

DENTAL TRIBUNE

— The World's Dental Newspaper • Middle East & Africa Edition —

Printed in Dubai

www.dental-tribune.me

February 2015 | No. 2, Vol. 4



EVENT

3rd Qatar Dental
International Conference

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INDUSTRY

AEEDC Dubai
17-19.02.2015

>DWTC, UAE



EVENT

The SDS Annual
Conference, Innovative
Digital Dentistry...

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DANAHER opens MEA Office in Dubai Healthcare City

By Dental Tribune MEA

DUBAI, UAE: Danaher is a global science and technology innovator committed to helping its customers solve complex challenges and improving quality of life around the world. Its family of world class brands have unparalleled leadership positions in some of the most demanding and attractive markets, including health care, environmen-

tal and industrial. The company's globally diverse team of 66,000 associates is united by a common culture and operating system, the Danaher Business System. In 2015, Danaher generated \$19.1 billion in revenue and its market capitalization exceeded \$50 billion. For more information please visit www.danaher.com.

Dental Tribune MEA had the pleasure to attend the opening of the Danaher MEA



Danaher celebrates together with the Dental Division the opening of the new MEA office.

offices at Dubai Healthcare City and shortly interview James Lico, Executive Vice President Danaher and Alex Joseph, President Middle East and Turkey, Danaher Corporation on their thoughts for the region.

What does the opening of the MEA office in Dubai Healthcare City mean for Danaher?

A. Joseph: The opening highlights our commitment to the Middle East and is the direct result of the growth we are experiencing in the region.

And how important is it for you to

have an office in Middle East and Africa?

J. Lico: As Alex mentioned, the region is incredibly important for us. Unlike many companies who focus on just selling to the region, for us it is important to be close to customers and build up the capability of our team locally so we can serve customers. The opening of this office really proves we not only want to do business in the region but invest in the long run to serve our clients.

Regarding your dental companies,

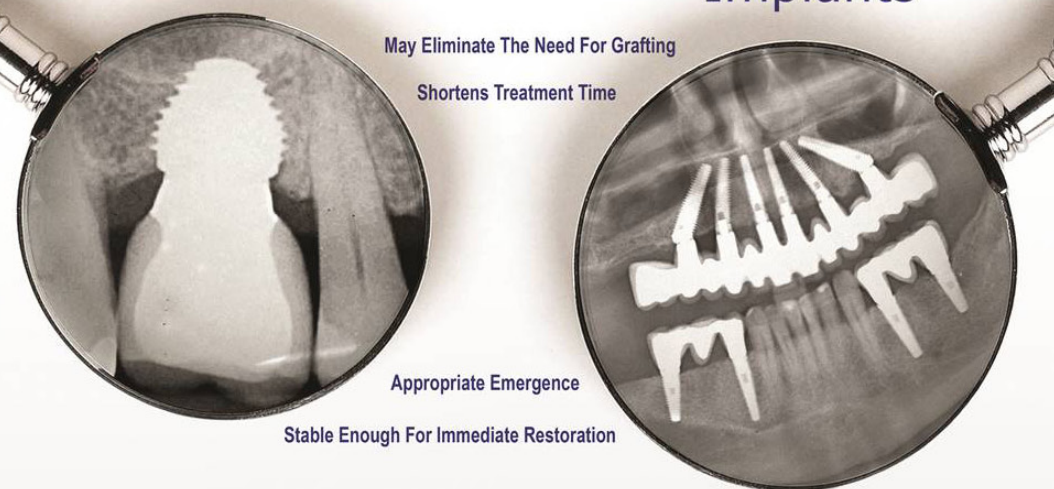
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now available in eight languages

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ORAL-B UP TO DATE

Oral-B Launches Up-To-Date series
in MEA Region. More to come in 2015

>Insertion



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what does it mean for them being part of Danaher and what are your plans for them?

A. Joseph: Our dental business has been a major contributor to our growth in the region. There is a big focus on dental care in the Middle East. Through our broad dental product portfolio and leading brands such as KaVo, Kerr and Ormco to name a few, Danaher serves customers across all segments – from dental instruments, to treatment centers, to imaging equipment, to orthodontic technology and services, to dental consumables– so we have a full gamut and we believe that we provide our customers the highest quality dental products and solutions that serve 99% of dental practices throughout the world.

Can we expect to see more dental companies joining Danaher?

J. Lico: Well, we never comment on acquisitions but I think as Alex said that the dental market is a growth platform within Danaher. Our commitment to the dental market and our customers has been seen both in our organic and in-organic investments over the years. We have recently announced our latest addition to our dental segment with the acquisition of Nobel Biocare which closed beginning of December 2014. Looking into the dental business, there are probably no better examples of investments than investing in high growth market parts of the world. The Middle East is no different and our dental team here

has really done an outstanding job over a number of years investing in products, technology, sales and services resources to make sure that we can really deal with the growing customer base that exist in the region. Obviously, investing here in Dubai is a Danaher investment but it can very much be seen as an investment in our growth platforms, of which dental is a key component.

What do you expect from our biggest media partner in dental here in the region in the coming year?

J. Lico: Any partnership which can continue to reach our customers in a creative, innovative way is positive for us and we ask this from every partner in all of

our industries. Extending our ability to communicate to our growing customer base is an important part of our success in the region.

A. Joseph: Thank you for coming and joining us for our grand opening.

Dental Tribune: Thank you for the opportunity to interview you. ^{DT}

Contact Information

Alex A. Joseph
President
Danaher, Middle East & Turkey
Alex.Joseph@danaher.com

“The Saudi Dental Society Annual Conference - Innovative Digital Solutions in Dentistry”

By Dental Tribune MEA

RIYADH, KSA: *This is your second SDS Conference for you as President, what are your thoughts of the*

upcoming event in relation to previous?

The Saudi Dental Society (SDS) International Dental Conference last year paved the way to

the first paperless event for the society where we introduced the Poken which is a technology that utilizes Near Field Communication (NFC) technology to allow the exchange of online

social networking data between two keychain accessories. Participants were able to interrelate professionally and exchange ideas during the conference activities digitally through their poken devices. The membership of the SDS continues to grow and each event is as successful as the previous year. This year, the event will feature 20 outstanding clinicians and dental experts who will cover various dental topics and bring forth another unique experience to its numerous members.

How do you reflect back over the last 2 years as president of the SDS?

During my first year, I had vowed to perform my tasks aimed at developing the society's vision and to implement these policies and procedures. I am humbled to state that during my 2 years as President, the SDS served the dental community with many meaningful and remarkable accomplishments. I had hoped to stimulate more progress for the members of the Society towards providing them a better and diversified service, education and support.

We see more and more the SDS has become very active outside of the Kingdom, could you elaborate on your involvement in Dentistry for the GCC region?

The membership of the SDS is by far one of the largest in the GCC region. This is why some of the SDS Board members are often involved in the GCC conference organizing committee and a majority of its members are always actively participating in the conferences outside the Kingdom like Dubai, Kuwait, Beirut, etc. The commitment and presence of the SDS members in the GCC conferences ensures their support and they gain scientific and educational

DENTAL TRIBUNE

—The World's Dental Newspaper—Middle East & Africa Edition—

GROUP EDITOR

Daniel Zimmermann
newsroom@dental-tribune.com
Tel.: +49 341 48 474 107

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DENTAL TRIBUNE INTERNATIONAL

Holbeinstr. 29, 04229 Leipzig, Germany
Tel.: +49 341 48 474 302
Fax: +49 341 48 474 173
www.dental-tribune.com
info@dental-tribune.com

REGIONAL OFFICES

ASIA PACIFIC
Dental Tribune Asia Pacific Limited
Room A, 20/F, Harvard Commercial Building,
105–111 Thomson Road, Wanchai, HK
Tel.: +852 3113 6177
Fax: +852 3113 6199

THE AMERICAS

Tribune America, LLC
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Fax: +1 212 244 7185

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mollova@dental-tribune.me
Tel.: +971 50 42 43072

DIRECTOR

Tzvetan Deyanov
deyanov@dental-tribune.me
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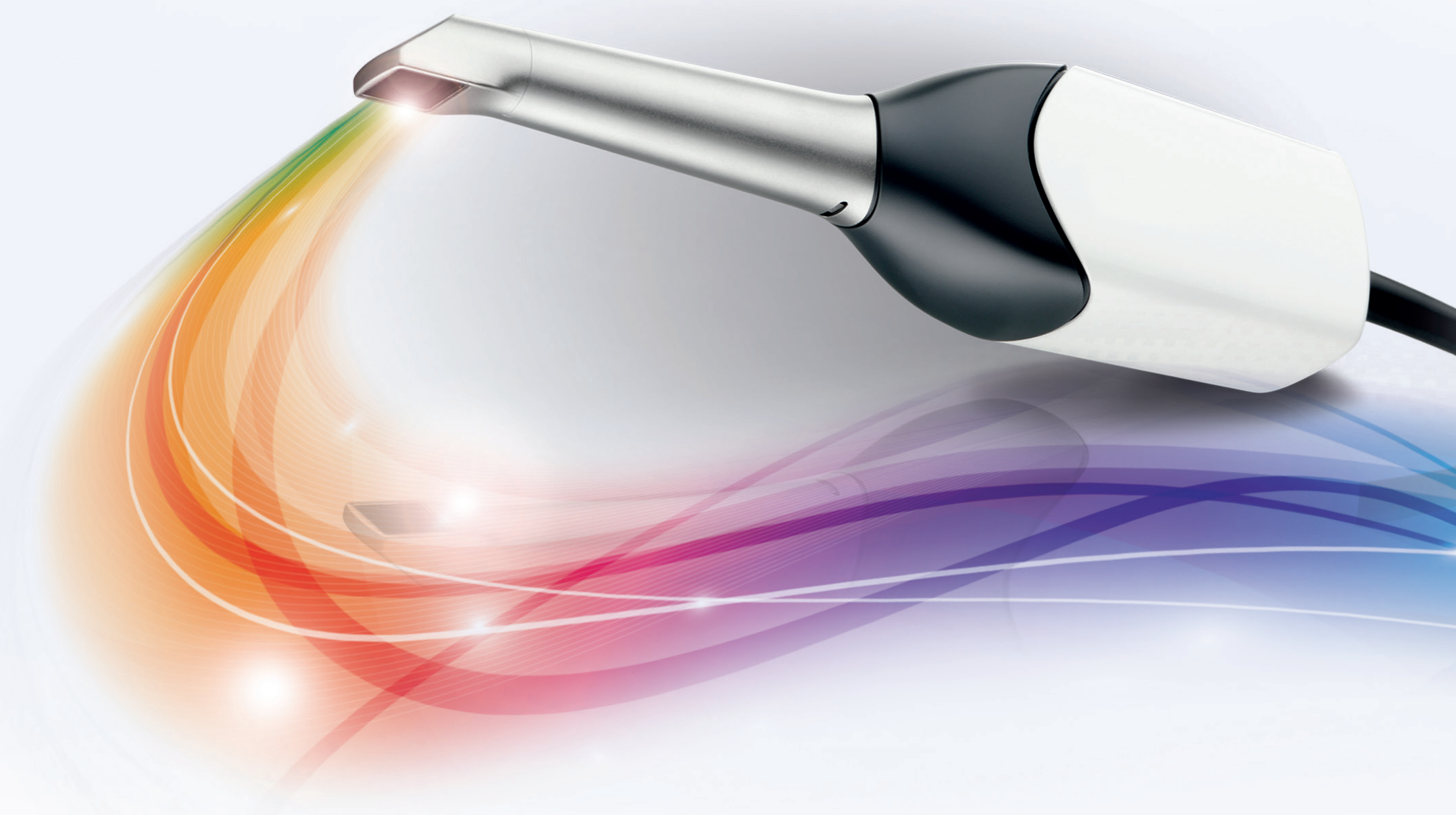
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Office: +965 2 224 6063, Mobile: +965 9 800 2225

GC introduces MI Varnish with Recaldent*(CPP-ACP)

Topical fluoride varnish with Calcium and Phosphate for the effective treatment of hypersensitivity

By GC Europe

LEUVEN, Belgium: GC, a world leader in dental operatory and laboratory materials has launched MI Varnish, a topical fluoride varnish containing the patented Recaldent technology. Recaldent, also known as casein phosphopeptide – amorphous calcium phosphate (CPP-ACP), is a milk-derived protein that remineralises tooth surfaces by offering bio-available calcium and phosphate ions. Tooth Mousse and MI Paste Plus are the other products from GC containing Recaldent. The remineralising effect of Recaldent in Tooth Mousse and MI Paste Plus not only offers general prevention for all ages, but also offers the much needed prevention for high caries risk patient groups under orthodontic treatments, for paedodontic or geriatric dentistry.

MI Varnish is composed of 2% Recaldent and 5% sodium fluoride. This unique combination

in MI Varnish offers the much needed protection to patients of all age groups, all caries profiles to effectively relieve them from hypersensitive teeth. MI Varnish is the only varnish in the market that contains the patented CPP-ACP. Evidence supports that addition of bio-available calcium source enhances the efficacy of MI Varnish.

MI Varnish enhances the hard tissues fluoride uptake and effectively supports, replenishes and protects tooth surfaces with the stroke of a brush. Its features are as follows:

Quick

Applied in minutes, MI Varnish requires no preparation or prophylaxis, enhancing patient satisfaction, particularly for children.

Easy

The texture and consistency of MI Varnish enables it to stick effectively to the applicator brushes and flow easily into hard to

reach proximal areas, while covering all tooth surfaces evenly and effectively.

Effective

MI Varnish penetrates dentinal tubules effectively to form a good seal, while its neutral pH of 6.6 enhances enamel acid resistance and inhibits demineralisation.

Aesthetic

MI Varnish has a neutral shade, creating an almost invisible coating.

Comfortable

MI Varnish does not clump or coagulate when exposed to saliva and provides a creamy texture and comfortable film thickness, even when multiple layers are applied.

Pleasant

MI Varnish is available in fragrant mint and strawberry flavours.

MI Varnish is available on unit

dose containers that are easy to open and contain enough material for a full mouth application. MI product family

MI Varnish a great complement to GC's line of preventive and diagnostic products that include Tooth Mousse and MI Paste Plus, Saliva Check BUFFER, Saliva check Mutans and GC Tri Plaque ID Gel.

MI Varnish is the latest product in the portfolio of preventive dental care that GC offers dentists to manage a minimum intervention continuum of care, ranging from diagnosis to prevention and treatment.

References

GC trademarks: Tooth Mousse, MI Paste Plus, Saliva Check Buffer, Saliva Check Mutans, GC Tri Plaque ID Gel

*Recaldent is not a GC Trade-mark 

Contact Information

GC EUROPE N.V.
Head Office
Researchpark Haasrode-Leuven
1240
Interleuvenlaan 33
B - 3001 Leuven
Tel: +32.16.74.10.00
Fax: +32.16.40.02.14
info@gceurope.com
www.gceurope.com

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Dr. Mohammad I. Al-Obaida - President of The Saudi Dental Society

advancement in return.

What is your impression of the dental scene in the Middle East region? How has it evolved over the last 2 years?

During the last 2 years, the Society supported successfully and effectively various community services and campaigns in the various regions of the Kingdom to promote health care awareness and education. The Awareness Day in Shrooq Almarefah Private Elementary School, Awareness Campaign for Special Needs Center, Yslam Famak Campaign to Raise Awareness for Cancer Damage, Children's Charity Committee for Orphans Care, Awareness Campaign in AlNoor Institute for the Blind, Awareness Day in Abdullah bin Masood Elementary School, Education Day in Al-Ghat, Campaign Smoke-Free Mecca and participation in the Activities of the General World Children's Day are just a few of those accomplishments. This is a clear manifest that SDS fulfills its objectives not only to its members but to the whole community as well.

How much impact has Digital Dentistry had in The Kingdom so far?

The Digital Dentistry had been

introduced many years back but only a few keen users have adopted it until recently when many more dentists had found it better and convenient to use. The dental community in the Kingdom has adopted to using these current digital techniques and workflows. They are now familiar to its learning experience and the impact of the new technologies in the dental community.

What advice do you have for the younger generations?

I am encouraging the younger generations to focus their professional ambitions by being committed to obtaining educational advancement to ensure their success and not to forget to share their services to the community.

Is there anything else you would like to share with the readers?

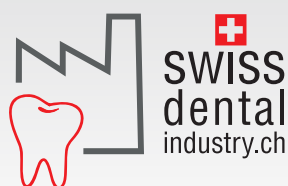
I am urging everyone to continue to contribute in terms of support, services and goodwill for a better community. 

Contact Information

Dr. Mohammad I. Al-Obaida
President Saudi Dental Society
sds_riyadh@hotmail.com

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Speakers:



Professor David Wray
Dean of the DCDM
Professor of Oral Medicine.
Dubai College of Dental Medicine

Date: January 05, 2015

Time: 07:45 pm – 08:30 pm

Lecture 1

Dental Prescribing



Dr. Iyad Hussein
Assistant Clinical Professor/
Specialist in Paediatric Dentistry
and Dental Anxiety.
Dubai College of Dental Medicine

Date: January 05, 2015

Time: 08:45 pm – 09:30 pm

Lecture 2

The neglect and abuse of children: prevention, detection and management. What is our role as healthcare professionals in the modern age?

Dr. Shazia Naser-Ud-Din
Assistant Professor Orthodontics
Dubai College of Dental Medicine

Date: February 02, 2015

Time: 07:45 pm – 08:30 pm

Lecture 1

Treatment Planning In Orthodontics-a Systematic Approach



Dr. Manal Al Halabi
Postgraduate Program Director of
Pediatric Dentistry
Dubai College of Dental Medicine

Date: February 02, 2015

Time: 08:45 pm – 09:30 pm

Lecture 2

The Child Friendly Dental Practice, A Myth Or A Fact?



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For inquiry, please contact **Ms. Rose Clemente**
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From everyday dentistry to advanced photoacoustic endodontic applications (PIPS): Er:YAG & Nd:YAG dual wavelength laser



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By Lawrence Kotlow, DDS, Enrico DiVito, DDS, and Giovanni Olivi, MD, DDS

Lasers provide an exciting new technology that allows the dentist the ability to give patients optimal care without many of the “fear factors” found in conventional dental techniques. Used with proper understanding of laser physics, lasers are extremely safe and effective.

Using lasers for caries removal, periortreatment, endodontic treatment, bone management, cutting and shaping, and soft-tissue procedures can reduce postoperative discomfort and infection, and provide safe, simple in-office treatment. As a result, we can improve our efficiency, expand what we can do, achieve better results and increase production.

Lasers represent a real quantum leap forward in the treatment of our patients, including the pediatric patient. The U.S. Food and Drug Administration (FDA) gave approval for the use of the Er:YAG laser in 1997 for both hard- and soft-tissue procedures. The erbium doped (erbium particles placed within the YAG crystal) crystal of Yttrium-Aluminum-Garnet's (Er:YAG) development and success has made the treatment of children safer and quicker.

Plainly stated, a laser is a piece of equipment that creates a concentrated monochromatic beam of visible or infrared light that can be absorbed by a specific target. Since then, laser-assisted dental care has changed forever the way dentists can prepare diseased teeth, ablate bone and treat soft-tissue abnormalities and disease. An entire new standard of care is becoming a reality.

Lasers and pediatric dentistry are a perfect fit. There are a wide range of hard and soft dental procedures that may be completed using lasers as an alternative to conventional dental care on adults and, especially, children. Many of these procedures may be treatments dentists historically refer out to other specialists; however, if you understand and use your laser efficiently, you will discover that many of these are procedures that every dentist can easily complete.

The question that is often the major concern and barrier to in-

vesting in lasers is the how this investment will pay for itself, more recently described as return on investment (ROI). Will it pay for itself? We prefer to speak of this as the secondary effect. If you understand your laser, it will easily pay premiums on your investment, and the cost factor becomes a non-issue.

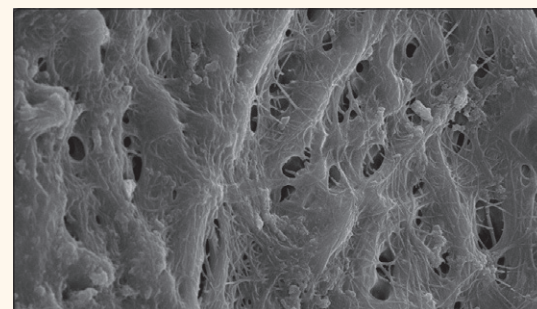
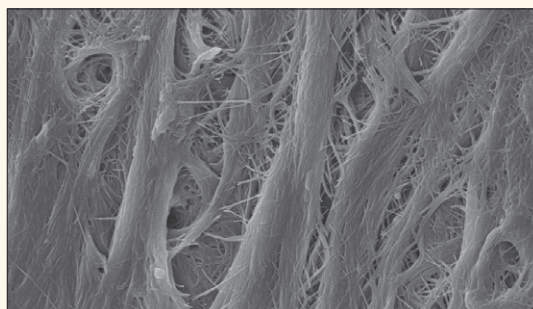
The purchasing of lasers is an investment, not an expense, for any dental practice.

Lasers represent a fundamental change in the entire way dentistry has been taught. We can now rethink and often modify G.V. Black's principle of extension for prevention with the concept of minimally invasive micro-dentistry. We need to understand that laser dentistry is one portion of an entire new way of practicing conservative, pain-free dentistry. The laser that we call the “all-purpose” laser is the Lightwalker Er:YAG & Nd:YAG laser, manufactured by Fotona and distributed in the United States by Technology4Medicine. The Er:YAG produces its effect at 2940 nm and has as its primary tissue target water and hydroxyapatite. It is very safe, relatively quiet, eliminates the smells and vibrations associated with the dental handpiece and, most importantly, is much more comfortable for the patient, significantly reducing the need for local anesthesia.

The use of the new generation erbium lasers for repair of incipient hard-tissue disease allows the dentist to provide a stress-free means of restoring teeth in a minimally invasive manner, most often with no shot and no numb lip, without the need for any local anesthetics.

The erbium laser can be used for restoring primary and permanent teeth, eliminating or reducing the amount of local anesthetics. In most cases, the patient will not require numbing for Class 1, 2 (sometimes), 3, 4, 5, 6 restorative procedures using bonded restorative materials. Using the concept of minimally invasive restorative procedures, the Er:YAG laser allows the operator to remove only diseased tissue and thus preserves much more of the healthy, unaffected tooth.

In cases where alloy is preferred, the laser's analgesia effect may also allow the dentist to create a restorative preparation using a



Figs. 1-2. Representative sample images of root canal dentinal walls irrigated with 17 percent EDTA and PIPS for 20 seconds. (Photos/Provided by Technology4Medicine)

conventional handpiece that is not meant for bonding. The erbium laser is effective because of its effect on its target, water within the tooth structure. This effect occurs when the laser heats up water within the target tissue, causing it to create small microscopic explosions (photothermal followed by photoacoustical effects). When applied to soft tissue, bone or teeth and cavities, the explosions then cause the areas to be vaporized.

Er:YAG laser 2940 nm: Soft-tissue procedures

There is a wide array of soft-tissue procedures that can be completed using the all-purpose laser: maxillary and mandibular frenum revisions, lingual frenum revisions, treatment of pericoronal pain or infection, removal of hyperplastic tissue because of drugs or poor oral care in orthodontic patients, biopsies, treatment of aphthous ulcers and herpes labialis, pulpotomies, removal of impacted teeth and, in adults, apicoectomies and bone recontouring.

Pulpotomies

Parents often express concern about the need to take radiographs because of the nature of X-rays and their possible side effects on a child's overall health. They question the use of alloys because of the chemical makeup of the alloy. Whether these should be a real concern in today's dental care is open to debate, depending on your individual beliefs. There are also concerns by many, although not as loudly, about the effect of various pulpotomy procedure medicaments used in pulpotomy procedures, such as formocresol.

Lasers provide a safe, non-chemical, effective and alternative treatment for pulpotomies. During the span of eight years, post-treatment results on more than 4,000 pulpotomies using the erbium (2940 nm) laser provide ample

evidence that this method is both effective and safe for children without the need for introducing chemicals or using electrosurgery methods.

When the final result of orthodontic positioning of the front teeth results in gingival hypertrophy, the laser can be a useful tool to increase crown length and give the patient a more esthetic smile. This may often be accomplished without the need for local anesthesia. Patients who have medically induced hyperplastic tissue, such as patients requiring dilantin, can also have their tissue reduced and reshaped with the erbium.

In addition to the many examples described in this article, lasers can be used for additional procedures not usually required in pediatric dentistry, such as revisions of the abnormal mandibular frenum, often avoiding the need for soft-tissue grafts, crown-lengthening procedures where bone requires recontouring, apicoectomies, removal of bony exostoses, removal of third molar impactions, removal of root remnants, incising and draining soft-tissue infections, advanced periodontal treatments and the latest in advanced endodontic treatment via photon-induced photoacoustic streaming.

Photoacoustic endodontics using PIPS

The goal of endodontic treatment is to obtain effective cleaning and decontamination of the smear layer, bacteria and their byproducts in the root canal system. Clinically, traditional endodontic techniques use mechanical instruments, as well as ultrasonic and chemical irrigation, in an attempt to shape, clean and completely decontaminate the endodontic system but still fall short of successfully removing all of the infective microorganisms and debris. This is because of the complex root canal anatomy and the inability for common irrigants

to penetrate into the lateral canals and the apical ramifications. It seems, therefore, appropriate to search for new materials, techniques and technologies that can improve the cleaning and the decontamination of these anatomical areas.

Among the new technologies, the laser has been studied in endodontics since the early 1970s¹⁻³ and has become more widely used since the '90s.⁴⁻⁶

Different wavelengths have been shown to be effective in significantly reducing the bacteria in the infected canals, and important studies have confirmed these results in vitro.⁷ Studies reported that near infrared laser are highly efficient in disinfecting the root canal surfaces and the dentinal walls (up to 750 microns for the diode 810 nm and up to 1 mm for the Nd:YAG 1064 nm). On the other hand, these wavelengths did not show effective results in debridging and cleansing the root canal surfaces and caused characteristic morphological alterations of the dentinal wall. The smear layer was only partially removed and the dentinal tubules primarily closed as a result of melting of the inorganic dentinal structures.^{5,8} Other studies reported the ability of the medium infrared laser in debridging and cleaning root canal walls.^{9,10} The bacterial load reduction after erbium laser irradiation demonstrated high on the dentin surfaces but low in depth of penetration because of the high absorption of laser energy on the dentin surface.⁷ Also the laser activation of commonly used irrigants (LAI) resulted in statistically more effective removal of debris and smear layer in root canals compared with traditional techniques (CI) and ultrasound (PUI).^{11,12} Additionally, the laser activation method resulted in a strong modulation in reaction rate

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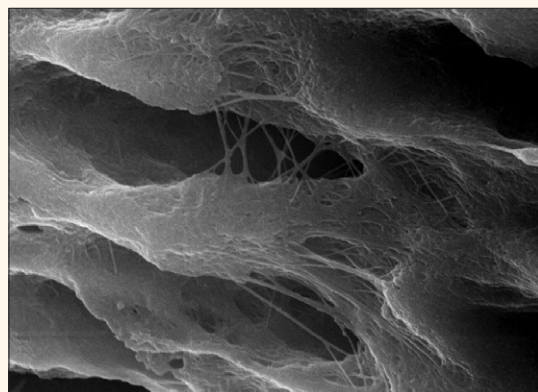


Fig. 3. Representative sample image of root canal dentinal walls irrigated with 17 percent EDTA and PIPS for 20 seconds

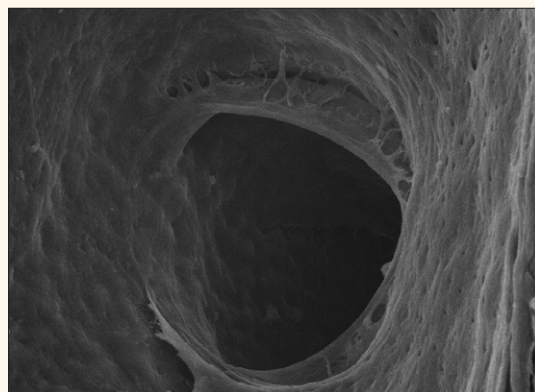


Fig. 4. SEM image of clean lateral canal

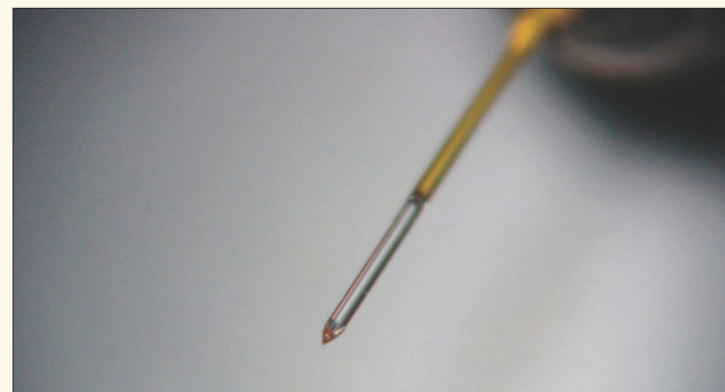


Fig. 5. New tapered tip design for this technique

of NaOCl, significantly increasing production and consumption of available chlorine in comparison to ultrasound activation.¹⁵

A recent study has reported how the use of an Er:YAG laser, equipped with a newly designed radial and stripped tip, in combination with 17 percent EDTA solution, using very low pulse duration (50 microseconds) and low energy (20 mJ) resulted in effective debris and smear layer removal with minimal or no thermal damage to the organic dentinal structure through a photoacoustic technique called photon induced photoacoustic streaming or "PIPS."^{14,15} Also the same photoacoustic protocol in combination with 5.25 percent sodium hypochlorite solution has been investigated and shown to reduce the bacterial load and its associated biofilm in the root canal system three dimensionally.¹⁶ Other similar studies are in progress for publication and the results are promising and suggest a three-dimensional positive effect of this laser activated decontami-

nation (LAD) method.

The purpose of this article is to present briefly the experimental background of this laser technique and to introduce the clinical protocol.

Scientific background

The microphotographic recording of the LAI studies suggested that the erbium lasers used in irrigant-filled root canals generate a streaming of fluids at high speed through a cavitation effect.¹⁷ The laser thermal effect generates the expansion implosion of the water molecules of the irrigant solution, generating a secondary cavitation effect on the intracanal fluids. To accomplish this streaming, it is suggested the fiber be placed in the middle third of the canal, 5 mm from the apex and stationary.¹⁸ This concept greatly simplifies the laser technique, without the need to reach the apex and to negotiate radicular curves.

Also, the recorded video of the new technique, PIPS, showed a strong agitation of the liquids in-

side the canals. It differs from the already cited LAI technique by activating the irrigant solutions in the endodontic system through a profound photoacoustic and photomechanical phenomena. The use of low energy (50 microsecond pulse, 20 mJ at 15 Hz, 0.5 W average power, or less) generates only a minimal thermal effect. The study with thermocouples applied to the radicular apical third revealed only 1.2 degrees C of thermal rise after 20 seconds and 1.5 degrees C after 40 seconds of continuous radiation.¹⁴

When the erbium laser energy is delivered at only 50 microsecond pulse duration through a special designed tapered and stripped 400 microns tip (Fotona Light-Walker, Technology4Medicine), it produces a large peak power of 400 watts when compared to a longer pulse duration. Each impulse, absorbed by the water molecules, creates a strong "shock wave" that leads to the formation of an effective streaming of fluids inside the canal while also limiting the undesirable thermal effects seen with other methodologies. The placement of the tip in the coronal portion only of the treated tooth allows for a more minimally enlarged canal preparation with less thermal damage as seen with those techniques placed into the canal system.

The root canal surfaces irrigated with 17 percent EDTA and laser activated for 20 seconds showed exposed collagen matrix, opened tubules and the absence of smear layer and debris (Figs. 1-5). The rinsing with 5.25 percent sodium hypochlorite and laser irradiation for 20 seconds produced a strong activation of the solution, as reported by Macedo,¹⁵ improving the disinfecting action of the sodium hypochlorite.¹⁶ The disinfecting action of PIPS is very effective both on the root surface, the lateral canals and the dentinal tubules, as confirmed with SEM and confocal studies (Fig. 4).

The profound and distant effect of PIPS eliminates the need to introduce the tip into the root canal system. Unlike traditional laser techniques requiring placement of the tip 1 mm from the apex, or even 5 mm from the apex as proposed for LAI¹⁸, the PIPS tip is placed in the coronal portion of the pulpal chamber only and left stationary, allowing the photoacoustic effect to spread into the openings of each canal. A new tip design consisting of a 400-micron

diameter, 12 mm long, tapered end is used for this technique (Fig. 5). The final 3 mm of coating is stripped from the end to allow for greater lateral emission of energy compared to the frontal tip. This mode of energy emission allows for improved lateral diffusion with low energy and enhanced photoacoustic effect.

Discussion

Laser irradiation is a common technique used in endodontics to improve the cleaning, the debridement and disinfection of the root canal system. Many wavelengths and protocols are used. Near infrared lasers are used for the three-dimensional decontamination of the endodontic system. Nd:YAG and diode lasers use thermal energy to destroy bacteria. Observations reveal a certain grade of thermal injury to the root canal surface and create a typical morphological damage. Moreover, they are not able to thoroughly remove the smear layer.

On the contrary, erbium lasers are used for their effective smear layer removal while their bactericidal activity is limited to the root surface. The placing of the tip close to the apex and its back movement during the activation process is related to the risk of apical perforation, ledging and surface thermal damage, because of the ablation ability of this wavelength. Also a combination of the near and medium infrared lasers has been proposed. A technique, called twilight endodontic treatment (TET), uses the erbium laser energy first, to clean the root canal surface and remove the smear layer, and the Neodimium:YAG laser second, used in dry mode as the final disinfecting step. All these techniques utilize traditional tips and fibers placed into the canal, close to the apex (1 mm) with all the corresponding thermal disadvantages observed in long, narrow and curve canals. The erbium lasers are also used as a medium of activation of commonly used irrigants (LAI), avoiding the risk of thermal damage, while increasing the cleaning and disinfecting activity of the fluids. PIPS, in particular, reduces all these risks and disadvantages, thanks to the position of the tip in the coronal orifice only and to the use of minimally ablative energy levels of 20 mJ or less.

The findings of our studies dem-

onstrated that PIPS technique resulted in a safe and effective debridement and decontaminating of the root canal system. Our clinical trials showed that PIPS technique greatly simplifies root canal therapy while facilitating the search for the apical terminus, debridement and maintaining patency.

As a result of the efficacy of PIPS, the final size required for canal shaping can be significantly reduced, often to a size 25/04, allowing for a more minimally invasive and biomimetic preparation that can then be obturated three dimensionally.

Conclusion

Lasers are an extremely versatile addition to the dental practice and can be used in many instances instead of the conventional methods employed by the vast majority of dentists. Incorporating a laser in the dental practice should be viewed as an investment rather than a cost. When used with a good knowledge of laser physics, training and safety, lasers provide our patients a new standard of dental care.

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About the Author

Lawrence Kotlow, DDS, has been in private dental practice in Albany, N.Y., since 1974. He is board certified in pediatric dentistry. He is a recognized standard proficiency course provider for the Academy of Laser Dentistry. Enrico DiVito, DDS, is an adjunct professor at the Arizona School of Dentistry and Oral Health. He is in private practice at the Arizona Center for Laser Dentistry in Scottsdale, Ariz., in conjunction with MDATG research group. Giovanni Olivi, MD, DDS, is a professor of endodontics at the University of Genoa School of Dentistry, where he is director for the Laser in Dentistry Master Course with Prof. S. Benedicenti. He is in private practice in Rome, Italy.

Simplification at its best

By Thorsten-Simon Eickholt,
3M ESPE, Seefeld, Germany

Is there a need for another posterior restorative in dentistry? Clearly, the answer is yes. What is desired is a product that offers the mechanical properties users of products like 3M™ ESPE™ Filtek™ Supreme XTE Universal Restorative are familiar with, but allows for a more time-efficient placement procedure.

For this purpose, 3M ESPE developed the new 3M™ ESPE™ Filtek™ Bulk Fill Posterior Restorative. The material contains true nanotechnology and is available in five shades. It may be placed in increments of up to 5 mm, but if desired, a layering technique is also possible. In combination with the fact that the new material does not require a covering composite layer and is easily sculptable right after placement, this ensures a fast and easy filling procedure ideal for all kinds of posterior restorations.



The new material is available in capsules and syringes.

Reducing shrinkage stress
Traditionally, a reduction in shrinkage and shrinkage stress has been accomplished by optimizing the filler composition as

in Filtek Supreme XTE Universal Restorative. This restorative uses an innovative filler technology with silica and zirconia particles and clusters. The

ing polymerization. The obtained fragments are more evenly distributed so that the network relaxes and stress is prevented. Cross-linking again at a later stage, the final polymer structure is obtained.

Conclusion
The uniform network formation and the increased flexibility of the matrix result in a restoration that causes less shrinkage stress even when applied in 5 mm increments.

As a consequence, a tight marginal seal is obtained and the risk of post-operative sensitivities is minimized, while superior physical properties are achieved.

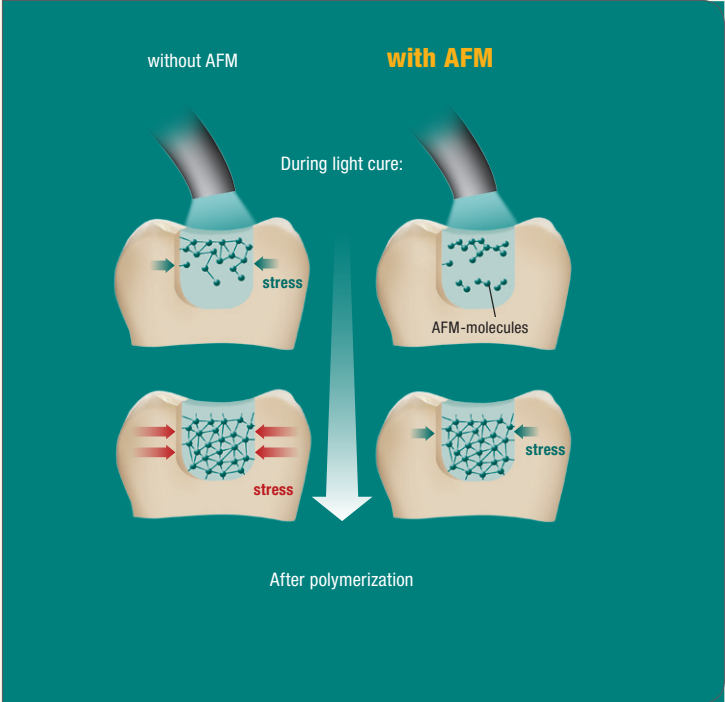
This was confirmed in initial tests: Properties such as the

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Shrinkage stress-preventing mechanism in 3M™ ESPE™ Filtek™ Bulk Fill Posterior Restorative.

shrinkage inherent to any methacrylate matrix is low in this material and does not compromise its clinical performance when placed in layers of 2 mm.

In order to allow for increments of up to 5 mm in Filtek Bulk Fill Posterior Restorative, the nanofiller technology was adopted, but a different matrix developed. The composite contains a new aromatic dimethacrylate with high molecular weight (AUDMA) and a novel addition-fragmentation monomer (AFM). Due to AUDMA, the polymer matrix developing during polymerization obtains a higher flexibility. AFM changes the polymerization reaction: Typically, light curing causes chains of monomers to form and cross-link with each other, resulting in a polymer network. Those monomers which are closest to the light source react immediately and the chains grow from this point. The increasing rigidity and decreasing volume of the network cause stress to develop at the margins. In contrast, AFM contains an additional reactive site that enables cleavage of the forming molecular chains dur-

ing polymerization. The obtained fragments are more evenly distributed so that the network relaxes and stress is prevented. Cross-linking again at a later stage, the final polymer structure is obtained. As a consequence, a tight marginal seal is obtained and the risk of post-operative sensitivities is minimized, while superior physical properties are achieved.

The result: 92% of the dentists would recommend the material to a colleague.^[1]

Contact Information

Elena Golubeva
Marketing Manager MEA

3M ESPE Division
3M Gulf Ltd., Dubai Internet City,
Bldg. 14, 4th floor | Dubai, PO Box
20191 UAE
Office: +971 4 3670686
Mobile: +971 52 6072269
Fax: +971 4 3670599
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