5th World Congress on

Dentistry and Maxillofacial Surgery

September 18-19, 2023 | Rome, Italy

DAY-1
Keynote Forum

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Pharyngeal airway anatomy in Dentistry

The relationship between the pharyngeal airway and craniofacial morphology has been a topic of interest to researchers since the 19th century (1). Respiration is a vitally important functional process that has implications for normal craniofacial development (2). Due to the neighborhood relationship between the pharyngeal and dentofacial structures, a mutual interaction between them is an expected result (3).

Pharynx is a tubular structure with a length of about 12-14 cm consisting of muscles and membranes. It extends from the cranial base to the sixth cervical vertebra and the lower border of the cricoid cartilage. Pharynx when viewed from the sagittal plane; It consists of 3 regions: the nasopharynx, which is defined as the region between the nasal turbinates and the hard palate, the oropharynx, which is the region from the level of the hard palate to the caudal edge of the soft palate, and the hypopharynx, which is defined as the region from the base of the tongue to the larynx (4,5).

The upper airway is essential among orthodontists, as the oropharyngeal and nasopharyngeal structures play an important role in the growth and development of the craniofacial complex (6). The primary craniofacial bone structures that determine the size of the airway are the mandible and the hyoid bone. In addition, it is reported that the forward development of the maxilla positively affects the upper airway. The bone structure is effective in the size of the airway as they are the supporting structures to which the muscles and soft tissues are attached (7,8). Therefore, good knowledge of pharyngeal anatomy is important in dentistry, especially in orthodontic diagnosis and treatment.

Recent Publications

1. Meyer W. On adenoid vegetations in the naso-pharyngeal cavity: their pathology, diagnosis, and treatment. Medico-Chirurgical Transactions. 1870; 53: 191.
2. Aboudara C, Nielsen I, Huang JC, Maki K, Miller AJ, Hatcher D. Comparison of airway space with conventional lateral head films and 3-dimensional reconstruction from cone-beam computed tomography. American Journal of Orthodontics Dentofacial Orthopedics. 2009; 135(4): 468-79.
3. Unuvar Ay Y, Karadede MI, Yildiz I. Evaluation of Pharyngeal Airway Volume in Individuals with Different Skeletal Patterns. Meandros Med Dent J 2021;22:7-17

Biography

Mehmet İrfan Karadede DDS PhD of Orthodontics, PhD of Histology and Embriology; Dentist at Dicle University in 1986, Doctor of Orthodontics (PhD) in 1992, Assistant Professor in 1993, Associate Professor in 1996, Doctor of Histology and Embryology Science (PhD) in 2004, Professor in 2009. Dr. Dr. Karadede; Animal Experiments, Histological studies, Development and Growth, Orthodontic Tooth Movement, TMJ, Occlusion, Cephalometry, Cleft Lip and Palate, Orthognathic (maxillofacial orthopedics) treatments, CT / CBCT, Stereophotogrammetry, Forensic Dentistry and He has a scientific focus on genetics. He has many postgraduate thesis advisors, national projects, editorship and chapter authorship in international and national books, and many works published in international and national scientific journals and congress papers. He has refereed international and national journals and national projects in different fields and has many international and national citations to his articles.

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Leszek A Dobrzansk

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To what extent does modern Dental engineering fit into the integrated model of the industry sustainable development, which takes into account the expectations of consumers

Statement of the Problem: The classic model of H. Kagermann of the current stage of Industry 4.0 contains only nine IT technologies referred to as cyber-physical systems, which the originator recognized as IT only after ten years. This model ignores the need for progress in the field of materials, without which it is impossible to produce any product, as well as machines and production technologies limited only to additive manufacturing, without considering the necessary development of all other technologies. The diagram above shows the proprietary Industry Integrated Idea 3xI 4.0 model/5/0, showing two approaches of producers and consumers focused on products. They are illustrated by parallel planes: technological with four determinants, materials and multi-cyber- physical factors, and consumer with ecology and economy, recognized as coincident horizontal factors. The model captures the three most important challenges regarding the sustainable development of engineering materials and the ongoing revolution in digitization, and ecological challenges related to the need to minimize the environmental footprint out of concern for the well-being of present and future generations. Over the last few decades, there has been a systematic development of modern dentistry, described by the proprietary model of Sustainable Development of Dentistry (DSD) > 2020, consisting of Global Dental Prophylaxis (GDP), Advanced Interventional Dentistry 4.0 (AID 4.0) and the Dental Safety System (DSS). The Dentistry 4.0 model is about dental engineering fully corresponding to the 3xI 4.0/5.0 model of industrial development, and the modern prosthetic production center's standards fully correspond to the smart factory. This concept is characterized by advances in cloud computing, 3D imaging using CBCT, computer-aided design and manufacturing CAD/CAM, data manipulation, personalized incremental technologies so-called 3D printing. This requires complete understanding on the part of dentists and close cooperation with highly specialized dental engineers with fluent knowledge of technology, material engineering, and applied IT. Due to poor substantive education, stereotypes, simplifications, and erroneous and anachronistic solutions in this area are often disseminated to the detriment of patients, which is often reflected in specialist and scientific literature.

Conclusions: A highly developed level of engineering support for dentistry requires systematic education of dentists in the field of advanced issues of dental engineering and revision of medical study programs in this area.

Recent Publications

1. Dobrzanski, L.A.; Dobrzanski, L.B. (2020) Dentistry 4.0 concept in the design and manufacturing of prosthetic dental restorations. Processes, 8: 525.
2. Dobrzanski, L.A. (Ed.) (2020) The Concept of Sustainable Development of Modern Dentistry. Processes, 8(12): 1605;
3. Dobrzanski, L.A. (Ed.) (2018) Biomaterials in Regenerative Medicine; IntechOpen: Rijeka, Croatia.

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Biography

Leszek A Dobrzanski has been a full professor and Director of the ASKLEPIOS science center for five years at the design, research, and production center of medical and Dental engineering ASKLEPIOS Ltd. in Gliwice, Poland. At the same time, he is a professor at the department of Biomedical engineering of the Koszalin university of technology in Kozalin, Poland. He worked in the years 1971-2017 at the Selesian university of technology in Gliwice as a full professor, vice-rector and dean of the faculty. He is the president of the World academy of materials and manufacturing engineering WAMME, Vice president of the engineering academy in Poland and a foreign member of the engineering academy of Ukraine and Slovakia, editor-in-chief of the journal of achievements in materials and manufacturing engineering JAMME, and archives of materials science and engineering AMSE. He is a member of Editorial Boards, incl. at Taylor & Francis, MDPI, ASTM International,

and others. The title of prsofessor was awarded to him by the President of the Republic of Poland in 1995, and abroad in 2017 the title of honorary professor of the Lviv state university of technology in Ukraine, and three honorary doctoral degrees in 1997 from the University of Ruse (Bulgaria), in 2007 from the State Universuty in Khmelnytsky (Ukraine) and in 2016 at the university of Miskolc (Hungary). His workds are cited atleast 16,000 in

world journals according to Web of Science, Scopus, and Google Scholar, and a number of Citations: 5,189 (SC), 3,040 (WB), 16,000 (GS), h index: 52 (GS), 33 (SC), 26 (WS). He is the author of approx.. 3,000 scientific publications and books which includes, 60 books and monographs, 250 articles in the journals reffered in Web of Science core collections, over 100 lectures at international conferences worldwide. His research interests include materials, biomedical and dental engineering, surface engineering, organization and management, manufacturing engineering, nanotechnology and additive manufacturing, and technological foresigh

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Lech B Dobrzanski

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The innovative technology of additive manufacturing of dental prosthetic restorations using multi-component titanium alloys with aluminium and vanadium and cobalt alloys with chromium

Statement of the Problem: In modern dentistry, as well as in medicine in general, various engineering devices are often used to replace components of the human body removed due to illness or, for example, during an accident, including but not limited to teeth removed for the reasons given or lost for other reasons, as well as due to developmental defects. Modern dentistry requires extensive engineering support based on the synergistic use of extensive knowledge in materials engineering, production engineering, and tissue engineering covered by the current stage of Industry 4.0 of the industrial revolution. This approach describes digitization and computerization in dentistry as Dentistry 4.0. Thanks to technology combining data obtained from the CBCT scanner, scanning of intraoral conditions, and computer-aided design, it is possible to integrate individual components and manufacture them using additive technologies, reducing potential bacterial threats, their weight, and the number of connecting elements. The lecture compares the results of tests on the Ti6Al4V titanium alloy and the Co25Cr5W5MoSi cobalt alloy produced by milling in a numerically controlled machining center (CNC) and additively by selective laser sintering (SLS) and on the structure and properties of the tested alloys. It has been shown that even small changes in technological conditions in the SLS production variant, especially laser power, laser beam diameter, and possible overlapping of working paths, significantly change the tensile and bending strength by two to almost two and a half times. The tensile and bending strength obtained in the most advantageous production variant using the SLS method is over 25% higher than in the case of materials milled from previously cast discs. Plug-and-play SLS terms provided by device manufacturers provide only about 60% of the capability. Structural, tribological, and electrochemical tests were carried out. The main reason for achieving low strength properties is high porosity reaching even more than 10% when the best properties are ensured when the porosity does not exceed 0.5%. In vitro biological studies using osteoblasts confirm a good tendency to multiply living cells on the medium produced under the most favorable SLS conditions.

Conclusions: The use of the SLS additive technology for the production of dental implants and connectors made of titanium and cobalt alloys in combination with the digitization of dental diagnostics and computer-aided design and production of computer-aided design/manufacturing (CAD/CAM) by the idea of dentistry 4.0 is the best choice for technology for the production of restorations prosthetic devices and implantological devices used in dentistry.

Recent Publications

1. Dobrzański, L.B., Achtelik-Franczak, A., Dobrzańska, J., & Dobrzański, L. A. (2020). Comparison of the structure and properties of the solid Co-Cr-W-Mo-Si alloys used for dental restorations CNC machined or selective laser-sintered. Materials Performance and Characterization, 9(4), 556-578.
2. Dobrzanski L.A.; Dobrzanski, L.B., A. Achtelik-Franczak and J. Dobrzańska (2020); Application Solid Laser-Sintered or Machined Ti6Al4V Alloy in Manufacturing of Dental Implants and Dental Prosthetic Restorations According to Dentistry 4.0 Concept, Processes 8(6), 664;

3. Dobrzanski L.A.; Dobrzanski, L.B. (2020) Dentistry 4.0 concept in the design and manufacturing of prosthetic dental restorations. Processes, 8: 525.

Biography

Lech B. Dobrzanski is a graduate of the Silesian University of Technology in Gliwice, majoring in electronics and medical informatics. He completed his doctoral thesis and obtained a doctoral, degree in the interdisciplinary area of materials and dental engineering at the AGH University of Science and Technology in Krakow, Poland. He is a medical manager, dental engineer, coordinator of 10 Research and Development projects. He is an active researcher. He is the author of about 60 papers and chapters in international books. The number of citations is: 627 (GS), 325 (SC), 114 (WS), hindex: 16(GS), 13(SC), 7(WS). He is the author of 4 patents and 5 applications in the field of dental engineering. He received about 20 awards at invention fairs around the world. He is the author of 14 applications to the Patent Office in Poland for medical devices along with the conformity assessment. Since 2004, he has been continuously holding managerial positions in NGOs and private companies. He is a healthcare manager, including the President and CEO of Center SOBIESKI since 2011 and Center Asklepios since 2016. He is the Director of the Dental Engineering Center and the Head of the CAD/CAM Laboratory at the Asklepios Company. In the Asklepios Company, he implemented the IMSKA-MAT project in the years 2017-2022, acting as the deputy project manager. At SOBIESKI Company he implemented 4 completed research, development, and investment projects related to the expansion of the company's offer, increasing its competitiveness and creating a unique offer of dental services and implementation of innovative prosthetic products on a national scale. These projects were financed from the EU and its own funds and resulted in a significant increase in the share of the company's offer in the provincial and nationwide market. One of the projects involved the implementation of innovative dental services in the field of surgery, implantology, implant prosthetics, and the second implementation of innovative products and services in the field of dental engineering (innovative milled implant-prosthetic and prosthetic restorations) and the launch of an innovative CAD/CAM laboratory. The next 2 projects concerned the implementation of 2D-printed restorations

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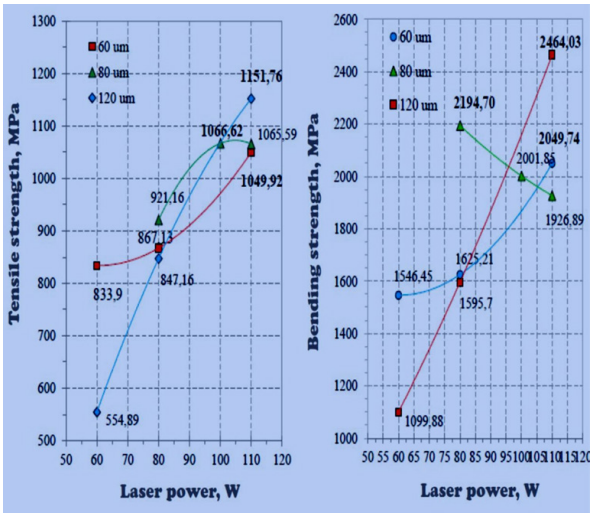

Figure 1. Influence of SLS conditions on the mechanical properties of the Ti6Al4V alloy

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Paula Vaz

University of Porto, Portugal

The role of genetics and innovation on Dental implants

Genetics could be apllied in several different fields of Dentistry, namely Oral Rehabilitation, Periodontology, Orthodontics, Prenatal Diagnosis. But the main focus for the next years would be in Orofacial Rehabilitation, in Dental Implants, Biomaterials, Oral rehabilitation materials and Medical devices in general.

Implant-supported or implant-retained treatments provide predictable results with improved stability, retention, aesthetic and patient satisfaction. However, understanding the mechanisms of failure of osseointegrated oral implants is essential to treat or to prevent this occurrence. Peri-implantitis is an inflammatory response with a loss of bone support of the implant. Pathogenic bacteria and other factors like biomechanical overload, history of periodontitis, smoking habit, alcohol consumption, and genetic factors have been suggested in the pathogenesis of peri-implantitis. Some research studies analysed the role of some genes and their variants (polymorphisms) in host responses in peri-implantitis and its progression but few have evaluated the time of implant loss. The understanding of the osseointegrated implant failure as a multifactorial process and the clinical observation of repetitive unsuccessful dental implants in certain individuals raise interesting questions related to host susceptibility to failed dental implant. Moreover, the implant surface and design, abutment connection and also the material of the fixed restoration in dental implants and natural tooth may also be in the basis of the success or failure of the oral rehabilitation.

The Research and Industry should walk together in order to solve complications with dental implants Rehabilitations and promote innovation and development with targets to serve the community of Investigators, Industry and the patients.

The information of the clinical practice and science are the power of the SUCCESS!

Recent Publications

1. P Vaz , M M Gallas, A C Braga, J C Sampaio-Fernandes, A Felino, P Tavares. IL1 gene polymorphisms and unsuccessful dental implants. Clin Oral Implants Res. 2012 Dec;23(12):1404-13. doi: 10.1111/j.1600-0501.2011.02322.x. Epub 2011 Nov 10.
2. Suárez-López Del Amo F, Rudek I, Wagner VP, Martins MD, O'Valle F, Galindo-Moreno P, Giannobile WV, Wang HL, Castilho RM. Titanium Activates the DNA Damage Response Pathway in Oral Epithelial Cells: A Pilot Study. Int J Oral Maxillofac Implants. 2017 Nov/Dec;32(6):1413-1420. doi: 10.11607/jomi.6077. PMID: 29140388
3. Søren Jepsen, Jack G Caton, Jasim M Albandar, Nabil F Bissada, Philippe Bouchard, Pierpaolo Cortellini, Korkud Demirel, Massimo de Sanctis, Carlo Ercoli, Jingyuan Fan, Nicolaas C Geurs, Francis J Hughes, Lijian Jin, Alpdogan Kantarci, Evanthia Lalla, Phoebus N Madianos, Debora Matthews, Michael K McGuir, Michael P Mills, Philip M Preshaw, Mark A Reynolds, Anton Sculean, Cristiano Susin, Nicola X West, Kazuhisa Yamazaki. Periodontal manifestations of systemic diseases and developmental and acquired conditions: Consensus report of workgroup 3 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. J Periodontol 2018 Jun;89 Suppl 1:S237-S248. doi: 10.1002/JPER.17-0733.

Biography

Paula Vaz has expertise in evaluation and a passion for improving health and well-being, focused on Dental Implant Complications and Orofacial Rehabilitation. Her open and contextual evaluation model based on responsive constructivists creates new pathways for improving healthcare. She has built this model after years of experience in research, evaluation, teaching and Clinical Practice. Both Clinic Practice (Clinica Paula Vaz, Prevage by Paula Vaz) Industry, Research and education institutions (FMDUP, LAETA, Porto University) allow to solve complications with Oral Rehabilitation (Carevage) with Dental Implants based on Science and Innovation.

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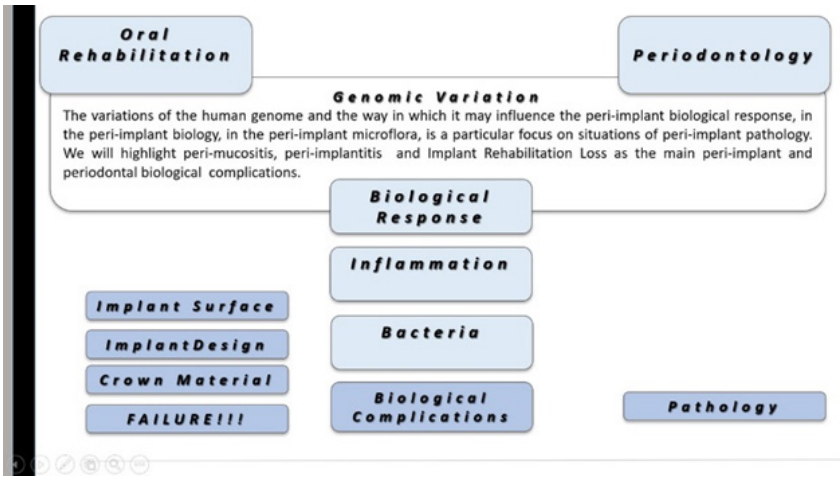

Figure 1: Genetics and Innovation on Dental Implants.