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Overview on the sustainable development of modern Dentistry for the prevention of Dental diseases, treatment with significant technological support and the safety of patients and dentists

Statement of the Problem: Caries, which affects 3.5-5 billion people and periodontal disease, with the inevitable toothlessness, have a wide impact on the development of systemic complications. The territorial extent of these diseases varies significantly between countries and strongly affects the Disability Adjusted Life Years (DALY) and Oral Health-related Quality of Life (OHRQoL). The program of egalitarianism in dental care is glorious, though utopian, as shown by the presented global statistics of expenditure on these purposes. Due to the populist approach, it is highly polemical to intend to strengthen dental prophylaxis instead of developing interventionist dentistry and its technological support. The prophylactic and therapeutic strategies undertaken as a result of the modification of the Deming circle through the idea of the principles of five are presented. The state of technological development of Dentistry 4.0 support is an element of the current stage of the industrial revolution of Industry 4.0, for which the extended holistic model was developed by the authors. Its application in Advanced Dental Engineering (ADE) points to a shift in the traditional relationship between the dentist and the dental engineer. New classes of implants and implant-scaffolds with a porous part integrated with the solid core were characterized, as well as engineering-biological materials using human living cells. The research on the importance of cone-beam computed tomography (CBCT) in the planning of prosthetic treatment as well as in the design and production of prosthetic restorations is described. A fully digital approach using computer-aided design and manufacturing (CAD/CAM) methods and additive manufacturing (AM) technologies, including selective laser sintering (SLS), are presented. Examples of dental treatment from the authors' own clinical practice are given. The systemic safety of patients and dentists in the world is presented. Instead of a passive strategy of using Personal Preventing Equipment (PPE), by introducing own strategy of active prevention of the spread of pathogenic microorganisms, including SARS-CoV-2. The ethical aspects of dentists' activities towards their own patients and the ethical obligations of the dental community towards society were discussed in detail.

Conclusion & Significance: The prospects for the development of modern dentistry are based on three pillars, ensuring a stable balance. Presented is the Dentistry Sustainable Development (DSD)> 2020 model, consisting of Global Dental Prevention (GDP), Advanced Interventionist Dentistry 4.0 (AID 4.0) and the Dentistry Safety System (DSS).



Figure 1: Model of the sustainable development of modern dentistry from 2020.

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.
4. Dobrzański, L.B. & Achtelik-Franczak, Anna & Dobrzańska, Joanna & Dobrzanski, Leszek. (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.
5. Peres, M.A.; et al. (2019) Oral diseases: A global public health challenge. *Lancet*, 394:249–260.
6. Watt, R.G.; et al. (2019) Ending the neglect of global oral health: Time for radical action. *Lancet*, 394: 261–272.

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 Koszalin, Poland. He worked in the years 1971-2017 at the Silesian 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 professor 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 University in Khmelnytsky (Ukraine) and in 2016 at the university of Miskolc (Hungary). His works are cited at least 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 referred 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 foresight.

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