7th International Congress of the Croatian Society for Dental Prosthodontics

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Invited lectures

11 THE USE OF DIGITAL DENTISTRY AND CAD-CAM TECHNOLOGY FOR ENHANCING CLINICAL OUTCOMES Arthur Cortes

Faculty of Dental Surgery, University of Malta, Valletta, Malta

Computer-aided design and computer-aided manufacturing (CAD-CAM) technology has evolved in parallel with its applications in dentistry, including a variety of new techniques for oral rehabilitation. These techniques generally differ from conventional analogue methods either in the way impressions are obtained (e.g. traditional impressions versus intraoral scanning) or in the way restorations are designed and fabricated (e.g. conventional wax modelling and casting versus CAD-CAM fabrication). The general advantages of the digital workflow with CAD-CAM over conventional workflows include reduced treatment time, shorter patient visits, decreased discomfort, elimination of plaster models and better predictability of the outcome. Another key feature of the digital workflow is the ability to merge and overlay three-dimensional (3D) data from various imaging sources to create a virtual patient. This approach enhances digital treatment planning and improves communication with patients. This lecture is divided into two main parts. The first part will introduce the key concepts and knowledge required to understand and apply digital workflows in diagnosis and multidisciplinary treatment planning in both private dental practices and integrated dental clinics. This will include a discussion of the pros and cons, economic considerations and clinical research related to digital dentistry. The second part of the lecture will focus on clinical cases and strategies for utilizing digital workflows and CAD-CAM technology to improve the predictability of clinical outcomes in patients undergoing prosthetic oral rehabilitation with or without dental implants.

12 HOW GUIDED IS GUIDED SURGERY – WHERE ARE WE NOW? Ali Tahmaseb

Faculty of Dentistry, University of Ghent, Belgium

Since the introduction of cone-beam computed tomography (CBCT) and intraoral scanners (IOS) in dental medicine, guided implant surgery has gained considerable popularity among dental clinicians. Numerous challenges - such as anatomical constraints and complex prosthetic rehabilitations - can now be anticipated and addressed through the use of these advanced technologies. In addition, with precise planning of the future implant position, the fabrication of the final prosthetic restorations can be considered prior to implant placement. To realize this possibility, several critical challenges must be overcome to increase surgical accuracy to a level where immediate final prosthetic restoration becomes clinically feasible.

This lecture will introduce a novel approach to facilitate this protocol in a simplified and interactive manner.

13 DIGITAL TRANSFORMATION IN DENTAL MEDICINE: PRECISION, SPEED, AND A NEW DIMENSION IN TREATMENT PLANNING Andreja Carek

School of Dental Medicine, University of Zagreb, Croatia

Digital technologies are reshaping the face of modern dental prosthodontics, enabling faster treatment planning, more precise diagnostics and seamless fabrication of restorative solutions. With advanced tools for designing models, splints and restorations, combined with the integration of 3D printing, clinicians are empowered to create personalized solutions directly in the dental office. The combination of sophisticated AI analytics and advanced radiological tools enables the automatic detection of caries, restorations, calculus, implants and potential anomalies, facilitating a rapid and standardised diagnosis. Visual interpretation through colour mapping and structured reports improves patients' understanding of their oral health, boosting confidence and engagement.

These digital tools establish a streamlined clinical workflow that reduces treatment time and optimises the quality of care. The flexibility of the system gives the clinician the ability to customise the treatment plan and control the entire process.

Digital transformation is not merely a technological advancement, but the key to building a dynamic, precise and patient-centred dental practice that delivers excellent clinical outcomes and elevates the standards of modern dentistry.

I4 POTENTIAL APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN DENTISTRY Marin Vodanović

School of Dental Medicine, University of Zagreb, Croatia

Artificial intelligence (AI) has been around for several decades, but its integration into everyday life is a relatively recent development. Initially, it was primarily applied in academic and government research institutions, but technological progress has led to its broader implementation in industry, commerce, medicine and dentistry. Considering the rapid pace of technological progress and the expanding scope of AI applications, this presentation aims to provide an overview of the potential of AI in medicine and dentistry, focusing on the benefits and challenges it entails.

The true potential of AI in these fields is only now beginning to emerge. As the tool of the future, artificial intelligence plays a key role in shaping the development of medicine and dentistry, particularly in the context of personalized healthcare, which promises significantly improved treatment outcomes.

15 MAXILLOMANDIBULAR JAW RELATIONS AND OCCLUSION IN THE ERA OF DIGITAL TECHNOLOGIES Ivica Pelivan

School of Dental Medicine, University of Zagreb, Croatia

The advancement and daily implementation of digital technologies in dental practices continue to grow rapidly. Traditional impression techniques are increasingly being replaced by the use of intraoral scanners (IOS), representing a significant technological leap in digital impression workflows, as well as in the precision of fit and marginal

210 Acta stomatol Croat. 2025;59(2):209-223.

adaptation of prosthetic restorations fabricated from intraoral scans.

However, an experienced clinician or a dental prosthodontics specialist may rightfully ask what has become of a crucial clinical phase in the digital dentistry era – the registration of intermaxillary relations and the subsequent occlusal accuracy of digitally fabricated prosthetic restorations.

This lecture will present an overview of recent scientific literature and provide clinical guidelines on how to implement intermaxillary relation registration into the digital workflow through simple and accessible procedures. Different methods for recording intermaxillary relations in a digital environment will be critically discussed, with emphasis on their practicality, accessibility, and clinical feasibility. Additionally, the lecture will address the influence of various analog-digital and fully digital methods of intermaxillary registration and mandibular movement tracking on occlusal precision and the long-term success of prosthetic restorations.

16 PROSTHODONTICS OF FORTHCOMING: INCORPORATING ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING Venera Bimbashi

Alma Mater Europaea College, Rezonanca Campus, Pristina, Kosovo

Artificial intelligence (AI) in dentistry is no longer a conceptual vision, but a rapidly evolving reality. AI has revolutionized both medicine and dentistry by providing innovative solutions and reshaping traditional practices. With machines capable of replicating intelligent human behaviour, AI is making significant strides in various domains. Its widespread global acceptance testifies to its transformative impact and intelligencedriven innovations.

In dental medicine - particularly in prosthodontics - AI represents a major turning point as it optimises the prosthetic design and fabrication of functional maxillofacial devices. It also enhances processes such as patient documentation, diagnostics, treatment planning and patient management, enabling dental professionals to work more efficiently, rather than harder. Although AI cannot yet replace the clinical expertise of dentists - as dentistry involves not only the diagnosis of disease, but also the correlation of clinical findings and comprehensive patient care - it serves as a powerful tool to advance and streamline the dental workflow.

The integration of AI and digitalization has introduced a new paradigm in dentistry, offering highly promising prospects. Nevertheless, the limited availability of accurate and comprehensive data remains one of the primary challenges for a wider implementation of AI.

To overcome this obstacle, dental professionals must prioritise the collection and input of authentic data into databases, forming a critical foundation for fully realising the potential of AI in the near future. This presentation will explore the current applications of AI in prosthodontics, its limitations and possible future directions of development in this field.

17 A COMPREHENSIVE OVERVIEW OF INTRAORAL SCANNING – PRODUCTS, LITERATURE, DIGITAL WORKFLOWS, AND HOW TO TRANSITION TO DIGITAL

Ahmad Al-Hassiny

Private Dental Clinic, Wellington, New Zealand

In this lecture, Dr Ahmad Al-Hassiny, founder of the Institute of Digital Dentistry (iDD), will provide a comprehensive overview of digital dentistry with a focus on intraoral scanners. The session will begin with a detailed comparison of major intraoral scanner brands, outlining their respective advantages and limitations. Are all scanners really the same? What distinguishes the best from the rest?

The presentation will then explore digital workflows, including 3D printing, milling, and the growing role of artificial intelligence in dentistry. Attention will be given to the latest scientific literature - what is supported by evidence and what is driven primarily by marketing? How can clinicians filter through the noise and make informed purchasing decisions for their practice?

Dr Al-Hassiny will share key criteria to consider when selecting an intraoral scanner and strategies to maximize return on investment. The lecture is based on real-world experience of a full-time clinician who has used every major intraoral scanner, most CAD software platforms and leading 3D printers and milling machines.

This unbiased market overview will guide clinicians through the entire digital workflow - from scan to design to production - and help them confidently adopt digital dentistry in a way that is both clinically effective and economically sustainable.

18 DIGITAL PRESCRIPTIONS

Dejan Lisjak

Private Dental Clinic Cerec Centar, Belgrade, Serbia

With the rise of new technologies, new clinical protocols are also emerging. On the one hand, the advancement of digital systems and artificial intelligence leads to the impression that the role of the dental technician is becoming obsolete. On the other hand, daily collaboration between clinicians and technicians has never been more important. This paradox reflects a deeper truth: there are digital tools, protocols and procedures tailored for various indications, but none of them are universally applicable to all clinical situations. No single technology can replace the clinical expertise required for delivering high-end dentistry.

However, digital workflows support the delivery of top-quality dentistry, which is now more creative and demanding than ever before. Continuous communication, collaborative treatment planning and synchronized process tracking represent up to 90% of therapeutic success. Digital protocols in collaboration with dental laboratories, chair-side CAD/CAM workflows, digital protocols in implant prosthodontics and the balance between "fast" and "slow" dentistry reflect the evolving preferences and needs of modern clinicians.

This "digital soup" contains numerous ingredients - tools and techniques that clinicians can mix and adapt to create their own personalized digital protocols, tested and refined in daily clinical practice. What does the future hold for digital dentistry? This lecture offers a journey through the colourful world of digital workflows and shares insights gained in the ongoing search for the ideal digital prescription.

19 THE CONCEPT OF PROSTHETICALLY DRIVEN PERI-IMPLANT SOFT TISSUE SHAPING

Matej Kuliš Driveto Dantel Dreatico, Liublian

Private Dental Practice, Ljubljana, Slovenia

The fully digital workflow in implant dentistry continues to expand. The development of digital dental equipment - CBCT devices, intraoral scanners and specialized software - has enabled prosthetically driven implant placement to become the standard protocol in implantology. This approach facilitates the optimal positioning of implants from a prosthetic point of view so that the restoration can achieve a desirable emergence profile and aesthetic outcome. The contour of the peri-implant soft tissue is also of paramount importance for both the aesthetics and long-term health of implant-supported restorations. Ideally, the profile of the peri-implant tissue should replicate that of a natural tooth.

In recent years, numerous publications have focused on the concept of "pink aesthetics". Most authors agree that achieving a gingival profile and height comparable to natural dentition remains a challenge in implant prosthetics. In order to fully utilise the benefits of prosthetically optimal implant positioning - which is predictably achieved using digital workflows - an additional step in the treatment sequence should therefore be considered: prosthetically guided conditioning of the peri-implant soft tissue. This supplementary procedure enables controlled adaptation of the soft tissue to the designed emergence profile and aims to replicate the natural gingival architecture and fully utilize the potential of digitally planned implant positioning for restorations on implants placed in healed sites.

110 THE EFFECTS OF THE DIGITAL WORKFLOW IN DENTISTRY ON THE DEVELOPMENT OF INNOVATIVE TECHNOLOGIES Robert Sader

Faculty of Dentistry, Goethe University Frankfurt, Germany

The advancement of the digital workflow, based on new medical 3D devices, has transformed the landscape of dental therapy. While treatment outcomes are increasingly optimized, the complexity of workflows has also risen, accompanied by escalating costs. These innovations have not only introduced new opportunities, but have also brought new challenges and risks, necessitating the development of new technologies or the revitalization of existing ones. Therefore, previously established techniques such as osseofixation could be revitalised and represent a potential alternative to osseointegration. However, if new digital technologies are successfully integrated with sound biological principles, new therapeutic avenues can emerge for the benefit of patients.

To explore these potentials, the lecture will present 3D surgical planning and CAD/ CAM-based manufacturing of patient-specific implants in dental implantology. It will demonstrate how digital technologies directly drive surgical innovation, including the development of new surgical tools such as laser osteotomy and 3D-printed dental implants that further improve both aesthetic and functional treatment outcomes.

This development will allow for implant-based dental rehabilitation in even the most complex cases that were previously considered untreatable. The next logical step is the integration of artificial intelligence into this digital ecosystem

111 DIGITAL TECHNOLOGIES IN IMPLANT PROSTHODONTICS – WHERE ARE WE TODAY? Anja Zembić

Private Dental Practice, Winterthur, Switzerland

Digital technologies have significantly advanced in dentistry, contributing to enhanced treatment efficiency and reduced therapeutic costs. Artificial intelligence is developing rapidly and is increasingly being integrated into dental practice. However, the question remains: do these innovations truly contribute to achieving predictable and long-term stable clinical outcomes?

Thanks to established computer-aided design and manufacturing (CAD/CAM) protocols, restorative materials have been refined - ranging from hybrid materials (ceramic-resin combinations) to highly aesthetic dental ceramics such as reinforced glass ceramics, and high-strength ceramics like zirconia. Today, multiple types of zirconia are available, differing not only in translucency, but also in fracture resistance. Clinicians often do not know exactly which material the dental technician has chosen, which may affect the treatment outcome.

To minimize the risk of ceramic fractures, restorations can be produced either with a minimal veneering ceramic layer (<0.5 mm) or as monolithic restorations without a veneering layer. When connecting these restorations to implants, prefabricated standardized components such as titanium bases are predominantly used.

This lecture will present the latest insights into advancements in implant prosthodontics and provide recommendations for a structured approach aimed at achieving predictable outcomes with fixed implant-supported prostheses in daily clinical practice.

112 THE AESTHETICS OF NATURE: FROM A BLANK CANVAS TO A WORK OF ART

Robert Pongrac

Private Dental Laboratory, Zagreb, Croatia

Staining various zirconia frameworks in dentistry is not merely a technical procedure - it is an artistic expression that demands precision, aesthetic sensitivity and a deep understanding of material science. Much like a painter starting with a blank canvas, the dental technician or clinician uses the zirconia structure as the foundation for creating a natural and harmonious smile.

Through the application of glaze colours and layered staining techniques, it becomes possible to reproduce the subtle nuances, textures, translucency, brightness and lustre of natural teeth. This presentation will explore the artistic potential of zirconia staining, emphasizing the importance of an individual approach to each patient and an understanding of the interplay between light and colour.

Special focus is placed on methods of layered staining, the use of glaze pigments to achieve optical depth and dynamism, and aesthetics that transcend technical execution. The staining technique adds depth and dimensionality - an illusion reminiscent of the delicate brushstrokes on a painter's canvas.

In our work, we employ a wide range of digital tools and software to approach the exact shade of natural teeth, including digital photography, colour measurement devices (such as spectrophotometers and colorimeters), software to determine tooth colour, and image editing programmes such as Adobe Lightroom, Procreate and Keynote.

The aim of this presentation is to demonstrate how the fusion of science, technology and art enables the creation of a smile that is not only functionally successful, but also aesthetically compelling and leaves a lasting impression of natural beauty.

113 DIGITAL OCCLUSION ANALYSIS – IS IT WORTH IMPLEMENTING IN CLINICAL PRACTICE?

Robert Ćelić

University of Zagreb, School of Dental Medicine, Croatia

Traditional methods for occlusal analysis in dental prosthetics and dentistry - such as articulating papers, shimstock foils, bite registration waxes and silicones - are widely used in daily clinical practice. However, these approaches only provide qualitative data and lack the ability to quantify the occlusal contact forces (both relative and absolute) and the temporal sequence of tooth contacts.

Digital occlusal analysis, using special devices and software systems (e.g. T-Scan), represents a significant technological advance in contemporary prosthodontics and dental medicine. It enables a more precise and objective evaluation of static and dynamic occlusal contacts, not only in comparison to traditional techniques, but also to virtual design software (CAD) and intraoral scanning systems, which offer only limited occlusal visualization and analysis. The clinical relevance of digital occlusal analysis has been demonstrated in various dental disciplines, including prosthodontics, implantology, orthodontics, periodontology and temporomandibular disorders.

The use of digital systems allows the real-time quantification of occlusal force magnitude and distribution, reducing the clinician's subjectivity when interpreting occlusal contacts and increasing the reliability of the analysis. The integration of digital methods into daily clinical workflows is not merely a technological improvement, but a necessity to ensure predictable diagnostic accuracy and long-term therapeutic success.

7th International Congress of the Croatian Society for Dental Prosthodontics

This lecture aims to compare qualitative (analogue) and quantitative (digital) occlusal analysis techniques based on current scientific literature and clinical experience. The focus will be on the practical application, advantages and limitations of analogue versus digital occlusal analysis.

Poster presentations

P1 GINGIVAL BIOTYPE REVISITED: PROSPECTIVE RADIOGRAPHIC STUDY USING CONE BEAM COMPUTED TOMOGRAPHY

Vedrana Braut^{1, 2°}, Vivianne Chappuis², Robert Ćelić³, Michael M. Bornstein⁴, Daniel Buser⁵

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Introduction: The objective of the present study was to determine whether the clinical categorization of the ginigival biotype by the periodontal probe visibility test shoows a positive correlation with the soft tissue thickness measured by cone beam computed tomography.

Materials and methods: Based on the clinical examination, the maxillary anterior teeth of 45 patients were categorised according to the gingival biotype. This evaluation was based on the visibility of the periodontal probe through the gingival margin while probing the sulcus at the midfacial aspect of the respective tooth. All subjects were then scanned using the Morita 3D Accuitomo 170 (FOV 6X6cm and 8X8cm). The vertical distance from the CEJ to the facial alveolar crest was determined at the sagittal midpoint of each maxillary anterior tooth. The corresponding thickness of the soft tissue was measured at the same level.

Statistical analysis: All data were summarised in groups P1, C, I1 and I2 for descriptive analysis, as the side paired Wilcoxon tests showed no significant difference between the left and right tooth positions. Parametric (t-test) and non-parametric (Mann-Whitney test, Kruskal-Wallis test with post-hoc by Dunn) statistical methods were applied. The significance level was set at 0.05. In order to find cut-off values and prognostic relevance, a ROC analysis and optimisation using the Youden index were performed.

Results: In the thin biotype group, subjects had a mean distance between CEJ and initial bone crest of 2.03 to 3.32 mm, while subjects in the thick biotype group were between 2.22 and 2.82 mm. There was no statistically significant difference between the two gingival biotypes with regard to this parameter. There was a statistically significant difference in soft tissue thickness at the alveolar crest between the two gingival biotypes in all teeth. The ROC analysis showed that I2 and C at alveolar crest level present the highest prognostic significance for the gingival biotype. The cut-off value between thick and thin biotype was 1.44 mm and 1.34 mm for I2 and C, respectively.

Conclusion: Clinical categorization of the ginigival biotype by the probe visibility test has proven a positive correlation with soft tissue thickness measured by cone-beam computed tomography. CBCT measurement of soft tissue thickness at the level of the facial alveolar crest is a viable option for determining the gingival biotype in modern daily practice.

Keywords: Probe visibility test; Gingival biotype; CBCT; Dental implants

P2 SINGLE DAY RESTORATIONS USING THE CEREC SYSTEM

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Introduction: The CEREC system is a pioneering digital dentistry tool that enables the fabrication and placement of veneers and crowns in a single dental visit, also known as same-day dentistry. The combination of digital impressions, precise design software, and in-office milling units will be presented.

Materials and methods: The CAD/CAM workflow, which involves three key steps, is presented on two case reports. Digital scanning involves an intraoral scanner that captures a precise 3D impression of the prepared tooth, ensuring high accuracy and reducing the need for traditional impression materials. Digital scanning is followed by computer-aided design (CAD) or processing of the scanned data using specialized software, which the dentist uses to design the restoration based on tooth morphology, occlusion and aesthetics. This is followed by computer-aided manufacturing (CAM), i.e.

7th International Congress of the Croatian Society for Dental Prosthodontics

the transfer to a milling unit that carves the restoration from high-quality ceramic, zirconia, or composite blocks. Lithium disilicate (e.g. IPS e.max), feldspathic porcelain, and hybrid ceramics are popular materials due to their durability, strength and aesthetic qualities.

After milling, the restorations are often polished, stained or glazed to improve the aesthetics. In the final step, the restoration is bonded directly to the prepared tooth using adhesive techniques.

Conclusion: The integration of CAD/CAM technology and the CEREC system has revolutionized dental treatment by combining precision, speed and convenience. This method improves clinical efficiency, increases the durability of the restoration and enhances the patient experience. By using advanced ceramic materials and streamlined workflows, one-day dentistry has become a reliable solution for long-lasting, naturallooking restorations in a single visit.

Keywords: CAD/CAM technology; CEREC system; Same-day dentistry; Dental veneers; Dental crowns

P3 PERCEPTION OF TOOTH COLOUR LIGHTNESS INCREASE AMONG GENERAL POPULATION AND DENTISTS

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Introduction: Comparison of the perception of tooth colour (lighter central incisor) in the general population, in general dentists and in 3 groups of specialists (prosthodontics, periodontists and orthodontics).

Materials and methods: Front teeth and lips were photographed while smiling from a distance of 15 cm using a mobile phone camera (Huaweii Pro20, Shenzhen, Gunagdong, China). The camera settings of the smartphone were set to the default values before taking the photos and the Smile Lite MDP device (Smile Line, St-Imier, Switzerland) was installed.

A total of 8 photos were taken, the initial one (WB = 5500 K) and 7 photos each with 200 K more than the previous one (WB 5300 K, 5100 K, 4900 K, 4700 K, 4500 K, 4300 K, and 4100 K) to obtain 7 different luminance levels of a tooth (increase in lightness of tooth 11). From all 7 manipulated photos, tooth 11 was cut and pasted into the source photo (Adobe Photoshop 2021) taken at WB 5500 K. In this way, a set of 8 photos was made (the initial photo plus 7 manipulations of a gradually brightening tooth 11). A total of 136 evaluators participated. They were asked one question: Mark the photo where you first notice the change.

Results: The results showed that the general dentists only noticed the change when the tooth was lighter in colour. The general population and the orthodontists were the last group to notice the change, while the periodontists and the prosthodontists noticed that the tooth was lighter from the first manipulations of the tooth colour. The independent samples t-test revealed statistically significantly lower values for periodontists, general dentists and prosthodontists (p<0.001), and orthodontists (p<0.05), i.e. all groups of dentists noticed the manipulations earlier compared to the general population.

Conclusion: The perception of the increase in the lightness of teeth varies between the general population, general dentists and specialists in prosthodontics, periodontology and orthodontics.

Keywords: Perception; Tooth; Colour; Dentist; Population

P4 ATTITUDES AND KNOWLEDGE OF DENTAL STUDENTS REGARDING CAD/CAM TECHNOLOGY

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Objectives: CAD/CAM technology represents an innovative digital approach in dental medicine, making it essential to provide adequate training in its implementation. The aim of the study was to assess the attitudes and knowledge of dental students at the Faculty of Dental Medicine and Health in Osijek regarding the use of CAD/CAM in order to evaluate their level of knowledge and identify the need for additional education. Materials and methods: The study included 102 dental students: 44 students (44.88%) were enrolled in preclinical training (PT) and 58 students (55.12%) in clinical training (CT). The average age of the participants was 24.38 years. Among the respondents, 41 (40.20%) were male. Participants completed an anonymous 21-item questionnaire developed for the study. The collected data were statistically analysed with significance level set at p<0.05.

Results: Although 80.39% of students were exposed to CAD/CAM as part of their standard curriculum (p<0.05), less than half (45.10%) had the opportunity to engage with it in a practical setting. Regardless of their level of study, most students (88.24%) had not taken any extracurricular courses on CAD/CAM (p<0.05). Twenty-four PT students (54.5%) and 19 CT students (75%) did not feel adequately informed about this topic (p<0.05). Furthermore, 85.29% of students expressed interest in additional education in CAD/CAM and believed that it was worth investing in such education. The majority of students (77.45%) agreed that CAD/CAM offers a significantly faster alternative to conventional techniques and 4.90% considered it too complex or not cost-effective (p<0.05). The results also showed a statistically significant difference in knowledge and attitudes between students with family members working in dentistry and those without such a background (t(100)=4.12, p<0.05).

Conclusion: Although CT students demonstrated significantly greater knowledge and more positive attitudes toward CAD/CAM compared to PT students and although the majority of students had heard of CAD/CAM, it can be concluded that dental students are generally insufficiently informed about this topic. There is a clear need for improved education on CAD/CAM. Greater knowledge and more favourable perceptions of CAD/CAM were observed among students with family members in dentistry, suggesting that early and personal exposure to the profession may positively influence attitudes towards modern technologies in dental medicine.

Keywords: Computer-aided design; Dental education; Dental students; Questionnaires; Attitude to health

P5 COMBINED PROSTHODONTIC SOLUTION IN A PARTIALLY EDENTULOUS PATIENT – A CASE REPORT

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Introduction: Complete oral rehabilitation in edentulous and partially edentulous patients presents a significant challenge in modern prosthodontics. This case report describes the rehabilitation of a female patient with complete maxillary edentulism and partial mandibular edentulism using a combined digital/analogue approach for fixed and removable prostheses.

Case report: The treatment plan included the fabrication of a conventional complete (metal framework supported) maxillary denture and a combined fixed and removable prosthodontic solution for the mandible (metal framework supported). The lower jaw rehabilitation was achieved with two metal-ceramic crowns (digitally designed and printed), two ball attachments for enhanced prosthesis retention, and a removable partial denture. With this approach, the patient's natural vertical and horizontal dimensions were successfully restored, ensuring optimal function and high aesthetic standards. Through careful clinical and laboratory procedures, the rehabilitation resulted in improved masticatory efficiency, phonetics and facial aesthetics, which significantly improved the patient's quality of life. The use of ball attachments contributed to the stability and retention of the lower prosthesis, preventing excessive movement and ensuring long-term success.

Conclusion: This case highlights the importance of a comprehensive treatment strategy in achieving functional and aesthetic rehabilitation in partially edentulous patients. The combination of fixed and removable prostheses provides a cost-effective and efficient solution that preserves the oral structures while meeting the patient's functional and aesthetic expectations.

Keywords: Crown; Denture; Retention; Stability; Aesthetics

P6 COMPARISON OF ANALOG AND DIGITAL PROTOCOLS FOR THE FABRICATION OF A MAXILLARY COMPLETE ACRYLIC DENTURE – A CASE REPORT

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Introduction: Advances in digital technology have significantly changed prosthetic rehabilitation, particularly in the fabrication of complete dentures. This case report compares the analogue and digital protocols for the fabrication of a maxillary complete acrylic denture in the same patient. The aim was to assess the functional and aesthetic differences between dentures fabricated using conventional methods and those produced with digital techniques.

Case report: The patient was provided with two maxillary complete dentures - one was

fabricated using the conventional analogue method in a dental office and laboratory, the other using a digital approach. The digital denture was designed using an intraoral scanner to capture the edentulous jaw, functional impression and bite registration templates. After digital data processing, the denture was milled from a prefabricated acrylic block, incorporating prefabricated teeth into the design. After completion, the patient tested both dentures and evaluated their functionality and comfort. The results indicated that the digital denture had a superior suction effect and offered better retention and stability compared to the analogue denture.

Conclusion: This case study highlights the advantages of digital denture fabrication, particularly in terms of precision, retention and patient comfort. While the analogue protocol remains a reliable method, digital technology offers an efficient alternative with the potential to improve prosthetic rehabilitation outcomes. Further research and clinical studies are needed to fully understand the long-term benefits of digital dentures. Keywords: Complete denture; Digital dentistry; Analog fabrication; Retention; Stability

P7 COMPARISON OF ANALOG AND DIGITAL TECHNIQUES FOR FABRICATING A MAXILLARY PARTIAL DENTURE WITH A METAL BASE – A CASE REPORT Dubravka Knezović Zlatarić^{1, 2*}, Ivana Bergovec², Leonard Francetić²

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Introduction: The development of digital technology has had a significant impact on prosthetic dentistry, offering new possibilities for the fabrication of partial dentures. This case report compares the analogue and digital techniques used in the fabrication of a maxillary partial denture with a metal base for a patient with existing fixed restorations featuring attachments. The patient wished to retain these attachments, which posed a challenge for the design and fabrication of the new partial denture.

Case report: The patient required a new maxillary partial denture while retaining her existing fixed prosthetic work, which contained attachments of satisfactory quality. The initial attempt to fabricate the partial denture using conventional analogue methods was unsuccessful, probably due to the non-parallel alignment of the attachments, which prevented the framework from fitting correctly. To overcome this challenge, a digital approach was chosen. Intraoral scanning was used to capture the exact geometry of the edentulous areas and the existing attachments. The digital design process made it possible to compensate for the misalignment of the attachments, ensuring a precise and functional fit. The metal framework of the denture was produced using 3D printing technology, ensuring a high degree of accuracy and adaptability to the patient's oral conditions. On delivery, the patient reported excellent comfort and satisfaction with the new digital partial denture. The improved fit and stability provided by the digitally designed framework improved both function and aesthetics, making it a superior solution compared to the conventional approach.

Conclusion: This case study underscores the advantages of digital fabrication in prosthodontics, especially in complex cases with existing fixed restorations. The ability to digitally design and 3D print metal frameworks allows for greater precision and overcoming challenges that are difficult to address with traditional analogue techniques. Digital technology is therefore a valuable alternative for achieving optimal patient outcomes in removable prosthodontics.

Keywords: Partial denture; Digital dentistry; Metal framework; 3D printing; Prosthetic attachments

P8 DIGITAL ANALYSIS OF OCCLUSAL CONTACTS IN MAXIMUM INTERCUSPATION USING THE MEDIT I700 INTRAORAL SCANNER – A CASE REPORT

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Introduction: The introduction of intraoral scanners in prosthodontics allows not only the digital recording of the patient's current oral condition, but also the performance of complex analyses that were traditionally difficult, time-consuming and relatively imprecise in an analogue setting. Digital scanning enables a more detailed and precise visualization of occlusal contacts, which are often difficult to see in a conventional intraoral examination. With the help of the scanner application, it is possible to identify the patient's occlusal contacts and their intensity with greater accuracy.

Case report: A patient underwent a digital occlusal analysis with the MEDIT I700 intraoral scanner. The scanner captured the maxillary and mandibular arches in maximum intercuspation and registered the occlusal contacts with a high degree of precision. The scanned data was saved as JPEG images and later analysed using the GIMP application, which allowed quantification of the pixel values corresponding to different occlusal pressure intensities. This digital approach made it possible to evaluate the occlusal contacts in various mandibular positions, ensuring a more reliable and reproducible analysis compared to the traditional methods using articulating paper. The scanner allowed for better visualization of occlusal discrepancies that would have been challenging to detect intraorally, so that more precise adjustments could be made if necessary.

Conclusion: This case report highlights the advantages of digital occlusal analysis using an intraoral scanner. The ability to evaluate occlusal contacts digitally provides a more objective and accurate assessment compared to conventional analogue methods. By utilising software tools to quantify occlusal forces, clinicians can achieve a higher level of diagnostic accuracy, improving the quality of prosthetic and restorative treatments. Keywords: Intraoral scanner; Occlusal analysis; Digital dentistry; Maximum intercuspation; Prosthodontics

P9 DIGITAL FABRICATION OF THE KOIS DEPROGRAMMER FOR ACCURATE MANDIBULAR POSITIONING

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Introduction: Positioning the mandible in centric relation traditionally relies on various analogue techniques, which can often be unreliable. These methods depend on the patient's concentration, muscle relaxation, and the skill and experience of the dentist. In addition, the involvement of a lab technician is required in some cases, which increases the time, material costs and complexity. The digital approach offers a more efficient and precise solution. By scanning both jaws and digitally determining the position of the centric relation, a front deprogrammer can be designed in just a few minutes, ensuring optimal mandibular positioning. The deprogrammer is then 3D printed, making the process significantly faster and more reproducible.

Case report: A patient required accurate mandibular positioning for a prosthetic treatment. The traditional analogue deprogramming methods proved to be inconsistent and time consuming. A digital workflow was implemented using an intraoral scanner to capture both the maxillary and mandibular arches. The patient was guided into the correct centric relation position, which was then scanned. Using digital design software, a front Kois deprogrammer was designed and optimised within minutes. The digital design allowed for highly accurate customisation of the deprogrammer to the patient's individual characteristics, eliminating the need for multiple corrections. This method reduced reliance on patient cooperation and muscle relaxation during impression-taking.

Conclusion: This case highlights the advantages of digital fabrication in mandibular positioning. The ability to digitally design and 3D print the Kois deprogrammer ensures greater precision, efficiency and reproducibility compared to traditional analogue methods. Digital workflows simplify the process and reduce chairside time, material costs and dependence on external laboratories. The implementation of intraoral scanning and 3D printing in prosthodontics significantly improves the accuracy of centric relation registration.

Keywords: Kois deprogrammer; Digital dentistry; Intraoral scanner; Mandibular positioning; 3D printing; Centric relation

P10 FABRICATION OF COMPLETE DENTURES IN A PATIENT WITH MEDICATION RELATED OSTEONECROSIS OF THE JAW - CASE REPORT

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Background: Medication related osteonecrosis of the jaw can be difficult to treat due to different jaw defects.

Case report: In this case report, a patient with medication related osteonecrosis of the jaw (MRONJ; female, 74 years) is presented. The anamnesis showed a history of breast cancer and long-term therapy with Zometa (four years, every four weeks), which was recently replaced by Ibat (50 mg per os daily). Clinical examination revealed exposed bone surrounded by inflamed mucosa. The patient stated that tooth 43 had been extracted six months previously by her general dentist and that she had been referred to the School of Dental Medicine due to prolonged post-extraction inflammation. The patient's symptoms included pain at the site of the inflammation. After a detailed examination and medical history, a diagnosis of MRONJ was made and a panoramic radiograph confirmed the clinical diagnosis. Prior to the fabrication of complete dentures, it was decided to perform the extraction of teeth 17 and 27 and the smoothing of the necrotic bone margins at the Department of Oral Surgery. Ibat therapy was discontinued one month before the operation and resumed one month after the operation. Antibiotic

7th International Congress of the Croatian Society for Dental Prosthodontics

prophylaxis (Clavocin) was also administered for seven days. Two months after the surgery, an upper and a lower complete dentures were fabricated. Four months after the first operation, satisfactory bone healing had not been achieved and persistent inflammation was visible. It was decided to repeat the surgery, but this time a more radical approach was taken and all the necrotic bone sequestra was removed and the bone cleaned. The patient was again prescribed the same antibiotic prophylaxis and the Ibat therapy was discontinued. Two months after surgery, successful healing was evident and hard denture relining was made.

Conclusion: Prosthetic therapy in patients with bone defects, such as those of MRONJ, represents a great challenge for the clinician. Such patients require frequent follow-up appointments. If necessary, a hard or soft prosthetic relining can be applied to dentures. **Key words:** Dentures; Osteonecrosis; Relining

P11 POSSIBILITIES OF USING DIGITAL TECHNOLOGIES IN PUBLIC HEALTHCARE SYSTEMS

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Introduction: Digital technologies, including CAD/CAM systems and 3D printing, are rapidly transforming dental prosthetics, offering potential for improving precision, efficiency, and accessibility of therapy. However, the implementation of these technologies in clinical practice, especially in public healthcare systems, requires a systematic assessment of their actual value compared to traditional methods. There is a lack of a standardised framework for comparing different digital solutions based on a broader range of relevant criteria.

Goals: The aim of this paper is to present the concept of an "indexed score" as a tool for the structured evaluation and comparison of different 3D digital technologies used in the fabrication of specific dental prosthetic restorations.

Methods: A composite index was developed that quantifies and integrates key aspects of the application of digital technologies. The index focuses on cost efficiency, which is divided into the following components:

- Ease of application and integration: The ease with which the technology can be introduced into existing clinical/laboratory workflows and the need for additional training
- Potential to replace traditional technologies: The possibility of completely or partially abandoning conventional procedures
- Quality: Impact on the precision of fit, aesthetics, comfort and durability of the restoration
- Time efficiency: Total time from impression taking/scanning to delivery of the finished restoration (patient waiting time)
- Resource utilization: Material consumption and time spent by clinicians and dental technicians
- Investment requirements: The need to acquire new, often expensive equipment and software
- Environmental component: Impact on the environment (e.g. waste reduction, energy consumption).

Discussion and conclusion: Various digital workflows for fabricating were evaluated and compared according to this index, possibly in the form of a ranking list. The proposed index provides a structured, multi-criteria framework for the objective assessment and comparison of digital technologies in prosthodontics and suggests printed occlusal splints, printed complete dentures, printed partial denture frameworks, printed hybrid ceramic crowns and monolithic zirconia crowns as digital technologies for entry into the public health system.

Keywords: Tier list; Dental health services; Dental CAD/CAM; Dental 3D printing

P12 THREE-DIMENSIONAL ANALYSIS OF THE POSTERIOR WALL INCLINATION OF THE TEMPOROMANDIBULAR JOINT ARTICULAR EMINENCE

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Objective: The anatomy of the temporomandibular joint (TMJ) has been the subject of numerous studies, with the inclination of the posterior wall of the articular eminence (AEI) being an important biomechanical factor in mandibular movements. The purpose of this research was to investigate the AEI values on sections obtained from digital imaging of articular eminence.

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Materials and methods: The study was conducted on digital scans of 60 TMJ articular

eminences (30 from the left and 30 from the right side). Silicone impressions of the articular eminence and fossa were made on skulls of the modern Croatian population (20th century), which were then scanned using an Atos Core 135 optical scanner. Measurements of AEI were taken through 5 virtual sections of articular eminence, from lateral to medial, with a 4 mm distance between consecutive sections (the first section being the most lateral). The AEI was defined as the angle formed by the Frankfurt horizontal plane and the line connecting the highest point of the glenoid fossa to the lowest point of the articular eminence. The results were interpreted with a significance level of 0.05.

Results: In the samples from the right side, the highest AEI value was recorded in the second section (36.2°), while in the samples from the left side, the highest AEI value was recorded in the fourth section (37.9°). The differences in AEI values between the sections of the same articular eminence were not always statistically significant, nor were the differences in AEI values between the right and left sides (p>0.05).

Conclusion: AEI values vary depending on the measurement location through the articular eminence from lateral to medial. Higher AEI values are most commonly measured in the second, third and fourth sections, while lower AEI values are most frequently found in the first and fifth sections.

Keywords: Temporomandibular joint; Croatia; Dentistry

P13 ANALYSIS OF ENDODONTIC TREATMENT IN ABUTMENT TEETH SUPPORTING FIXED PROSTHETIC RESTORATIONS

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Objective: The evaluation of the condition of teeth that serve as abutments for fixed prosthetic restorations is crucial for the planning of prosthetic therapy. The aim of this study was to assess the endodontic treatment of maxillary and mandibular incisors – teeth that serve as abutments for fixed restorations.

Materials and methods: The study was conducted using orthopantomograms stored in the archives of the Clinical Department of Prosthodontics at Dubrava University Hospital. The study included only incisors from the upper and lower jaw that served as abutments for fixed restorations. Using an appropriate computer program for analysing orthopantomograms, the distance between the radiological apex of the tooth and the end of the root canal filling was measured in millimetres. On this basis, the root canal filling was categorised as either too short (distance greater than 2 mm), normal (distance less than 2 mm) or overfilled (exceeding the apex). The results were analysed at a significance level of p < 0.05.

Results: Normal filling was observed in the majority of the upper incisors (53%) and a similar result was found for the lower incisors (70%). Overfilling was observed in a small number of cases in both upper and lower teeth (2%). Shorter endodontic fillings were observed more frequently: 45% of the upper teeth and 28% of the lower teeth showed this condition. The differences observed were statistically significant (p < 0.001).

Conclusion: On the basis of the conducted research and the results obtained, it can be concluded that, despite a higher number of well-performed endodontic treatments on upper and lower incisors, there are a considerable number of inadequately filled root canals on teeth that serve as abutments for fixed prosthetic restorations. This highlights the need to improve the quality of endodontic treatments and the necessity for additional training for dentists.

Keywords: Teeth; Endodontically treated; Dentistry; Prosthodontics

P14 OCCLUSAL TRAUMA OF IMPLANT-PROSTHETIC RESTORATION – CASE REPORT

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Background: Unstable occlusion can develop different symptoms in different patients. Case report: This case report presents a patient who presented to the prosthodontic clinic with pain around a dental implant in position 15. The patient was female and 65 years old. She suffers from lung cancer. The treatment against the cancer started 3 years ago (iv. bisphosphonate every 4 weeks), while the immunotherapy against the recurrence of the cancer was recently stopped (atezolizumab). Other medications include fexofenadine hydrochloride and metformin chloride. The patient came after a specialist periodontological treatment (around the implant 15), and after a consultation with an oral surgeon (the suspicion of osteonecrosis was dismissed). The pain around the dental implant 15 started 4 months ago. The upper jaw was rehabilitated with an implant prosthodontic restoration (all on five). The implants were placed 4 years ago and a new prosthodontic restoration was made a few months ago (due to a ceramic fracture of the first

Acta stomatol Croat. 2025;59(2):209-223.

7th International Congress of the Croatian Society for Dental Prosthodontics **215**

restoration). X-ray examination revealed bone loss around the dental implant 15 and intraoral examination showed premature tooth contact (in the upper right premolar/molar region) with a visible lateral displacement of the mandible to the left. Analysis of the study casts (in centric position) revealed premature contact on teeth 14 and 15, while the remaining teeth were not in occlusion. A stabilisation splint was made, and the patient was referred to the clinic where rehabilitation for occlusal equilibration was performed. Conclusion: A stable occlusion is necessary for the long-term function of any prosthetic restoration. Occlusal trauma affects the health of the gingiva around dental implants. **Keywords:** Occlusion; Occlusal trauma; Dental implants

P15 FINITE ELEMENT ANALYSIS OF STRESS DISTRIBUTION IN COMPLETE DENTURES WITH VARYING OCCLUSAL RELATIONSHIPS

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Introduction: Complete dentures are subject to significant load variations during masticatory function. The stress patterns within complete dentures are different for each patient and depend on many factors, such as the thickness of the acrylic base, the uneven geometries of the complete dentures, the acrylic material used, the muscle strength, the nature of the underlying soft tissues, the stability of the denture base, and the shape and position of the acrylic teeth (occlusal contacts).

Research objective: This study is based on the finite element analysis of numerical models of complete dentures and their mechanical compression testing in two selected occlusal relationships (eugnathic and progenic) under average bite forces (100 N and 200 N). The objective of the research was to determine and monitor the areas of load transfer from dental contacts through the denture base components, aiming to identify potential locations on the complete dentures (acrylic base and acrylic teeth) where fractures may occur due to equivalent stresses (i.e. stresses that exceed the strength limits of the material).

Materials and methods: To develop three-dimensional spatial models of complete dentures for numerical simulation (finite element analysis) in eugnathic and progenic occlusal relationships, upper and lower acrylic dentures were digitally scanned using a threedimensional computerized tomography system (Soredex Scanora 3D, Biotech, Hong Kong). The mechanical properties of the acrylic teeth and the base material were measured, including tensile and compressive strength, modulus of elasticity, and Poisson's ratio.

Results: Experimental compression tests on actual acrylic complete dentures in the eugnathic relationship, performed on a universal testing machine, revealed that fracture of the acrylic base occurred centrally, indicating a higher probability of cracking in the base due to the stress concentration in the acrylic material. In contrast, in the progenic occlusal relationship, a longitudinal fracture of the acrylic teeth was observed. The numerical results showed a similar pattern to the experimental investigations and confirmed the presence of stress-prone regions that correlate with potential and actual fracture sites depending on the occlusal contact pattern between the acrylic teeth.

Conclusion: Under compressive loading, a complete denture behaves as a load-bearing structure that redistributes forces from the contact points of the acrylic teeth to the regions of the acrylic base.

Keywords: Finite element analysis; Stress distribution; Complete dentures; Bite force; Eugnathic and progenic occlusal relationship

P16 FABRICATION OF DIGITAL COMPLETE DENTURES USING CAD/ CAM AND 3D PRINTING TECHNOLOGIES – CASE REPORT

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Introduction: This case report presents the clinical and laboratory application of digital technologies in the fabrication of complete dentures using a reference protocol based on the patient's existing conventional complete dentures.

Case report: A new complete dentures were fabricated over the course of three clinical appointments. Functional impressions and maxillomandibular records were scanned extraorally using an intraoral scanner (3Shape Trios 5, Denmark). The resulting STL files of the functional impressions and intermaxillary registrations were imported into CAD software (exoCAD, Complete Denture Module, Germany), where the virtual design process was performed. To validate the virtual design, trial dentures were 3D printed and used to assess the seal (retention), aesthetics of the tooth position, phonetics (speech test), as well as static and dynamic occlusal contacts using articulating paper. Based on

the final virtual design, fabrication was carried out in parallel using two digital manufacturing technologies: CAD/CAM milling (imes-icore, Germany), in which the denture base and teeth were milled separately from acrylic blocks, and 3D printing (Asiga, Australia), in which the base and teeth were printed separately using light-cured acrylic resin. In both cases, the denture base and teeth were bonded with the same adhesive system (Bredent visio.link + crea.line, Germany).

Discussion: Digitally fabricated complete dentures, whether milled or 3D printed, offer greater precision, reproducibility and a shorter fabrication time. The digital design work-flow allows for rapid replication and customisation and offers the option of archiving the digital denture files. However, 3D printed complete dentures exhibit greater porosity and lower mechanical resistance compared to milled or conventionally processed dentures (flasks). The cost of digital fabrication equipment and software is relatively high, and the current aesthetic options - especially in terms of tooth colour and translucency - are still somewhat limited when compared to conventional dentures.

Conclusion: This case demonstrates that the fabrication of complete dentures using CAD/CAM and 3D printing technologies enables a predictable and accurate workflow. The approach offers a simplified clinical protocol, reduced fabrication time, and improved accuracy of maxillomandibular records and functional adaptation.

Keywords: Digital complete denture; Intraoral scanner; CAD/CAM technology; 3D printing.

P17 RESIDUAL METHYL METHACRYLATE CONTENT IN MATERIALS FOR DIGITAL DENTURE BASE FABRICATION

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Aim of study: Pre-polymerised discs are used for the subtractive production of denture bases. The polymerisation process is carried out in the factory under controlled conditions and should result in a material with better mechanical properties compared to conventional heat-polymerised polymethyl methacrylate (PMMA) materials. The degree of monomer conversion should be higher, with better cross-linking between the polymer chains and with a lower residual monomer content. On the other hand, the materials for the additive manufacturing of denture bases are polymerized with light, in two steps, and the resins used are chemically significantly different from conventional PMMA materials. The purpose of this study was to investigate the residual monomer content of methyl methacrylate (MMA) in materials used for the digital fabrication of denture bases.

Materials and methods: Five different materials were used to produce the digital denture base: three for subtractive manufacturing and two for additive manufacturing. One conventional heat-polymerized PMMA material was used as a control group. The residual monomer content was determined using High Performance Liquid Chromatography (HPLC) method according to ISO specification 20795-1:2013.

Results: Compared to the control group, two subtractive manufacturing materials had a statistically significantly higher residual monomer content and did not meet the criteria of ISO specification 20795-1:2013, while the third subtractive manufacturing materials had the lowest average value in this study. Both additive manufacturing materials showed lower values compared to the control group, but the difference was not statistically significant (p < 0.05).

Conclusion: The choice of denture base fabrication technology is not the determining factor for achieving lower MMA residual values, but rather the choice of the material itself.

Keywords: CAD CAM; Denture base; Methyl methacrylate

P18 ORAL REHABILITATION OF A SEVERELY ATROPHIC MAXILLA AND MANDIBLE - A CASE REPORT

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Introduction: The rehabilitation of patients with severe alveolar ridge resorption requires careful planning and the application of contemporary technologies. This case report presents the rehabilitation of a patient with a partially dentate maxilla and a completely edentulous mandible. Due to the significant atrophy and reduced retention surfaces, a digitally planned and 3D-printed metal base was selected, integrated with the external component of a telescopic crown.

Case report: The patient presented to the Department of Removable Prosthodontics seeking complete oral rehabilitation as she was dissatisfied with her old, inadequate dentures, which lacked retention and stability. Clinical examination and orthopantomography revealed near-total resorption of the mandibular ridge and pronounced atrophy

216 Acta stomatol Croat. 2025;59(2):209-223.

7th International Congress of the Croatian Society for Dental Prosthodontics

of the maxilla with two canines, one of which was indicated for extraction. To improve retention, a telescopic crown was planned on the remaining maxillary canine. Using a combination of digital and analogue techniques, a maxillary overdenture with a metal base retained by a telescopic crown on the upper right canine and a complete mandibular denture were fabricated. This approach provided satisfactory aesthetics and optimal function - including phonetics and mastication - and significantly improved the patient's quality of life.

Conclusion: By combining analogue and digital workflows, successful rehabilitation was achieved in an originally complex clinical situation. The digital design enabled optimal adaptation of the metal base to the anatomical conditions and improved the stability and accuracy of fit of the remaining abutment. The use of 3D-printed metal components contributes to greater accuracy and predictability in prosthetic fabrication. This case highlights the importance of integrating digital technologies in the treatment of complex edentulous cases.

Keywords: Overdenture; Telescopic crown; Digital dentistry; Metal base; 3D printing

P19 PROSTHETICALLY GUIDED IMMEDIATE IMPLANT PLACEMENT WITH INDIVIDUAL SOFT TISSUE SHAPING – A CASE REPORT

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Introduction: The emergence profile and the stability of the peri-implant soft tissue are critical factors for the aesthetic and biological success of immediate implant placement. A well-contoured emergence profile allows for optimal gingival adaptation, the formation of a biological width and the preservation of the interdental papillae. This case report emphasizes the importance of using a customized healing abutment to achieve an optimal emergence profile.

Case report: The patient presented for prosthetic rehabilitation of the lower right first premolar, for which clinical and radiographic evaluation indicated extraction. It was decided to proceed with implant placement. After an atraumatic extraction, the goal was to preserve the existing alveolar ridge as much as possible and to shape an optimal soft tissue emergence profile for the future prosthetic restoration. Digital planning was performed using Real Guide software, which enabled precise segmentation of the tooth to be extracted, and provided important morphological data for implant positioning and the design of the temporary restoration. Based on the segmented data, a customized healing abutment was fabricated using CAD/CAM technology. The zirconia abutment was designed to replicate the natural cervical contour of the original tooth, allowing for controlled and predictable soft tissue formation during the healing phase. The customized healing abutment was temporarily fixed immediately after implant placement and the soft tissue was progressively shaped over several weeks to achieve the desired morphology. Follow-up examinations showed the preservation of the alveolar ridge volume, the stability of the peri-implant soft tissue and the formation of natural interdental papillae. The final restoration was performed after complete soft tissue maturation, achieving a high level of aesthetic integration and functional predictability.

Conclusion: Precise digital segmentation and the fabrication of a customized healing abutment enable controlled shaping of the emergence profile and soft tissue stability in immediate implant placement cases. This approach significantly enhances aesthetic predictability and long-term stability of peri-implant structures. The integration of digital technologies into daily clinical practice represents an important step towards improving the success of implant prosthetic therapy

Keywords: Emergence profile; Digital planning; Customized healing abutment

P20 IMPLANT-PROSTHETIC REHABILITATION OF A MANDIBULAR FIRST MOLAR USING A SURGICAL GUIDE – A CASE REPORT

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Introduction: The aim of this case report is to demonstrate a fully digital surgical-prosthetic protocol for the replacement of a missing mandibular first molar, which involves the placement of a dental implant using a guided surgical template (immediate loading protocol) and the fabrication of a provisional acrylic crown, followed by a definitive screw-retained monolithic zirconia crown (prosthetic protocol).

Case report: The patient, a healthy 45-year-old female, had lost her mandibular first molar due to a vertical root fracture six years ago. A qualitative and quantitative analysis of the bone tissue (DICOM format) was performed with a 3D CBCT device (Planmeca Promax 3D Classic, Finland). A detailed intraoral scan of both dental arches (STL format) was created with the 3Shape Trios 5 intraoral scanner (3Shape A/S, Denmark) for the design of the surgical guide. The surgical guide was designed with ICX - Magellan X Real Guide 5.3 software (Medentis Medical, Germany) and printed on a 3D printer (NEXA 3D XIP, Ventura, USA) using a light-polymerising resin (Keyprint, USA). A dental implant (ICX Master Active 4.1×12.5 mm, Medentis Medical, Germany) was placed. The prosthetic protocol included digital impression taking using the Panda Smart intraoral scanner (Freqty Technology, China) and an ICX scanbody MDK (Medentis Medical, Germany), followed by a virtual prosthetic design using ExoCAD Elefsina software (Exocad, Germany). The provisional restoration was milled from a PMMA disc, while the definitive monolithic zirconia crown was fabricated from a zirconia disc using an IMES-iCore milling machine (IMES-iCore, Germany).

Discussion: Recent scientific research leads to the conclusion that the use of customized surgical guides produced by CAD/CAM milling or 3D printing should be considered the gold standard for achieving high precision implant placement, following a prosthetically oriented treatment plan.

Conclusion: In contrast to conventional analogue workflows, the use of digital technologies for the fabrication of surgical guides for implant placement and the fabrication of implant-supported prosthetic restorations after the loss of a single posterior tooth offers numerous advantages, including better control and a reduction in the risk of biological and technical complications.

Keywords: Surgical guide; Dental implants; Provisional and definitive prosthetic restorations; Digital workflow

P21 USE OF THE T-SCAN NOVUS 10 DEVICE IN QUANTITATIVE DIGITAL OCCLUSAL ANALYSIS

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Introduction: The aim of this case report is to demonstrate the diagnostic and therapeutic value of T-scan analysis in a patient with natural dentition and clinical signs of temporomandibular disorder (TMD).

Case report: A 30-year-old female patient without systemic disease reported long-term orthodontic treatment and a bimaxillary osteotomy performed four years earlier. She complained of discomfort when chewing, a feeling of bite instability, pain in the masticatory muscles, and occasional joint noises (clicking) in the area of the temporomandibular joint.

A qualitative occlusal analysis with 20-micron articulating paper and a quantitative digital analysis with the T-Scan Novus 10 device revealed premature centric occlusal contacts on the right side of the dental arches. A selective occlusal adjustment (equilibration) of these premature contacts was performed. Follow-up examinations two weeks later showed a significant improvement in the patient's subjective symptoms and a functionally balanced distribution of occlusal forces. Repeated T-scan analysis confirmed symmetrical force distribution and synchronised timing of occlusal contact activation. Discussion: Unlike articulating paper, which merely visualises the presence of contact, the T-Scan Novus 10 device provides an objective, reproducible and quantitative evaluation of occlusion, including a precise measurement of initial contact timing, force distribution and dynamic changes during occlusal function. This type of analysis is particularly useful in the patients with functional disorders where clinical signs are inconspicuous, but the subjective symptoms are pronounced. In daily clinical practice, the application of this device enables more accurate treatment planning, faster diagnosis and improved patient communication through the clear visualisation of occlusal discrepancies (in combination with articulating paper), which ultimately improves the overall quality of dental care.

Conclusion: Quantitative digital occlusal analysis with the T-Scan Novus 10 device is a highly valuable diagnostic and therapeutic tool in modern dentistry. In the presented case, the elimination of premature occlusal contact led to a reduction in TMD symptoms and an improvement in functional occlusal stability.

Keywords: Digital quantitative occlusal analysis; T-Scan Novus 10 device; Premature occlusal contact; Selective occlusal adjustment

P22 BITE FORCE AS A CLINICAL PARAMETER FOR EVALUATING MASTICATORY FUNCTION

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Introduction: Bite force is an important clinical parameter when assessing the functionality of the masticatory system. In addition to its association with the integrity of the masticatory musculature and occlusal relationships, it also reflects the effectiveness of oral rehabilitation in prosthetic and implant-prosthetic patients. The aim of this presentation is to demonstrate the potential clinical applications of the Innobyte digital device for measuring maximum bite force in patients with natural dentition and various types of prosthetic and implant-prosthetic restorations in daily clinical practice.

Case reports: This case series presents the results of maximum bite force measurements in a patient with complete natural dentition who underwent occlusal adjustment (equilibration), in a patient with complete dentures, in a patient with fixed prosthetic restorations, and in a patient with implant-prosthetic restorations. The measurements were conducted using the Innobyte device (Kube Innovation, Canada). The results were quantitatively compared with normative values and analysed in relation to the type of restoration and the subjective feeling of occlusal stability. The measured results indicated a trend towards increased maximum bite force in the patient with pathological occlusion after occlusal adjustment, as well as in prosthetic and implant-prosthetic cases when compared to normative average values for the observed patient types.

Discussion: Bite force measurement using the Innobyte device enables an objective evaluation of the functional efficiency of oral rehabilitation and can serve as a diagnostic tool for treatment planning, assessment of prosthetic treatment outcomes, and patient motivation. Compared to other devices (e.g. T-Scan), the Innobyte provides absolute quantification of bite force, but no temporal distribution or topographic mapping of occlusal contacts.

Conclusion: The measurement of maximum bite force can be used as a tool to evaluate therapeutic progress, to monitor adaptation to new prosthetic restorations, and to assess the symmetry of occlusal loading. The Innobyte device has proven to be a practical and clinically valuable instrument that contributes to the objectification of functional parameters in contemporary oral rehabilitation.

Keywords: Bite force; Innobyte device; Natural dentition; Prosthetic and implant-prosthetic restorations; Masticatory system function

P23 MANDIBULAR OVERDENTURE SUPPORTED BY TWO NARROW TI-ZR IMPLANTS: EFFECTS OF MUCOSA THICKNESS AND SPLINTING

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Objectives: Currently, there is no data in the dental literature regarding the effects of different mucosal thickness and implant splinting on strain distribution when a mandibular overdenture (OD) is supported by two narrow Ti-Zr implants (2.4 mm in diameter) under different loading conditions. This study aimed to evaluate the influence of mucosal biotype (thin vs. thick) and splinting status on peri-implant and edentulous ridge strains during OD loading.

Material and methods: Two Ti-Zr implants (10 mm length, 2.4 mm diameter, Straumann) were placed in four identical models of an atrophic mandible simulating D2 bone. A 2.0 mm mucosal mask was applied to two models—one with non-splinted implants and one with splinted implants. The other two models received a 3.8 mm mucosal mask (representing a thick mucosal biotype), again with both splinted and non-splinted implant configurations. The mucosa was manufactured using low-viscosity addition-vinylpolysiloxane injected into digitally designed and 3D-printed moulds. Strain gauges (SGs) were positioned bilaterally at the first molar sites under mucosal mask and the OD saddles to measure edentulous ridge strains, while additional vestibular and lingual SGs were loaded bilaterally, unilaterally, and anteriorly with forces ranging from 50 to 300 N, repeated 15 times. Data were analyzed using descriptive statistics and multifactorial ANOVA.

Results: The highest peri-implant strains were observed under unilateral OD loading with high loading forces in the 2 mm mucosa group, approaching levels that may exceed the bone's reparative capacity (p < 0.01), in both splinted and non-splinted configurations. Bilateral loading also elicited high strain values. Splinting of two implants led to a statistically significant, though modest, reduction in peri-implant strains-but only when thick mucosa (3.8 mm) was present (p < 0.05). Nevertheless, strain levels still exceeded 2000 microstrains under higher loading forces. In the distal edentulous regions, both splinting and increased mucosal thickness significantly reduced strain levels (p < 0.01); however, all denture loading conditions produced strains within a range unlikely to impair bone healing, and thus the reductions are not considered clinically significant. Conclusions: The use of two narrow Ti-Zr implants (2.4 mm diameter) to support mandibular ODs is advisable only in patients with low to moderate masticatory forces and a thicker mucosal biotype. Implant splinting reduced peri-implant strains only in the presence of thick mucosa. For patients with higher occlusal loads (e.g., opposing natural dentition), neither splinted nor non-splinted configurations can be recommended with confidence for long-term success, although splinting may offer some benefits when mucosa is sufficiently thick.

Keywords: Implant splinting; Mandibular overdenture; Mucosal thickness; Periimplant strains; Ti-Zr narrow implants

P24 EFFECT OF MUCOSAL THICKNESS ON PERI-IMPLANT AND DISTAL RIDGE MICROSTRAINS UNDER MANDIBULAR OVERDENTURES ON NARROW TI-ZR IMPLANTS: IN VITRO STUDY

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Purpose: Marginal bone loss in implants occurs due to infection or excessive strains (or a combination). Excessive stress and strain on the bone under the denture base leads to resorption of the alveolar ridge. There are limited publications on clinical findings on the new single-piece Ti85Zr15 narrow category 1 implants. A thick mucosal biotype reduces bone loss around implants supporting fixed restorations, but there is no data on the effect of mucosal thickness on peri-implant bone loss in overdentures (OD). The aim was to examine the effect of mucosal thickness (thin or thick biotype) on strains in the mandibular bone with different numbers of single-unit Ti-Zr narrow implants supporting OD.

Materials and methods: Ti-Zr implants (Roxolid alloy, 10 mm height, 2.4 mm width, Straumann) were placed in identical models of atrophied mandible (D2 bone density properties). There were 4 models depending on the number of implants (1 or 3). A mask representing a mucosa of 2.0 mm thickness was attached to 2 models, and a mask of 3.8 mm (thick biotype) to the other 2 models. The mucosa (low-viscosity addition vinylpolysiloxane) was injected in virtually designed and printed molds. Strain-gauges (SG) were glued to the ridge under the OD at the site of the first molar (bilaterally) to measure strains during OD loading. SGs were also glued both vestibularly and orally to each implant to measure peri-implant stress (Figure 1, left). The ODs retained on the implants were loaded bilaterally, unilaterally and anteriorly with forces 50-300 N (Figure 1 right). Loadings were repeated 15 times. Statistical analysis included descriptive statistics and multifactorial ANOVA.

Results: Strains increased at higher forces (p<0.01). In one implant situation, the highest peri-implant microstrains were recorded during anterior loading, and in 3 implants, microstrains were highest in unilateral posterior OD loading. Smaller microstrains were measured in the distal areas of the edentulous ridge with thicker mucosa (3.8 mm; p<0.01). In one implant situation (in the middline of the mandible), mucosal thickness did not affect peri-implant stresses (p<0.05), nor did it affect with 3 implants retaining the OD.

Conclusions: Strains increase at higher forces. Mucosal thickness reduces strains in the edentulous bone under the OD saddles. Peri-implant strains did not change significantly depending on the mucosal biotype.

Keywords: Microstrains; Edentulous ridge; Mandibular overdenture; Mucosal thickness; Narrow implants

P25 ANALOG AND DIGITAL SUPPORT IN DENTISTRY: STABILIZATION SPLINT FABRICATION

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Objectives: Stabilization splints are an essential therapeutic modality in dental medicine, particularly in the management of temporomandibular disorders (TMD). Traditionally, splints were made using analogue methods that involved taking impressions, fabricating plaster models and manual processing in a dental laboratory. With advances in digital technology and the widespread adoption of CAD/CAM systems, digital workflows for splint fabrication have become increasingly prevalent. The aim of this study is to compare the fabrication processes and clinical outcomes of analogue and digital stabilisation splints.

Materials and methods: A female patient presented with a two-year history of mandibular deviation and clicking sounds during wide mouth opening. After clinical evaluation, the fabrication of both analogue and digital stabilization splints was indicated.

Analogue workflow: An alginate impression was taken to create plaster models. The upper model was marked for the future splint margin. An interocclusal wax recording was obtained in centric relation using a customised retainer. This record defined both the mandibular position and vertical dimension of the splint. The wax-up was sent to the laboratory for fabrication of an acrylic stabilization splint.

Digital workflow: Intraoral scanning was performed (Trios 3 Wireless, 3Shape, Denmark) with the patient wearing a retainer fitted with an interocclusal wax record in centric relation. The digital impressions were processed with CAD software (Ceramill Mind, Amann Girrbach, Austria) to design the splint. The design was printed (Asiga Max 2, Cosmodent, Germany) using a biocompatible resin (KeySplint Hard, Keystone Industries, Germany). After finalisation and polishing, the splint was clinically tested, the occlusal conditions were adjusted and the splint was delivered.

Results: After two weeks of use, the patient reported a reduction in TMD symptoms. The patient reported no noticeable difference between the analogue and digitally fabricated splint in terms of comfort or function.

Conclusion: The choice between analogue and digital fabrication methods depends on the clinician's expertise, resources and available technology. Digital fabrication offers advantages in terms of precision, reduced production time and the ability to archive and reproduce splints without the need for new impressions or bite registrations. **Keywords:** Temporomandibular disorders; Stabilization splint; CAD/CAM technology

P26 FABRICATION OF TEMPORARY GLASS FIBER-REINFORCED COMPOSITE BRIDGE

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Objectives: Temporary prosthetic restorations play a crucial role in preserving the functionality, aesthetics and health of oral tissues while preparing for a permanent prosthetic restoration. With the advancement of materials and technologies, glass fibres are increasingly used in fixed prosthetics due to their strength, flexibility and aesthetic properties. This paper presents the fabrication of a temporary glass fibre-reinforced composite bridge, focusing on the clinical application, advantages and challenges compared to traditional methods.

Materials and methods: The patient presented with a root perforation of tooth 22 (*fausse-route*), which occurred during the revision of an endodontic filling, making further treatment impossible and indicating the need for extraction. Prior to extraction, an alginate impression of the maxilla was taken to fabricate a temporary bridge and a stone cast was made. The cast was then moulded with a transparent silicone material (Exaclear, GC, GC EUROPE, Leuven, Belgium) to create a silicone key that captured the reference morphology of tooth 22. Tooth 22 was reduced on the model to make room for the replacement tooth, which was to be made of composite material. Glass fibres (everStick C&B, GC, GC EUROPE, Leuven, Belgium) were placed as a support structure and the composite material (G-aenial Universal Injectable, GC, GC EUROPE, Leuven, Belgium) was injected through the transparent silicone key to reconstruct tooth 22 directly on the cast. The neighbouring teeth (21 and 23) were completely preserved. The fabricated temporary bridge was then transferred to the patient's mouth and fixed using the adhesive technique with composite cement (GC Link Force, GC, GC EUROPE, Leuven, Belgium).

Results: The temporary glass fibre-reinforced composite bridge, fabricated using this method, provides a satisfactory aesthetic solution during the healing phase and further implant-prosthetic therapy. The adhesive cementation technique enabled bonding of the bridge to the unprepared adjacent teeth.

Conclusion: The use of glass fibres in the fabrication of temporary bridges enables a fast, aesthetically pleasing and functionally effective solution with minimal invasiveness. This approach is particularly beneficial in cases where permanent prosthetic rehabilitation is not immediately possible. The method is easy to perform and represents a reliable temporary option in everyday clinical practice.

Keywords: Glass fibre-reinforced composite; Temporary bridge; Adhesive cementation

P27 A PRECISELY BEAUTIFUL SMILE: DIGITAL TRANSFORMATION USING VENEERS

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Objectives: Aesthetic veneers, particularly in the anterior region, present both an opportunity and a challenge. Among the various materials, leucite-reinforced glass-ceramics have proven to be a reliable option due to their translucency, strength and ability to mimic enamel. This case report describes the clinical workflow and outcome of replacing composite veneers with leucite-reinforced ceramic veneers in a highly aesthetic zone. Materials and methods: A female patient presented to the dental clinic with the wish to replace old, unaesthetic composite veneers. After a clinical and photographic evaluation, the treatment plan involved fabrication of leucite-reinforced ceramic veneers for teeth 12, 11, 21 and 22. Before the old veneers were removed, a digital scan (Trios 3 Wireless, 3Shape, Copenhagen, Denmark) of the initial state was taken using an intraoral scanner. The composite veneers were removed and the teeth were prepared for the ceramic veneers. Retraction cords were placed for soft tissue management. A second digital impression of the prepared teeth was taken and sent to the dental laboratory. Colour matching was completed during the same appointment. The temporary veneers were fabricated from biocompatible resin (Detax FREEPRINT temp UV, Ivoclar Digital, Ivoclar Vivadent, Shaan, Lichenstein) and checked for fit and patient satisfaction. After checking, they were cemented using a temporary cement (Dentotemp, ITENA Clinical, Villepinte, France). The final restorations were fabricated from leucite-reinforced glass-ceramics (IPS Empress CAD, Ivoclar Vivadent, Shaan, Lichenstein). During the try-in appointment, the marginal adaptation and aesthetics were assessed. Once this was confirmed, the veneers were adhesively cemented with composite resin cement (Variolink Esthetic LC, Ivoclar Vivadent, Shaan, Lichenstein).

Results: The patient's aesthetic expectations were fully met. The leucite-reinforced ceramic veneers showed excellent marginal adaptation, colour matching, and an overall natural appearance. No complications were observed during or after the procedure. Conclusions: Leucite-reinforced glass-ceramics is a highly effective material for aesthetic anterior restorations that has excellent physical and aesthetic properties. It is the material of choice in cases with high aesthetic demands, especially when supported by digital workflows and adhesive cementation techniques.

Keywords: Veneers; Leucite-reinforced glass-ceramics; Aesthetic restorations

P28 AESTHETIC TRANSFORMATION OF A "VAMPIRE LATERAL INCISORS"

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Objectives: Peg-shaped teeth represent a morphological anomaly, typically affecting the maxillary lateral incisors, falling under the developmental anomaly known as microdontia. Peg laterals have a significant impact on the aesthetic appearance, especially in the smile zone, where symmetry and proportions of the teeth are essential. The management of such anomalies often involves restorative and prosthetic techniques aimed at improving the size, shape and harmony of the tooth within the dental arch. Contemporary prosthetic dentistry offers several solutions, including full crowns, ceramic veneers, and composite veneers. This case report presents the digital design and fabrication of a composite veneer during preclinical exercises, simulating real clinical conditions at the Dental *Academicus* Center for Dental Medicine, a department of the University of Split School of Medicine.

Materials and Methods: The procedure was conducted on a simulation phantom head.

- Initial Scan: A digital impression of the initial condition was taken using an intraoral scanner (Trios 3 Wireless, 3Shape, Copenhagen, Denmark).
- Tooth Preparation: The lateral incisor was prepared using the *window* preparation technique, preserving the palatal and incisal surfaces for a conservative restoration.
- Shade Selection and Second Scan: Following preparation, the appropriate tooth shade (A2) was selected and a second digital impression was captured.
- CAD Design: The veneer was designed using Ceramill Mind CAD software (Amann Girrbach, Mäder, Austria) to match the curvature and aesthetics of the dental arch.
- CAM Milling: The veneer was milled from a composite block (Vita ENAMIC HT, VITA Zahnfabrik, Bad Säckingen, Germany) using the CORiTEC 250i PRO CAM unit (imes-icore GmbH, Hessen, Germany).
- Try-In and Cementation: After checking the fit and aesthetics during the try-in, the veneer was permanently cemented using Variolink Esthetic LC cement (Ivoclar Vivadent, Schaan, Liechtenstein).

Results: The fabricated composite veneer successfully restored the natural proportions and contours of the peg-shaped lateral incisor with the minimally invasive preparation approach.

Conclusions: This case demonstrates the successful application of CAD/CAM composite veneers in the rehabilitation of peg-shaped lateral incisors. The use of a fully digital workflow in a preclinical setting emphasises the educational value and clinical potential of such technologies, which are in line with contemporary prosthodontic principles. **Keywords:** *Peg teeth*; Composite veneers; Digital workflow; CAD/CAM dentistry

P29 TWO WORLDS, ONE GOAL: A REVOLUTION IN TEMPORARY RESTORATION FABRICATION

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Objectives: Temporary dental restorations play a vital role in maintaining oral function, protecting prepared teeth, and providing the opportunity to evaluate aesthetics and function prior to the final prosthetic solution. With the advancement of digital technologies in dentistry, clinicians now have the ability to fabricate temporary restorations

with increased precision and efficiency. This case study compares two methods – direct analogue and indirect digital – for the fabrication of a temporary crown following the removal of a metal-ceramic crown on tooth 21.

Materials and methods: A female patient presented to the dental clinic with an old, inadequate metal-ceramic crown on tooth 21. The tooth had been previously endodontically treated and a glass fibre-reinforced composite post was placed (3M[™] RelyX[™] Fiber Post, 3M ESPE, St. Paul, USA). An alginate impression of the upper jaw was taken to fabricate a temporary crown using the direct method in the clinic. In addition, an intraoral scan of the initial condition was performed using an intraoral scanner (Trios 3 Wireless, 3Shape, Copenhagen, Denmark). After removal of the old crown and refinement of the tooth preparation, a retraction cord was placed; a digital impression was taken and sent to a dental laboratory. The directly fabricated temporary crown was made of 3M[™] Protemp[™] 4 (3M ESPE, St. Paul, USA), adjusted and polished, and then cemented using 3M[™] RelyX[™] Temp NE temporary cement (3M ESPE, St. Paul, USA). The laboratory-fabricated crown, which was based on the digital scan, was printed in a biocompatible resin for temporary crowns (Detax FREEPRINT temp UV, Ivoclar Digital, Ivoclar Vivadent, Schaan, Liechtenstein). The following day, the direct temporary crown was removed and the digitally fabricated crown was cemented using the same temporary cement.

Results: Both the direct analogue and indirect digital methods provided satisfactory functional and aesthetic outcomes during the temporary phase. The direct method allowed a faster initial restoration of function. However, the indirect digital technique showed better marginal fit, strength, and aesthetic quality.

Conclusion: While digital techniques offer improved marginal accuracy, aesthetics and predictability of the final outcome, the analogue method remains an important and practical option in clinical practice due to its accessibility and speed. The combined use of both methods can lead to optimal results by combining efficiency with high precision. **Keywords:** Temporary crown; Digital impression; CAD/CAM workflow

P30 AESTHETIC HARMONY IN RESIN LAYERS – A CASE REPORT

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Objectives: Aesthetic veneers offer a visually appealing and minimally invasive solution for correcting the shape, size, colour, and position of teeth, particularly in the anterior segment. The aim of this study was to present the fabrication process of composite veneers using the indirect technique in a dental laboratory for teeth 12, 11, 21 and 22, focussing on both the clinical and laboratory steps as well as a comparison between two different preparation designs.

Materials and methods: This case report presents the fabrication of composite veneers on a maxillary model in the region of teeth 12, 11, 21 and 22 using a phantom head to simulate intraoral conditions during the preclinical training of students at the Dental Academicus Center for Dental Medicine, a department of the University of Split School of Medicine. The procedure began with a digital impression of the unprepared upper and lower jaws using an intraoral scanner (Trios 3 Wireless, 3Shape, Copenhagen, Denmark), followed by the fabrication of a silicone index for the upper jaw using addition-curing putty silicone (Zhermack, elite HD+, Bovazecchino, Italy). The tooth surfaces were marked using a 1.6 mm depth cutter and a graphite pencil to guide the preparation. Two types of preparation were selected: "window" preparation for the central incisors (11, 21) and "butt joint" for the lateral incisors (12, 22). After preparation, a digital impression of the prepared teeth was taken with the same intraoral scanner. Temporary veneers were fabricated using a direct technique (Acryltemp, Zhermack, Italy), while the final composite veneers (Vita ENAMIC HT, VITA Zahnfabrik, Bad Säckingen, Germany) were manufactured in a dental laboratory using a CAM unit (CORiTEC 250i PRO, imes-icore GmbH, Hessen, Germany). The final step was the adhesive bonding of the veneers using a composite cement (Variolink Esthetic LC, Ivoclar Vivadent, Schaan, Liechtenstein).

Results: The case presented confirms that the indirect technique, when performed with adequate preparation and protocol, can provide a functionally and aesthetically satisfactory solution, especially for patients with minor aesthetic deficiencies.

Conclusion: The fabrication of composite veneers on a model allows students to develop precision, understand direct technique protocols and cultivate the aesthetic awareness required for anterior restorations. Phantom-based training significantly increases students' confidence and competence for future clinical application.

Keywords: Composite veneers; Indirect technique; Aesthetics; Tooth preparation; CAD/CAM system

P31 SPORTS MOUTHGUARD – ANALOGUE VS. DIGITAL

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Objectives: Sports mouthguards are essential to prevent dentoalveolar injuries in contact sports such as martial arts, basketball, handball or water polo. The fabrication method may influence the quality of protection, comfort and acceptance by athletes. This case report presents the fabrication of a custom-made mouthguard for an athlete using both analogue (conventional) and digital (modern) methods, based on an analysis of material, workflow, time efficiency, accuracy and comfort.

Materials and Methods: Two custom-made mouthguards were provided to a single water polo athlete: one was fabricated using the conventional analogue approach and the other using a digital workflow. In the analogue method, alginate impressions were taken and ethylene-vinyl acetate (EVA) material (Playsafe Triple, Erkodent, Pfalzgrafenweiler, Germany) was thermoformed on a plaster model. The material was heated and moulded onto the plaster model with the help of an interocclusal bite registration using the vacuum technique. The mouthguard was then carefully trimmed, customised, polished and tested on the patient in the clinic. The digital method used intraoral scans (Trios 3 Wireless, 3Shape, Copenhagen, Denmark), CAD software for the design (Optor Lab, Open Tech 3D, Brescia, Italy) and 3D printing (AccuFab-L4K Printer, Shining 3D Dental, Stuttgart, Germany) with a soft biocompatible resin (KeySplint Soft, KeyPrint, Keystone Industries GmbH, Singen, Germany). The mouthguard was then trimmed and polished and returned to the clinic to be tested on the patient.

Results: Both mouthguards demonstrated excellent precision without the athlete perceiving any difference in terms of comfort or ease of use.

Conclusion: Digital fabrication of sports mouthguards offers significant advantages, including greater accuracy, reproducibility, faster processing and digital archiving for future use. Although the initial cost of the equipment is higher, the digital approach proves to be more efficient and economical in the long run, especially in practices that frequently manufacture protective equipment for athletes.

Keywords: Mouthguard; Digital workflow; Analogue fabrication; Intraoral scanning; 3D printing

P32 LASER MARKING OF DENTAL PROSTHESES FOR TRACEABILITY AND FORENSIC IDENTIFICATION

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Objective: This study investigates the feasibility and effectiveness of dental identification systems (DIS) with a specific focus on laser engraving as a complementary forensic method in cases where conventional identification techniques – such as dactyloscopy and genetic profiling – are limited or not applicable. The primary aim is to establish a standardized protocol for laser-based marking of metal-based dental prosthetic devices, enhancing traceability and identification accuracy in mass fatality scenarios and in clinical populations with cognitive or neurodegenerative impairments.

Materials and methods: Three removable partial dentures with metal frameworks were laser engraved to provide individual identification markings. Each prosthesis was inscribed at a specific anatomical location using a high-energy laser beam to engrave alphanumeric codes that serve as primary identifiers. The procedure was carried out under controlled conditions to maintain the structural and functional integrity of the prostheses.

Results: The laser engraving process resulted in permanent, legible and consistent markings without compromising the mechanical properties or clinical functionality of the prosthetic materials. The positioning and visibility of the markings were suitable for both forensic and clinical applications.

Conclusion: Laser engraving of dental prostheses is a robust, durable and precise method for post-mortem and in vivo identification. Despite existing limitations due to economic and legal factors, the technique demonstrates high potential for integration into forensic protocols and clinical documentation practices. The outcomes of this preliminary investigation support the broader implementation of laser-marked prosthetic devices as a cost-effective strategy to improve patient traceability and identification, particularly in mass casualty and cognitively vulnerable populations.

Keywords: Laser engraving; Dental prostheses; Forensic identification

P33 COLOUR AND TRANSLUCENCY CHANGES OF SUPER-TRANSLUCENT ZIRCONIA WITH DIFFERENT TREATMENTS AFTER SIMULATED WEAR

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Purpose: To investigate the influence of different surface treatments of zirconia on the colour change (ΔE) and translucency parameter (TP) before and after simulated wear by brushing.

Materials and methods: A total of 30 samples were made from a super-translucent zirconia disc (Vita YZ ST, A1, dimensions $7\times11\times2$ mm). The milled samples were sintered according to the manufacturer's instructions and divided into three groups (n=10): polished, glazed (Vita Lumex Unique 370 glaze) and additionally stained and glazed (Vita Lumex Unique red-brown (A) 330 Chroma + Vita Lumex Unique 370 glaze). The L, a and b values were measured on a white and black background using a Vita Easyshade V spectrophotometer before and after 10,000 brushing cycles - a protocol that simulates one year of oral hygiene. The values for the colour difference (ΔE) and the translucency parameter (TP) were calculated.

Results: The highest ΔE value was recorded on the white background for glazed samples, and the differences between the groups were not statistically significant (p=0.069). On a black background, the ΔE changes were even smaller and also not statistically significant (p=0.980). The TP values differed significantly between the groups (before brushing: F=62.49, df=2, p<0.001; after brushing: F=13.74, df=2, p<0.001). Before brushing, the glazed samples had the highest TP value (7.29), while the samples with added chroma (stained and glazed) had the lowest (4.80). After brushing, the TP values remained stable.

Conclusion: The surface treatment of zirconia has a significant effect on translucency, but not on colour change after simulated wear by brushing. The addition of colour (chroma) reduces translucency but at the same time contributes to colour stability. These results may help in the clinical selection of the surface treatment of monolithic zirconia restorations.

Keywords: Zirconia; Colour change; Translucency parameter; Surface wear

P34 THE INFLUENCE OF SURFACE TREATMENT OF SUPER-TRANSLUCENT ZIRCONIA ON COLOUR PARAMETERS BEFORE AND AFTER SIMULATED WEAR

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Purpose: The aim of this study was to examine the changes in L^* (lightness), C^* (saturation) and h (hue) values of monolithic zirconia samples with different surface treatments before and after simulated wear by brushing.

Materials and methods: A total of 30 samples were made from a super-translucent zirconia disc (Vita YZ ST, A1, dimensions 7×11×2 mm). The milled samples were sintered according to the manufacturer's instructions and divided into three groups (n=10): polished, glazed (Vita Lumex Unique 370 glaze) and additionally stained and glazed (Vita Lumex Unique red-brown (A) 330 Chroma + Vita Lumex Unique 370 glaze). The L, C and h values were measured on a white and black background with a Vita Easyshade V spectrophotometer before and after 10,000 brushing cycles - a protocol that simulates one year of oral hygiene.

Results: Statistical analysis showed that there was no significant change in L, C and h values within the groups before and after simulated brushing wear, neither on white nor on black background (p > 0.001). ANOVA analysis showed statistically significant differences in the values for lightness (F=189.8, df=2, p<0.001), saturation (F=417.99, df=2, p<0.001) and hue (F=148.77, df=2, p<0.001) between the different types of surface treatment, both before and after simulated wear.

Conclusion: The surface treatment has a significant effect on the values of brightness, saturation and hue of zirconia. The group with added colour (stained and glazed) had the lowest brightness and the highest colour saturation. After simulated wear, the values for brightness, saturation and hue remained stable in all groups.

Keywords: Zirconia; Colour; L, C and h values; Surface wear

P35 DIGITAL ANALYSIS OF OCCLUSION IN A COMPLEX FIXED-IMPLANT PROSTHETIC CASE USING THE RUNYES INTRAORAL SCANNER – A CASE REPORT

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Introduction: Complex rehabilitations involving simultaneous fixed and implant-supported prosthetic treatment require a high degree of precision in diagnosis, planning and execution. Digital tools such as intraoral scanners – in this case the Runyes scanner – enable precise recording of the condition and detailed occlusal analysis, especially in cases where both natural teeth and implants are involved.

Case report: A female patient presented with severe abrasion, reduced vertical dimension, and dissatisfaction with both function and aesthetics. Missing teeth in the lateral support zones (16, 15, 26, 36, 46) indicated the need for comprehensive rehabilitation. The treatment plan included preparation of teeth 17 to 47 (with the exception of region 15-16, where a bridge was placed), implant placement in regions 26, 36 and 46, and fabrication of both provisional and final restorations. A combined approach was used for the primary impression: analogue for precision of the margins and digital scanning for accurate occlusal registration. In the second phase, following trial placement and aesthetic control, additional digital scanning of the final work was performed to confirm stability and function and to prepare individual trays and impressions of open-tray implants. Special attention was paid to the placement of the provisional crowns in infraocclusion over the non-integrated implants to preserve the prosthetic arch, protect the space and allow for undisturbed osseointegration. Thus, the implants not only served as future abutments, but also as active stabilizers of the prosthetic balance during the entire treatment.

Conclusion: This case confirms the value of digital scanning as both a diagnostic and therapeutic tool, not only in the final phase but also during the transitional stages of complex rehabilitations. The use of the Runyes scanner enabled improved occlusal control, more accurate planning and safer implant integration, while the combined impression approach ensured a high degree of clinical precision.

Keywords: Intraoral scanner; Implant prosthetics; Infraocclusion; Digital occlusal analysis; Fixed rehabilitation

P36 EFFECT OF OLIVE LEAF EXTRACT IN COMBINATION WITH STANDARD ANTIFUNGAL THERAPY ON ORAL SIGNS AND SYMPTOMS

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Aim: The aim of this study was to investigate whether the combined administration of olive leaf extract (OLE) with a standard antifungal therapy – nystatin (NYS) or miconazole (MIC) – could be a more efficient alternative in reducing oral signs and symptoms. Materials and methods: The study included 59 subjects who had at least one oral sign or symptom identified by clinical examination. The signs and symptoms assessed included red lesions on the oral mucosa, red lesions of the tongue, oral dryness, taste disturbances, burning sensations on the tongue, burning sensations of the oral mucosa and salivary flow rate. The subjects were randomly divided into four groups depending on which therapy they underwent: OLE+NYS group (n=15), OLE+MIC group (n=15), NYS group (n=14), MIC group (n=15). In order to evaluate the effect of the therapy applied, a clinical examination was carried out at the beginning (before treatment) and on the third and seventh day.

Results: A significant increase in salivary flow rate was observed in the OLE+NYS group, while a significant decrease in tongue burning was reported in the OLE+MIC group. A significant decrease in burning of the oral mucosa and tongue was observed in the miconazole group. No significant differences in other clinical signs or symptoms were observed between the treatment groups.

Conclusion: Decreased salivation and burning sensations in the oral cavity are common clinical findings, and the results suggest that OLE may have supportive potential in the clinical management of these conditions.

Keywords: Olive leaf extract; Oral signs; Oral symptoms

P37 DENSITY OF BONE SURROUNDING FIXED PARTIAL DENTURE ABUTMENTS IN COMPARISON TO DENSITY OF HOMOLOGOUS TEETH

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Aim: To measure bone density of abutments of FPDs on periapical radiographs and to compare it with bone density of homologous teeth. The hypothesis was that the abutments might have a higher density than homologous teeth.

Materials and methods: A total of 69 patients with 130 abutments participated. The inclusion criteria were an FPD in successful function for two or more years on one side of the jaw and natural homologous teeth on the other side. After clinical examination periapical radiographs were taken with a Cu stepwedge of 8 layers (0.05-0.7 mm) attached to a sensor. RTG-s were taken of both the abutment and the homologous teeth. The average grey values in the region of interest were converted to equivalent thicknesses of the calibration wedge using a third-degree polynomial function. Bone density is expressed in equivalents of the thickness of the Cu stepwedge of the grey scale in the region of interest (ROI).

Results: Bone density increased in the direction from the alveolar crest to the apex in both abutments and homologous teeth (p<0.01). In addition, bone density also increased from the mesial to the distal ROIs at the level of the alveolar crest in both the abutments and the homologous teeth (p<0.01). Highest density values were at the root apex in both abutments (0.321) and homologous teeth (0.303), but without significant differences (p>0.05). Men had significantly denser bone than women only at the ROIs in the midline of the root levels and at the root apexes (p<0.05). There was no significant difference in bone density between abutments and homologous teeth (p>0.05). There was no significant effects of age, FPD material and abutment/pontic ratio (p>0.05).

Conclusion: The lower bone density at the alveolar crest level at the mesial ROIs compared to distal ROIs in both the abutments and the homologous teeth is not a pathological finding, but an increase in bone volume towards the distal parts of the mandibular alveolar bone. No difference in bone density between abutments and homologous teeth can be attributed to the fact that the loads from FPDs are not only distributed to the abutments but also to the entire dental arch through interdental contacts. The findings of the present study emphasize the importance of establishing good interdental contacts between FPDs and natural teeth.

Keywords: Digital x-ray; Fixed partial denture; Bone density; Cu stepwedge

P38 PROSTHETIC REHABILITATION OF A PATIENT WITH REDUCED VERTICAL DIMENSION OF OCCLUSION DUE TO NON-CARIOUS LOSS OF HARD DENTAL TISSUES – A CASE REPORT

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Introduction: In patients with extensive loss of hard dental tissues leading to a reduced vertical dimension of occlusion (VDO), the normal function of the stomatognathic system is disturbed. The changes affect the temporomandibular joint and the masticatory muscles, and aesthetics are also impaired.

Case report: The patient presented with dissatisfaction regarding the appearance of their smile. Medical history revealed a habit of clenching teeth, and clinical examination showed extensive loss of hard dental tissues, reduced VDO, diastemas in the anterior segment of the maxilla, existing metal-ceramic crowns on teeth 26 and 36 that required replacement, multi-surface amalgam fillings on teeth 16 and 46, and a missing tooth 45. Symptoms of temporomandibular joint disorders were not present. It was decided that full rehabilitation should be carried out with monolithic zirconia crowns. In the first phase, temporary PMMA crowns were fabricated (using a CAD/CAM system) based on a digital impression (MEDIT 1700), which achieved an optimal VDO. After two months, the definitive prosthetic restoration phase began, in which the prepared teeth were scanned with the MEDIT 1700 scanner, and the final design was created, taking into account the functional and aesthetic parameters. After prototype testing, the monolithic zirconia restorations were fabricated using a milling technique and finished with a staining technique (A1, A-D Shade Guide, Ivoclar). The patient left the clinic satisfied and happy with the prosthetic solution.

Conclusion: The digital technology enabled greater precision and a reduction in the number of working phases, which increased efficiency. Compared to analogue impressions, scanning was more comfortable for the patient and communication with the dental laboratory was simplified.

Keywords: Reduced vertical dimension of occlusion; Monolithic zirconia; Digital impression, CAD/CAM

P39 IMPLANT RESTORATION EMERGENCE PROFILE DESIGN AND ITS SIGNIFICANCE FOR LONG-TERM SUCCESSFUL CLINICAL OUTCOMES

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Introduction: The emergence profile or the design of the implant superstructure is important for the long-term success of a prosthodontic treatment. Prosthodontic-driven implant placement is a prerequisite for a good abutment and crown design that influences peri-implant hard and soft tissues.

Case report: The treatment plan included the fabrication of the abutment and crown on several teeth. First, the cover screw of the implant was removed and an impression was taken to fabricate the provisional screw-retained composite crown. Both additive and reductive techniques were used to shape the temporary crown to achieve its full contour, supporting the soft tissue 360° around the implant. According to the literature, the deep part (near the implant shoulder) should be designed with a small angle, less than 40°, between the abutment axis and the surface contour. As a widening towards the gingival margin is required to achieve the correct dimensions of the crown, a larger angle of up to 70° should be used. Due to the proximity of the sulcus and biofilm, the literature indicates a strong correlation between an increased angle of the emergence profile and the risk of bleeding and inflammation.

Conclusion: The transmucosal implant-abutment-crown structure is a complex structure, even if it is small in size. The proper design of the emergence profile, especially its concave shape on the vestibular side, plays an important role in long-term clinical success.

Keywords: Dental implant; Abutment; Crown; Emergence profile; Design

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