth. The most sensitive was tooth 46 (see Figs. 1–7). We removed the old filling with MAX mode and switched to QSP for caries removal. The cavity appeared very deep, with bleeding in the interdental area, so we proceeded with Nd:YAG for hemostasis. At the end, we irradiated all of the dentin and enamel with QSP for surface modification, without the need for acid etching.

OLD FILLING REMOVAL	
Laser source:	Er:YAG (LightWalker AT S, Fotona)
Wavelength:	2940 nm
Mode:	MAX
Energy:	1000 mJ
Frequency:	20 Hz
Handpiece:	H02–N

CARIES REMOVAL	
Laser source:	Er:YAG (LightWalker AT S, Fotona)
Wavelength:	2940 nm
Mode:	QSP
Energy:	200 mJ
Frequency:	10 Hz
Handpiece:	H02–N

HEMOSTASIS	
Laser source:	Nd:YAG (LightWalker AT S, Fotona)
Wavelength:	1064 nm
Mode:	MSP
Energy:	5 W
Frequency:	30 Hz
Handpiece:	R21-C3

SURFACE MODIFICATION	
Laser source:	Er:YAG (LightWalker AT S, Fotona)
Wavelength:	2940 nm
Mode:	QSP
Energy:	120 mJ
Frequency:	10 Hz
Handpiece:	H02-N

Fig. 1:
Tooth 46 before procedure

Fig. 2-3:
Old filling removal with MAX and QSP modes

Fig. 4-5: *Hemostasis with Nd:YAG*

Fig. 6: *Surface modification with QSP mode*

Fig. 7: *Tooth 46 after procedure*

By Prof. Giovanni Olivi

A difficult clinical case involving endo-perio treatment demonstrates the effectiveness of the photon induced photoacoustic streaming technique.

Taking Endo-perio Treatments to a Whole New Level

No post-op symptoms were reported and the mobility of the teeth progressively disappeared up to grade 0.

A patient asked for the option to save her teeth that were scheduled for extraction by another dentist. The lower-left first and second molars had high mobility (grade 2), were necrotic, with significant probing depths in the buccal aspect. The teeth were diagnosed for endo-perio treatment.

Difficulties with this case included complex radicular anatomy, long anatomical measurements (26 and 27 mm respectively for #36 and 37) and the presence of a deep vertical bone loss in the buccal aspect. After scaling and root planning, the teeth were scheduled for root-canal therapy.

Before each treatment the PIPS™ technique was applied into the periodontal pockets of each tooth for refining the debridement, removal of biofilm from the root surfaces and pocket disinfection. The root-canal treatments were performed using PIPS™-specific irrigation protocols with 5% NaOCl and 17% EDTA. The canals were obturated with a flowable resin sealer (Endoreze Ultradent, South Jordan, UT-USA) and gutta-percha points. A final treatment of the pockets using PIPS™ for disinfection was performed after completing each root canal therapy to remove any extruded sealer or residual biofilm. No post-op symptoms were reported and the mobility of the teeth progressively disappeared up to grade 0.

The follow up X-rays performed after 1 and 4 months showed healing in progress for both the teeth. LightWalker AT laser device with contact H14-N handpiece and PIPS™ fiber tip was used for the treatment.

PARAMETERS:	
Laser source:	Er:YAG
Wavelength:	2940 nm
Pulse duration:	SSP
Energy:	15 mJ
Frequency:	15 Hz
Handpiece:	H02-N

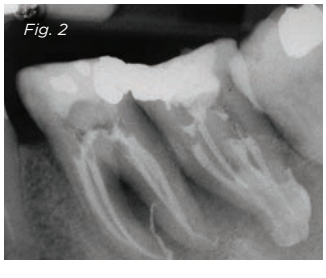

Fig. 1: *Pre-op: Before the PIPS™ treatment*
Fig. 2: *Post-op: Immediately after the PIPS™ treatment*
Fig. 3: *1 month post-op*
Fig. 4: *4 months post-op*

A 47-year-old female patient was diagnosed with advanced generalized periodontal disease, numerous missing teeth, a lack of prosthetic supplements in the posterior region, periapical lesions, and an incomplete endodontic treatment. The patient required a comprehensive dental treatment.

By Dr. n med.
Kinga Grzech-Lesniak

Molecular-biological Test: a Baseline for Treatment

In the case of a significantly severe disease, high tooth mobility, numerous missing teeth, it is recommended to carry out a molecular-biological test to assess periopathogens quantitatively and qualitatively.

To create a preliminary treatment plan, it was necessary to implement an initial treatment (hygienization) to check the patient's motivation to continue the highly specialized treatment and assess the prognosis of her teeth.
Detailed clinical examination included, among others, data on the periodontal pocket depth (PD), bleeding on probing (BOP) and plaque index (PI). In the case of a significantly severe disease, high tooth mobility, numerous missing teeth, it is recommended to carry out a molecular-biological test to assess periopathogens quantitatively and qualitatively.

Before the treatment the patient underwent supragingival hygienic procedures with an ultra-sound scaler (EMS, Piezon). After hygienization, the clinical condition of the patient improved. Additional examination was carried out to determine the stage of the periodontal disease. Then, an Nd:YAG laser was applied for periodontal pocket sterilization and decontamination and Er:YAG laser to remove subgingival calculus. For the final decontamination and stabilization of the fibrin clot, the Nd:YAG laser was applied again.

***Fig. 1**: Initial state with baseline values of molecular-biological test*

***Fig. 2**: Situation after 6 months*

***Fig. 3**: Situation after 16 months*

Steps:	Step 1	Step 2	Step 3
Laser source:	Nd:YAG, 1064 nm	Er:YAG, 2940 nm	Nd:YAG, 1064 nm
Pulse duration:	MSP	MSP	VLP
Power and energy:	2-4 W	40 mJ	2-4 W
Frequency:	20 Hz	40 Hz	20 Hz
Handpiece:	R21-C3	R14, varian fiber tip	R21-C3
Air / water:	/	3 / 2	/

By Asst. Prof. Dr. Dragana Gabric

Many situations in oral surgery require the removal of pathological, changed or healthy soft tissue.

QSP Mode for Fascinating Results in Soft-Tissue Surgery

No post-op symptoms were reported and the mobility of the teeth progressively disappeared up to grade 0.

There are many treatments for oral lesions, including the use of various medications, change of lifestyle, surgical excision, cryosurgery or laser ablation and excision. Classical excision with a scalpel is performed under local or general anesthesia, depending on the size of the lesion and the general health of the patient, and the treatment can be fairly invasive, with a lengthy post-operative recovery perio.

Lasers have long been studied as high-potential surgical tools due to their coagulative properties and reduced edema and pain. The Er:YAG laser in particular appears to be a very promising tool for excision and ablation in the oral cavity. The principle of ablation is completely the same, whether for oral lesion removal, gum hyperpigmentation removal or the ablation of healthy soft tissue as a necessary step in the treatment process.

X-Runner: Precision is His Middle Name

The recently introduced X-Runner digitally controlled dental handpiece provides the possibility to guide the Er:YAG laser beam automatically in a required shape and dimension. Such precise coverage of large areas is highly appreciated by surgeons and dentists.

When bloodless surgery is preferred, the laser's LP and VLP modes (with longer pulse durations) allow for a greater thermal effect. In this case, part of the energy is used for effective ablation and the rest for coagulation of the surrounding soft tissue, observed as a slight whitish tissue color around the ablated area. In the following presented cases, a newer QSP mode was used, by which the ablation is very precise and heals even faster than with the LP mode, due to the minimally invasive delivery of short, low-energy pulses of high frequency.

CASE 1: Leukoplakia removal

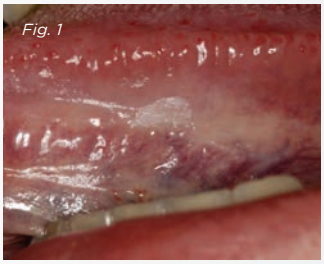

***Fig. 1**: Lingual Leukoplakia – before.*

***Fig. 2**: Lingual Leukoplakia – immediately after the treatment with X-Runner.*

In the following case of 30-year-old female patient with leukoplakia (7 mm x 4 mm), a total of 8 X-Runner passes were necessary to ablate the lesion completely. There was a complete absence of bleeding and no observation of any thermal effects. No analgesic was prescribed.

LEUKOPLAKIA REMOVAL	
Laser source:	Er:YAG (LightWalker AT S, Fotona)
Wavelength:	2940 nm
Mode:	QSP
Energy:	120 mJ
Frequency:	20 Hz
Handpiece:	X-Runner (4 mm x 4 mm, rectangle)

CASE 2: Depigmentation

***Fig. 3**: Hyperpigmentation – before.*

***Fig.4**: Hyperpigmentation – during the treatment with X-Runner.*

***Fig. 5**: 5 Days after the treatment.*

Hyperpigmentation of the gingiva is caused by melanin pigmentation and represents an aesthetic problem. In the case of the following 32-year-old female patient, the treatment was paused after each pass to examine the depth of ablation. A light water spray was used during the procedure. The gingiva healed in 5 days.

DEHYPERPIGMENTATION	
Laser source:	Er:YAG (LightWalker AT S, Fotona)
Wavelength:	2940 nm
Mode:	QSP
Energy:	120 mJ
Frequency:	20 Hz
Handpiece:	X-Runner (3 mm diameter, circle)

By Dr. Ilay Maden and Dr. Zafer Kazak

Peri-implantitis is one of the major complications in implantology. As the number of dental implants being placed increases, reported cases of peri-implantitis are becoming more frequent.

The TwinLight Approach to Peri-implantitis

In addition to being safe, both wavelengths are known to promote healing by disinfecting and biomodulating the tissue.

The most beneficial usage of the Er:YAG laser in implantology is for treatment of peri-implantitis; with Er:YAG, it is possible to clean the granulation tissues, both on the bone surface and implant surface. This is done through decontamination of the site, which is the main purpose of peri-implantitis treatments. In this case, a removable prosthetic with two ball attachments was planned. Due to the patient's request the implants were immediately loaded, which most probably is the reason for the resorption seen around the implant on the right lower jaw (Fig. 1). The site was directly accessed to clean the granulation tissue and disinfect the implant surface with Er:YAG laser, while deep disinfection and biomodulation were executed with Nd:YAG laser (Fig. 2). The defect was augmented with synthetic bone substitute. After 3 years of follow up with very good healing (Fig. 3), the patient demanded a fixed prosthetic, which was delivered with an additional placement of implants in both jaws. X-rays taken 5 years after the peri-implantitis treatment can be seen in Fig. 4. Two more implants were placed distally when the patient could afford more treatments after a year.

Removing the granulation tissue around the implant without trauma

There are a number of advantages of using lasers in this type of case. One of them is that there is no mechanical, chemical or any other means of trauma while removing the granulation tissue around the implant – neither to the implant nor to the bone tissue. In addition to being safe, both wavelengths are known to promote healing by disinfecting and biomodulating the tissue. The erbium laser targets the water content to remove the granulation tissue selectively, due to its long chosen pulse duration and lower peak power while ablating the microorganisms on the surface of the bone. Shorter pulses are used on the surface of the implant to avoid thermal effects, but with lower energies, so as to not have a too high peak power and thereby damage the surface. With short pulses and higher peak power (higher energy), we can create bleeding spots on the bone to improve healing of the augmentation material. The penetration of Nd:YAG through bone helps the achievement of deep disinfection and biomodulation. Care should be taken to avoid lasing the implant surface with Nd:YAG because the absorption is high in titanium and could cause a rise in temperature. It is also important to have a fast, sweeping motion with high

suction to avoid heat accumulation on one spot. Too much bleeding would block the penetration of the Nd:YAG laser. Nd:YAG can also be used on the incision line, vestibular, the oral side of the surgical site and extra orally after suturing, and bi-daily for faster and better healing, with less pain and swelling.

SETTINGS	
Degranulation:	Er:YAG, 160 mJ, 10 HZ, LP, 1.3 mm cylindrical tip, H14-C handpiece, W/A: 6/4.
Implant surface disinfection:	Er:YAG, 80 mJ, 10 HZ, MSP, non-contact, H02-C handpiece, W/A: 6/4.
To create bleeding spots on the bone:	Er:YAG, 160 mJ, 15 Hz, non-contact, H02-C handpiece, W/A: 6/4.
Deep disinfection of the bone (no lasing of the implant with Nd:YAG):	Nd:YAG, 1.5 W, 15 Hz, MSP, non-contact, R21-C3 handpiece, 300 µm fiber.
Biomodulation:	Nd:YAG, 0.5 W, 10 HZ, VLP, non-contact, R21-C3 handpiece, 300 µm fiber.

***Fig. 1**: **(A)** Pre-op X-ray*

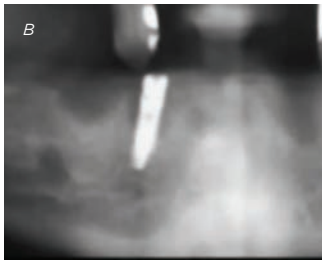

***Fig. 1**: **(B)** Pre-op X-ray zoomed*

***Fig. 1**: **(C)** Pre-op Clinical*

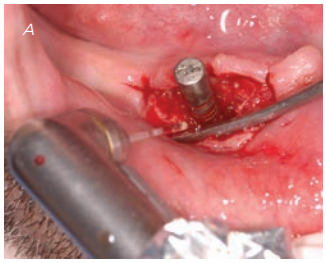

***Fig. 2**: **(A)** De-granulation and disinfection of the implant surface with Er:YAG*

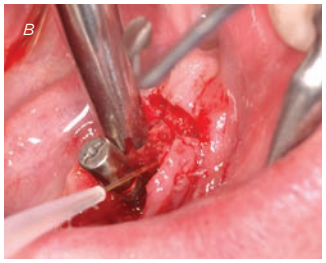

***Fig. 2**: **(B)** Deep disinfection and biomodulation on the bone with Nd:YAG*

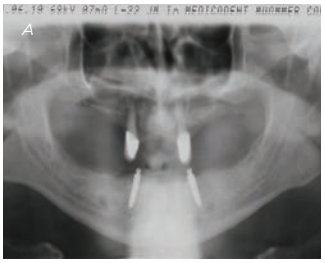

***Fig. 3**: **(A)** 3 years Post-op X-ray*

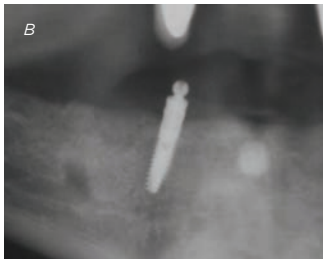

***Fig. 3**: **(B)** 3 years Post-op X-ray zoomed*

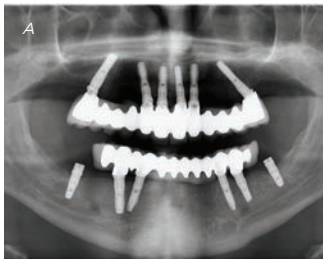

***Fig. 4**: **(A)** 5 years Post-op X-ray*

***Fig. 4**: **(B)** 5 years Post-op Clinical*

By Dr. Harvey Shiffman

Although snoring affects millions of people, many have decided not to treat their snoring problems because of low success rates and the high invasiveness of surgical treatment. Dentists, however, are uniquely suited to treat problems with airway management.

TwinLight NightLase® Protocol for Snoring Reduction Therapy

After being treated with NightLase® patient reported that he breathed much easier and was more alert and focused.

***Fig. 1**: Patient before nightlase (March 2016).*

***Fig. 2**: Patient after nightlase (July 2016).*

The NightLase® snoring and sleep apnea reduction therapy is a unique approach to treatment using the LightWalker dental laser and a proprietary protocol with specially designed handpieces for a specific spot size and power density. NightLase® uses the photothermal capabilities of the Erbium laser to convert and initiate the formation of new collagen within the mucosal tissue of the oropharynx, soft palate and uvula. The heat generated by the laser allows the collagen to re-form, resulting in a tightening of the soft palate and surrounding tissues. This causes a rise of the soft palate and a tightening of the tissues of the oropharynx, resulting in improvement in the airway. The outcome can be seen in the before and after images reported in the following case.

Treatment of a “pure snorer”

A 43-year-old male presented for NightLase consultation after his wife sent him for treatment to reduce snoring. His medical history was clear, and he reported being allergic to codeine. Being aware of the importance of proper examination, we performed the evaluation methods described below before the treatment.

The Snoring, Tiredness, Observed apnea, high blood Pressure (STOP) and the Body mass index, Age, Neck circumference, and Gender (BANG) screenings were both negative. His Epworth was 5, Thornton "14" and a very high Dx defined him as "pure snorer".

The anatomic characteristics of the patient were examined and Mallampati Class 3 was defined (Fig. 1). His snoring was monitored by the SnoreLab application. Snoring time was 68% of the total monitoring time of 6 hours and 24 minutes. The snore score was 85 (Fig 3). An assessment was made of the patient's airway using cone beam computed tomography and SICAT air software. The total volume and minimal cross sectional area were analyzed (Fig 5).

The snoring time decreased by 44%

The TwinLight NightLase® protocol was performed three times over a period of 45 days. The first step was to preheat the tissue with 25 millisecond Nd:YAG pulses to reach a temperature between 32-48°C. Then the Er:YAG step with SMOOTH mode was performed with just under 9000 shots delivered. The temperature was controlled to not exceed 60°C (Fig 7).

After the three treatments were completed: Mallampati Class 2 was achieved (Fig. 2), SnoreLab reported only 38% snoring time of the total monitoring time of 6 hours and 15 minutes (similar to the monitoring time before the treatment), and the snore score was 51 (Fig 4). We observed that the snoring time decreased by 44% and the snore score decreased by 40%.

Result: oropharyngeal airway volume significantly increased

After the TwinLight NightLase® treatment, a significant visual improvement in volume and square area was noted (Fig 6). The total airway volume increased by 14% from 18972 mm3 to 21692 mm3, and the minimum cross sectional area doubled from 76 mm2 to 156 mm2. The data clearly demonstrate that the oropharyngeal airway volume significantly increased as a result of the photothermal effects from the non-ablative laser procedure.

The outcome of the treatment was very beneficial for the patient, who reported that he breathed much easier and was more alert and focused. NightLase® achieved great results without side effects for the patient. The patient's wife stated that there was no significant snoring any more. Moreover, helping this patient improve his sleep also profoundly improved his health, his quality of life and the wellbeing of his wife.

PARAMETERS AND METHOD	
Nd:YAG	preheating
Handpiece	R-30A
Spot size	2 mm (in distance to have 8 mm)
Mode	25 ms
Frequency	8.0 Hz
Fluence/power	40 J/cm2
Method	proprietary patterning per FLIR infrared
Er:YAG	
Handpiece	R16
Mode	Smooth
Frequency	1.5 Hz
Fluence	3.5 J/cm2
Bursts per spot	4-6 (depending on patient tolerance)
Number of passes	4-6 (depending on patient tolerance)
Total number of shots	Tx 1: 8744, Tx 2: 9454, Tx 3: 8813

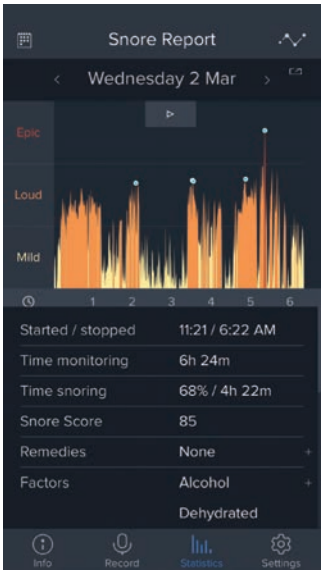

***Fig. 3**: SnoreLab – before*

***Fig. 4**: SnoreLab – after*

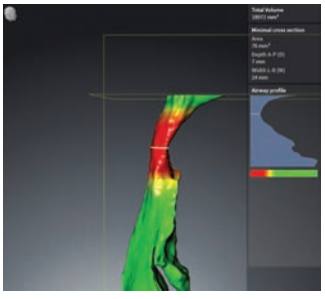

***Fig. 5**: Patient pre tx CBCT*

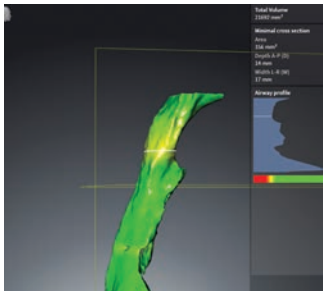

***Fig. 6**: Patient post tx CBC*

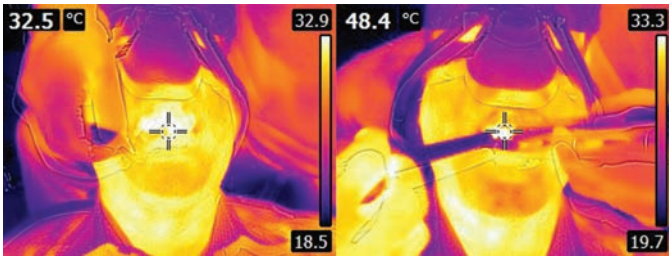

***Fig. 7**: Patient before and after nd pre heat IR*

EVALUATION METHOD	
	YES/NO
Mallampati	yes
Polygraph	yes
SnoreLab	yes
Questionnaire	yes
CBCT volume and cross-section measurement	yes

Dr. Anna Maria Pescatore

A Caucasian male aged 69 exhibited a painless exophytic cutaneous neoplasm on the perioral region of the upper lip, with the same color as the surrounding skin and progressively increasing volume.

With Laser Therapy Against Warts

At the 30-day follow-up, the skin was fully healed with no scar contraction and remained so at subsequent follow-ups.

Past medical history did not reveal any significant pathologies. The lesion was completely painless. Clinical examination revealed a digitiform, nodular cutaneous neoplasm on the perioral epidermis adjacent to the upper lip, firm and elastic in consistency, mobile, skin-colored and around 4 mm x 3 mm in size.

The history and clinical examination suggested a working diagnosis of verruca vulgaris. In this specific case of a common wart in a key aesthetic location, treatment with an Erbium laser was arranged.

The therapy plan was explained to the patient in detail, accompanied by complete and exhaustive information on alternative treatments. The patient agreed to undergo the suggested laser therapy and signed a consent form in the presence of a witness.

Laser source:	Er:YAG, 2940 nm
Pulse duration:	MSP
Power and energy:	2 W, 100 mJ
Frequency:	20 Hz
Handpiece:	R14, conical tip Ø 800 µm
Air / water:	0 / 0

R14 handpiece with conical tip was positioned tangentially against the lesion. The lesion was held with surgical tweezers and excised. We opted to excise rather than vaporize the lesion since this would allow for a definitive diagnosis via histological analysis.

The patient was instructed to apply a gentamycin-based antibiotic cream (Gentalyn) twice a day for the first 3 days after washing his face and not to shave for a week. From the third to the eighth day, he was advised to use a moisturizing cream after cleansing. We also recommended he avoid sun exposure and not remove the thin crust which would form.

There were no local or systemic complications resulting from the procedure. The patient was followed up at 8 and 30 days, and remotely at 3 and 6 months. At 8 days, there were no signs of inflammation. The patient reported that the thin crust fell off on the sixth day. On examination, a more pinkish color was observed due to the recent skin regeneration.

At the 30-day follow-up, the skin was fully healed with no scar contraction and remained so at subsequent follow-ups at three and six months.

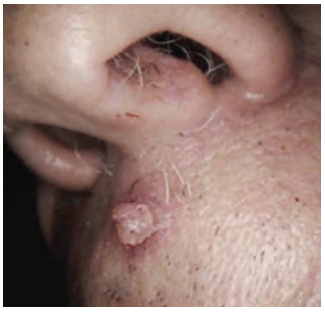

***Fig. 1**: Digitiform on the perioral epidermis*

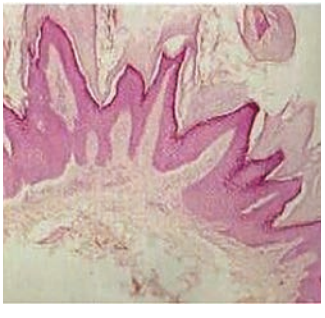

***Fig. 2**: Lesion removal procedure and histological analysis*

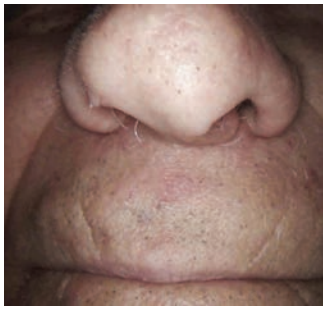

***Fig. 3**: Treated area 30 days after the procedure*

TouchWhite™ Laser Assisted Tooth Whitening

A perfect white smile now faster and safer than ever before

- Utilizing the unique laser tissue interaction of the Er:YAG laser wavelength and Fotona's VSP pulse mode
- Up to 10 times shorter treatment times
- Safer - no unnecessary thermal burden on the tooth or pulp
- More comfortable for patients while achieving the same or better whitening efficacy
- Any bleaching gel color can be used
- Perfect, natural looking results after one single treatment

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One Family Together

1. Nina Malej Primc congratulates Harvey S. Shiffman, DDS, for becoming an Expert Lecturer at the LA&HA Symposium. **2.** Which novelties is Dr. Kresimir Simunovic showing to practitioners at the LA&HA Workshop in Zürich? **3.** This is how it works in practice! Zdenko Vizintin (far left) and Dr. Marco Gambacciani (far right) with attendees at the LA&HA Institute's Opening Workshop. **4.** The showroom is an important feature of the LA&HA Institute. Guests gathered around the showcase at the Opening event. **5.** Dr. Giovanni Olivi showing new methods in Dentistry to attendees of the LA&HA Master's Program Module in Rome. **6.** All work and no play makes Jack a dull boy. Our attendees of the LA&HA Master's Program Module in Rome can confirm that!

7. We take great care of our Fotona Family: education, good food and great company guaranteed! The LA&HA Institute Opening was no exception! **8.** Dr. Matjaz Lukac, CEO of Fotona, listening to guests at the LA&HA Institute's Opening event. What are they saying about the Institute? **9.** Sharing knowledge is our mission, because we believe that sharing is caring. Guests listening to the welcome speech at the LA&HA Institute's new lecture room for more than 100 people. **10.** Dr. Leonardo Marini addresses guests from all over the world who gathered in Ljubljana for the LA&HA Institute's Opening event. **11.** Dr. Matjaz Lukac, CEO of Fotona, and Dr. Masa Gorsic Krisper, head of the LA&HA Institute, cutting the red ribbon. The new Institute is officially open! **12.** The LA&HA Institute is a place for sharing knowledge – Dr. Leonardo Marini with guests at the Institute's Opening.

13. LA&HA Masters' Program: top lecturers, incredible participants, one of the best training institutes in the world! **14.** Chinese proverb: "Learning is a treasure that will follow its owner everywhere". And who knows that better than clinicians from an aesthetic clinic in Beijing. **15.** You say 'Cheese', we say 'Cheers' to the crew from Shanghai! **16.** From East to West, from North to South, from Europe to China ... Welcome to the Beijing satellite meeting! **17.** A group photo is an absolute must at every Fotona meeting! This one is from the official Fotona4D and TightSculpting launch in China. **18.** LA&HA Expert lecturers Wong, Simunovic and Seto at a dental symposium in Hong Kong.

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