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Stefan Ihde | Insitute of basal Implantology | Switzerland

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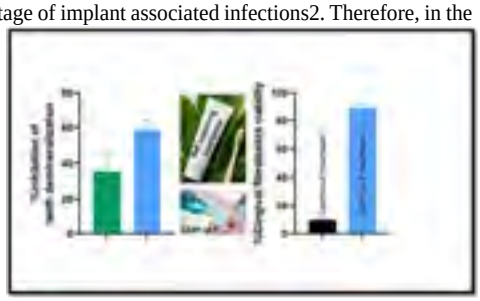
Harnessing the antibacterial properties of fluoridated chitosan polymers against oral biofilms

Marta Roldo
University of Portsmouth, UK

Dental caries is a worldwide endemic chronic disease affecting people of all ages, with high incidence in the young population of developing countries1. Due to the limitations of daily used oral hygiene products, there is an unmet need for new, effective, safe and economic oral hygiene products. Using chitosan as a starting material we exploit a sustainable source and address an environmental issue as the same time. In fact, food waste from the shellfish food industry can be recycled to extract chitin the precursor of chitosan. We have recently demonstrated that N-(2(2, 6-diaminohexanamide)-chitosan (CS3H Lys) has enhanced antibacterial properties against *Staphylococcus aureus*, a bacterium responsible for a high percentage of implant associated infections2. Therefore, in the present study we evaluated its efficacy against *Streptococcus mutans*, the main cariogenic bacterium. We further investigated the effect of fluoridation of this polymer (CS3H Lys F) on its antibacterial properties and the ability to protect teeth from acid demineralization. Finally, the polymers were formulated into mouthwash preparations and their cytocompatibility and physicochemical stability were assessed over 6 months3. CS3H Lys F was found to be 1.6-fold more effective than a 1450 ppm NaF aqueous solution in preventing acid demineralization. This higher efficacy was obtained with a concentration of fluoride ions 3000 times lower compared to the NaF 1450ppm solution used as control. This demonstrated that the mode of delivery of fluoride ions is more important for efficacy that the dose4. CS3H Lys F also had a 3 to 5-fold lower minimum inhibitory concentration value against *S. mutans* than values reported in literature for other chitosan polymers5 and showed negligible cell toxicity. The mouthwash formulation developed containing the chitosan polymers was stable at both 25 and 40°C for 6 months. Further work is under way towards other CS3H Lys F oral hygiene products such as toothpaste.



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Biography

Marta Roldo is a Reader in Biomaterials at the University of Portsmouth. Her research focuses on the development and characterization of novel biomaterials for biomedical applications. She has developed novel polymeric derivatives with antibacterial and anticoagulant properties, and composite hydrogels for tissue regeneration and has an interest in the development of state-of-the-art imaging techniques to visualize oral biofilm and test its removal efficacy using different oral hygiene strategies.

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Versatility of advanced integrated prosthetic digital workflow for the immediate full-arch restoration - Sobczak concept

Barbara Sobczak
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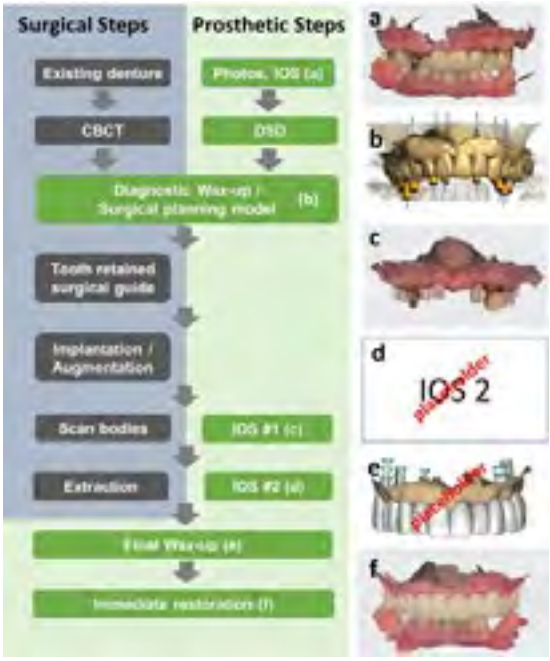
This lecture illustrates the application of a novel digital workflow for the immediate full-arch restoration with a white bridge over various indications and conditions. Pre- and intra-surgical direct digital impressions for the surgical and chairside prosthetic planning models were combined. This combination allowed to precisely adapt the prosthetic framework to the patients' macro aesthetics and local soft tissue anatomy and to identify and selectively apply regenerative procedures. This resulted in a precise, efficient and robust delivery of chairside manufactured immediate restorations. Implant-fixed complete dentures (IFCDs) are well established for the immediate rehabilitation of edentulous patients. Selecting an adequate treatment scheme is one of the most important factors for the long-term clinical success of IFCDs. This selection requires considering a wide range of objective clinical parameters, including anatomic, medical, technical, mechanical, and biological characteristics. In addition, subjective patient-perceived outcomes, including preferences and satisfaction, have recently gained equal importance for evaluating final treatment outcomes.



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Biography

Barbara Sobczak did her Master of Science in Oral Implantology, graduated with honors from Goethe University in Frankfurt am Main, Germany. She is the founder of Dr. Sobczak Dental Clinic in the Dubai Mall, Dubai, UAE; Dr Sobczak Klinika Radosc, Warsaw, Poland; Dr Sobczak Klinika Babice, Warsaw, Polan and Dr Sobczak Chiarity Foundation. She acts as the Key speaker and opinion leader for Straumann in the field of implantology in Europe, and in the field of implantology in the Middle East. She is an independent lecturer in the field of dental implantology worldwide functions as a Medical Consultant for Straumann in Poland and as a Medical consultant on behalf of Straumann Group, Swizerland. She runs courses for dentists in the field of advanced implantology through the Center of Excellence for Education Straumann. She is an ITI Fellow, awarded by a committee in Switzerland for achievements in the field of implantology, member of scientific projects regarding dental materials in implantology for temporary full arch reconstructions, member of the judge's committee for the Smile Award 2022 edition, member of International Team for Implantology (ITI). She also functions as an Author of publications in implantology with Jagiellonian University in Krakow, Poland and Basel, Swizerland. She is the founder and director of ITI Study Club of Mazovia and Polonika and is a Laureate of the global Straumann Group competition Smile Award 2021..

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Peri-Implantitis: etiology & timeline of a problem which is created by the bone itself if 2-stage implants are used

Stefan Ihde
Institute of basal Implantology, Switzerland

In literature various and conflicting concepts are used to explain why Peri-Implantitis(PI) appears around rough 2-stage implants. In this lecture it will be shown why the nature and design of (2-stage) implants in combination with the method of "osseointegration" alone are the principal reason for their frequent failure. The "root-form" design of dental implants is the reason for the failure of the concept. Alternative implant shapes and completely different method of implant placement (Osseofixation) have been developed and this method is overcoming all the shortcomings of the old method of Osseofixation.

Recent Publications:

1. Ihde, S.; Ihde, A.; Sipic, O.; Pałka, Ł. Peri-Implantitis: A New Definition Proposal Based on Unnatural Spatial Arrangement and Late Mechanical Coupling between Two Cortical Bone Layers during Osseointegration Phase Part II. Appl. Sci. 2022, 12, 5589. https://doi.org/10.3390/app12115589

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5. Ihde SK. The "Specialist Standard" has changed in oral implantology. Ann Maxillofac Surg 2021;11:215-6.

Biography

Stefan Ihde was born 1962 in Immenstadt i. Allgäu / West-Germany. He studied dentistry in Würzburg/Germany from 1982 until 1987. In 1988 he submitted successfully his Dr.-thesis in the field of laboratory medicine. After two years of work as dentist in Germany he relocated to Switzerland and focussed his clinical work on basal and later on cortico-basal dental implantology. In the following 25 years he has placed and equipped more than 50.000 oral implants and all this was done in an immediate functional loading protocol. Many of these cases are under his control for 20 and more years. With his vast and powerful clinical work he follows seamless in the footsteps of his teacher Prof. L. Linkow, New York, USA. For more than 20 years, Ihde has been conducting the product development department und clinical and pre-clinical research in the IHDE DENTAL group of companies. He developed the Technology of the Strategic Implant(R)" and most of cortico-basal implantalogy together with close friends/colleagues in the team of the IF. He united all their forces and knowledge into the International Implant Foundation (IF) , Munich/Germany. The IF is today the worldwide leading institution and authority for teaching and researching in the field of immediate functional loading of oral and maxilla-facial implants.

Ihde`s main field of research is the adaptation of bone, the repair of bone and the development of techniques and devices for the immediate loading of dental implants. He has researched in the field for many years in cooperation with the University of Belgrade/Serbia and he based the science on broad animal experiments done there. As international Journals initially refused to publish his results, he compiled them in the pathbreaking scientific textbook „Principles of BOI", published by Springer/Germany in 2005. This book was the first

complete textbook about the technique of lateral basale implants and with this book Dr. Ihde closed this chapter of his scientific life. He went on with research into cortico-basal implants which were much easier to teach and to install. His results have been published over a period of more than 20 years in more than 120 international publications (in English, German and Russian language), as well as in seven textbooks on dental implantology performed in immediate functional loading. He is a well-known international speaker and member of several workgroups and international and national associations in the field of dental Implantology. He coordinates research and teaching in several universities and other research institutions.

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CGRP in the temporomandibular joint and muscular inflammation

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To evaluate the effects of different kinds of adjuvants such as freunds adjuvant carrageenan oil on experimentally induced arthritis. The outcome of the different stimuli was always an increase in sensory neuropeptides such as calcitonin gene-related peptide and substance P. Other peptides that are increased are neurokinin A from the Sympathetic nervous system neuropeptide Y is increased and from the Parasympathetic nerves Vaso intestinal polypeptide.

Recent Publications:

1. Corticotropin releasing factor in urine--a possible biochemical marker of fibromyalgia. Responses to massage and guided relaxation. Lund I, Lundeberg T, Carleson J, Sönnerfors H, Uhrlin B, Svensson E. Neurosci Lett. 2006 Jul 31;403(1-2):166-71. doi: 10.1016/j.neulet.2006.04.038. Epub 2006 May 22. PMID: 16716515 Clinical Trial.

2. Muscle and brain changes of calcitonin gene-related peptide in experimentally induced unilateral rat masseter myositis. Carleson J, Lundeberg T, Appelgren B. J Orofac Pain. 2004 Summer;18(3):246-52. PMID: 15509004

3. A model for the study of experimentally induced temporomandibular arthritis in rats: the effect of human recombinant interleukin-1 alpha on neuropeptide-like immunoreactivity. Carleson J, Alstergren P, Appelgren A, Appelgren B, Kopp S, Theodorsson E, Lundeberg T. J Orofac Pain. 1996 Winter;10(1):9-14. PMID: 8995911.

Biography

Joakim has been a dentist since 1997 and did his PhD in 2001. His dissertation was at the Karolniska Institutet. From 1994 until 2008 he published 11 articles in the area of dentistry and physiology. The major interest of research is integrative medicine with the interaction between the nervous, humoral and immune system.

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3D printing in Endodontics

Abdullah AlFadda
King Saudi University, Saudi Arabia

It is well known that we view X- and Y-planes when we view images generated using digital X-rays. Now, let's embrace the third dimension that is capable of dramatically improving diagnostic interpretations and treatment planning. The aim of this lecture is to describe how endodontic therapy can be achieved by using static and dynamic navigation for complex root canal treatments.

Objectives:

1- Navigation in Dentistry

2- Digital Impression Systems, CAD/CAM, and STL file

3- 3D Printing in Endodontics

4- Static Guided Nonsurgical Approach for Calcified Canals of Anterior Teeth.

Recent Publications:

1. Perceptions, attitudes, and barriers toward obesity management in Saudi Arabia: Data from the ACTION-IO study

Biography

Alfadda was born and raised in riyadh, the Capital of Saudi Arabia. He graduated with second class honors and earned his bachelor of dental surgery (BDS) degree at king saudi university, college of dentistry. Alfadda enjoys all kinds of art and considers endodontics as one he's very passionate about, which led him to pursue advanced training at king abdulaziz medical city. In his free time, he loves to explore new developments in digital dentistry and virtual planning.

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Pre-invasive head and neck squamous precursors: screening, detection and biological assessment

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Head and Neck squamous carcinoma is broadly classified into conventional and oropharyngeal (HPV-associated) forms. Oropharyngeal squamous carcinoma originates from invaginated squamous epithelium of lymphoid-stromal sites (Base of tongue, tonsils, and adenoids) in younger male patients with no or low-risk factors. However, conventional squamous carcinoma arises in the squamous mucosal lining of the oral cavity, mobile tongue, and larynx. It typically afflicts older male patients with a protracted history of risk factors. In contrast to the HPV-associated carcinoma, conventionally squamous carcinoma is preceded by pre-malignant lesions defined clinically as leukoplakia (white plaque) and optically by progressive stages of hyperkeratotic dysplasias. These lesions, however, are not uncommon in the general population, and only a small subset of them progress to invasive carcinoma. Early screening for potentially progressive dysplasia is a subject of intense investigation. The presentation will discuss current pathological characterization and advances in biomarkers discovery for early detection and management.

Recent Publications:

1. Renata Ferrarotto, Moran Amit, Priyadharsini Nagarajan, M. Laura Rubin, Ying Yuan, Diana Bell, Adel K. El-Naggar, Jason M. Johnson, William H. Morrison, David I. Rosenthal, Bonnie S. Glisson, Faye M. Johnson, Charles Lu, Frank E. Mott, Bita Esmaeli, Eduardo M. Diaz, Paul W. Gidley, Ryan P. Goepfert, Carol M. Lewis, Randal S. Weber, Jennifer A. Wargo, Sreyashi Basu, Fei Duan, Shalini S. Yadav, Padmanee Sharma, James P. Allison, Jeffrey N. Myers, Neil D. Gross; Pilot Phase II Trial of Neoadjuvant Immunotherapy in Locoregionally Advanced, Resectable Cutaneous Squamous Cell Carcinoma of the Head and Neck. Clin Cancer Res 15 August 2021; 27 (16): 4557–4565. https://doi.org/10.1158/1078-0432.CCR-21-0585

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Biography

El-Naggar is a Kathrin O' Connor endowed professor of Head and Neck Pathology at the University of Texas M.D. Anderson Cancer Center. El-Naggar is a Senior Head and Neck Pathologist and the director of the subspecialty fellowship-training program at The University of Texas M.D. Anderson Cancer Center. His clinical and research interests are centered on the optimization of the clinicopathologic assessment, genomic characterization biomarker discovery, and integration of patients with mucosal, thyroid, parathyroid and salivary gland malignancies

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Stereolithographic additive manufacturing of ceramic dental crowns

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University, Japan

In stereolithographic additive manufacturing (STL-AM), 2-D cross sections were created through photo polymerization by UV laser drawing on spread resin paste including nanoparticles, and 3-D models were sterically printed by layer lamination. The lithography system has been developed to obtain bulky ceramic components with functional geometries. An automatic collimeter was newly equipped with the laser scanner to adjust the beam diameter. Fine or coarse beams could realize high resolution or wide area drawings, respectively. As the row material of the 3-D printing, nanometer sized metal and ceramic particles were dispersed into acrylic liquid resins at about 60 % in volume fraction. These materials were mixed and deformed to obtain thixotropic slurry. The resin paste was spread on a glass substrate with 50 μm in layer thickness by a mechanically moved knife edge. An ultraviolet laser beam of 355 nm in wavelength was adjusted to 50 μm in variable diameter and scanned on the spread resin surface. Irradiation power was automatically changed for an adequate solidification depth for layer bonding. The composite precursors including nanoparticles were dewaxed and sintered in the air atmosphere. In recent investigations, ultraviolet laser lithographic additive manufacturing (UVL-AM) was newly developed as a direct forming process of fine metal or ceramic components. As an additive manufacturing technique, 2-D cross sections were created through dewaxing and sintering by UV laser drawing, and 3-D components were sterically printed by layer laminations with interlayer joining. Recently, zirconia dental crowns with fine microstructures were fabricated by lithographic AM. Through computer-aided smart manufacturing, design, and evaluation (Smart MADE), practical material components were fabricated to modulate energy and material transfers in potential fields between human societies and natural environments as active contributions to Sustainable Development Goals (SDGs).

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2. Soshu Kirihara, Stereolithographic Additive Manufacturing of Acoustic Devices with Spatially Modulated Cavities, International Journal of Applied Ceramic Technology, (2021) 13925-1-13925-8.

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5. Soshu Kirihara, Ultraviolet Laser Lithography of Titania Photonic Crystals for Terahertz-Wave Modulation, Materials, 11 [5] (2018) 835-845.

6. Koki Nonaka, Soshu Kirihara, Three Dimensional Smart Processing by Ultra Violet Laser Lithography of Ceramic Additive Manufacturing, Journal of Materials Science Forum, 941 (2018) 2196-2199.

Biography

Soshu Kirihara is a doctor of engineering and a professor of Joining and Welding Research Institute (JWRI), Osaka University, Japan. In his main investigation, “Materials Tectonics as Sustainable Geoengineering” for environmental modifications and resource circulations, multi-dimensional structures were successfully fabricated to modulate energy and materials flows effectively. Ceramic and metal components were fabricated directly by smart additive manufacturing, design and evaluation (Smart MADE) using high power ultraviolet laser lithography. Original stereolithography systems were developed and new start-up company “SK-Fine” was established through academic-industrial collaboration.

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