

Er:YAG laser irradiation

Effects on bacteria communication

The Biofilm Research Laboratory, Institute of Dental Sciences in collaboration with the Department of Endodontics at the Hebrew University-Hadassah School of Dental Medicine in Jerusalem, Israel, has been researching "Laser irradiation effects on cell-to-cell communication" since the incorporation of the LiteTouch Er:YAG laser in the University. The research findings suggest a possible effect of laser irradiation on bacteria's quorum sensing cascade, essentially disrupting cell-to-cell communication and bio-film formation. As far as has been known yet this is a novel discovery, which had not been documented before. The research team is led by renowned key opinion leaders and users of the LiteTouch Er:YAG laser such as Idan Redenski, BSc,



Sharonit Sahar-Helft, DMD, Adam Stabholz, DMD, Reuven Aharoni, PhD, and Doron Steinberg, PhD.

"This previously undetected interaction between Er:YAG laser and bacteria opens a new field of clinical applications for the LiteTouch," Claudia Yoel, Marketing projects Manager at Syneron Dental Lasers, said.

Following a presentation of this research at IADR, the Hebrew University team won in the first place of the European IADR Robert Frank Award. The International Association for Dental Research (IADR), headquartered in Alexandria, Virginia, US, is a non-profit organisation with nearly 11,000 members worldwide.

Growing and ageing population drives

Australian's dental industry

IBISWorld, an independent research firm, has recently updated its report on the dental service industry in Australia. It found that ageing and the country's growing population have driven the industry over the past five years, particularly as the oral care of older people has increasingly improved and they have retained their natural teeth. The report further indicates that the dental services industry has grown over the past five years owing to a considerable increase in individual expenditure on dental services. According to IBISWorld industry analyst David Whytcross, growing private health insurance coverage has also benefited the industry, as patients are willing to visit their dentist more regularly and undergo procedures that are more expensive. Therefore, industry revenue is expected to rise through the 2014–2015 period to reach A\$9.4 billion. Similar trends are expected over the next five years, as a growing number of older Australians will require dental work and owing to a greater willingness to take up



[PICTURE: ©RUSLAN GUZOV]

private health insurance extras to subsidise out-of-pocket dental costs. Furthermore, policy interventions have affected the industry. Whytcross explained that initiatives such as the Medicare Chronic Disease Dental Scheme and the Medicare Teen Dental Plan enabled many patients who could not afford to pay for dental care to maintain their oral health by entitling them to dental visits to public clinics and the provision of vouchers for private clinics.

Dental plaque can be used for

Disease prediction and treatment

Researchers from Canada have suggested that dental plaque, a bacterial biofilm formed on dental surfaces, can be used to predict, identify and treat diseases. In a recently established laboratory, they collect and analyse plaque samples to screen for biomarkers that correlate with certain oral and systemic conditions, such as diabetes.

In particular, the researchers scan for the 16S rRNA gene, which is unique to each bacterial type, yet present in all bacteria and can thus be used to distinguish individual species. Plaque analysis only takes a few hours, and the results help the scientists determine disease risk and shed light on the effectiveness of a specific treatment rapidly. The research is being conducted at the recently formed Oral Microbiome and Metagenomics Research Laboratory at the University of Toronto's Faculty of Dentistry. It is



currently focused on plaque as a source of microbiological biomarkers for disease, but aims to study biomarkers for inflammation, for example. In the future, the laboratory's work could also benefit head and neck cancer patients undergoing radiation therapy, which often damages oral mucosa and salivary glands, the researchers believe. With the development of plaque transplantation therapies, for instance, healthy plaque samples could help stabilise bacterial content in the mouth and effectively protect teeth without the use of chemicals, operations or other invasive procedures.

After 50 years US need to

Lower fluoride in drinking water

US health authorities have updated their guidelines for fluoride in drinking water and now recommend an optimal fluoride concentration of 0.7 mg/l. As Americans today have greater access to fluoride in the form of toothpaste and mouthrinse and owing to the increasing incidence of fluorosis due to excess fluoride, the Department of Health and Human Services sought to replace its recommendations that were issued in 1962.

Since the early 1960s, the practice of adding fluoride to public drinking water systems has grown steadily in the US. Nearly all water fluoridation systems in the US have used fluoride concentrations ranging from 0.8 to 1.2 mg/l. With the recent update, however, this will be reduced by 0.1–0.5 mg/l, and fluoride intake from drinking water alone will decline by approximately 25 per cent. The total fluoride intake will be reduced by about 14 per cent. According to the department's report issued on April 27, the new optimal concen-



tration of 0.7 mg/l was chosen to maintain caries prevention benefits, but reduce the risk of dental fluorosis. Today, nearly 75 per cent of Americans who are served by public water systems receive fluoridated water. In 2012, the Centres for Disease Control and Prevention estimated that approximately 200 million people in the US were served by 12,341 community water systems that added fluoride to water or purchased water with added fluoride from other systems.

Dental researchers to complete

HIV test for use in developing world



After having achieved promising results in the first test phase, researchers in New York, USA, have received a new grant from the National Institutes of Health to complete the development of a rapid blood and saliva test for HIV/AIDS. They believe that the time- and cost-saving device will particularly benefit people in remote geographic areas with only limited access to advanced diagnostics. In total, the

project received a \$1.5 million Small Business Innovation Research Phase II grant, which will be used to develop a commercial-ready fully automated system that can simultaneously detect HIV/AIDS antibodies and viral RNA from the AIDS virus in a single specimen.

The primary aim of the project is to simplify HIV testing and eliminate the need for multiple patient visits to health providers. The grant was awarded to Rheonix, a New York-based company specializing in the design of automated, customizable molecular diagnostic devices. In collaboration with dental experts at the New York University College of Dentistry, the company successfully performed an initial test of its Rheonix CARD cartridge system. The system, which is the size of a smartphone, is a disposable card that acts as a receptacle for blood or saliva samples. The card is then placed on an instrument that carries out all of the required steps in processing the sample. According to the researchers, the entire testing process takes less than one hour and the device is mobile and can be battery operated.

BBC Research reports

Healthy Growth for the medical laser market

During the next five years, the medical laser market should enjoy healthy growth, bolstered by growing consumer demand for elective laser procedures. Combined with advances in medical laser technology, along with development of new applicators and tool holders that will widen the range of applications, this industry should rebound impressively from the economic downturn.



The global market for medical laser devices was at nearly \$3.7 billion in 2013. This market is expected to increase from more than \$4.1 billion in 2014 to nearly \$7.8 billion in 2019, with compound annual growth rate (CAGR) of 13.6 per cent over the five-year period from 2014 to 2019.

BCC Research examines the medical laser devices industry in its report, *Global Markets and Technologies for Medical Lasers*. The report addresses the global market for lasers used in diagnostic, therapeutic, and cosmetic applications during the period from 2013 through 2019. It addresses the market in its entirety as well as in selected regional and country markets.



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