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CLINICAL CASES

DYNAMIC NAVIGATED SURGERY IN THE REHABILITATION OF EDENTULOUS JAW: A DIGITAL PROSTHETIC WORKFLOW

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BACKGROUND This work describes a digital workflow using 3D-printed models for provisional prosthesis fabrication, thereby avoiding conventional postoperative impression techniques. Prosthetic phases following X-Guide-assisted full-arch immediate-load rehabilitation traditionally use an analogical workflow. This involves taking a postoperative impression on bleeding and painful tissues, risking impression material or realigning material contamination.

CASE REPORT A 72-year-old man presenting edentulous lower jaw was treated by All-On-4[®] protocol performed with X-Guide[®] system in the Special Oral Rehabilitation Unit (director: Prof. EL Agliardi) of Vita-Salute San Raffaele Dentistry Department (director: Prof. EF Gherlone). A full-arch immediate fixed provisional prosthesis was realized by following the FastMap[®] navigated photogrammetry workflow and delivered to the patient on the same day as the surgery. After positioning the Multi Unit Abutments (MUA), a X-Nav FastMap[®] Scan Body was placed on top of each MUA, maintaining the patient's tracker in situ. The X-Guide[®] camera was repositioned to look into the patient's mouth, enabling the registration of the implants' position in the virtual space, without anatomical reference. Afterwards, a post-surgical intraoral optical surface scanning (IOS) with the aid of Elos[®] Accurate Intra Oral Position Locator MUA RP was performed. The pre-operative (vertical dimension and occlusion) and post-operative (position and inclination of

MUA) acquired data were matched into the Exocad software, to digitally design the 3D working models. The digitally designed models were then transferred to Sprinray RayWare software for nesting processing and finally sent to Sprinray 3D printer to finalize the printing process. Following the analogical workflow, a provisional prosthesis with 10 teeth was fabricated by our laboratory technician using the 3D-printed models.

CONCLUSIONS The proposed approach has been used to successfully rehabilitate the case described, offering benefits to both patients and clinicians. The growing use of 3D printers in dental labs and offices makes a full digital workflow for provisional and definitive restorations a promising option, ensuring enhanced precision and aesthetics. Further studies with larger samples are needed to validate this approach and its broader applicability.

FIXED ON TWO PROSTHODONTIC REHABILITATIONS IN A FRAGILE PATIENT WITH SEVERE BONE ATROPHY AND SUPERFICIALIZED AIN

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BACKGROUND Female 80 years old edentulous patient shows up at our observation with a severe bone atrophy both mandibular and maxillary. A floating crest with a severe hypertrophic gingival tissue is present. At the radiographic exam it can be observed the outcrop in mandibular ridge of the Alveolar Inferior Nerve (AIN). After clinical and radiographic case study it is programmed a prosthetic rehabilitation with an upper moveable prosthesis and a fixed on two implants prosthesis (FO2) in the lower jaw.

CASE REPORT Patient without important health problems, but after her husband death, she developed a depression form, she didn't smile anymore and eats little. She lost the desire to do anything and her daughter asked us to help her with the dental

aspect following a significant weight loss. As first phase a soft plastic soft tissue surgery was made to reduce hypertrophic tissue in the intraforaminal zone. After tissue healing two implants have been inserted in the lower jaw, using a flapless approach, in presence of good and plentiful keratinised gingiva. They presented a good first stability (torque of insertion greater than 80Ncm). A prosthodontic project was made using classical methodology. Custom single-plug fused Co-Cr bar, with specially designed shims for a ten teeth fixed prosthesis, was made for the lower jaw and a total moveable prosthesis was made for the upper jaw. The use of a screwed approach was preferred because of important thickness of keratinised gingiva. Excellent stability for the upper jaw was present. The lower fixed prosthesis allows, in addition to stability, to prevent the compression of the superficialized AIN. The patient reports a good chewing function and a satisfying aesthetics. She started eating and smiling again. A little help to start living again. Six years follow-up shows a good success and survival of the fixed on two implants lower prosthesis.

CONCLUSIONS FO2 rehabilitation for the lower jaw is a good option to give a good chewing function and stability in case of severe bone atrophy. A fixed option is also the only option to prevent the compression of superficialised AIN. Within the limit of this case a total moveable prosthesis in the upper jaw and a fixed on two or three implants for the lower jaw can be considered a good therapeutical prosthodontic option in total edentulous patient.

COMBINED APPROACH IN IMPLANT SURGERY, CONNECTIVE TISSUE GRAFT AND NEW PROSTHETIC MATERIALS IN A FRAGILE PATIENT

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BACKGROUND In 2024, ISTAT confirms the ongoing rise in the ageing index: as of Jan 1, 2024, nearly 7% more than 2023, with 200 elderly per 100 youths. Projections say in 10 years, 35% will be >65, with 300 seniors per 100 youths. Do we have the skills to rehabilitate with a Multidisciplinary plan that considers Fragility and Multimorbidity?

CASE REPORT 66-year-old female patient, complex history due to post-COVID vaccine she began to suffer from SFN (Small Fiber Neuropathy). She suffered severe symptoms, treated with antidepressants, antiepileptics, opioids, and had a suicide attempt (she jumped from her balcony) with major facial trauma(1). She is edentulous, underweight, and depressed(2). A fixed full-arch plan is proposed: 3 implants in the interforaminal area, avoiding posterior due to osteosynthesis plates to avoid removing them and to limit surgery stress(3-4). Surgery included placing 3 implants Sweden & Martina model Prama long neck 3.8x8.50 mm that allow crestal positioning at different heights thanks to their neck UTM with Insertion torque >80 Ncm(5). After 3 months, a PMMA provisional was delivered, greatly improving mood(6-7). Due to lack of keratinized tissue, a submarginal connective-epithelial graft was performed to maintain and increase adherent

gingiva(8-9). Final rehab: full-arch screw-retained bridge with the structure in BIOLOREN FRC (Fiber Reinforced Composite) and resin tooth extended to posteriors(10-11-12).

CONCLUSIONS After 3 years, patient has regained ability to eat and smile. Her smile confirms improved mood and quality of life. Using heterogeneous materials like FRC, which dissipate energy (vs. metals/zirconia that concentrate it), also allows longer cantilevers. A 2 or 3 implants-supported prosthesis in selected patients is well supported by literature.

NAVIGATED IMPLANT PLACEMENT BY DYNAMIC GUIDED SURGERY: CASE REPORT

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BACKGROUND Dynamic guided surgery X-Guide (Nobel Biocare) is an advanced technology that enhances surgical accuracy compared to traditional free-hand or static guided techniques. It provides real-time feedback on the position, angle and depth of both drills and fixture in three-dimensional space during surgery. This allows intraoperative adjustments based on anatomical findings or unexpected conditions. This case report illustrates the clinical application of dynamic guided surgery and analyzes the differences between the preoperative plan and the actual positioning of the fixtures.

Case report

MATERIALS AND METHODS A 22 year-old male patient, D.S., required implants placement at sites 1.4 and 2.4 due to bilateral agenesis. CBCT (DICOM) and intraoral scan (STL) were acquired and used to plan the case with DTX StudioTM software. Osteotomies were performed using a flapless approach, helped by the real-time navigation. The clinician can control the procedure, verifying his position in the space and the angle in relation to the planning and surrounding anatomy. Two fixtures (3.5x11,5mm) were placed with primary stability. Implant positioning was verified with an intraoral scan.

RESULTS Complete healing without postoperative complications and prosthetic phase shows optimal function and aesthetic adaptation. The differences between the planning and real fixture positioning were minimal.

CONCLUSIONS Dynamic guided surgery is a viable alternative, particularly in complex cases. It offers clinicians several advantages, minimizing complications and ensuring both prosthetic and aesthetic success for the patient.

MANDIBULAR FULL-ARCH REHABILITATION WITH THE CONOMETRIC TECHNIQUE ON AN INNOVATIVE IMPLANT-PROSTHETIC CONNECTION

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BACKGROUND Protesi Toronto a connessione conometrica per dare al paziente una protesi fissa ma rapida da rimuovere e reinserire per migliorare l'igiene. Fatta con il sistema Orbit® Abutment, una connessione implanto-protesica composta da 2 parti: la prima, sferica, fissata alla fixture; la seconda, il moncone (LEM Abutment), ruota sulla prima a qualsiasi angolo tra 0° e 30°. Con un parallelometro è possibile azzerare la divergenza tra gli assi implantari permettendo passività della struttura protesica.

CASE REPORT È stata eseguita una CBCT per pianificare il posizionamento implantare. Si è deciso di realizzare una protesi di tipo Toronto all-on-six. In seguito al posizionamento implantare sono state avvitate le sfere Orbit® Abutment. È stato posizionato e serrato il primo LEM Abutment in modo che facesse da guida agli altri, e sono stati poi posizionati e parallelizzati i monconi successivi. Tutto questo ha permesso di azzerare la divergenza tra gli assi implantari. Infine sono stati avvitati sui monconi i transfer da impronta ed è stata eseguita la sutura. La protesi provvisoria è stata realizzata con tecnica avvitata, non necessitando controlli periodici come una definitiva. La protesi definitiva è stata realizzata con tecnica conometrica dopo 6 mesi di guarigione. L'attivazione delle cappette è stata realizzata in maniera calibrata usando il filetto dei LEM Abutment per far ingaggiare la vite di serraggio per tecnica avvitata. Questa premendo sulla cappetta ha permesso di attivare tutte le cappette con lo stesso torque utilizzando una chiave dinamometrica. Una volta attivate le cappette sono state isolate con della diga di gomma; fatto ciò è stata cementata la struttura in PEEK nel cavo orale della paziente con un cemento composito duale. È stato finalizzato e consegnato il manufatto, dopo averne verificato la facilità di rimozione e reinserimento.

CONCLUSIONS Da questo case report si può dedurre che con la componentistica utilizzata è semplice e predicibile la realizzazione di manufatti protesici con tecnica conometrica, che offre maggiore rapidità nella rimozione e reinserimento del manufatto. Questo fa presupporre che sia incentivata la disinserzione del manufatto per l'igiene professionale delle fixture e del manufatto stesso, e che dunque gli impianti possano avere maggior longevità con minor dispendio di tempo alla poltrona.

COMFROM DIGITAL PLANNING TO THE REHABILITATION OF A COMPLEX CASE: AN ORTHODONTIC-IMPLANT-PROSTHETIC APPROACH

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BACKGROUND Donna di 52 anni, ASA 1, senza patologie sistemiche, allergie o fattori di rischio. Non si reca dal dentista da oltre 3 anni e desidera migliorare la funzione ed estetica dentale. Presenta condizioni socio-economiche svantaggiose. L'esame clinico evidenzia gengivite, malposizioni dentali, abitudini disfunzionali e lesioni cariose multiple, senza segni

di parodontite e senza affettazione da apnea notturna esclusa tramite poligrafia respiratoria.

CASE REPORT La paziente è stata trattata con fase igienica e protocollo CAMBRA, estrazioni e ricostruzioni in composito. Successivamente studio ortodontico e logopedico, pianificazione implantare pre-ortodontica e collocazione guidata, trattamento ortodontico breve con sbiancamento domiciliare, ceratura digitale con l'utilizzo di scanner facciale e mock-up estetico-funzionale. Sono seguite preparazioni per corone, faccette e intarsi per ottimizzare estetica e funzione.

CONCLUSIONS Il caso è stato finalizzato con corone e corone su impianti in zirconia con cut-back e stratificazione feldspatica, così da uniformarsi a faccette e intarsi in feldspatica. La cementazione è stata eseguita con protocollo APC per la zirconia e tecnica adesiva per i restauri feldspatici. Controllo del bilancio occlusale tramite T-Scan. Sono state consegnate le mascherine di contenzione post-ortodontiche per garantire stabilità estetico-funzionale.

INTEGRATION OF DIGITAL SOLUTIONS IN COMPLEX PATIENT REHABILITATION IN THE CONCEPT OF R. SLAVICEK

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BACKGROUND Our development shows the possibilities of rehabilitation of a patient with TMJD and erasure of the dentition. It is an integration of an analog approach at the initial therapy and a fully digital protocol for occlusion rehabilitation from the moment of fixation of the therapeutic position ThP to the fixation of restorations. The main feature of this digital process is a unique sequence sequential intraoral scanning, which allows for the transfer of the therapeutic position to the digital space with absolute accuracy to launch virtual modeling, as well as at the stage of rehabilitation using Mock-Up, prototyping and ceramic.

CASE REPORT In May 2024, a 49-year-old patient came to the Mitralab dental clinic complaining of aesthetics, erasure, pain in left TMJ and muscles. The first stage was the diagnosis of the craniomandibular system: main concern, muscle palpation, CMS, TMJ; analog models in the articulator in RP, functional analysis; calculation of cephalometry and analysis of parameters: type of jaw growth, skeleton class, LFH analysis, OP and others; TMJ CT scan, TMJ MRI; condylography. The diagnosis was confirmed: Right TMJ: the correct position of the disc. Left TMJ: ADDwoR, Osteoarthritis and Hypermobility. Next was the stage of initial splint therapy to find the therapeutic position - ThP, as well as the reuptake of the disc in the left TMJ. After the splint, there was an interim analysis. Next was the stage of occlusal rehabilitation with E.max ceramics. All further stages were carried out using a digital protocol, and for this, the "splint removal" procedure was introduced, which consists of a project intraoral scan of the dentition rows with and without

splints within the same project using preliminary and additional scanning, which allowed us to: transfer ThP to a virtual space to create a single digital scene of the patient. Next, functional aesthetic modeling of a new occlusal scheme in Exocad DentalCAD within the framework of the concept of sequential disocclusion by R. Slavicek, with the calculation of the angle of disocclusion with SCI, RCI, OP and other parameters. Then the patient was transferred to ceramics according to a fully digital protocol with the following stages: transferring the layout, prototyping the dentition rows and fixing the restorations in a given position, which is monitored and reproduced at absolutely every stage of rehabilitation.

CONCLUSIONS The result of the introduction into clinical practice of the procedure – project intraoral scanning and ThP position transfer – was the possibility of integratively merging analog diagnostics and digital occlusal rehabilitation, which was the link between analog and digital methods, and also allowed predictably transferring the ThP position after completion of initial splint therapy, as well as reproducing it at each stage of occlusal rehabilitation in a full digital protocol..

INTEGRATED PROSTHETIC-SURGICAL APPROACH IN SEVERE POSTERIOR MANDIBULAR ATROPHY: INFERIOR ALVEOLAR NERVE LATERALIZATION WITH IMMEDIATE IMPLANT PLACEMENT AND LOADING – A CLINICAL CASE

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BACKGROUND Mandibular full-arch rehabilitations can represent a clinical challenge, especially in cases of severe atrophy. Proper planning must begin with prosthetic requirements: vertical dimension, emergence profiles, and occlusal scheme. The integration of aesthetic-functional diagnosis and targeted surgery enables immediate loading with a fixed prosthesis, optimizing treatment time, patient comfort, and clinical predictability even in severely atrophic cases.

CASE REPORT A 63-year-old edentulous female with severe alveolar ridge atrophy presented to the Department of Dentistry, Vita-Salute San Raffaele University, for implant-prosthetic evaluation. Radiographic examination revealed a superficial course of the Inferior Alveolar Nerve (IAN). Prosthetically driven planning included aesthetic analysis, vertical dimension of occlusion (VDO) recording, and intermaxillary relationship assessment using the patient's existing prosthesis. During surgery, a vestibular osteotomy allowed identification of the IAN, its lateralization, and simultaneous placement of six bicortically anchored implants. Primary closure of the flaps was achieved after repositioning the IAN. The mandibular removable prosthesis was converted into an immediate screw-retained provisional, ensuring light centric contacts, VDO stability, and functional disclusions. Follow-ups at 1 week, 1 month, and 3 months documented uneventful healing, absence of neurosensory deficits, and clinical-radiographic stability. At 5 months, open-tray impressions were taken on multi-unit

abutments, with splinted transfers and passivity verification, intermaxillary registration at stabilized VDO, and CAD/CAM framework try-in. At 6 months, the definitive screw-retained prosthesis was delivered on a metal framework with a hygiene-oriented emergence profile. The 12-month follow-up confirmed implant stability, peri-implant health, and high patient satisfaction.

CONCLUSIONS The integration of prosthetic planning with surgery aimed at exploiting native bone, combined with IAN lateralization, allowed implant placement and immediate prosthesis delivery in a single session, avoiding regenerative procedures and reducing treatment time. At one year, implant stability, peri-implant health, and patient satisfaction were achieved, with predictable aesthetic and functional outcomes.

SURGICAL EXTRACTION AND IMMEDIATE IMPLANT PLACEMENT OF IMPACTED CANINE: A PROSTHETICALLY DRIVEN DIGITAL APPROACH

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BACKGROUND Prosthetically driven implant planning enhances aesthetics, function, and peri-implant health. Screw-retained crowns avoid excess cement, simplify maintenance. 30° angled abutments expand indications in challenging sites. Another essential aspect is the use of implants with a macroscopic geometry that ensures optimal primary stability, particularly suitable for immediate post-extraction placement.

CASE REPORT A 56-year-old female presented with an impacted upper right canine (1.3), declining orthodontics. Plan: surgical extraction, immediate implant. CBCT and intraoral scans used for digital prosthetic-driven planning. AI-assisted segmentation and virtual wax-up guided ideal implant positioning for optimal apical primary stability, avoiding vestibular bone regeneration. A 30° angled screw-retained abutment (SRA) was selected for a palatal screw channel, integrated in digital workflow. Surgical guide translated plan clinically. Surgery: conservative approach, tooth extraction, implant placement (40 Ncm torque). SRA connected intraoperatively, screw-retained provisional crown relined chairside. After three months, digital impression taken, monolithic zirconia crown delivered, fulfilling aesthetic/functional goals.

CONCLUSIONS This case shows benefits of prosthetically guided implant placement using 30° SRAs in immediate post-extraction protocols. Digital planning and implant macro design enabled primary stability without bone grafting and immediate provisionalization. Further research is needed to evaluate, on a larger scale, the impact of angled screw-retained restorations at 30° on clinical outcomes and retrievability in single-tooth restorations.

TISSUE CONDITIONING AND IMPRESSION TAKING ON IMMEDIATE LOADING POST-EXTRACTION IMPLANTS

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BACKGROUND Tissue conditioning in implantology includes techniques aimed at optimising the quality of the bone and gum around the implant, improving its integration, stability and aesthetics. The aim of these case reports is to highlight the importance of using a temporary restoration and a valid technique for taking impressions, to achieve a correct restoration of aesthetic and masticatory functions.

CASE REPORT The two cases described illustrate the clinical procedure for restoring function and aesthetics in the anterior region. For both patients, the procedure involved placing post-extraction implants with immediate functionalisation by loading a temporary prosthesis screwed onto the fixture. The use of the temporary prosthesis (on implants) was necessary to immediately restore occlusal and aesthetic-phonetic function, but also to preview the correctness of the prosthetic design, as well as the final result. The temporary prosthesis is useful during the waiting time for tissue healing: the implant emergence follows the course of the prosthesis, as the tissues are conditioned by the temporary prosthesis itself. Especially in the anterior areas, where the aesthetic result must be better, the need to condition the tissues becomes even more important to achieve correct emergence. After tissue maturation has been achieved, the next step is to take a correct impression. To better identify the new tissues, the precision transfer was customised with Flow composite. As the material is fluid, it is able to faithfully replicate the morphology, especially of the trans-mucosal path. In this way, it was possible to obtain a final product that is precise and stable over time.

CONCLUSIONS The use of the temporary proved to be essential for adequately conditioning the tissues during the post-operative period. Furthermore, customising the transfer using Flow allowed us to obtain a faithful and precise positional impression that perfectly replicated the implant emergency. If performed carefully and correctly, the two phases of prosthetic restoration can produce a more predictable long-term result and better aesthetics, which is a fundamental factor for the anterior sectors.

PROSTHETIC REHABILITATION OF A YOUNG FEMALE PATIENT WITH ADVANCED PERIODONTAL LOSS: A CASE REPORT

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BACKGROUND Advanced periodontal destruction may cause early tooth loss and lead to considerable difficulties in

mastication, speech, and daily life. Prosthetic rehabilitation is required to restore oral function and aesthetics in such patients. This report presents the prosthetic management of a young female with generalized periodontal loss using conventional clinical procedures.

CASE REPORT A 27-year-old female patient presented with generalized advanced periodontal loss, resulting in mobility and poor prognosis of the remaining dentition. The patient reported difficulties in mastication, speech, and esthetics. Clinical and radiographic examinations confirmed generalized bone resorption and several hopeless teeth. After extraction of teeth with poor prognosis, a combined treatment plan was established. For the remaining teeth, porcelain restorations were fabricated following tooth preparation, impressions with an A-type silicone material, and maxillomandibular relation records with wax rims. The metal framework was evaluated intraorally, and the definitive porcelain stage was completed. Subsequently, due to insufficient bone support and financial limitations, conventional removable partial dentures were planned to replace the missing teeth. Definitive impressions for the partial denture framework were obtained, and the framework was assessed intraorally for fit and stability. A wax trial with artificial teeth was carried out to evaluate aesthetics and occlusion. After some adjustments, the dentures were produced with heat-cured acrylic resin and delivered. The patient reported improved function, aesthetics, and overall satisfaction.

CONCLUSIONS This case demonstrates that conventional prosthetic treatment remains a reliable option in patients with advanced periodontal loss, especially when implant therapy is not feasible. Functional, aesthetic, and patient-centered outcomes were successfully achieved.

FULL ARCH REHABILITATION WITH THE COLUMBUS BRIDGE DIGITAL PROTOCOL: A NOVEL CASE REPORT OF PHOTOGRAMMETRY

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BACKGROUND The objective of this case report is to show a new digital approach in full-arch rehabilitation with immediate loading using the new Columbus Bridge Digital Protocol.

CASE REPORT A 65 y.o. man with hopeless dentition, with good systemic health, required a mandibular full-arch rehabilitation. Starting from CBCT of the patient and an intraoral scan, the mandibular conditions has been reproduced. The first step of the digital planning of the patient is achieved by matching of all the pre-operative data: facial pictures, face scanning and CBCT can be linked together to be able to evaluate the anatomical initial

situation. The previous intra-oral scan allowed the operator to record the pre-surgical bite registration. A traditional full thickness flap was elevated. After the extraction of the hopeless teeth, immediate implant placement was performed following the “all-on-six” principles, tilting distal implants to optimize the residual native bone. The two distal molars were extracted at the end of the surgical procedure, since they do not interfere with implant positioning and can be used as reference points. Post surgical intraoral photogrammetry (IPG) is performed using scan caps, which are the last update of IPG system and very helpful in the mandibular arch with tough surgical approaches. 48 hours after the surgery, the patient has restored masticatory function, aesthetics and phonetics.

CONCLUSIONS IPG represents an efficient technique for the post-surgical scan procedures that reduces the problems related to the intraoral scan in edentulous patients rehabilitated with CBP.

REHABILITATION OF A POST-ONCOLOGICAL DEFECT OF THE MAXILLO-FACIAL DISTRICT USING A PROSTHETIC DEVICE

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BACKGROUND For massive defects that include multiple facial subunits, because of resective cancer surgery, the elective treatment remains the surgical reconstruction with free flaps, because it is very difficult to recover these defects by the grafting techniques using autogenous tissue. The aim of this work is to present a complex clinical case concerning the post-oncological prosthetic rehabilitation of the nasal and maxillary. **CASE REPORT** A 52-year-old woman comes to our observation at the Department of Dentistry and Dental Prosthetics of San Rocco Hospital Clinic, Ome (BS), with a maxillofacial defect involving the nasal pyramid and part of the maxillary bone with an extensive oro-nasal communication, result of resective oncological surgery for epidermoid carcinoma infiltrating the tip of the nose, involving in addition to the nasal cavities, pre-maxilla and labial filter. It was decided for a rehabilitation with traditional facial epitheses anchored to the obturator prosthesis, already in the patient's possession. An acrylic resin extension is made on the palatal obturator that allows the attachment of the nasal epitheses via a knight hook. This system allowed the easy removal of the prosthesis, a better hygiene and the prosthetic device by the patient. Results: One year after rehabilitation, the epithesis is well tolerated. From an oncological view, there is no recurrence of the disease. Rehabilitation is useful to give a better aesthetic appearance to patient and assuring greater self-confidence.

CONCLUSIONS The clinical use of facial epitheses is based on the cooperation between the surgeon and the prosthetist. With the limitations of this study, maxillofacial epitheses are an excellent solution to significantly increase the quality of life of patients who have undergone resective cancer surgery, improving their aesthetic appearance and social interactions.

3D FACIAL SCAN-GUIDED OCCLUSAL PLANE ALIGNMENT IN POSTERIOR MAXILLARY IMPLANT REHABILITATION: A CASE REPORT

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BACKGROUND The occlusal plane should be oriented parallel to Camper's plane to ensure functional stability and harmonious mandibular posture. Incorporating three-dimensional (3D) facial scanning into digital prosthodontic planning enables reconstruction of the occlusal plane aligned with facial landmarks, thereby improving precision in implant placement and enhancing restorative outcomes.

CASE REPORT A patient presented with posterior maxillary edentulism and pre-existing implants in the mandibular arch. A digital workflow integrating a 3D facial scan was utilized to align the occlusal plane with Camper's plane. This alignment guided the diagnostic wax-up and the prosthetically driven implant planning. The maxillary implant positions were virtually planned to correspond precisely with the intended occlusal scheme. A 3D-printed surgical guide was used to ensure accurate implant placement. After three months of osseointegration, digital impressions were obtained, and a screw-retained monolithic zirconia prosthesis was fabricated and delivered. Integration of facial scan data enabled the creation of a harmonious occlusal curvature aligned with the patient's facial anatomy. At the 2-year follow-up, clinical and radiographic evaluation revealed stable peri-implant conditions with no evidence of inflammation, 2-year bone loss, or prosthetic complications. The zirconia prosthesis exhibited excellent integrity, with no chipping, fractures, or occlusal wear. **CONCLUSIONS** Integration of 3D facial scanning in digital implant planning enables reconstruction of an occlusal plane in harmony with Camper's plane. This case demonstrates the value of a prosthetically guided approach in posterior maxillary rehabilitation. At 2 years, the zirconia prosthesis showed stable peri-implant health and mechanical integrity, with no complications observed.

DIGITAL PROJECT COMBINED WITH FUNCTIONAL EVALUATION IN IMPLANT-PROSTHETIC REHABILITATION IN AESTHETIC AREA

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INTRODUCTION In this study we evaluate the occlusal and myoelectric characteristics of a prosthetic rehabilitation through digital project.

CASE DESCRIPTION A 52-year-old healthy female patient was referred to our Dentistry Department (IRCCS San Raffaele Hospital – Milano-Dir. Prof E. Gherlone). She presented dental blemishes at the level of the frontal group, a reduced vertical dimension and imperfection of the lips. After clinical and radiological evaluation, a prosthetic treatment plan was proposed through digital smile design protocol Smile LYNX (Smile Lynx, 3D LYNX srl, Varese). A double full arch Mock-Up was realized with CAD-CAM technology supported by digital drawing Software CAD-LINX. Occlusal aesthetic mock-up test and EMG pre-post treatment were performed. Then the extraction of elements 14-15-16 and integration of post-extraction implants were carried out. The provisional step was performed and afterwards that the double cord impression technique taken. A PEEK manufact was tested in the oral cavity and the definitive double zirconia arches were produced. The final EMG test was done. The patient was added into a maintenance program.

DISCUSSION At time T0 the patient presents in the electromyography an initial occlusal and muscular balance of 82%. At time T1 post provisional prosthetic rehabilitation the patient presents a good occlusal and muscular balance with a 90% increase. At time T2 post definitive prosthetic rehabilitation the patient presents a good maintenance equal to 90% as at time T1. So the digitization of the diagnostic phase and the computerized EMG control of muscle activity, can help the clinician improve the patient's understanding of the rehabilitation project and to maintain the initial design during the work phases.

CLINICAL RESEARCH

HARD AND SOFT TISSUE RESPONSE TO THREE DIFFERENT IMPLANT DESIGNS USED AS SINGLE IMPLANTS IN THE AESTHTIC ZONE: A RETROSPECTIVE ANALYSIS

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AIM Few studies directly compare the performance of bone level implants, tissue level implants with a straight transgingival portion and tissue level implants with a convergent collar in the anterior zone. The aim of this retrospective study is to examine the influence of three different neck designs on marginal bone stability as well as on the facial bone anatomy of single implants, placed in the aesthetic area, after a 1.5-to-6.5-year follow-up, by means of CBCT, 2D radiograph and pink aesthetic score analysis.

MATERIALS AND METHODS The population of the present study was collected from the database of one private practice in Adria, Italy. Patients with a single implant supported restoration in position between 14-24 were candidate to take part in the study. Both adjacent teeth as well as the contralateral tooth had to be present for the patient to be included in the study sample. All surgical procedures were performed in the same facility by the same experienced oral surgeon. The analysis of marginal

bone loss and interproximal bone to implant contact points was based on 2D periapical radiographs and was carried out using a computerized technique. Intraoral radiographs were initially taken immediately after the insertion of all implants included in the study and at each follow-up visit with a minimum interval of 1 year. The analysis of the anatomical features of the facial bone in addition to the emergence angle of the restoration was based on a 3D CBCT taken at the last follow-up visit. Based on standardized pictures, the pink aesthetic score was applied to evaluate the peri implant soft tissue situation in a comparative way.

RESULTS 67 subjects were enrolled in the study, divided into three groups based on the type of implant received: bone level, BL (n=22), tissue level with a convergent neck, TLCON (n=27), and tissue level with a straight neck, TLST (n=18). Follow-up duration showed a significant difference, with the TLCON group having the longest mean follow-up (3.64 ± 1.02 years) and the TLST group the shortest (1.48 ± 0.41 years). The TLCON group presented the highest interproximal bone to implant contact points. No marginal bone loss was reported among the three groups and in both TL groups the first bone to implant contact was found to be stable above the rough and smooth surface interface. No correlation was found between the pink aesthetic score and marginal bone loss nor with the position of the first bone to implant contact. All groups archived clinically acceptable pink aesthetic score scores, although the TLST reported significantly lower results. Regarding the CBCT analysis, the facial bone crest values were positive for all implant groups. However, the facial bone to implant contact points and the facial bone height were significantly lower in the BL group than in the other two groups.

CONCLUSIONS Although the TLCON presented a superior bone stability and excellent aesthetic results, despite some statistically significant differences, all groups achieved a clinically acceptable PES, positive MBL, DIB and DIC values, therefore confirming that a clinically acceptable outcome of single implant restorations in the aesthetic area can be achieved regardless of the implant neck design. For such reason we can affirm that, if implants are placed in the correct 3D position, the crestal bone remodeling affecting the bone to implant contact does not affect the aesthetic outcome of the therapy as it is most likely of an intrabony nature.

IS THERE AN ASSOCIATION BETWEEN CANINE GUIDANCE AND TEMPOROMANDIBULAR DISORDERS? A CROSS-SECTIONAL INVESTIGATION

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AIM The aim of the present investigation is to get deeper into the topic by analyzing the presence/absence of the left/right/bilateral CG in a large sample of patients seeking TMD care and comparing it to a control healthy group. The secondary aim is to assess if specific forms of TMDs, that is, predominantly myogenous, arthrogenous, related to disc position, or their combination, are associated with canine guidance.

MATERIALS AND METHODS For the present cross-sectional study, participants were recruited among the patients seeking care at the XXX, between November 2022 and April 2025. TMDs were diagnosed using the diagnostic criteria for temporomandibular disorders (DC/TMD). CG was assessed by two calibrated operators, blinded to the diagnosis of TMD. A t-test was used to assess the age difference between the two groups. The chi-square test was used to assess the difference in sex between the two groups and the difference in the presence/absence of canine guidance between patients and healthy individuals. Statistical significance was set at $p < 0.05$.

RESULTS A total of 736 participants were recruited. Of them, 599 were TMD patients and 137 were healthy individuals. The group of patients was composed of 452 females (75.5%), with a mean age of 42 ± 11.4 , while the patients' group was composed of 84 females (62%) with a mean age of 37 ± 9.3 . The chi-square test showed no significant difference between TMD patients and healthy individuals for the presence of left canine guidance ($\chi^2 = 0.59$, $p = 0.439$), right canine guidance ($\chi^2 = 0.47$, $p = 0.491$), or bilateral canine guidance ($\chi^2 = 1.53$, $p = 0.214$). The statistical analysis showed no significant difference in the presence/absence of left/right/bilateral canine guidance between TMD patients and healthy individuals.

CONCLUSIONS The absence or presence of canine guidance showed no significant relationship with TMDs or with their specific diagnostic categories. These findings question the biological rationale for restoring or pursuing canine guidance through prosthodontic, orthodontic, or splint therapy as a preventive or therapeutic strategy. Clinicians are encouraged to base treatment decisions on evidence-based conservative approaches rather than on occlusal schemes.

HOW MUCH FERRULE IS ENOUGH? CLINICAL EVALUATIONS OF RESTORED ANTERIOR TEETH WITH A PARTIAL FERRULE EFFECT

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AIM The restoration of a compromised tooth with fractures or subgingival caries presents both functional and aesthetic challenges. A 2 mm ferrule contribute to long-term restoration stability. This study aims to evaluate periodontal stability and the clinical success of monolithic zirconia crowns using a partial ferrule effect.

MATERIALS AND METHODS Patients with anterior teeth having partial subgingival fractures or subgingival caries were included in this study. Root canal treatments were performed when necessary, and if the loss of dental substance was greater than 50%, this was followed by the placement of glass fiber posts cemented with resin-reinforced glass ionomer cement. Vertical preparation was performed, and relined provisional crowns were placed. No crown lengthening or gingivectomy was made. After 3 months of soft tissue maturation, a fully digital workflow was carried out with intraoral scanning, CAD design, and milling of monolithic zirconia crowns. In the CAD-CAM software, the

angles in which the crown did not have the ferrule effect were calculated for each tooth. Clinical periodontal probing and Rx follow-up evaluations were conducted two months after the delivery of the restoration and at 2 years.

RESULTS Fifteen dental elements were treated. The mean of the partial ferrule angles was calculated to be 260.87° , with a standard deviation of 42.54° . (Fig.4) From the image overlay analysis using Matlab software, the most frequently compromised wall was found to be the lingual/palatal. (Fig. 5) At the 2-year follow-up, all restorations demonstrated no debonding mechanical failure, or chipping. Periodontal tissues remained healthy and stable in all cases, with no signs of inflammation. The crowns showed stable integration, and no intervention was required during the follow-up period. The success rate was 100%, with consistent aesthetic and functional performance observed across all cases.

CONCLUSIONS This study demonstrated successful prosthetic outcomes and healthy periodontal soft tissues in teeth restored with monolithic zirconia crowns using a partial ferrule effect (mean 72.4%) at the 2-year follow-up. Further research with larger cohorts and extended observation is needed to validate these findings.

FULL DIGITAL WORKFLOW FOR IMPLANT- PROSTHETIC REHABILITATIONS

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AIM Implant dentistry is going through a significant digital implementation. Through the development of new equipment and their corresponding workflows, the diagnosis and treatment of patients are becoming simpler and more efficient. The aim of the present study was to describe a digital workflow for the implant-prosthetic treatment in a totally edentulous patient.

MATERIALS AND METHODS A 58-year-old patient, in good health, with a reduced number of teeth, was treated with 4 zirconia-coated titanium implants for each arch. After 4 months of submerged healing, the implants were loaded with standard abutments with 4° of tapering and prefabricated secondary conical copings. These conical copings were cemented onto pre-existing denture bases. After 4 months of function, 5 digital impressions were taken with an intraoral scanner. The first 2 were with the existing prostheses in situ, to duplicate the functionality and aesthetics of the final prostheses. 2 more were taken to record the correct position of the abutments with dedicated scan bodies. The last impression was taken to place the 2 arches in correct occlusion. The STL files were sent to Exocad and processed in the conometric workflow for the fabrication of metal-resin prostheses. The patient was instructed to remove and reinsert the prosthesis himself.

RESULTS Throughout 30 months of observational period, no biological or mechanical complications occurred. The patient exhibited a good plaque control, confirmed by healthy peri-implant soft tissue conditions. The radiographic examination (OPT) showed an excellent bone healing and stable crestal bone level without peri-implant radio-transparency. Precise fit

between the abutments and the secondary components was also noticed. The patient reported a remarkable satisfaction for the received therapy. In detail, he appreciated the prosthetic stability, the chewing function, the aesthetics phonetics and the hygienic accessibility.

CONCLUSIONS The recent improvements in digital dental technologies now allow clinicians to take digital impressions of the dental arches, avoiding the use of conventional impression materials, and to work in a completely virtual environment, without any physical model situation. Studies have shown that the digital technique is more efficient and convenient than the conventional impression technique and that patients often prefer the intraoral scanning approach to the traditional impression.

COMPARISON ON CLINIC BETWEEN DIFFERENT JAW TRACKING SYSTEM, MODJAW, ITAKA, ZEBRIS

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AIM All three tracking systems examined showed a fair amount of precision in identifying mandibular movements. However, the Modjaw system has record lower values during the opening motion, suggesting a possible tendency to underestimate this dynamic phase compared to other devices. The analysis of the Intraclass Correlation Index (ICC) showed a moderate inter-subject variability in the data obtained, a phenomenon that would deserve further in-depth studies also within the same method. This variability could be linked to several factors, including some elements of a technical and procedural nature.

MATERIALS AND METHODS 20 adult subjects (12 males and 8 females; mean age 27 years, range +4) were recruited, undergoing an orthognathodontic check-up. For each participant, mandibular kinematics were recorded with all three systems. The tests were conducted by the same operator, with the help of two colleagues, strictly following the manufacturers' instructions. The order of the recordings was randomized and the traces in opening, closing, protrusion and right and left laterality were acquired. The data obtained were collected in an Excel file and analyzed with StatPlus by means of descriptive statistics and calculation of correlation coefficients between the systems.

RESULTS Statistical analysis showed a significant difference only between Modjaw and Zebris in aperture values, with Modjaw tending to measure around 5.7mm less. For the other variables, no significant differences emerged. This discrepancy may be due to the fact that larger movements are recorded differently, or that the Modjaw examination causes patients to reduce the maximum opening. The analysis of the ICC showed moderate values (0.50–0.64), indicating a significant but not high correlation between the measurements. This suggests some random variability in the opening data, linked to individual differences in the execution of movements rather than a systematic error of the tools.

CONCLUSIONS All three tracking systems examined showed a fair amount of precision in detecting jaw movements. However, the Modjaw system has record lower values during the opening

movement, suggesting a possible tendency to underestimate this dynamic phase compared to other devices. The analysis of the Intraclass Correlation Index (ICC) revealed a moderate inter-subject variability in the data obtained, a phenomenon that deserves further in-depth studies also within the same method.

SCREW-RETAINED IMPLANT-SUPPORTED PROSTHESES USING TI-BASE ABUTMENTS: PRELIMINARY RESULTS OF A MULTICENTER RETROSPECTIVE STUDY

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AIM To evaluate the clinical outcomes and mechanical complications of screw-retained implant-supported fixed prostheses using bonded Ti-base components, through a multicenter retrospective study.

MATERIALS AND METHODS The present project was conceived and supported by SIPRO (Società Italiana di Protesi Dentale e Riabilitazione Orale). Patients with screw-retained partial prostheses on implants using Ti-base abutments were included from four dental centers in Italy: 2 University clinics and 2 dental practices, all run by SIPRO founding members. The inclusion criteria were: complete clinical records since implant placement and availability of periapical radiographs at the prosthesis delivery (T0). At follow-up, clinical charts were reviewed, and periapical radiographs were taken. Bone levels were measured mesially and distally and compared with bone levels at T0, in order to measure bone loss. Patient characteristics as well as implant and prosthesis features were collected. Crown height and transmucosal height of the Ti-base were also recorded. The emergence profile was classified into three categories (0°, <30°, >30°). Any biological or technical complication was recorded.

RESULTS A total of 252 implants in 157 patients were analyzed. Of these, 178 rehabilitations were single crowns, and 74 were fixed partial dentures supported by 2–4 implants. Regarding prosthetic materials, 95.2% were made of zirconia, while 4.8% were made of PMMA or cobalt-chromium ceramic. Sixteen patients (10.2%) were classified as suffering from bruxism. The mean marginal bone loss at follow-up (mean follow-up periods: 30 months; range: 9–78 months) was 0.32 mm (range: -1.25 mm to 1.9 mm). Notably, 37.3% of implants showed marginal bone remodeling greater than 0.5 mm. The median bone loss was 0.1 mm, indicating high stability in most cases. Technical complications occurred in 13 cases (5.2%), mainly involving screw loosening (5 cases, 2.0%), decementation of the Ti-base (2 cases, 0.8%), crown fractures (4 cases, 1.6%), and the need for crown replacement (2 cases, 0.8%) during the follow-up period. Biological complications were reported in 5 cases, all of which

were mucositis.

CONCLUSIONS Screw-retained prostheses using bonded Ti-base abutments demonstrated excellent clinical outcomes, with stable marginal bone levels and a low incidence of biological and technical complications over time.

ENHANCING SOFT TISSUE INTEGRATION IN MAXILLARY LATERAL INCISOR AGENESIS: A DIGITAL IMPLANT-PROSTHETIC STUDY FOCUSED ON MATERIAL BIOCOMPATIBILITY WITH A 4-YEAR CLINICAL FOLLOW-UP

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AIM This prospective clinical investigation aimed to assess the 4-year survival and success rates of single implant-supported monolithic zirconia crowns, fabricated through a fully digital workflow, in the prosthetic rehabilitation of patients presenting with unilateral or bilateral congenital absence of the maxillary lateral incisors. The study also analyzed biological and technical variables affecting clinical outcomes, including patient-reported satisfaction.

MATERIALS AND METHODS A total of 22 patients with mono- or bilateral agenesis of the maxillary lateral incisors were enrolled, receiving 30 narrow-diameter implants. Corresponding screw-retained monolithic cubic zirconia (5Y-TZP) crowns with internal connections were digitally manufactured and delivered. Clinical performance was objectively evaluated using the Functional Implant Prosthodontic Score (FIPS), while subjective patient satisfaction was measured using a Visual Analog Scale (VAS). Survival and success analyses were performed using descriptive statistics and the Kaplan-Meier method.

RESULTS At the four-year follow-up, the mean FIPS was 9.2, and the mean VAS score for patient satisfaction was 8.7. Cumulative survival and success rates were 100% and 93.3%, respectively, according to Kaplan-Meier estimates.

CONCLUSIONS The use of a fully digital implant-prosthetic protocol represents a reliable and effective short-term solution for the functional and aesthetic rehabilitation of maxillary lateral incisor agenesis. The use of zirconia-coated titanium profile designers resulted in reduced healing and working times, as well as in improved peri-implant tissues conditions. Nonetheless, further longitudinal studies are warranted to confirm the long-term predictability of this approach.

ALL-ON FOUR REHABILITATIONS IN HIV+ PATIENTS: A SEVEN YEARS' FOLLOW-UP

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AIM This study was carried out to evaluate the expectation

of implant-prosthetic rehabilitations in HIV+ patients under antiviral treatment, evaluating the marginal bone level change (MBLC) and the survival in relation to the implant surface and clinical parameters.

MATERIALS AND METHODS Full-arch rehabilitations (according to All-on4 protocol) were performed on patients with controlled disease and an antiviral treatment. The survivals and the MBLC, analyzed over 84 months, were related to serological parameters such as CD4/CD8 ratio and HIV-RNA. The implant surfaces were of two types: a group of implants with a greater surface roughness (microrough surface-MRS) and the other one with a reduced surface roughness (Full Contact Covering Surface-FCC).

RESULTS Implants were placed in 24 patients, and the overall number of fixtures was 31 All-on4 (124 fixtures). After seven years of follow up, the rehabilitations showed a high survival rate (90.3%). The success rate for MRS implants was 84%, while for FCC implants the success rate was significantly higher (95.4%). Implant failures occurred in 5 patients (17 fixtures out of 124: 5%) due to primary infection (7 fixtures out of 124: 5%), fractures (2 fixtures out of 124: 1.6%) and periimplantitis (8 fixtures out of 124: 6.4%). Mean MBLC measured at T3 was 0.78 mm for FCC implant surface and 0.69 mm for MRS implant surface. A statistically significant correlation was found between the viremic quantity (HIV-RNA) in the blood and the MBLC (0.01 p 0.05). Instead, a statistically negative correlation was found between CD4/CD8 ratio and the values of MBLC (p 0.05).

CONCLUSIONS This study showed how the amount of MBLC is closely related to markers such as the HIV-RNA and the CD4 / CD8 ratio. Furthermore, FCC implant surfaces showed a reduced tendency to fail.

PREFABRICATED THREE-IMPLANT-SUPPORTED FULL-ARCH PROSTHESIS FOR TREATMENT OF EDENTULOUS MANDIBLE: A PROSPECTIVE CLINICAL TRIAL

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AIM The study aims to evaluate a prefabricated three-implant-supported full-arch prosthetic rehabilitation (Trefoil® protocol) for the treatment of edentulous mandible, assessing its clinical predictability and long-term effectiveness. The main objective was to assess implant and prosthetic survival, while secondary outcomes were marginal bone resorption and patients' satisfaction.

MATERIALS AND METHODS Twelve edentulous or terminally dentate subjects were selected among patients who attended the Special Oral Rehabilitation Unit (director: Prof. EL Agliardi) of Vita-Salute San Raffaele Dentistry Department (director: Prof. EF Gherlone) between 2015 and 2016. All patients were treated by the Trefoil® protocol performed by a single expert surgeon (ELA). Following dental extractions and mandibular crest regularization, 3 intra-foraminal implants were placed. The prosthetic workflow began with jaw relation and vertical dimension assessment. Then, a high-precision definitive

impression was taken, and implant position and intermaxillary relationship were transferred to the laboratory. Compensating screws were used to create a perfectly passive prefabricated bar. The final prosthesis was delivered on the same day as the surgery. Implant survival and both biological and prosthetic complications were evaluated at 8-year clinical and radiographic follow-up.

RESULTS After 8 years, implant and prosthetic survival was 100%. Only two cases of mucositis were reported, both resolved with conservative therapy. There were no fractures or replacement of the prefabricated bar during the follow-up period. Mean marginal bone resorption was 0.55 ± 0.35 mm at 6 months and 1.9 ± 1.25 mm at 8 years, values consistent with physiological limits. Prosthetically, the standardized workflow helps preserve vertical dimension and correctly distribute occlusal forces, ensuring predictable functional and aesthetic outcomes. Patients reported high satisfaction, especially regarding chewing stability. The protocol is well-suited for situations that require less surgical time, simpler procedures, and lower costs, ensuring rehabilitation effectiveness.

CONCLUSIONS The Trefoil® protocol is a reliable and predictable option for immediate implant-supported full-arch mandibular rehabilitation. The standardized prosthetic workflow ensures an optimal restoration of function and aesthetics. High patient satisfaction and reduced clinical and technical times make Trefoil® protocol a benchmark in implant-prosthetic practice.

BRUXISM FLUCTUATION AS A NEGLECTED RISK FACTOR FOR PROSTHODONTIC COMPLICATIONS

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AIM In the field of prosthodontics, bruxism has always been considered an important risk factor for the long-term survival of tooth restorations. Nevertheless, the available randomized clinical trials in prosthodontics tend to exclude patients with bruxism, creating an important gap in the knowledge. The aim of the present study is to retrospectively investigate, in a group of patients who were initially considered non-bruxers and delivered different four types of prosthodontic tooth restorations, if the presence of bruxism at the follow-up assessment is associated with a higher failure rate.

MATERIALS AND METHODS For this retrospective, cross-sectional investigation, participants were recruited from the patients of the University of Siena between July and November 2019. The inclusion criteria were patients aged 18 to 80 years, in good general and periodontal health, that has previously received a prosthodontic restoration on posterior teeth (molars or premolars) 6 years before (October, following endodontic treatment. Only teeth with 50% or less tooth structure, with symptom-free root canal filling and a minimum apical seal of 4 mm, in occlusal function with a natural tooth, and in interproximal contact with two adjacent natural teeth were included. Exclusion criteria were age <18 years, disability,

pregnancy, systemic diseases or severe medical conditions, history of bruxism or signs of bruxism, and temporomandibular disorders. The following four types of tooth restoration were considered: 1. FP GC FIBER POST, GC (FP) luted with GRADIA CORE, GC (GC) + Initial LiSi Press, GC partial crown luted with G-CEM LinkForce, GC (LF); 2: EverX Flow, GC (EXF) core build up + Initial LiSi Press partial crown luted with LF; 3: EXF + G-aenial Posterior Composite, GC (GPC); 4: FP + EXF + GUI.

RESULTS A total of 160 patients (63 men and 57 women, mean age 48.5 ± 9.3 years) were included in the present study. Of the 160 teeth included, 75 were premolars and 85 were molars. The average time of the tooth restoration in function was 6.7 ± 0.4 years. The statistical analysis showed no association between the group considered and the success ($p > 0.05$), and no significant difference between the age of patients who had tooth failure and those who did not ($p > 0.81$). The Kendall Tau test showed a significant positive correlation was found between failure and the use of direct composite for tooth reconstruction ($r = 0.22$) (Groups 3 and 4). The presence of bruxism at the 6-year control was positively correlated with the restoration failure ($r = 0.41$). The logistic regression model was built using the variables that had a significant correlation in the bivariate analysis, the use of composite for tooth reconstruction, and the presence of bruxism. The regression showed that the combined effect of the use of composite and the presence of bruxism significantly contributes to the number of absolute failures ($R = 0.452$).

CONCLUSIONS The present study shows that the baseline exclusion of bruxism does not rule out its future impact on the outcome of prosthetic restoration. Thus, clinicians should consider implementing during the periodical recall visit, a screening protocol of bruxism in the years following the prosthodontic restoration.

A RANDOMIZED CONTROLLED CLINICAL TRIAL ON PRESS AND BLOCK LITHIUM DISILICATE PARTIAL CROWNS: A 4-YEAR RECALL

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AIM To evaluate clinical performances of two lithium disilicate systems (Initial LiSi press vs Initial LiSi Block, GC Co.) using modified United States Public Health Service (USPHS) evaluation criteria and survival rates after 4 years of clinical service.

MATERIALS AND METHODS Partial adhesive crowns on natural abutment posterior teeth were made on 60 subjects who were randomly divided into two groups: Group 1: Initial LiSi press and Group 2: Initial LiSi Block. Fabrication of partial crowns was made with full analog and digital procedure in Groups 1 and 2 respectively. The restorations were followed up for 1 and 4 years, and the modified USPHS evaluation was performed at baseline and each recall together with periodontal evaluation. Contingency tables to assess for significant differences of success over time in each group and time-

dependent Cox regression to test for differences between the two groups were used and the level of significance was set at $P < 0.05$.

RESULTS Regarding modified USPHS scores, all evaluated parameters showed Alpha or Bravo and no Charlie was recorded. No statistically significant difference emerged between the two groups in any of the assessed variables ($P > 0.05$). No statistically significant difference between scores recorded at the baseline and each recall. All modified USPHS scores were compatible with the outcome of clinical success and no one restoration was replaced or repaired, and the survival rate was 100% after 4 years of clinical service. No difference was found between traditional and digital procedure to fabricate the crowns. The two lithium disilicate materials showed similar results after 4 years of clinical service.

CONCLUSIONS The crowns made with the two tested lithium disilicate materials with analog and digital procedures showed 100% survival after 4 years of clinical service with no statistically significant difference using the modified USPHS scores.

R12_ SEVEN-VERSUS 5-MM DIAMETER MOLAR POST-EXTRACTION IMPLANTS: 1-YEAR RESULTS FROM A MULTICENTRE RANDOMISED CONTROLLED TRIAL

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AIM This multicentre randomised controlled trial compared the clinical effectiveness of 7.0-mm wide-diameter implants with 5.0-mm conventional-diameter implants placed immediately after molar extraction.

MATERIALS AND METHODS Thirty-nine patients requiring a single immediate post-extraction implant in a molar site were recruited at five centres. Patients were randomly assigned to receive either a 7.0-mm wide-diameter implant ($n=20$) or a 5.0-mm conventional-diameter implant ($n=19$). Any bone-to-implant gaps were grafted with a bone substitute. Definitive zirconia crowns were delivered 4 months post-placement. Outcomes were assessed up to 1 year after loading and included implant failures, complications, pink aesthetic score (PES), peri-implant marginal bone level (MBL) changes, and patient satisfaction.

RESULTS No patient dropped out. No implant failed in the 7-mm group, whereas one implant failed in the 5-mm group (difference=5.3%; 95% CI: -15.3% to 4.8%; $P=0.487$). Four complications occurred in four patients in the 7-mm group versus none in the 5-mm group (difference=20%; 95% CI: 2.5% to 37.5%; $P=0.106$). At loading, mean PES was 5.65 ± 2.43 (7-mm) and 6.29 ± 4.03 (5-mm). At 1 year, PES was 9.10 ± 2.17 (7-mm) and 9.28 ± 2.95 (5-mm), with no significant differences. At 1 year, mean bone loss was 0.48 ± 0.56 mm (7-mm) and 0.33 ± 0.71 mm (5-mm), with no significant difference between groups (mean difference=0.44 mm; $P=0.364$).

CONCLUSIONS Preliminary 1-year follow-up data suggest that

immediate placement of 7-mm wide-diameter implants yielded similar outcomes compared with conventional 5-mm implants in molar extraction sockets. Longer follow-up is required to confirm these findings.

RESEARCH IN DIGITAL PROSTHODONTICS

FRACTURE FORCE OF 3D PRINTED RESIN BRIDGES: IMPACT OF CONNECTOR SIZE AND LUTING PROTOCOL

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AIM 3D printing has played a pivotal role in revolutionizing prosthetic workflows, substantially reducing production times. 3D printed resin composite (3DPC) is now a reliable option for single-unit provisional restorations; however, its use in extended restorations still requires validation. The aim of this study was to evaluate whether the resistance to simulated clinical load of 3DPC fixed dental prostheses (FDPs) is influenced by different connector cross-sections and cementation protocols.

MATERIALS AND METHODS A metal model was used to simulate two abutment teeth for a three-unit FDP. Based on the scan of the model, the technician performed a digital wax-up and the resulting STL file was processed by a DLP 3D printer (Asiga MAX UV, NSW, Hawthorn, Australia) to fabricate 80 three-unit FDPs in GC Temp PRINT resin composite. Specimens were divided into two main groups based on connector dimensions: 40 bridges with a 5×5 mm connector and 40 with a 3×3 mm connector. Each group was further divided into four subgroups ($n = 10$) according to the cementation protocol: no cement, TempBond (Kerr), Ketac Cem radiopaque (3M ESPE), and G-Cem One (GC Corp.). Bridges were either placed or cemented onto the metal model and subjected to three-point bending tests using a universal testing machine (Instron 5567, Norwood, MA, USA) to measure fracture force. Means and standard deviations were calculated, and statistical analysis was performed using ANOVA, Kruskal-Wallis, and Mann-Whitney U tests ($p < 0.05$).

RESULTS Samples with 5×5 mm connectors demonstrated significantly higher fracture load compared to those with 3×3 mm connectors, regardless of cement type. No statistically significant differences were observed among the cement subgroups within the 5×5 mm group. In the 3×3 mm group, the bridges cemented with G-Cem One showed significantly higher values of fracture force (343 ± 17 N), while TempBond showed greater variability, suggesting lower mechanical predictability.

CONCLUSIONS Fracture load was higher in FDPs with 5×5 mm connectors, independently of the cement used. In bridges with smaller connectors (3×3 mm), G-Cem One provided the best mechanical performance. Cement selection is therefore more critical when connector dimensions are reduced.

R14_ COMPARISON OF FULL-ARCH INTRAORAL SCANS IMMEDIATELY AFTER IMPLANT INSERTION VERSUS HEALED TISSUE: A MULTICENTRIC CLINICAL STUDY

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AIM The purpose of this clinical study is to compare implant full-arch intraoral scans taken immediately after implant placement with those obtained after tissue healing in patients rehabilitated with implant-supported fixed prostheses.

MATERIALS AND METHODS Between September 2023 and March 2024, a total of 19 patients with compromised residual dentition (6 women; 13 men) were rehabilitated using 4-to-6 immediately loaded post-extraction implants. These implants supported fixed full-arch screw-retained prostheses either in the lower jaw (9 patients) or upper jaw (10 patients). Intraoral scans were taken immediately after implant placement (termed "immediate scan"). After a healing period of four months, the provisional prosthesis was removed, and a second intraoral scan was performed using the same scan bodies and scan pattern as the initial scan (termed "delayed scan"). The two scans were overlaid, and the discrepancies between them were measured.

RESULTS The average discrepancy between the immediate and delayed scans was 0.1905 mm. Our statistical analysis revealed larger discrepancies for implants placed in the posterior areas, with the implant in site 1.6 (Implant 1) showing a discrepancy of 0.2326 mm, and the implant in site 2.6 (Implant 4) showing a discrepancy of 0.2124 mm ($p = 0.05$). No statistically significant difference was observed when comparing patients treated in the upper and lower jaws.

CONCLUSIONS Within the limitations of the study and based on this result, clinicians should be aware that an immediate post-surgical intraoral digital scan for implant-supported full-arch rehabilitations may result in a higher risk of imprecision. Furthermore, according to the results of the study, the accuracy of the digital impression on implant full-arch rehabilitations seems to be influenced by the clinician's skills. Further studies with larger sample sizes are required to confirm our results.

ACCURACY OF FULL-ARCH INTRAORAL SCANS COMPARED TO CONVENTIONAL IMPRESSIONS: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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AIM The digitalization of workflows in implant dentistry has introduced intraoral scanners (IOS) as a potential alternative to conventional impressions, particularly in full-arch rehabilitations. However, the accuracy of digital impressions in these complex clinical scenarios remains a topic of debate. This study systematically compares the two methods and proposes standardization criteria for future research.

MATERIALS AND METHODS A systematic review was conducted following PRISMA guidelines, with a protocol registered on PROSPERO. The search was performed in four databases (PubMed, Scopus, CENTRAL, and Web of Science), with no time restrictions, and included articles published in English up to December 2024. Only clinical studies (randomized or observational) comparing the accuracy of digital and conventional impressions in patients with implant-supported rehabilitations on at least four implants were included. Accuracy was assessed using both indirect methods (comparison of prostheses obtained via digital and conventional workflows through the Sheffield test and radiographic analysis) and direct methods (comparison of STL files by analyzing linear, angular, and 3D deviations using RMS 3D values). Risk of bias was assessed with the QUADAS-2 tool. The meta-analysis included only studies with comparable quantitative data, using a random-effects model.

RESULTS Out of a total of 2,535 articles, 9 were selected for the systematic review and 3 for the meta-analysis, based on inclusion criteria. Five studies assessed IOS accuracy by comparing the fit of prostheses obtained through conventional and digital impressions using the Sheffield test and radiographic evaluation. Results showed that prostheses made from intraoral scans were slightly superior in terms of fit, passivity, and time efficiency. STL files obtained from IOS systems were also compared to those acquired by scanning plaster models using laboratory scanners. Furthermore, the use of prefabricated aids and photogrammetry showed clinically comparable results in terms of interimplant distance measurements. The 3D accuracy of STL files obtained from these devices was also analyzed, and only one device showed greater 2D and 3D deviations, with fit discrepancies.

CONCLUSIONS Intraoral scanners have made significant progress, but the lack of standardized protocols and the variability in scanners, techniques, and materials affect accuracy. Digital impressions are considered reliable, but scanning the edentulous lower arch remains problematic due to the absence of reference points. IOS are advantageous in cases with non-parallel implants. Future studies are needed with standardized measurements based on recorded distances.

FLEXURAL STRENGTH COMPARISON OF CONVENTIONAL, CAD-CAM-MILLED, AND 3D-PRINTED DENTURE BASE RESINS

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AIM This study aimed to compare the flexural strength of complete denture resins fabricated using conventional, CAD-CAM-milled, and 3D-printed technologies. The influence of

different polymerization techniques on mechanical performance was also evaluated to determine whether innovative digital approaches, particularly 3D-printed composites, could achieve comparable or superior properties to traditional PMMA denture base materials.

MATERIALS AND METHODS A total of 170 standardized rectangular specimens ($64 \times 10 \times 3.3$ mm) were prepared in compliance with ISO-20795-1:2013. Twelve denture base resins were tested: six conventional heat- and cold-cured PMMAs, two CAD-CAM-milled PMMA discs (Ivotion, AADVA), and four 3D-printed resins, including PMMA- and UDMA-based (NextDent Denture 3D+, SprintRay EU Denture Base, GC Temp Print with/without pink pigment). Milling was performed from pre-polymerized discs, while 3D-printing used a DLP printer (Asiga MAX UV) followed by post-curing with either LaboLight DUO or BB cure units for 20–40 min. All specimens were finished, polished, water-stored for 24 h, and tested in a universal machine using a three-point bending setup. Flexural strength values were calculated in MPa and analyzed with Kolmogorov-Smirnov, one-way ANOVA, Bonferroni post hoc, and Spearman correlation tests, with significance set at $p < 0.05$.

RESULTS CAD-CAM-milled AADVA discs achieved the highest flexural strength (107.87 ± 7.56 MPa), followed by 3D-printed Temp Print Pink polymerized 40 min with the BB cure unit (102.96 ± 9.37 MPa). Among conventional PMMAs, Acrypol Fast showed the highest strength (98.86 ± 10.66 MPa), whereas Acryself displayed the lowest (74.83 ± 7.84 MPa). Within the 3D-printed group, Sprintray cured 20 min with LaboLight had the lowest flexural strength (54.07 ± 3.55 MPa), below the ISO minimum requirement of 65 MPa, as did NextDent under the same conditions (60.11 ± 5.72 MPa). In contrast, extending curing time or using BB units significantly improved values, with several 3D-printed resins reaching results statistically comparable to milled and heat-cured controls. Strong positive correlations were found between polymerization technique and flexural strength, particularly for Temp Print and Sprintray resins ($r > 0.80$).

CONCLUSIONS Polymerization method was shown to be a key determinant of flexural strength in both acrylic and composite denture resins. CAD-CAM-milled PMMA exhibited the best mechanical properties overall, but BB-cured 3D-printed resins demonstrated comparable strength, surpassing conventionally fabricated specimens. The experimental Temp Print Pink achieved values equivalent to milled PMMA, highlighting its promise as a reliable and aesthetic alternative for digital denture base fabrication.

R17_ IN VITRO EVALUATION OF THE MARGINAL FIT OF NANOCOMPOSITE, 3D PRINTED CROWNS WITH HORIZONTAL AND VERTICAL PREPARATION MARGINS

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AIM This study aimed to evaluate the marginal adaptation of 3D printed crowns with either horizontal or vertical margin

preparations, scanned with an IOS (3Shape), showing an accuracy of 5 μ m, at standardized environmental conditions.

MATERIALS AND METHODS Two maxillary first premolar abutments were designed using CAD software, one with a horizontal preparation (Ho) and the other with a vertical preparation (Ve). Both abutments had 5-degree angle of TOC (Total occlusal Convergence); they were 3D printed in resin, then mounted on a reference typodont. Ten crowns were fabricated for each preparation geometry using the DFAB 3D printer (DFAB CHAIRSIDE, Thiene, Italy). Cementation was simulated with polyether impression material, then the crowns were scanned with an industrial metrological device (Atos Core 80; GOM GmbH, Germany). Finally, the scans were analyzed using a dedicated software (Geomagic Control X, Raindrop Inc., USA) to assess the marginal fit. Descriptive statistics (95% confidence interval) was calculated, and an independent samples t-test was performed at a significance level of $\chi = 0.05$ to compare differences between groups.

RESULTS Mean marginal fit values for both preparation geometries were below the clinically acceptable threshold of 120 μ m, with Ho at 76.83 μ m and Ve at 84.37 μ m. No statistically significant difference was found between the two groups (Ho $p = 0.58$; Ve $p = 0.83$).

CONCLUSIONS Nanocomposite crowns fabricated via 3D printing showed mean marginal discrepancies within clinically acceptable limits for both vertical and horizontal preparation geometries, with no significant difference between the two.

DIGITAL MORPHO-FUNCTIONAL ANALYSIS IN THE PROSTHETIC REHABILITATION OF THE MAXILLARY AND MANDIBULAR ARCHES

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AIM Digital technologies assist clinicians in enhancing diagnostic accuracy and treatment planning. Various devices can be employed to develop a case with a detailed workflow aimed at rehabilitating the patient both aesthetically and functionally.

MATERIALS AND METHODS Two patients, a woman and a man, presented at the Department of Dentistry of San Raffaele Hospital (Head: Prof. E. F. Gherlone). The woman showed a loss of vertical dimension of occlusion (VDO) and advanced dental wear; the man had terminal dentition with partial edentulism and consequent VDO loss. Both patients exhibited functional and aesthetic deficiencies. They underwent prosthetic rehabilitation: the woman on natural teeth and the man through a surgical approach following the All-On-Four® protocol on both arches. The patients were analyzed using intraoral scanners, facial scanners, and the Itaka® system, the latter being useful for studying mandibular kinematics and identifying areas requiring rehabilitation to restore functionality during movement. Through the creation of a digital avatar, provisional

prosthetic restorations were designed with a functional purpose, and definitive ones with both functional and aesthetic goals.

RESULTS Thanks to this digital workflow, it was possible to observe how the design of prosthetic restorations based on the patients' morphological, functional, and aesthetic characteristics led to a complete recovery of both function and aesthetics. A key step was the ability to functionalize the provisional restorations before intraoral placement, enabling neuromuscular-functional adaptation to proper mandibular kinematics during common movements (chewing, protrusion, and lateral excursions).

CONCLUSIONS The use of these new technologies is an important aid for the clinician during the planning and subsequent creation of customized prostheses tailored to each patient's aesthetic and functional needs. However, this does not replace the essential knowledge of correct clinical procedures to be applied, nor the fact that the clinician requires a learning curve to adequately master these new digital techniques.

IN VITRO COMPARATIVE STUDY ON ACQUISITION TIME AND CHAIRSIDE CAD DESIGN ACCURACY PERFORMED BY OPERATORS WITH DIFFERENT LEVELS OF CLINICAL EXPERIENCE

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AIM This experimental investigation aimed to evaluate the impact of clinical competence on two key parameters within the digital chairside workflow: the efficiency of the intraoral scanning phase and the morphological-design quality of CAD-generated prosthetic crowns, by comparing three groups of dental operators with varying levels of experience.

MATERIALS AND METHODS The study involved a sample of 30 dental operators, divided into three homogeneous groups: ten sixth-year dental students (S), ten general practitioners (O), and ten prosthodontic specialists with advanced clinical expertise (P). The reference model featured the lower left second premolar prepared with a horizontal finish line and a supragingival margin (Fig. 1). Each operator performed three digital scans of the model, following a standardized scanning strategy (Fig. 2), and subsequently completed a CAD design of a prosthetic crown on the prepared tooth (Fig. 3). Digital impressions were captured using the Primescan intraoral scanner by Dentsply Sirona, and crown designs were created with CEREC 5.3 software from the same manufacturer. Scanning time was measured manually with a stopwatch, while the quality of the CAD designs was independently evaluated by three expert prosthodontists using a Visual Analogue Scale (VAS).

RESULTS The statistical analysis of scan time data showed mean values of 231.80 s for group S, 174.40 s for group O, and 70.00 s for group P. As for the VAS-based quality assessment, the mean scores were: S = 7.60; O = 9.00; P = 9.60 (Table 1). The Shapiro-Wilk test indicated a non-normal distribution of the data ($p > 0.005$). The Kruskal-Wallis non-parametric test revealed statistically significant differences between the student group and the expert prosthodontist group for both scan time

($p = 0.002$) and CAD design quality ($p = 0.012$) (Table 2). No statistically significant differences were found between the student and general practitioner groups, nor between the general practitioners and prosthodontists.

CONCLUSIONS Considering the inherent limitations of this in vitro study, all operators were able to produce intraoral scans and prosthetic designs deemed clinically acceptable. However, a positive correlation was observed between the level of clinical experience and overall performance, in terms of scanning efficiency and CAD design quality.

EVALUATION OF TOOTH POSITION CHANGE BETWEEN PREPARATION AND CEMENTATION APPOINTMENTS FOR OVERLAY RESTORATIONS

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AIM This study aimed to evaluate possible tooth displacement—of the prepared tooth or adjacent/antagonist teeth—between the two clinical appointments required for overlay restoration, with or without the use of temporary filling.

MATERIALS AND METHODS After ethical approval, 42 patients requiring one or more overlay restorations on upper or lower premolars and molars were enrolled (total: 50 restorations). Restorations were divided into two groups based on the presence or absence of temporary material between visits. Intraoral scans were performed after preparation and at a second appointment (minimum 1 week later). STL files were analyzed with Geomagic Wrap® to assess positional changes of the prepared tooth, mesial/distal teeth, and antagonists. Two analyses were carried out: the first evaluated the effect of provisionalization (YES/NO) and tooth location (prepared/adjacent/antagonist), while the second assessed provisionalization (YES/NO) and tooth type on maximum displacement. Post-hoc tests were run using the Holm-Sidak method with significance set at $p < 0.05$. All data were analyzed using SigmaPlot 14.0 (Systat Software Inc.).

RESULTS Prepared teeth shifted significantly more than both adjacent and opposing teeth ($p < 0.001$). Tooth type and its interaction with provisionalization had a notable effect on movement ($p < 0.001$ and $p = 0.035$, respectively). In particular, upper molars exhibited greater displacement when no provisional restoration was placed, compared to upper ($p < 0.001$) and lower premolars ($p = 0.009$). Placement of a provisional significantly reduced movement in upper molars ($p = 0.002$). Among non-provisionalized teeth, lower molars also showed more movement than upper premolars ($p = 0.049$).

CONCLUSIONS Depending on the type of tooth, the use of a temporary filling may help prevent undesired dental movements between appointments, improving the fit of the final restoration and reducing chairside adjustment time. Further studies with larger samples are needed to confirm these findings.

INFLUENCE OF PRINTING ANGULATION ON THE FLEXURAL STRENGTH OF 3D PRINTED RESINS: AN IN VITRO STUDY

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AIM The aim of this study is to assess and compare flexural strength values of different 3D-printed materials at different built inclinations. The null hypothesis was that resin type and the printing angle have no statistically significant influence on flexural strength.

MATERIALS AND METHODS One hundred twenty rectangular specimens (25 × 2 × 2 mm) were produced in line with ISO 4049:2019 from four printable resins: Varseo Smile Teeth, Triniq, V-Print C and B Temp, and SprintRay Crown (n = 30 per resin). Each group was divided by print orientation (0°, 45°, 90°; n = 10). Models were created in Meshmixer and printed with a DLP printer (Asiga MAX UV, 385 nm), then cleaned (20 min) and post-cured (40 min). After support removal, specimens were polished with 600-grit sandpaper, measured (±0.02 mm), and stored in distilled water for 24 h. Flexural strength was determined in a three-point bending test (20 mm span, 5 mm/min; FS = 3PL/2bd²). Fractures were inspected by SEM. Data were analyzed in SPSS v26 using ANOVA with Bonferroni correction. Sample size adequacy (n = 10) was verified by power analysis.

RESULTS Printing orientation strongly influenced flexural strength, whereas differences between resin types were minimal. For V-Print C&B Temp, specimens printed at 90° exhibited lower strength, averaging 116.97 MPa, compared with 156.56 MPa at 0° and 130.46 MPa at 45°. In contrast, Bego TriniQ showed the highest strength when printed at 45° (148.91 MPa), while 0° and 90° prints were weaker, at 113.37 MPa and 100.96 MPa, respectively. Orientation had little effect on Varseo Smile Teeth or Sprintray Crown. When all materials were considered together, specimens printed at 90° generally showed reduced flexural strength (116.75 MPa) compared with 0° (137.19 MPa) and 45° (128.21 MPa). These results highlight the critical role of build angle in determining the mechanical performance of 3D-printed dental resins and suggest that optimizing printing orientation could improve material reliability for clinical applications affects mechanical performance.

CONCLUSIONS In this lab study, 3D-printed dental resins were made at 0°, 45°, and 90° angles. Flexural strength was affected by print orientation, though some resins were less sensitive. All materials met ISO standards, but 90° prints were generally weaker. Fracture patterns showed orientation influences stress distribution. These results highlight the importance of choosing the right print angle for durable dental restorations and demonstrate the potential of 3D printing in dentistry.

COMPARATIVE EVALUATION OF ZIRCONIA CROWNS MADE BY 3D PRINTING AND CAD/CAM MILLING

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AIM This in vitro research aimed to compare the trueness and marginal adaptation of zirconia crowns produced with additive manufacturing (3D printing) and subtractive manufacturing (CAD/CAM milling). The study assessed which workflow ensures higher dimensional accuracy and clinical reliability for prosthetic restorations.

MATERIALS AND METHODS Twenty zirconia crowns were fabricated and divided into four groups according to tooth type and manufacturing method (printed vs. milled). Material composition was verified by energy-dispersive X-ray spectroscopy (EDX). Each crown was scanned using an intraoral scanner to produce STL files, which were compared to the original CAD designs using CloudCompare software for 3D deviation analysis. Marginal adaptation was assessed by scanning electron microscopy (SEM) on sectioned specimens. Quantitative deviations were measured and statistically analyzed to determine differences in precision and trueness between the two workflows.

RESULTS Both methods produced clinically acceptable results, but with significant differences. CAD/CAM milling showed superior dimensional trueness, with smaller deviations from the reference CAD file. SEM analysis confirmed tighter and more consistent marginal adaptation in milled crowns. Additive manufacturing yielded larger deviations, particularly at the margins, though variability remained within clinically tolerable limits. Nevertheless, 3D printing demonstrated advantages in workflow efficiency and customization potential, suggesting promising clinical applications once technological improvements are achieved.

CONCLUSIONS CAD/CAM milling currently offers higher precision and marginal adaptation than 3D printing for zirconia crowns. However, additive manufacturing shows considerable potential due to its flexibility and efficiency. With further refinement of printing technologies and materials, 3D printing could represent a valuable alternative for prosthetic dentistry.

MICROLEAKAGE EVALUATION OF DIFFERENT 3D-PRINTED RESIN VENEER RESTORATION ON RESTORED ANTERIOR TEETH: AN IN VITRO STUDY

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AIM The application of veneer restorations over previously composite-restored anterior teeth presents significant clinical challenges, particularly in achieving optimal marginal sealing. So, this in vitro study aimed to evaluate the marginal integrity of different 3D-printed resin veneer restorations on sound versus composite-restored anterior teeth using two types of 3D-printed materials: Gc Temp print and Varseosmile Triniq.

MATERIALS AND METHODS Forty freshly extracted human anterior teeth (20 central incisors and 20 canines) were randomly assigned into two main groups: sound teeth and composite-restored teeth. We prepared standardized Class III and Class V cavities on half of the specimens and restored them using a light-cured composite. All the teeth were prepared to receive veneer and digital scanning. The STL files generated by the intraoral scanner was employed by exocad software to design the veneer restoration on the previously prepared teeth (central incisors and canines), followed by fabrication of veneers via 3D printing using either Gc Temp print or Varseosmile Triniq resin. Veneers were cemented using G-CEM ONE dual-cure adhesive resin cement. The specimens were then subjected to microleakage testing to assess the marginal adaptation at the tooth-restoration interface. The samples were analyzed using a digital stereomicroscope (Nikon Shuttle Pix, Tokyo, Japan) at magnifications of 2x, 4x, 6x, and 10x. Two observers independently evaluated the amount of tracer at the veneer restoration interface.

RESULTS Wilcoxon sum rank test reveals that there are no significant differences among all examined groups in term of microleakage evaluation, which indicates that the marginal accuracy and sealing of two 3D-printed veneer resins is not affected by the presence of previous composite restoration on cervical and proximal surfaces for both incisor and canine teeth. **CONCLUSIONS** Restored teeth with composite resin in proximal and cervical surface (CL III and/or CL V) can be successfully receive a 3D-printed veneer restoration and still have a comparable marginal integrity with sound teeth.

EVALUATION OF COLOUR STABILITY OF 3D PRINTED RESINS AFTER EXPOSURE TO VARIOUS COLORANTS: AN IN VITRO STUDY

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AIM This study investigates the colour stability of four types of 3D printed resins: TempPrint (TP) (GC, Tokyo, Japan), Varseo Smile Teeth (VST) (Bego GmbH, Bremen, Germany), TrinQ (TQ) (Bego), and V-Print(VP) (Voco GmbH, Cuxhaven Germany) when exposed to various colorants over a 30-day period.

MATERIALS AND METHODS A total of 200 disk-shaped specimens (10 mm × 2 mm) were printed using a DLP printer and exposed to four colorants: wine, Coca-Cola, tea, coffee and distilled water. Colour changes were measured at 7, 15, and 30 days and total colour differences (ΔE) were calculated.

RESULTS The results revealed significant discoloration across all resins, with wine and coffee inducing the most pronounced

colour changes. TP (GC) demonstrated DOI the least discoloration in all solutions, particularly in water and Coca-Cola. VST (Bego) showed the highest degree of discoloration, especially in wine and coffee, with ΔE values reaching 20.54 after 30 days of immersion in coffee. TQ (Bego) and VP (Voco GmbH, Cuxhaven Germany) exhibited intermediate levels of discoloration, with coffee causing the most severe colour changes. Statistical analysis indicated significant differences in colour stability between the resins, with wine and coffee causing more discoloration.

CONCLUSIONS These findings suggest that while all resins undergo colour change when exposed to common beverages, the extent of discoloration varies based on resin composition, highlighting the need for material selection based on expected environmental exposure in practical applications.

ANALOG AND DIGITAL DENTURE BASES ACCURACY AND DIMENSIONAL STABILITY: AN IN-VITRO EVALUATION AND DIMENSIONAL STABILITY AT 24 HOURS AND 6 MONTHS

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AIM The study aimed to evaluate the accuracy of 3D printed complete denture bases compared to analog and milling manufacturing.

MATERIALS AND METHODS Denture bases (n = 60) were created using three methods: milling (n = 10), analog (flasking) (n = 10), and 3D printing (n = 40). The 3D printing group was further divided into subgroups and each of the material groups. All samples were scanned, and their surfaces were analyzed using 3D software (Geomagic Control X software, 3D Systems) to compare them to the reference model. The accuracy was assessed using root mean square (RMS) values, reflecting the average deviation between the denture bases and the reference model.

RESULTS At 24 h, the “Temp Print”, from 3D printing group had the lowest RMS values ($54.20 \pm 9.44 \mu\text{m}$), indicating higher accuracy, while the “ProBase Hot” from the analog group showed the highest discrepancies, particularly in the border areas. Over six months, all groups experienced increased RMS values, with the 3d printed “Denture 3d+” group showing the most significant variations ($194.1 \pm 49.63 \mu\text{m}$). The “Temp Print” group maintained the lowest RMS values, indicating better stability at 6 months.

CONCLUSIONS Despite some discrepancies, all denture bases remained within clinically acceptable limits ($300 \mu\text{m}$). Milled bases were the most stable between 24 h and six months. In terms of accuracy and stability, 3D printed resins are suitable for both prototypes and definitive dentures. Further research is required to confirm the clinical acceptability of these materials.

ACCURACY EVALUATION OF TWO DIFFERENT INTRAORAL SCANNERS

IN IMPLANT PROSTHODONTICS. A COMPARATIVE IN VITRO STUDY

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AIM To test differences in term of accuracy among two intraoral scanners used in implant fixed prosthodontics.

MATERIALS AND METHODS A reference stone model was prepared, representing a partially edentulous maxilla on area #23 and from #14 to #16, with three implant analogues and polyether-ether-ketone (PEEK) scanbody screwed on to represent the situation of a single crown on implant and an implant-supported partial prosthesis. The model was digitized with a laboratory scanner (Ada lab scanner, GC, Tokyo, Japan) used as a reference, and with two intraoral scanners (Trios3, 3Shape A/S; i700, Medit). Ten scans were performed using the two different intraoral scanners. Scanning and processing time as well as the number of images were recorded for each scanner. All datasets were loaded into reverse-engineering software (Geomagic Control X 2018), where digital impressions were superimposed on the reference model to evaluate trueness in the full arch, in the SB area (#23) and in the 2SB areas (#14 and #16). Therefore, all the scans of the same group were superimposed onto the cast that recorded the best result of trueness whose trueness corresponded to the actual reference value for precision. Mann-Whitney U-test test was performed to analyze differences between the groups ($p < 0.05$) (SPSS software version 26, IBM).

RESULTS Statistically significative differences were found between Medit i700 and Trios 3 regarding trueness and precision in the full arch, with Trios 3 showing better results than Medit i700. Trios 3 performed statistically better also in the 2SB area regarding precision. No statistically significant differences were found regarding trueness and precision in other areas.

CONCLUSIONS Trios 3 performed statistically significative better than Medit i700 in acquiring scanbody position when the full arch model was analyzed. Both the tested intraoral scanners recorded good values in line with the previous literature.

FRACTURE RESISTANCE OF 3D-PRINTED FIXED PARTIAL DENTURES: INFLUENCE OF CONNECTOR SIZE AND MATERIALS

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AIM Limited data are available regarding the mechanical performance of 3D- printed fixed partial dentures (FPDs) fabricated from different materials and connector geometries. The purpose of this in vitro study was to evaluate the influence of connector size and material type on the fracture resistance of three-unit posterior FPDs fabricated with two commercially available 3D-printable dental resins.

MATERIALS AND METHODS A standardized metal model with two cylindrical abutments was used to design three-unit FPDs. A total of sixty samples were produced, considering three connector sizes (3×3 mm, 4×4 mm, and 5×5 mm) and two different resins: Temp Print (GC Corp., Tokyo, Japan) and V-Print c&b temp (Voco GmbH, Cuxhaven, Germany) ($n = 10$). Specimens were fabricated with a DLP printer (Asiga MAX UV), post-processed per manufacturer recommendations, and tested for fracture resistance under occlusal loading using a universal testing machine. Data were analyzed using nonparametric tests (Mann-Whitney U and Kruskal-Wallis; $\alpha = 0.05$).

RESULTS Significant differences were found between material and connector size groups ($p < 0.001$). Temp Print (GC Corp., Tokyo, Japan) demonstrated higher mean fracture loads (792.34 ± 578.36 N) compared to V-Print c&b temp (Voco GmbH, Cuxhaven, Germany) (359.74 ± 131.64 N), with statistically significant differences at 4×4 and 5×5 mm connectors. Fracture strength proportionally increased with connector size. FPDs with 5×5 mm connectors showed the highest resistance, reaching values above 1500 N.

CONCLUSIONS Both connector geometry and material composition significantly affected the fracture resistance of 3D-printed FPDs. Larger connector dimensions and the use of Temp Print (GC Corp., Tokyo, Japan) resin enhanced mechanical performance.

MANAGING DISTANCES IN INTRAORAL SCANNING: AN IN VITRO EVALUATION OF ARTIFICIAL SURFACE BRIDGING USING SIX DIFFERENT INTRAORAL SCANNERS FOR ONLAY PREPARATIONS

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AIM The aim of the study was to quantify the area of artificial surface bridging between non-contiguous tooth surfaces, using multiple scans from six different intraoral scanner devices.

MATERIALS AND METHODS A typodont master model featuring an onlay preparation on the maxillary left first molar (tooth 26) was scanned using a laboratory-grade scanner. To obtain controlled interproximal gaps, an artificial digital separation was created between the prepared surface of tooth 26 and the adjacent second molar (tooth 27). Interdental distances of 100 μ m, 300 μ m, 500 μ m, and 700 μ m were digitally modeled, generating four different STL files. Each file was 3D printed using polyurethane resin. Each model was scanned ten times by six different intraoral scanners: 3Shape TRIOS, Dentsply Sirona Primescan, iTero Element, Carestream CS 3800, Medit i900, and SIRIOS. The resulting STL files were analyzed using the software MeshLab for metrological evaluation. Bridging surface areas were measured and analyzed using descriptive statistics and post hoc tests.

RESULTS The statistical results showed that at 100 μ m the

mean ranged from 4.35 to 5.60 mm²; at 300 µm, from 1.57 to 5.11 mm²; at 500 µm, from 2.00 to 4.75 mm²; and at 700 µm, from 2.03 to 4.35 mm². The Friedman test revealed statistically significant differences among the experimental groups. Post-hoc Bonferroni tests confirmed significant differences among the analyzed IOS systems at interproximal distances of 0.1, 0.3, 0.5, and 0.7 mm.

CONCLUSIONS Bridging artifacts were present across all tested distances, within the limits of the study. The outcomes at 0.7 mm showed values that could be regarded as potentially suitable for clinical use. The data suggested a possible trend toward smaller bridging areas with wider gaps, but this observation requires further statistical validation.

USE OF DIGITAL SYSTEMS FOR SHADE MEASUREMENT IN DENTISTRY

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AIM This study aims to evaluate and compare the colour measurement repeatability, inter-device agreement and accuracy of three digital shade matching systems used in dental colour analysis: Spectroshade Micro (MHT Optic Research, Switzerland) MHT Opti Research, Optishade StyleItaliano (Smile Line, Switzerland), and eLab (Sascha Hein). The study examines performance, using the ΔE_{94} formula to assess colour discrepancies.

MATERIALS AND METHODS 28 healthy patients were enrolled. On each right upper central incisor, three colour measurements were taken with all devices. • Repeatability: ΔE_{94} calculated from three repeated measurements per patient per system. • Inter-device agreement: ΔE_{94} between average CIELAB values of the three instruments. • Accuracy: ΔE_{94} between in vivo measurements and laboratory reference values (Vita scale), under standardized conditions. Laboratory reference: analysis performed on a model with artificial gingiva using Vita Classical shade tabs.

RESULTS Spectroshade Micro (MHT Optic Research, Switzerland) showed the best repeatability and accuracy (lowest ΔE_{94}). eLab (Sascha Hein) had lower repeatability than Spectroshade Micro and Optishade StyleItaliano, but similar accuracy. Optishade StyleItaliano displayed comparable performance to Spectroshade Micro. • Repeatability: - Mean ΔE_{94} E-lab: 1.7 - Mean ΔE_{94} Spectroshade : 0.451 - Mean ΔE_{94} Optishade : 0.513 • Inter-device agreement: - Mean ΔE_{94} E-lab vs Optishade: 3.34 - Mean ΔE_{94} E-lab vs Spectroshade: 3.99 - Mean ΔE_{94} Spectroshade vs Optishade: 2.29 • Accuracy: - Mean ΔE_{94} E-lab : 2.59 - Mean ΔE_{94} Spectroshade : 2.55 - Mean ΔE_{94} Optishade: 3.41

CONCLUSIONS Spectroshade Micro (MHT Optic Research, Switzerland) provides the most reliable and accurate colour measurements for clinical use among the three systems tested. This study supports clinicians in choosing reliable digital shade-matching systems, offering objective performance analysis and potentially improving aesthetic outcomes and patient satisfaction.

A RANDOMIZED CONTROLLED CLINICAL TRIAL ON LITHIUM DISILICATE VENEERS MANUFACTURED BY THE CAD-CAM METHOD: DIGITAL VERSUS HYBRID WORKFLOW

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AIM To evaluate the clinical performance, periodontal health, and patient satisfaction of lithium disilicate veneers fabricated with two fully digital workflows compared with a hybrid workflow, using modified USPHS criteria, periodontal parameters, and Visual Analog Scale scores after 24 months. **MATERIALS AND METHODS** Twenty-nine patients received 105 lithium disilicate veneers, randomly assigned to three groups: Group 1, digital workflow with Trios 3; Group 2, digital workflow with Aadvia IOS; Group 3, hybrid workflow with analog impression and lab scanning. Preparations were minimally invasive and standardized. Veneers were milled from LiSi Block (GC, Tokyo) and cemented with resin under rubber dam. Restorations were evaluated at baseline, 12, and 24 months using modified USPHS criteria, periodontal parameters (PI, PPD, BoP), and patient satisfaction (VAS).

RESULTS All 29 patients completed the 24-month follow-up (105 veneers). At baseline, all restorations scored Alpha for USPHS criteria. At 12 months, minor Bravo scores appeared for marginal adaptation/discoloration in Groups 1 and 2. At 24 months, small increases in Bravo scores were observed, and one veneer in Group 3 fractured and was replaced. Survival rate was 99.05%. Periodontal parameters (PI, PPD, BoP) remained stable across groups. Patient satisfaction improved from 7.35 ± 1.8 at baseline to 9.4 ± 0.35 after treatment, with no significant differences among workflows.

CONCLUSIONS Lithium disilicate veneers showed excellent 24-month outcomes with a 99% survival rate. Fully digital workflows using different intraoral scanners performed comparably to the hybrid approach, with stable periodontal health and high patient satisfaction. Digital workflows can be considered reliable for clinical practice.

SHEAR BOND STRENGTH BETWEEN ARTIFICIAL TEETH AND DENTURE BASE RESINS FABRICATED BY CONVENTIONAL, MILLED, AND 3D-PRINTED WORKFLOWS: AN IN VITRO STUDY

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AIM This in vitro study evaluated the shear bond strength (SBS) and failure modes between artificial teeth and denture

base resins produced with conventional, milled, and 3D-printed techniques.

MATERIALS AND METHODS A total of 105 specimens were fabricated and assigned to 7 groups (n=15) combining conventional, milled, or printed denture bases with conventional, milled, or printed teeth. SBS was tested using a universal testing machine, and failure modes were classified as adhesive, cohesive, or mixed. Data were analyzed with one-way ANOVA and Tukey's post hoc test ($\alpha=0.05$). Results: SBS significantly varied among groups ($P<0.001$).

RESULTS The conventional base-conventional tooth group (CB-CT) showed the highest bond strength (14.9 ± 3.69 MPa), while the printed base-milled tooth group (PB-MT) had the lowest (6.58 ± 3.41 MPa). Milled base groups showed intermediate values (11.7–12.4 MPa).

CONCLUSIONS Bond strength between denture teeth and denture bases depends on the fabrication workflow. Conventional heat-cured PMMA bases exhibited the most reliable adhesion, while milled bases demonstrated satisfactory performance with optimized bonding. Printed bases showed reduced and variable adhesion, suggesting the need for improved bonding protocols before their widespread clinical application in definitive prostheses.

RESEARCH IN PROSTHODONTICS

LITHIUM DISILICATE AND ZIRCONIA VENEERS: IN VITRO COMPARISON OF MINIMAL ULTRASONIC PREPARATION AND NO PREPARATION ON FRACTURE RESISTANCE AND DETACHMENT

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AIM The idea behind this study is to evaluate whether minimal enamel preparation with ultrasonic instruments (with minimal invasion of the enamel up to a maximum of 0.3 mm) results in greater adhesion and better resistance to detachment than no enamel preparation and, in addition, to evaluate the behaviour of the lithium disilicate material in comparison with zirconia.

MATERIALS AND METHODS Twenty upper human incisor teeth were randomly divided into four groups (n = 5) with two different preparation types and two different materials: 1.No preparation-zirconia (NPZ); 2. Minimally invasive preparation-zirconia (MIZ or PZ); 3.No preparation-lithium disilicate (NPD); 4. Minimally invasive preparation-lithium disilicate (MID or PD). After being prepared and adhesively cemented, the specimens underwent thermocycling for 2000 cycles between 5°C and 55°C. Subsequently, their fracture strength was tested using a mechanical press, applying progressive loads of 50N, 100N, 150N, and continuing until fracture. The results were analyzed through light microscopy and ANOVA statistical analysis.

RESULTS In the 50N tests, 95% of the samples passed this load without any problems. Only sample NPD5 did not reach it. The same applies to the measurements at 100N, while at 150N, in addition to NPD5, NPZ1 also failed to reach this load. For the results at maximum load there was fracture of the veneers in 70% of the cases, detachment of the veneers in 15% of the samples and fracture of the teeth in the remaining 15%. Analysing the materials, we can say that lithium disilicate achieved lower forces while zirconia was slightly stronger.

CONCLUSIONS Furthermore, although from a statistical point of view there are no significant differences between the results obtained in the unprepared and minimally prepared specimens, from a clinical point of view it might be useful to go to roughen, by Crown Prep method, the surface of the dental enamel.

PROSTHETIC EVALUATIONS IN SHORT IMPLANT REHABILITATIONS: A RETROSPECTIVE STUDY

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AIM Short implants are valuable alternative to bone augmentation in patients with maxillary or mandibular atrophy, potentially reducing surgical invasiveness, treatment time, and cost. However, the impact of prosthetic design—as the emergence profile and angle—on long-term implant stability remains underexplored. This retrospective study aims to assess the effect of prosthetic emergence angle on marginal bone loss, peri-implant tissue health, and on biological or mechanical complication rates.

MATERIALS AND METHODS A retrospective study was conducted on patients rehabilitated with short dental implants measuring 4, 5, or 6 mm in length. Clinical and radiographic follow-ups were performed at 1, 3, 5, 8, and 10 years after functional loading. Implant and prosthetic survival rates, biological and mechanical complications, and marginal bone loss (MBL) were assessed. The prosthetic emergence angle was measured and categorized into two groups: $<30^\circ$ and $\geq 30^\circ$, to evaluate its influence on clinical outcomes.

RESULTS Within the observation period, implant-supported rehabilitations showed survival and success rates of 94.10% and 90.24%, respectively, indicating good reliability despite the retrospective design of the study. Data suggest that a prosthetic emergence angle $\geq 30^\circ$ may be associated with increased marginal bone loss and a higher incidence of inflammatory complications, likely due to greater biofilm and plaque accumulation in the peri-implant area.

CONCLUSIONS Prosthetic design - particularly the emergence angle and profile - may play a relevant role in the long-term success of short implants. However, further randomized controlled studies with long-term follow-up are needed to confirm these findings and guide future clinical decision-making.

MORPHOLOGICAL EVALUATION OF THE SEEGER IN OT BRIDGE SYSTEM: A CLINICAL AND LABORATORY STUDY

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AIM This study aimed to evaluate the morphological characteristics and wear level of Seeger rings from the OT Bridge system, assessing whether exposure to the oral environment or prolonged intraoral use could cause surface alterations.

MATERIALS AND METHODS The study was divided into two complementary phases: an in vitro experimental phase and a clinical-laboratory analysis. In the first phase, Seeger rings were immersed in artificial saliva for 7 days at 37°C and analyzed under multiple magnifications (35X, 50X, 200X, 1000X) using scanning electron microscopy (SEM), both before and after immersion. In the second phase, 11 Seeger rings retrieved after one year of intraoral function from fixed prostheses in a patient treated with the OT Bridge system were compared to a new, unused Seeger. All samples underwent digital microscopic analysis (VHX-7000, Keyence, Milan, Italy). Surface and linear roughness values (Ra, Rz, Sa, Sz) were processed using SigmaPlot software (Systat Software Inc., San Jose, CA, USA), applying one-way ANOVA and Holm-Sidak post hoc test ($p < 0.05$).

RESULTS SEM analysis revealed no visible alterations at lower magnifications, while only slight micrometric morphological changes were observed at 1000X. Microscopic evaluation showed no significant differences in linear roughness values (Ra and Rz) between the control and the used Seeger rings ($p > 0.05$). However, significant differences were found in surface roughness values (Sa and Sz) ($p < 0.05$).

CONCLUSIONS Prolonged use and exposure of Seeger rings to the oral environment did not result in significant alterations, supporting the system's reliability. However, further prospective studies with longer follow-up evaluating the morphology of the rings without the screw are needed to assess the potential impact on prosthetic retention.

EVALUATION OF VERTICAL LOAD RESISTANCE OF TWO NEXT-GENERATION MATERIALS FOR ORAL REHABILITATION: AN IN VITRO STUDY

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AIM The aim of this in vitro study is to assess the resistance of lithium disilicate and Vita Enamic ceramics under vertical loads. The flat punch employed creates an idealized condition, not reproducing cusp contact during mastication but ensuring standardization. Despite this limitation, the study also aims to

show that both materials have suitable physical and mechanical properties for clinical use in next-generation prosthetic rehabilitation.

MATERIALS AND METHODS This in vitro study evaluated the resistance to vertical loads of lithium disilicate (CEREC Tessera, HT-A2-C14) and a hybrid ceramic (Vita Enamic, 2M2-HT-EMC-14). Lithium disilicate is a glass-matrix ceramic, whereas Vita Enamic is a dual-network material with 86% ceramic and 14% polymer. In order to begin the study, twenty extracted premolars were selected, embedded in gypsum blocks, and prepared with a 90° shoulder using diamond burs. Furthermore, digital impressions (Medit i700) were taken to design standardized crowns (1 mm thickness) with Exocad software. Ten crowns were milled for each material using inLab CAM/CEREC MC X. Moreover, restorations were etched with hydrofluoric acid, silanized, and cemented on etched/adhesive-treated abutments with RelyX Unicem. Each specimen was embedded in resin cylinders, leaving the crown exposed. Finally, vertical load testing was performed with a universal testing machine at 1 mm/min using a flat punch, creating an idealized but standardized loading condition for material comparison.

RESULTS Compression tests showed significant differences between the two materials. Lithium disilicate crowns exhibited higher fracture resistance (1500 ± 120 N) compared to Vita Enamic (980 ± 90 N) (Table 1). This confirms the superior strength of lithium disilicate, a glass-matrix ceramic with well-documented mechanical reliability. Vita Enamic, a hybrid dual-network ceramic (86% ceramic, 14% polymer), showed lower thresholds. Load-displacement curves revealed for lithium disilicate a linear elastic trend followed by an abrupt drop at fracture, typical of brittle but strong ceramics. Vita Enamic displayed earlier instabilities, "sawtooth pattern" from microcrack propagation, and failures often linked to delamination between ceramic and polymer phases (Fig. 5a-5b). Fracture modes also differed: lithium disilicate showed cohesive cracks and multiple fragments, while Vita Enamic failed more catastrophically with cleaner separations. Stress conversion (MPa) confirmed lithium disilicate nearly doubled Vita Enamic's resistance under vertical loads.

CONCLUSIONS Both lithium disilicate and hybrid ceramics are suitable for single-unit restorations, but their mechanical behavior differs. Lithium disilicate, with higher fracture resistance, is more reliable in posterior regions under high occlusal forces, though its brittle failure requires thickness and adhesive precision. Vita Enamic, despite lower strength, shows progressive failure, offering shock absorption and preserving tooth structure, but is less suitable for high-load areas.

R36_ SURVIVAL RATE OF SEVERELY COMPROMISED TEETH RESTORED FOLLOWING SURGICAL CROWN LENGTHENING: A SYSTEMATIC REVIEW AND META-ANALYSIS

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AIM The aim of this systematic review and meta-analysis was to assess the medium- and long-term survival rates of structurally compromised teeth treated with surgical crown lengthening (SCL) followed by restorative rehabilitation, and to identify the most common causes of failure in this context.

MATERIALS AND METHODS Electronic searches were conducted in PubMed, Embase, Scopus, and Cochrane up to June 2025, complemented by grey literature screening and citation mining. Retrospective longitudinal studies with at least 5 years of follow-up were eligible. Six studies were included, comprising 1,131 teeth restored after SCL. Data extraction was performed independently by two reviewers, and risk of bias was assessed with the ROBINS-I tool. Meta-analyses of proportions were conducted using random-effects models to estimate pooled survival at 5 years and 8–10 years. Certainty of evidence was graded with the GRADE approach.

RESULTS Six retrospective studies, published between 2014 and 2024, were included. The pooled 5-year survival rate was 86.8% (95% CI: 80.8–92.8%) based on 1,045 teeth, with moderate heterogeneity ($I^2 = 68.8\%$). At 8–10 years, survival decreased to 74.6% (95% CI: 66.4–82.8%) across 1,131 teeth, with substantial heterogeneity ($I^2 = 82.4\%$). Kaplan-Meier analyses confirmed a gradual decline over time. The main causes of failure were restorative complications, root fractures, and endodontic issues, while periodontal breakdown was rarely reported. Overall, all studies were rated at moderate risk of bias, and the certainty of evidence was very low.

CONCLUSIONS Teeth restored after surgical crown lengthening demonstrate acceptable medium- and long-term survival rates, comparable to implant-supported options in selected cases. Failures are mainly restorative or endodontic rather than periodontal. However, due to methodological limitations and very low certainty of evidence, results should be interpreted cautiously. Further prospective controlled studies are needed to guide clinical decision-making.

FULL-ARCH REHABILITATION WITH A REDUCED NUMBER OF IMPLANTS: BALANCED OCCLUSION PROTOCOL – 2-YEAR FOLLOW-UP

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AIM At Vita-Salute San Raffaele University, an implant-prosthetic protocol was developed for full-arch rehabilitations of edentulous or compromised maxillae and mandibles, supported by a reduced number of tilted and/or axial implants. This study, involving 40 patients treated between 2022 and 2025, evaluates the outcomes of the rehabilitations with a 2-year follow-up after delivery of the definitive prosthesis.

MATERIALS AND METHODS Forty patients (age 46–77) received full-arch fixed prostheses on 244 implants, with immediate loading within 2–3 hours. After clinical and

radiographic diagnosis, 4–6 axial or tilted implants per arch were placed following standardized protocols. Temporary acrylic prostheses with 10–12 teeth and balanced occlusion were delivered. Definitive CAD-CAM prostheses with titanium frameworks and composite teeth were delivered after 4–6 months. Follow-up at 6, 12, and 24 months included clinical and radiographic checks, sEMG (Teethan), and marginal bone loss (MBL) analysis via DIGORA software. Outcomes included prosthetic and implant complications and biological complications.

RESULTS Forty patients (27 females, 13 males) were treated with 244 immediately loaded implants. Follow-ups were conducted at 6, 12, and 24 months post-delivery of the definitive prosthesis. The implant survival rate was 100%. Most common complications included screw loosening and anterior prosthetic fractures or detachment. MBL remained limited and stable between 12 and 24 months, with no significant differences between axial and tilted implants or between maxilla and mandible. Electromyographic analysis showed good neuromuscular balance, supporting the protocol's reliability and patients' adaptation to both temporary and final prostheses.

CONCLUSIONS The experimental approach enabled a detailed evaluation of implant functionality and integration. The low complication rate and positive clinical outcomes confirm the effectiveness of this implant-prosthetic protocol. Combining a reduced number of implants with a provisional prosthesis in balanced occlusion appears to be a reliable, long-lasting, and aesthetically valid option for full-arch rehabilitation.

A NEW INDEX FOR DIGITAL MONITORING OF EDENTULOUS PATIENTS: A 1-YEAR IN VIVO STUDY

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AIM Nowadays, digital technologies have deeply changed prosthetic paradigms and dentists are increasingly providing dental treatments with a full digital workflow. This study aimed to assess whether edentulous patients, who were trained by a dental hygienist about hygienic maintenance, show a different plaque retention at the intaglio surface of full dentures (FD) compared to untrained patients. Additionally, the study aimed to develop and introduce a new digital index for the denture hygiene evaluation.

MATERIALS AND METHODS Thirty edentulous patients were enrolled by dentists of the Scientific Unit of Digital Dentistry (S.U.D.D.), directed by Prof. Fernando Zarone, and were randomly divided into two groups: trained (TG) or control group (CG). TG received practical demonstrations on home hygiene procedures, while CG received only written instructions following the American College of Prosthodontists' guidelines. At baseline and 1 year follow-up, a plaque detector was used in the FD intaglio, then a photographic documentation and an intraoral scan of the FD were performed. Scan data was analyzed by MeshLab software to calculate the "Zarone Index," detecting the percentage of denture surface covered with plaque.

RESULTS Power analysis confirmed the study's statistical

validity. Normality and homogeneity of variance tests were performed. The Welch test showed statistically significant differences ($p < 0.001$) between the “Trained Baseline” and “Trained Follow-up” groups, as well as between the “Trained Follow-up” and “Control Follow-up” groups. No significant differences between the “Control Follow-up” and “Control Baseline” groups were evidenced.

CONCLUSIONS Patients who received a properly training demonstrated both statistically and clinically significant improvements in prosthesis care and home hygiene. These findings highlight the importance of a collaborative approach involving dentist, hygienist and patient in order to improve the treatment outcomes. These preliminary results will be extended with a longer-term follow-up.

EFFECT OF FINISHING AND POLISHING SYSTEMS ON SURFACE PROPERTIES OF UNIVERSAL COMPOSITES

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AIM The aim of this in vitro study was to evaluate the effect of different finishing and polishing systems on two surface properties of universal composites: roughness (Ra) and gloss (GU). The influence of filler morphology and resin matrix composition on surface quality, bacterial adhesion, and optical performance was also considered to highlight clinical implications for restorative dentistry.

MATERIALS AND METHODS Two universal composites were tested: Transcend (Ultradent) and Clearfil Majesty ES-2 (Kuraray). Each was subjected to three polishing systems: OneGloss (single-step), Enhance + PoGo (two-step), and Jiffy (three-step). Ten specimens per combination were prepared, giving 60 samples. After standardized polymerization, specimens were stored in distilled water at 37 °C for 24 h. Surface roughness (Ra) was measured with a profilometer and gloss (GU) with a glossmeter. Measurements were recorded at baseline (T0) and after polishing (T1). Data were analyzed with two-way ANOVA to assess the effect of composite type and polishing system, and to detect statistically significant differences ($p < 0.05$).

RESULTS Surface roughness and gloss varied according to both material and polishing system. OneGloss produced the highest Ra values, indicating rougher surfaces. Enhance and Jiffy achieved smoother finishes, with Jiffy providing the lowest Ra for Clearfil. Gloss results showed an opposite trend: Enhance yielded the highest GU values, followed by Jiffy, while OneGloss consistently gave the lowest gloss. Clearfil maintained higher gloss than Transcend, reflecting better structural and optical response to polishing. A clear inverse correlation between Ra and GU was observed, confirming that increased roughness reduces light reflection and negatively impacts aesthetics.

CONCLUSIONS The polishing system significantly affects composite surface properties. Multistep protocols (Enhance, Jiffy) yield smoother and glossier surfaces than OneGloss. Effectiveness depends on composite microstructure and compatibility with the clinical protocol. System selection should

be individualized to ensure a resistant, glossy, plaque-repellent, and clinically reliable restoration.

MACHINED VERSUS CAST ABUTMENTS FOR SINGLE DENTAL IMPLANTS: A 5-YEAR WITHIN-PATIENT MULTICENTRE RANDOMISED CONTROLLED TRIAL

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AIM To compare, in a within-patient randomised controlled trial, the clinical outcomes of titanium abutments (machined group) versus cobalt-chrome fully cast abutments (cast group). The null hypothesis was that no difference would exist between groups, against the alternative hypothesis of a difference.

MATERIALS AND METHODS Thirty-one partially edentulous subjects received two single non-adjacent implant-supported crowns at three centres. Three and a half months after implant placement, at impression taking, implants were randomised to receive a machined or a cast abutment according to a within-patient design. Four patients dropped out and one implant was lost before randomisation, leaving 26 patients. Outcome measures: prosthesis and implant failures, complications, and radiographic peri-implant marginal bone level changes. Patients were followed to 5 years after loading.

RESULTS After randomisation, five patients dropped out. Two implants failed and three crowns on cast abutments were lost. Differences for implant and prosthetic failures were not statistically significant (difference in proportions = 0.095, McNemar test $P = 0.4795$; and 0.143, $P = 0.248$). Three complications occurred in the cast group versus one in the machined group, with no significant difference (difference in proportions = 0.095; 95% CI -0.077 to 0.259; $P = 0.480$). Both groups showed significant peri-implant marginal bone loss from placement to 5 years (-0.76 ± 1.09 mm, $P = 0.001$ machined; -0.56 ± 0.77 mm, $P < 0.001$ cast), with no difference between groups (mean difference -0.19 mm; 95% CI -0.54 to 0.25; $P = 0.454$). From loading to 5 years, bone loss was not significant (-0.001 ± 0.86 mm machined; -0.12 ± 0.65 mm cast; mean difference 0.11 mm; 95% CI -0.31 to 0.50; $P = 0.629$).