“Plasma jets should be integrated into dental hand pieces”

Dental Tribune Germany Editor Jeanette Enders spoke with Dr. Stefan Rupf, Saarland University, and Dr. Axel Schindler, Leibniz Institute for Surface Modification, about their study on cold plasma jets and its future applications in dentistry.

Jeanette Enders: Dr. Rupf, how did you hit upon the idea of using plasma jet technology for dentistry?

Dr. Stefan Rupf: Plasma jets are used primarily to clean and treat surfaces, for example, to manufacture high-performance optical lenses in the near future. My colleague Schindler came up with the idea, following the long development phase of a miniaturised plasma jet source with body-like temperatures at the Institute for Surface Modification. Cold plasma allows us to generate surface temperatures of less than 40 °C at the point of impact. Through these cold atmospheric plasma jets, cleaning and hydrophilisation of surfaces with biologically tolerable temperatures is possible.

Could you explain the study in further detail?

In our study, we examined the antibacterial efficiency of plasma on oral pathogens, such as Streptococcus mutans and Lactobacillus casei. Dentine from extracted human molars was contaminated with four different bacterial strains and exposed to plasma for 6, 12, or 18 seconds. We found that the longer the dentine was irradiated, the higher the reduction in bacteria was. Longer the dentine was irradiated, or 18 seconds. We found that the higher the reduction in bacteria was.

What treatment procedure could potentially incorporate this technology?

Dr. Axel Schindler: I think that plasma jets could be integrated into dental handpieces. Technically, this will not be much of a challenge as these devices are already highly miniaturised.

Dr. Rupf: Treatment with plasma jets requires guiding the plasma jet over the treated area. As plasma jets are very flexible and locally effective, they will allow us to treat enamel, dentine and cementum very gently. The procedure promises therapy measures that could be applied not only in dentistry, but also in surgery and dermatology.

When will the procedure be tested on patients and when will it be available in markets?

Dr. Schindler: We intend to test the procedure on patients this year. As far as market release is concerned, we expect that it will be another three years before it will be available for use in dentistry.

“ Thanks-you very much for the interview.”

(Edited by Daniel Zimmermann, DT/Translation provided by Anna Marie Fischer)
Breakthrough in tooth-tissue engineering

Fred Michmershuizen
DTA

NEW YORK, NY, USA/LEIPZIG, Germany: Researchers at the University of Illinois in the US could have discovered the key to regrowing tooth enamel. In a comparative study on animals, they found that repeated simple amino acids, or Prolines (photo), are responsible for making teeth stronger and more resistant. Their findings could help in replacing lost parts of teeth in patients suffering from dental decay.

In the study, the researchers compared the number of Proline repeats in amphibian and mammal models, such as mice, cows and frogs, and discovered that when the repeats are short, teeth lack the enamel prisms that are responsible for the strength of human enamel. In contrast, when the Proline repeats are long, they contract groups of molecules that help enamel crystals grow. According to the researchers, the findings could aid other important areas of scientific research in addition to dentistry, including the treatment of neurodegenerative diseases, such as Alzheimer’s Disease or Creutzfeldt-Jakob Disease.

DT

Lisa Townshend
DT United Kingdom

LONDON, UK: Children’s toothpaste that contains low concentrations of fluoride fails to effectively combat tooth decay. For optimal prevention of cavities in children over age six, toothpastes should contain at least 1,000 parts per million of fluoride, according to a study carried out by the University of Manchester School of Dentistry. Toothpaste containing fluoride concentrations of less than this is as ineffective as toothpaste with no fluoride at all.

The study, published in the latest issue of the Cochrane Library, a publication of the Cochrane Collaboration, examined results from 79 controlled clinical studies on 73,000 children and found that the benefits of fluoride are reduced for low fluoride toothpastes.

“ Toothpastes with lower fluoride levels, in the 440 to 550 range, give results that are no better than the results seen with toothpaste that does not contain fluoride,” said co-authors Prof. Helen Worthington and Dr. Anne-Marie Glenny.

She added that brushing children’s teeth with fluoride toothpaste before the age of 12 months could lead to an increased risk of developing mild fluorosis. Children’s toothpastes currently range from 100 parts per million to 1,400 parts per million.

“For a public health point of view, the risk of tooth decay and its consequences, such as pain and extractions, is greater than the small risk of fluorosis. Children would have to swallow a lot of toothpaste over a long period of time to get the severe brown mottling on the teeth, as opposed to the more typical mild white patches,” Dr. Glenny said.

She added that for children considered to be at a high risk of tooth decay by their dentist, the benefit to oral health is likely to outweigh the risk of fluorosis. In such cases, careful brushing of children’s teeth with a small amount of toothpaste containing higher levels of fluoride would be beneficial.

“If in any doubt, we would advise parents to speak to their family dentist,” Dr. Glenny said.

(Edited by Daniel Zimmermann, DTT)
New job survey gives smiles to hygienists

Daniel Zimmermann

NEW YORK, NY, USA/LEIPZIG, Germany: Dental hygienists rank amongst the best ten jobs in the US, a new survey has found. According to CareerCast.com, a job search site based in Carlsbad (US) and the Netherlands, the hiring outlook for hygienists is second only to software engineers in the top ten list, which includes accountants and computer systems analysts. Dental hygienists held about 174,100 jobs in 2008 according to figures from the US Bureau of Labour Statistics.

The report analysed 200 jobs in North America based on a set of criteria, including work environment, income, outlook, stress and physical demands. Dental technicians ranked 72 in the survey, while orthodontists only ranked 94.

“Dental team members like the dental hygienist and dental assistant can be a great help to improve the delivery of dental care,” Dr Jerry Gordon, a dentist from Bensalem in Pennsylvania, told Dental Tribune Asia Pacific. “With the population of the US ageing, more people are seeking dental care than ever before. The field will continue to have a positive outlook for the foreseeable future.”

He added that pending health-care legislation in the US will not have a negative impact on the field.

UK tax campaign targets dentists

Claudia Salwiczek

LONDON, UK/LEIPZIG, Germany: Dentists and other medical professionals in the UK are being encouraged by the government to declare understated income. The campaign launched by the HM Revenue and Customs department earlier this year follows efforts to uncover taxable income hidden by UK taxpayers in offshore bank accounts. In the case of medical professionals, HMRC is looking for taxable income regardless of where it has been hidden.

A spokesperson for HMRC said the tax authorities had been gathering information about doctors, and others, from employers such as National Health Service trusts, private hospitals and medical insurance firms. He said that those dentists or physicians who contact HMRC by 31 March to make a voluntary disclosure will be able to put their tax affairs in order and only be charged a 10 percent penalty. He confirmed that his department will turn its attention to other professionals—solicitors, lawyers and accountants—later this year.

In its most recent offshore disclosure campaign, which closed earlier this month, the department flushed out 10,000 people who said they wished to pay tax on income hidden abroad.

“Our aim is to make it as easy as possible for people to come forward, make a full disclosure and benefit from the certainty of a reduced 10 percent penalty that HMRC is making available to those who qualify for this opportunity,” said Mike Wells, HMRC’s Director of Risk and Intelligence. “This is the first step in enabling those with undisclosed income or gains to avoid a full tax investigation together with much higher penalties.”

Anyone who does not come forward, and is found to have been avoiding tax, could be fined up to 100 percent of his or her unpaid tax, with a minimum penalty of 50 percent.
Global health care fraud costs put at US$260 billion
European network finds more than five per cent of spending is lost to corruption

Reuters

LONDON, UK: Some US$260 billion are lost globally every year to fraud and error in health care—enough to quadruple the World Health Organization’s (WHO) and UNICEF’s budgets and control malaria in Africa.

A study by the European Health-care Fraud and Corruption Network (EHFCN) and the Centre for Counter Fraud Studies (CCFS) at Britain’s University of Portsmouth found that 5.59 per cent of annual global health spending is lost to mistakes and corruption.

“Every euro lost to fraud or corruption means that someone, somewhere is not getting the treatment that he or she needs,” said Paul Vincke, EHFCN’s president and one of the authors of the report. “They are ill for longer, and in some cases they simply die unnecessarily. Make no mistake—health-care fraud is a killer.”

The report reviewed 60 exercises in 33 organisations in 6 countries to measure health care fraud and error losses. The combined expenditure assessed was more than US$490 billion and findings were extrapolated from Britain, the US, New Zealand, France, Belgium and the Netherlands in order to gain a global sense of the situation. Data from developing nations would not have changed the global figure, the authors said, but were difficult to obtain because the study included only exercises based on statistically valid samples with measurable levels of accuracy.

The report found evidence of many different types of fraud, including pharmacists dividing prescriptions into smaller packages to claim extra fees, drug companies forming price cartels, doctors over-claiming travel costs and abusing government grants, and patients submitting fraudulent insurance claims. Two doctors were found to have claimed a government improvement grant for their clinic, which they spent on establishing a car import-export business.

A Thomson Reuters report published last October found that the US health care system wastes between US$505 billion and US$850 billion annually, with around 22 per cent due to fraudulent insurance, kickbacks for referrals for unnecessary services, and other scams.

The WHO’s latest estimate of global health-care expenditure was US$4.7 trillion. The fraud report’s US$260 billion loss figure is based on an average of 5.59 per cent of spending lost to fraud.

Jim Gee, chair of CCFS’s advisory board, said the report proved it was possible to measure the nature and extent of losses due to fraud and error, which is vital to addressing the issue.

“It may be embarrassing for some organisations to find out just how much they are losing,” he said in the report. “Because of the direct, negative impact on human life of losses to fraud, it is never easy to admit they take place.”

But Gee said the first step to combating fraud is for governments and institutions to acknowledge that fraud occurs in their organisations. “If an organisation is not aware of the extent or nature of its problem, then how can it apply the right solution?”

The EHFCN was established to assist the region’s health-care organisations in determining and reducing losses due to fraud and error so that more money can be better spent on patient care.

Similar networks exist in the US and Canada.

(Edited by Daniel Zimmermann, DTI)