

COMPLETE REMOVABLE DENTURE IN A SINGLE APPOINTMENT: DESCRIPTION OF A NEW SUSTAINABLE AND STANDARDIZED CLINICAL PROTOCOL

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Aim: complete edentulism represents a chronic disabling condition that significantly affects patients' quality of life. In the current socio-economic context, characterized by population aging, there is an increasing need to identify more efficient and sustainable workflows for prosthetic rehabilitation.

The main limiting factor in complete denture rehabilitation has historically been the lack of medical-technical standardization and the limited optimization of clinical protocols.

A clinical workflow that allows the traditional five clinical steps to be condensed into a single appointment is proposed.

Methods: the protocol, described through the presentation of a clinical case of complete bimaxillary edentulism, involves the use of a facial device and preformed injectable dental arches,

which, together with intraoral impression recording, allow the clinician to obtain all the information necessary for denture fabrication.

Results: post-delivery clinical evaluation demonstrated levels of comfort, stability, function, and post-delivery management comparable to those achieved with conventional workflows.

Conclusions: in the current socio-economic scenario, this standardized protocol represents a valid alternative that maintains therapeutic effectiveness despite simplification and reduction in treatment time and costs.

The integration of digital systems may further improve workflow standardization. Studies on larger sample sizes are needed to confirm its effectiveness and reproducibility.

AI-ASSISTED DIGITAL WORKFLOW FOR FULL-ARCH IMPLANT REHABILITATION

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Aim: full-arch implant rehabilitations in completely edentulous patients remain clinically challenging because of the need for accurate implant position transfer and passive fit of prosthetic frameworks. This multicenter case series aimed to evaluate the clinical accuracy of an AI-assisted digital impression workflow using SmartX software and extended SmartFlag scan bodies for All-on-X implant-supported rehabilitations.

Methods: ten completely edentulous patients requiring full-arch implant-supported prostheses were included. A total of 54 implants were placed, with each patient receiving 4 to 8 implants. Definitive digital impressions were obtained using a Medit i900 intraoral scanner, extended SmartFlag scan bodies and the SmartX AI-assisted workflow for real-time scan body recognition and alignment. Clinical accuracy was assessed through visual and tactile inspection, the one-screw Sheffield

test and the screw resistance test. Secondary outcomes included implant and prosthesis survival rates and the incidence of biological or technical complications after a minimum 6-month follow-up.

Results: all patients completed follow-up period without drop-outs. Passive fit was achieved in all cases, with 100% positive outcomes in all tests. During progressive tightening from 5 to 20 Ncm, a consistent angular displacement of approximately 60° was observed in all cases, indicating homogeneous prosthetic framework seating. At 6 months, implant and prosthesis survival rates were 100%, with no complications.

Conclusions: within the limitations of this preliminary clinical study, the SmartX AI-assisted digital workflow combined with extended scan bodies showed high clinical accuracy and appears to be a reliable and feasible approach for full-arch implant-supported digital rehabilitations.

KENNEDY CLASS III ORAL REHABILITATION USING REMOVABLE PARTIAL DENTURES WITH LAMELLAE RETENTION

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Aim: Removable partial dentures (RPDs) are essential for partially edentulous patients with systemic comorbidities or financial constraints. The aesthetic limitation of visible clasps in the arch can reduce patient acceptance. The introduction of lamellae retentions (RLs) eliminates the visibility of the clasps, increasing esthetics while maintaining retention and stability. The aim of the study is to document the complete process of a Kennedy Class III rehabilitation using RLs in a frail patient.

Methods: a 54-year-old man with systemic comorbidities and financial constraints presented with Kennedy Class III upper edentulousness. Implant therapy is not recommended, and financial considerations dictate RPD with RLs; a new design

that leverages the balance of forces and desirable undercuts for aesthetics.

Results: upon delivery of the prosthesis, adequate retention was noted, and the patient was satisfied with the aesthetic and functional results. At follow-up visits after 7 days and 1, 3, and 6 months, the patient reported a complete absence of pain in the residual teeth and gingival mucosa, adequate chewing, and adequate oral hygiene at home.

Conclusions: RPD with lamellae retention represents a valid alternative in partially edentulous rehabilitation when implant-supported prosthetic solutions are not indicated or accessible, allowing for improved aesthetics without compromising stability and function.

TEMPORARY MAXILLOFACIAL PROSTHETIC REHABILITATION OF A PATIENT WITH POST-RHINECTOMY DEFECT: A CASE REPORT

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Aim: the aim of this case report is to describe the temporary prosthetic rehabilitation of a patient who underwent total rhinectomy for the surgical excision of a basal cell carcinoma. The focus is on the clinical advantages and the procedure for fabricating a provisional prosthesis using methacrylate resin.

Methods: four to six weeks after surgery, once sufficient wound healing was achieved, a facial impression was obtained with the patient in an upright position to prevent tissue distortion. A temporary nasal prosthesis was fabricated using heat-polymerizing methyl methacrylate resin. The prosthesis was designed to restore the facial profile and was retained using a medical-grade skin adhesive.

Results: the choice of methyl methacrylate allowed for easy relining with temporary materials to compensate for tissue

changes secondary to scar contracture and wound organization. This provisional approach provided several advantages: it enabled the patient to resume social interactions and return to work by restoring facial contour early in the healing process. Critically, the use of a prosthesis instead of an immediate surgical flap allowed for direct clinical observation of the site, which is essential for detecting potential tumor recurrence in advanced basal cell carcinomas.

Conclusions: temporary prosthetic rehabilitation with methacrylate resin is an effective interim solution for total rhinectomy patients. It offers immediate psychosocial benefits and allows for necessary oncological surveillance while providing a versatile platform that can be adjusted during the maturation of the surgical wound.

DIGITAL SCANNER APPLICATION MEASURING FACIAL ASYMMETRIES IN MAXILLECTOMY-REHABILITATED PATIENTS: A CASE REPORT

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Aim: this case report aims to describe a digital workflow for assessing facial asymmetry in a patient with a maxillectomy defect by using a synchronized intraoral and extraoral scanning system.

Methods: an 82-year-old edentulous male who had a 4 cm right-side palatal defect following tumor excision was evaluated. Facial geometry was recorded using the Opera System under two specific conditions: with the current 20-year-old obturator prosthesis in place and without the prosthesis. This allowed for the quantification of facial asymmetry by synchronizing external facial surface data with the internal topography of the defect.

Results: the digital workflow enabled the acquisition of synchronized facial data within a single, cohesive digital environment. This approach successfully overcame the technical limitations associated with traditional standalone digitizers, such as a restricted field of view that requires multiple overlapping scans. By avoiding these overlaps, the system reduced the risk of alignment errors and data fragmentation while ensuring geometric congruence between surfaces.

Conclusions: the integrated digital approach streamlines the clinical workflow and provides a more precise correlation between the prosthetic bulb design and the resulting support to facial soft tissues.

IN VITRO EVALUATION OF THE TRUENESS OF FOUR INTRAORAL SCANNERS

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Aim: this study investigates the *in vitro* trueness of four intraoral scanners (TRIOS 3, Medit i700, DEXIS IS 3800, and Dentsply Sirona Omnicam) in capturing a maxillary arch model.

Methods: a resin model of a maxillary arch was used as reference. Ten digital impressions were acquired with each intraoral scanner. The same model was also scanned using a high-precision laboratory scanner, which served as the gold standard. The STL files obtained from the intraoral scanners were aligned and compared using dedicated 3D analysis software (CloudCompare). For each comparison, mean deviation and standard deviation were calculated to assess trueness.

Results: Trios showed a mean deviation of 0,0143 +/- 0,0468 mm, while Dentsply showed a mean deviation of 0,0146 +/- 0,0555 mm. Medit i700 presented a mean deviation of 0,0144 +/- 0,0507 mm, and DEXIS showed a mean deviation of 0,0143 +/- 0,0590 mm.

Conclusions: the results indicate comparable trueness among all evaluated intraoral scanners. No clinically relevant differences were observed between TRIOS 3, Dentsply Sirona Omnicam, Medit i700 and DEXIS IS 3800 systems in capturing a maxillary arch model. Moreover, all scanners show higher level of trueness than clinical acceptable values.

DIGITAL SMILE DESIGN AND MINIMALLY INVASIVE ESTHETIC REHABILITATION: USE OF MOCK-UP AND CERAMIC VENEERS IN THE ANTERIOR REGION

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Aim: in recent years, Digital Smile Design (DSD) has become an important tool in esthetic dentistry, improving patient communication and treatment predictability. This paper presents a clinical case in which digital planning was used to guide a conservative approach for correcting esthetic discrepancies in the maxillary anterior region.

Materials and methods: a 26-year-old female patient presented with esthetic concerns related to interdental spaces in the upper anterior region. The diagnostic workflow included intraoral digital scans and intra- and extraoral photographs. Esthetic analysis was performed using graphic software (Keynote, Apple), with evaluation of dental proportions and facial reference parameters, including midline, smile symmetry, and central incisor dimensions. Based on this analysis, a custom-

ized digital treatment plan was developed and translated into an intraoral mock-up, allowing the patient to preview the expected result and participate in treatment planning. The clinical procedure involved minimally invasive preparation of teeth 13 to 23, followed by ceramic veneers. Gingivoplasty was also performed on teeth 12, 11, 21, and 22 to improve gingival contours and smile harmony.

Results and conclusions: digital planning ensured precision throughout treatment and encouraged active patient involvement. The mock-up improved patient understanding and acceptance of the proposed treatment. The final outcome showed significant esthetic and functional improvement, confirming the effectiveness of a digitally guided minimally invasive approach in esthetic rehabilitation.

PALATAL OBTURATOR REHABILITATION: A CHOICE AFTER A RESECTION OF CHONDROSARCOMA

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Aim: this clinical report describes the prosthetic management of a 34-year-old patient diagnosed with a nodular, infiltrative chondrosarcoma of the nasal septum (cT4aN0) scheduled for endoscopic ENT surgery.

Methods: in 2023, prior to surgery, maxillary and mandibular impressions were obtained to allow fabrication of an obturator prosthesis in case of a large postoperative palatal defect not amenable to immediate flap reconstruction. After ORL surgery, a 6-cm palatal defect remained; therefore, an intraoperative impression was performed to accurately record the defect and proceed with prosthetic rehabilitation. The obturator was fabricated with an acrylic resin base and metal wire clasps on the remaining teeth. The patient then underwent radiotherapy and routine postoperative follow-up until complete healing and re-

habilitation, during which continuous adjustments to the prosthesis were required. In 2025, during reassessment by the otorhinolaryngology team, surgical reconstruction of the palatal defect using a flap was proposed. However, due to the high risk of recurrence, the patient declined, and a new obturator prosthesis was fabricated. This second device was smaller, lighter, and more comfortable.

Results: the obturator provided effective closure of the palatal defect both in the immediate postoperative phase and in the long term.

Conclusions: appropriate preoperative planning, combined with rapid prosthetic rehabilitation, represents a reliable approach for restoring function in cases of orosinus communication.

GUIDED FIBER POST REMOVAL USING CBCT-BASED DIGITAL PLANNING AND A 3D-PRINTED SLEEVELESS SURGICAL GUIDE

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Aim: this study describes a dental technique for the conservative retrieval of a fiber post using cone-beam computed tomography (CBCT) data and a freeware surgical planning software program (Pylon; TrueAbutment Inc.).

Methods: CBCT data were imported into open-access planning software (Pylon; TrueAbutment Inc.). A virtual implant (diameter: 1.8 mm; length: 8.0 mm) was positioned to replicate the precise spatial orientation of the fiber post. A custom sleeveless surgical guide was designed directly on the digital dentition and 3D-printed using a biocompatible resin (Surgical Guide Resin; Formlabs). The removal protocol consisted of 3 guided steps: initial coronal access with a 1.8-mm spherical diamond bur, longitudinal post fragmentation with a 1.0-mm

extra-fine flame bur, and removal of residual material using a 1.8-mm Gates-Glidden bur (#2) in counterclockwise rotation, all stabilized with a handpiece extender.

Results: the described digital workflow ensured high procedural precision, significantly reducing the risk of canal deviation and root perforation. This mechanical guidance minimized operator dependency and promoted maximum dentin preservation compared with conventional freehand techniques.

Conclusions: CBCT-guided endodontics, implemented through digital planning and open-access platforms, offers a predictable, cost-effective, and minimally invasive solution for complex fiber post removal, ultimately enhancing the long-term prognosis of restored teeth.

SURGICAL PROCEDURES TO ENHANCE PROSTHETIC PROGNOSIS IN THE REHABILITATION OF MAXILLARY DEFECTS

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Aim: this research identifies surgical modifications to optimize retention, stability, and support of obturator prostheses after maxillary resection, aiming to restore speech, swallowing, and acceptable masticatory function.

Methods: we compared two clinical situations. The first represents an “ideal” defect, accessible, with preservation of the anterior maxilla and teeth, providing stable support for the prosthesis. The second is a non-ideal defect where closure was attempted with a flap, significantly complicating prosthetic support.

Results: both patients were rehabilitated with removable prostheses. In the ideal defect, masticatory and aesthetic functions were successfully restored. In contrast, in the sub

optimal defect, it was not possible to achieve a complete dental arch: closure of the defect with the flap prevented full arch reconstruction, resulting in insufficient prosthetic stability and suboptimal patient satisfaction. These functional differences were confirmed by the OFS and VAS assessments. Furthermore, in the flap closed defect, phonation did not reach the levels achieved in the patient rehabilitated with an obturator.

Conclusions: interdisciplinary planning is essential to adapt surgery to prosthetic needs. Techniques such as skin grafting and bone preservation improve outcomes. Maintaining access to the defect remains the gold standard, ensuring functional advantages and enabling early detection of recurrence.

CLINICAL CONSIDERATIONS IN COLOR SELECTION FOR PROSTHETIC REHABILITATION: CONVENTIONAL SHADE GUIDES VS DIGITAL SHADE-MATCHING DEVICES

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Background: the esthetic integration of prosthetic restorations involves multiple steps, among which color selection is undoubtedly the most critical, yet indeed, it is fundamental. However, it is often performed empirically, without a standardized methodology. Consequently, the outcomes may be unpredictable, and remakes by the dental laboratory become unavoidable in cases of failure.

Aim: to review the principles of color determination in prosthodontics and compare conventional shade guides with digital shade-matching devices in a clinical setting.

Methods: Visual assessment using conventional shade guides (VITA Classical A1–D4, VITA 3D-Master) and instrumental anal-

ysis using a digital color-matching device such as a spectrophotometer (VITA Easyshade). Clinical applications included cantilever bridges and an endocrown.

Results: conventional color selection required an average of three clinical sessions, whereas digital methods required two sessions (-33%). The spectrophotometer showed higher reliability, accuracy and reproducibility compared with visual assessment.

Conclusions: visual shade matching is influenced by operator- and environment-related factors. Digital devices provide more objective and time-efficient color determination, supporting their integration into routine clinical practice.

DIGITAL ASSESSMENT OF MASTICATORY FUNCTION IN PROSTHETIC REHABILITATION: QUANTITATIVE ANALYSIS OF A FULL DIGITAL WORKFLOW

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Aim: to quantitatively assess changes in masticatory function during prosthetic rehabilitation using a fully digital, individualized workflow, with a focus on objective digital measurements.

Methods: adult patients (≥ 18 years) requiring complex prosthetic rehabilitation due to masticatory dysfunction were included. Each participant underwent a comprehensive digital diagnostic protocol, including intraoral scanning, 3D facial photography, jaw kinematics recording, Cone Beam Computed Tomography, and digital assessment of masticatory performance using the two-color mixing ability test (Variance of Hue, VoH). Masticatory function was evaluated at three time points: baseline (T0), one week after prototype delivery (T1), and after final prosthetic rehabilitation (T2). Additional outcomes included mandibular kinematics and self-perceived masticatory function.

Results: twelve patients were treated using a fully digital, patient-specific workflow. A significant improvement in masticatory performance (VoH) was observed across all time points (T0-T1 $p = 0.014$; T1-T2 $p = 0.027$; T0-T2 $p = 0.002$), with an overall improvement of 47.03% from baseline to final rehabilitation. Kinematic analysis showed a progressive expansion and regularization of mandibular movements, with increased sagittal (5.7 ± 6.4 mm, $p = 0.010$) and frontal excursions (7.2 ± 5.6 mm, $p = 0.001$). Subjective assessment confirmed a marked improvement in perceived masticatory function at T2 compared to T0.

Conclusions: digital assessment of masticatory function provides objective and clinically relevant information during prosthetic rehabilitation. A fully digital, individualized workflow enables significant functional improvement and may support more precise treatment planning and outcome evaluation.

PROSTHETIC REHABILITATION WORKFLOW USING OBTURATORS IN PATIENTS WITH MEDICATION-RELATED OSTEONECROSIS

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Aim: Medication-related osteonecrosis of the jaw (MRONJ) may require surgical resection in advanced stages, resulting in maxillary defects that compromise speech, swallowing and mastication. This study describes the prosthetic rehabilitation workflow using obturator prostheses in patients undergoing maxillectomy for MRONJ.

Methods: two female patients with a history of breast cancer treated with antiresorptive drugs developed maxillary MRONJ requiring surgical maxillectomy. Both defects were classified as Class II according to Aramany. A staged prosthetic protocol was performed. Pre-operative alginate impressions were obtained to fabricate a surgical obturator with clasp retention. After sequestrectomy, the interim obturator was relined with resilient material to adapt to the surgical defect and support healing. After defect stabilization, definitive rehabilitation was

initiated with preliminary impressions, framework fabrication and functional impression of the defect using the altered cast technique.

Results: the staged obturator approach ensured early separation between oral and nasal cavities, improving speech, swallowing and patient comfort during healing. Definitive obturator prostheses provided satisfactory retention, stability and functional rehabilitation in both patients, as reported by evaluations performed through questionnaires (Visual Analogue Scale - VAS and Obturator Function Scale - OFS).

Conclusions: a structured prosthetic workflow represents a predictable strategy for functional rehabilitation after maxillectomy in patients affected by MRONJ. Multidisciplinary management between maxillofacial surgeons and prosthodontists is essential to optimize functional outcomes and quality of life.

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

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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 CG.

Methods: for the present cross-sectional study, participants were recruited among the patients seeking care between November 2022 and April 2025. TMDs were diagnosed using diagnostic criteria for temporomandibular disorders (DC/TMD). CG was assessed by two calibrated operators, blinded to the diagnosis of TMD. A t-test to assess the age difference between the 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 ($\chi^2 = 1.53$, $p = 0.214$). No significant difference in the presence/absence of left/right/bilateral canine guidance between TMD patients and healthy individuals found.

Conclusions: the present study showed a lack of association between the presence/absence of left/right/bilateral canine guidance and the presence/absence of specific TMDs.

WEAR OF PROSTHETIC SCREWS IN PATIENTS WITH IMPLANT-SUPPORTED FULL-ARCH FIXED PROSTHESES

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Aim: to compare microhardness and surface morphology of new and clinically used prosthetic fixation screws after 2 years of function, and to assess whether microhardness can indicate mechanical aging.

Methods: thirty-six prosthetic screws were analyzed: 20 titanium alloy and 16 gold-coated stainless steel. Four unused screws served as controls, while 32 were retrieved after 2 years of clinical use in full-arch implant-supported prostheses. Samples were embedded, sectioned, polished, and examined by reflected-light microscopy. Vickers microhardness tests (50 g, 15 s) were performed at the mid-thread region. Selected samples were analyzed by SEM and EDS. Statistical

comparisons were performed between new and used screws.

Results: titanium screws showed a significant increase in microhardness after use ($P = 0.0029$), suggesting strain hardening due to cyclic loading. Gold-coated stainless steel screws showed no significant variation ($P = 0.769$). SEM analysis revealed localized wear without fractures. EDS confirmed a high-chromium austenitic stainless steel core with thin gold coating.

Conclusions: titanium screws exhibit measurable mechanical aging after 2 years, whereas gold-coated screws remain stable. Microhardness may represent a useful quantitative parameter to evaluate screw aging and support preventive replacement strategies.

PERIO-GUIDE: DEVELOPMENT AND CLINICAL VALIDATION OF AN AI-ASSISTED TOOL FOR PERIO-PROSTHETIC RISK ASSESSMENT

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Aim: the study aimed to develop Perio-Guides, an AI-assisted tool to standardize perio-prosthetic risk assessment and optimize treatment planning and maintenance protocols in prosthetic patients.

Methods: Perio-Guides website was developed, integrating medical history, clinical, and prosthetic data from 50 prosthetically rehabilitated patients (28 females, 22 males). Based on entered data, the system generated 3 risk categories (low, moderate, high). Stratification was compared with current periodontal and prosthetic guidelines. To assess reliability and reproducibility, the tool was used by 4 independent operators with different clinical experience. Intra- and inter-operator agreement were analyzed using Weighted Cohen's Kappa and Fleiss' Kappa.

Results: 36% of patients were classified as low risk, 42% as moderate risk, and 22% as high risk. Statistical analysis showed high inter-operator agreement: Weighted Cohen's Kappa ranged 0.81–0.87 (almost perfect), and overall Fleiss' Kappa was 0.84 ($p < 0.001$), confirming excellent reproducibility. Higher risk levels were associated with worse clinical conditions, higher plaque and bleeding indices, and shorter maintenance intervals (<6 months).

Conclusions: Perio-Guides enables rapid, reproducible risk assessment, supporting evidence-based decisions and improving clinical predictability. It is applicable in daily practice and may provide medico-legal support through risk report generation. High agreement strengthens reliability, reduces inter-operator variability, and improves consistency in treatment planning and maintenance protocols.

FLUCTUATIONS OF ORAL BEHAVIORS AS A NEGLECTED RISK FACTOR FOR PROSTHODONTIC COMPLICATIONS: A RANDOMIZED CLINICAL TRIAL

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Aim: restoring endodontically treated teeth in patients with bruxism represents a challenge in clinical practice. The aim of this study is to retrospectively investigate the prosthodontic outcome of 4 different restoration protocols in relation to the fluctuations of oral behaviors (OB).

Methods: 160 patients needing endodontic treatment and tooth reconstruction were included in the present research. Of the 160 teeth tested, 75 were premolars and 85 molars. The average time of the tooth restoration in function was 6.7 ± 0.4 years. A block-randomized design with 4 arms was adopted to evenly allocate patients into the 4 experimental groups. Groups 1 and 2 received indirect restorations (lithium disilicate onlays), with fiber post placed only in group 1. Groups 3 and 4 received direct restorations (build-up: fiber-reinforced com-

posite with conventional composite), with the post placed only in group 4. The outcome of the crowns was evaluated using the US Public Health Service criteria, checking for 8 factors (e.g. caries, restoration wear, tooth fracture). Oral Behavior Checklist was used at baseline and at 6-year follow-up to evaluate the risk for OB.

Results: the regression showed that the combined effect of using direct composite and the high risk for OB significantly contributes to the number of absolute failures ($R = 0.452$).

Conclusions: a high frequency of OB has a negative impact on the survival of teeth restored with direct composite. The baseline exclusion of OB cannot rule out their long-term fluctuation and their future impact on the outcome of prosthodontic restoration.

CLINICAL OUTCOME OF FIBER POST AND FIBER-REINFORCED RESIN COMPOSITE FOR THE FULL CROWNS OF ANTERIOR ENDODONTICALLY TREATED TEETH: A 5-YEAR RANDOMIZED CLINICAL TRIAL

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Aim: to compare the outcome of short fiber-reinforced resin composite (SFRC) as core material for the build-up, with respect to the fiber post in anterior endodontically treated teeth (ETT), covered by a lithium disilicate crown.

Methods: inclusion criteria were the presence of an anterior tooth requiring endodontic treatment. Only teeth with more than 50% of tooth structure, in occlusal function, a natural antagonist, and in contact with two interproximal teeth were included. A simple randomized design with two arms was used to assign patients to the two experimental groups. The OBC (Oral Behavior Checklist) was adopted to assess the fluctuations in oral behaviors. The modified US Public Health Service (USPHS) criteria were used to evaluate the prosthodontic out-

comes. For the statistical analysis, significance was set at $p < 0.05$. (ClinicalTrials.gov n. CT01532947).

Results: in total, 80 patients (37 females; mean age, 52.5 ± 3.8 years) were recruited. No significant difference was found in the failure rate between build-ups made with fiber post with respect to the use of SFRC ($p = 0.471$). No association was found between prosthodontic failure and oral behaviors frequency.

Conclusions: this randomized clinical trial shows that at 5 years of follow-up, no significant difference exists in the number of prosthodontic failures between the abutment of anterior teeth, with at least 50% of residual tooth structure, restored with SFRC, with respect to fiber post. No significant association was found between the frequency of oral behaviors and the prosthodontic failures.

IN VIVO AND IN VITRO EVALUATION OF THE PRECISION OF TWO INTRAORAL SCANNERS

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Aim: the aim of this study was to evaluate and compare the precision of two intraoral scanners under both *in vitro* and *in vivo* conditions, in order to assess their reliability in clinical and laboratory workflows.

Materials and methods: two intraoral scanners (3Shape TRIOS 3 and DEXIS IS 3800) were used to acquire digital impressions. For the *in vitro* analysis, ten scans of a maxillary arch model were performed, whereas for the *in vivo* analysis, ten scans of a patient's maxillary arch were acquired. The resulting STL files were superimposed using the STL analysis software CloudCompare. Precision was assessed by calculating, for each scan, the mean error and the corresponding standard deviation (SD) relative to each other scan. Subsequently, the overall mean of the mean errors and the overall

mean of the standard deviations were computed.

Results: scans obtained with the 3Shape TRIOS 3 showed an overall mean of the mean errors of 0.00723 mm *in vitro* and 0.00714 mm *in vivo*, with an overall mean of the SDs of 0.0407 mm and 0.0545 mm, respectively. Scans acquired with the DEXIS IS 3800 showed an overall mean of the mean errors of 0.00642 mm *in vitro* and 0.00535 mm *in vivo*, with an overall mean of the SDs of 0.0567 mm and 0.0491 mm, respectively.

Conclusions: The results indicate that both scanners showed no significant differences in the overall mean of the mean errors and the overall mean of the SDs between *in vitro* and *in vivo* conditions, with a tendency toward higher precision in scans acquired with the DEXIS IS 3800.

COMPREHENSIVE METROLOGICAL EVALUATION OF DIFFERENT ACQUISITION SYSTEMS FOR IMPLANT POSITIONING

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Aim: this study aimed to perform a metrological comparison of different systems for recording implant position in full-arch rehabilitations.

Materials and methods: forty-five STL datasets were analyzed ($n = 15/\text{group}$): splinted implant scan bodies (ISBs) (Dynamic Abutment Solutions, Lleida, Spain), non-splinted ISBs, and extraoral photogrammetry (DAS EPG; Dynamic Abutment Solutions, Lleida, Spain). Intraoral scans were made with TRIOS 6 (3Shape, Copenhagen, Denmark). Metrological comparison was performed in CloudCompare on STL files. Mean distance and standard deviation were calculated. Data were assessed with Shapiro-Wilk and Levene tests; repeated-measures ANO-

VA and Friedman test were used for comparisons ($\alpha = .05$).

Results: the following mean distance values were detected: -0.0297, -0.0143, and -0.0408 for splinted ISBs, non-splinted ISBs, and EPG, respectively. Standard deviation values were found: 0.0848, 0.0607, and 0.1093, respectively. No statistically significant differences were found among the groups for mean distance (ANOVA $p = .0546$; Friedman $p = .0849$) or standard deviation (ANOVA $p = .0508$; Friedman $p = .1546$).

Conclusions: within the limits of this *in vitro* metrological analysis, splinted ISBs, non-splinted ISBs, and EPG showed comparable performance for implant position recording in full-arch rehabilitation.

MARGINAL ADAPTATION OF 3D-PRINTED NANOCOMPOSITE CROWNS WITH HORIZONTAL *VERSUS* VERTICAL PREPARATION DESIGNS: AN *IN VITRO* COMPARATIVE STUDY

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Aim: to assess and compare the marginal adaptation of 3D-printed nanocomposite crowns fabricated on horizontal and vertical preparation designs.

Methods: two maxillary first premolar abutments were digitally designed using CAD software with either a horizontal (Ho) or vertical (Ve) preparation design. The abutments were additively manufactured in resin and mounted on a reference typodont. Ten crowns per group were produced using a DFAB 3D printer (DFAB CHAIRSIDE, DWS SYSTEMS, Thiene, Italy). After luting with polyether material, all restorations were digitized using an industrial metrology scanner (Atos Core 80; GOM GmbH, Braunschweig, Germany). Marginal discrepancies were measured using dedicated software (Ge-

omagic Control X, Raindrop Inc., Morrisville, USA). Descriptive statistics with 95% confidence intervals were calculated, and an independent-samples test ($\alpha = 0.05$) was used for intergroup comparison.

Results: mean marginal gap values for both preparation designs were below the clinically acceptable threshold of 120 μm (Ho: 76.83 μm ; Ve: 84.37 μm). No statistically significant intergroup differences were observed ($p > 0.05$).

Conclusions: within the limitations of this *in vitro* study, all the 3D-printed nanocomposite crowns showed clinically acceptable marginal adaptation, on both horizontal and vertical preparation designs, with no significant differences between the two groups.

DENTAL IMPLANT TITANIUM SURFACE MODIFICATION FOR MUCOSAL SEALING IMPROVEMENT: AN *IN VITRO* STUDY

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Aim: the long-term success of dental implants depends on osseointegration, but also on a robust peri-implant soft tissue integration. Epithelial attachment is crucial for establishing an effective peri-implant mucosal seal that limits bacterial penetration and inflammation.

This study aims at investigating the effect of titanium surface anodization on adhesion-related behavior of gingival epithelial cells.

Methods: Human gingival epithelial cells (HGECS) were cultured on titanium (Ti) and yellow anodized titanium (y-Ti) surfaces. Cell viability was assessed at 1, 3, and 7 days by a cell luminescent assay. Immunofluorescent microscopy was used to evaluate early cell adhesion and morphology. Gene expression of epithelial adhesion markers (KRT14, ITG β 4, and COL17) was analyzed

by real-time PCR and protein distribution was qualitatively assessed by immunofluorescence staining.

Results: both surfaces supported cell viability. Higher proliferation was observed on y-Ti at day 3, whereas an opposite trend appeared at day 7, suggesting a time-dependent cellular response. Early adhesion was significantly enhanced on the y-Ti surface, while cell morphology 24h after seeding was comparable between the samples. No significant differences were found in the expression of KRT14, ITG β 4 and COL17, although all genes showed a trend toward higher expression on y-Ti.

Conclusions: yellow anodized titanium enhanced early epithelial adhesion, while maintaining comparable cell morphology to pure titanium. The observed positive trend in adhesion-related markers suggests a potential benefit for a successful mucosal sealing.

EFFECTS OF POLISHING AND GRINDING ON CAD-CAM MONOLITHIC MATERIALS: AN *IN VITRO* STUDY

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Statement of problem: the effect of clinical adjustments on the strength of cemented computer-aided design and computer-aided manufacturing (CAD-CAM) monolithic materials under aging challenge is unclear.

Purpose: the purpose of this *in vitro* study was to assess the surface roughness and fracture resistance (with or without mechanical aging) of cemented CAD-CAM monolithic materials submitted to grinding and polishing procedures.

Material and methods: disks of Lava Ultimate, Vita Enamic, crystallized Vita Suprinity, and IPS e.max CAD were analyzed for roughness after polishing by using silicon carbide papers (Lava Ultimate and Vita Enamic) or glazing (IPS e.max CAD and Vita Suprinity) (control), after grinding by using 30-mm grit diamond rotary instruments, and after grinding and polishing by using a polishing kit. For fracture resistance, a simplified tri-layer model consisting of a restorative disk, an epoxy resin

disk, and a steel ring was used. The bonded trilayer disks received the same treatments described for the roughness analysis. Half of the specimens underwent mechanical aging for 1×10⁶ cycles. All specimens were loaded until failure. The Weibull modulus was calculated.

Results: the IPS e.max CAD and Vita Suprinity showed the highest roughness after grinding and the lowest at baseline. For the Lava Ultimate and Vita Enamic, polishing provided lower roughness than at baseline. Grinding, followed or not by polishing, and mechanical aging did not adversely affect the fracture resistance or the reliability of the materials.

Conclusions: polishing did not recover the initial surface roughness of the glass-ceramic materials. Fracture resistance was not affected by grinding, followed or not by polishing, even after mechanical aging. (J Prosthet Dent 2019;121:866.e1-e8)

INFLUENCE OF OPERATOR EXPERTISE ON INTRAORAL SCANNING TIME AND CHAIRSIDE CAD CROWN DESIGN PERFORMANCE: AN *IN VITRO* COMPARATIVE INVESTIGATION

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Aim: to investigate the influence of different levels of clinical experience on intraoral scanning efficiency and on the quality of chairside CAD crown designs.

Methods: thirty participants with different levels of expertise were randomly equally allocated to three groups: final-year dental students (DS), general practitioners (GP), and expert prosthodontists (EP). Using a standardized reference model with a horizontal preparation and a supragingival finish line on a mandibular second premolar, each operator performed three digital scans and the corresponding CAD crown design. Scanning time was recorded, whereas design quality was independently assessed by three calibrated evaluators using a visual analogue scale (VAS). Data were analyzed using a normality test and the Kruskal-Wallis test.

Results: scan time confidence intervals were 204.00-259.60 s for DS, 155.68-193.12 s for GP, and 56.31-83.69 s for EP. VAS score ranges were 6.92-8.28 for DS, 8.12-9.28 for GP, and 8.92-10.28 for EP. The normality test indicated that the data were not normally distributed ($p < 0.05$). The Kruskal-Wallis test revealed statistically significant differences between DS and EP for both scan time ($p = .002$) and CAD quality ($p = .012$), whereas no significant differences were observed between DS and GP.

Conclusions: within the limitations of this study, all groups achieved clinically acceptable outcomes; however, greater operator experience was associated with improved efficiency and higher CAD design quality.

IN VITRO EVALUATION OF BRIDGING IN INTRAORAL SCANNING: COMPARATIVE ACCURACY OF SIX IOS SYSTEMS FOR ONLAY PREPARATIONS

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Aim: this *in vitro* investigation aimed to evaluate the occurrence of bridging between adjacent teeth using six different intraoral scanners (IOSs).

Methods: four polyurethane resin typodonts were fabricated by 3D printing. Each featured a first molar onlay preparation with a different interproximal distance (0.1, 0.3, 0.5, and 0.7 mm). Ten scans per model were acquired with six IOS devices. The resulting bridging areas were quantified using metrology software. Data were analyzed using descriptive statistics (means, 95% confidence intervals, standard deviations, and related metrics) and appropriate post-hoc tests.

Results: according to interproximal distance, mean bridging areas ranged from 4.35 to 5.60 mm² at 0.1 mm, 1.57 to 5.11 mm² at 0.3 mm, 2.00 to 4.75 mm² at 0.5 mm, and 2.03 to 4.35 mm² at 0.7 mm. The Kruskal-Wallis test showed statistically significant differences among groups. Bonferroni-adjusted post-hoc analysis confirmed significant performance differences among the evaluated IOS systems at all tested interproximal distances.

Conclusions: within the limitations of this *in vitro* study, bridging between adjacent digital surfaces was detected in all groups. However, the values recorded at the 0.7 mm distance may be considered potentially acceptable for routine clinical application.

ARE 3D SCAN APPS READY FOR THE VIRTUAL PATIENT? ACCURACY AND EFFICIENCY OF SMARTPHONE PHOTOGRAMMETRY

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Aim: to validate accessible smartphone 3D facial scanning for digital dentistry by evaluating the whole and regional trueness, and acquisition time of three applications against an industrial reference scanner.

Methods: a mannequin head with 14 anatomical landmarks was scanned using an industrial reference scanner. Thirty scans were acquired using an iPhone17 (n = 10 per group): Polycam (POL), KIRI Engine (KIR), and Qlone Dental (QLO). A standardized 45-cm-distance and 60-frame protocol was maintained. Whole and regional (upper, middle, and lower thirds) metrological evaluations were conducted using the Iterative Closest Point (ICP) algorithm with "Adjust Scale" enabled. Accuracy was measured via root mean square (RMS) of the cloud-to-mesh distance. Acquisition time was quantified.

Statistics evaluated inter-group differences and clinical acceptability.

Results: no significant differences were found in whole RMS trueness among the applications, with all mean values remaining below 1.0 mm. Regionally, trueness decreased in the lower third across all groups. Regarding efficiency, QLO demonstrated the shortest mean acquisition time (13.17 ± 1.08 s), significantly faster than both KIR (51.63 ± 2.27 s) and POL (53.33 ± 2.44 s) (P < .001). All applications completed scans in under 60 seconds (P < .001).

Conclusions: all applications achieved an overall accuracy within the 1.0 mm limit, proving clinically viable for aesthetic treatment planning and broader digital workflow integration. Qlone Dental provided a significant advantage in acquisition efficiency, critical for mitigating motion artifacts.

ACCURACY OF IMPLANT PLACEMENT AND PROSTHETIC FABRICATION IN DIGITAL DENTISTRY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Aim: digital dentistry has gained increasing attention for its potential to improve the accuracy of implant placement and prosthetic fabrication. However, current evidence is inconsistent, requiring systematic evaluation.

Methods: a comprehensive search was conducted across electronic databases using MeSH terms and Boolean operators. Eligible studies were selected and data were extracted systematically. Methodological quality and risk of bias were assessed using modified CONSORT criteria. Pooled odds ratios (OR) and risk ratios (RR), with 95% confidence intervals (CI), were calculated.

Results: five studies met the inclusion criteria. Overall analysis

showed no statistically significant differences between digital and conventional workflows regarding implant placement accuracy and prosthesis fabrication (OR: 0.95, 95% CI: 0.73-1.23; RR: 0.95, 95% CI: 0.73-1.23). Subgroup analyses did not reveal consistent patterns across studies.

Conclusions: under *in vitro* conditions, digital approaches did not show significant advantages over conventional techniques in implant or prosthetic accuracy. However, the evidence is limited by the small number of studies and heterogeneity. Further well-designed clinical studies and randomized controlled trials are needed to clarify the actual impact of digital dentistry in practice.

INFLUENCE OF PROSTHETIC OUTCOMES ON MECHANICAL COMPLICATIONS AND MARGINAL BONE LOSS IN IMPLANT PROSTHODONTICS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Aim: this systematic review and meta-analysis evaluated the incidence of mechanical complications and marginal bone loss (MBL) associated with modern restorative materials, focusing on the biomechanical role of Titanium bases (Ti-bases), angulated screw channels (ASCs), and patient-specific risk factors such as bruxism.

Methods: following PRISMA 2020 guidelines, an electronic search was conducted across PubMed/MEDLINE, Scopus, and Google Scholar for articles published between January 2016 and February 2026. Studies evaluating monolithic zirconia, lithium disilicate, and hybrid materials supported by implants were included, while porcelain-fused-to-metal (PFM) restorations were excluded. The risk of bias was assessed using ROBINS-I for non-randomized studies and RoB 2 for randomized controlled trials.

Results: full-zirconia connections showed a higher risk of connection fracture compared to zirconia crowns supported

by a Ti-base. However, extra-orally bonded Ti-bases frequently suffered from decementation, a complication mitigated by novel mechanically retained systems. Screw-retained restorations, including those with ASCs up to 25°, showed no significant difference in long-term MBL *versus* cement-retained restorations when subgingival cement was avoided, though screw loosening was more common. Bruxism was identified as a critical technical risk factor, yet it did not significantly increase marginal bone loss.

Conclusions: monolithic zirconia supported by a Ti-base provides a biomechanically sound and highly predictable rehabilitation strategy. ASCs expand aesthetic indications without compromising crestal bone stability yet require strict torque maintenance. Bruxism does not induce biological bone loss but necessitates robust prosthetic engineering to withstand amplified occlusal forces.

BIOMECHANICAL COMPLICATIONS IN IMPLANT-SUPPORTED PROSTHESES. AN INTERDISCIPLINARY MODEL: FROM BIOENGINEERING TO PATIENT CLINICAL OUTCOMES

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Aim: to integrate bioengineering simulations and clinical outcomes to assess how attachment design affects biomechanical complications and peri-implant health in early-loaded implant overdentures, focusing on OT Equator® and Locator®.

Methods: two complementary approaches were used: a 3D FEM/Von Mises analysis in Ansys® Workbench comparing Universal, Locator® and Equator® abutments under 800 N vertical compression, with screw preload, non-penetrating contact, friction, Ti6Al4V components and orthotropic bone; and a European multicentre study in eight centres on 42 ASA 1-2 mandibular edentulous patients treated with two interforaminal implants and early loading. Patients received OT Equator® (n = 24) or Locator® (n = 18). Outcomes were implant/prosthetic survival, complications, bone loss and BI/PI.

Results: FEM showed no static failure at 800 N and geometry-dependent stress paths. Locator® produced higher peri-implant bone stress, whereas OT Equator® mainly concentrated stress within the attachment. The connection screw was the most stressed component. Clinically, one implant failed in the Locator® group and none in the OT Equator® group; no prosthesis failed. The most frequent technical complication was retention loss due to daily hygiene wear. The only significant difference favoured OT Equator®, with lower BI/PI values, likely related to its reduced vertical profile.

Conclusions: clinical follow-up combined with FEM supports an interdisciplinary model in which attachment geometry modulates stress distribution and complication patterns in implant-supported overdentures.

ACCURACY AND MARGINAL THICKNESS OF 3D-PRINTED ZIRCONIA CROWNS VERSUS MILLED ZIRCONIA CROWNS: AN *IN VITRO* COMPARATIVE STUDY

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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).

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 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.

BIOLOGICAL, MICROBIOLOGICAL, AND OPTICAL CHARACTERIZATION OF MONOLITHIC ZIRCONIA: A COMPARATIVE STUDY BETWEEN LCM ADDITIVE MANUFACTURING AND CAD/CAM MILLING

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Aim: this multidisciplinary study aims to investigate the impact of the manufacturing process, subtractive CAD/CAM milling *versus* additive manufacturing via Lithography-based Ceramic Manufacturing (LCM), on the bio-functional and aesthetic properties of monolithic zirconia.

Materials and methods: for the biological and microbiological evaluation, zirconia discs (milled and 3D-printed) were seeded with human dermal fibroblasts (HDFa). Adhesion and proliferation kinetics were quantified at 16, 24, and 48 hours using laser scanning confocal microscopy (DAPI/Phalloidin fluorescence staining). Biofilm susceptibility was analyzed through adhesion tests with *Candida albicans* SC5314, quantifying colony-forming units (CFU) on Sabouraud agar after 90 minutes of incubation. Concurrently, a spectrophotometric analysis was conducted on clinical

crowns to determine color coordinates (CIELab*) and translucency parameters, comparing the results with clinical perceptibility and acceptability thresholds.

Results: both manufacturing technologies exhibited optimal cytocompatibility profiles with no cytotoxic effects. In the microbiological assessment, while total CFU counts were comparable, the LCM group showed a significantly lower adhesion percentage of *Candida albicans* ($p = 0.0259$), suggesting enhanced surface resistance to colonization. Spectrophotometric analysis confirmed the clinical acceptability of both groups.

Conclusions: LCM additive technology represents a promising evolution in prosthetic dentistry, demonstrating aesthetic performance comparable to traditional subtractive methods alongside distinctive biological advantages.

POST-PLACEMENT VOLUMETRIC CHANGES OF 3D-PRINTED INLAY SURFACES: A STANDARDIZED METHODOLOGY

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Aim: the advancement of additive technologies in prosthodontics aims to simplify clinical workflows; however, evaluating abrasion resistance over time remains critical. This prospective study defines a standardized technique to analyze thickness variation and surface volumetry of 3D-printed inlays, providing a repeatable measurement method.

Methods: using “Medit Link” software, intraoral scans were acquired at different post-placement intervals and superimposed. By mapping multiple control points per tooth, spatial surface variation was analyzed to calculate average thick-

ness loss and determine material wear.

Results: results indicate that a standardized digital protocol significantly reduces measurement errors and operator subjectivity. The use of accessible software provided precise, superimposable data, ensuring high reliability in the quantitative analysis of material degradation.

Conclusions: the proposed method allows for a rapid and objective evaluation of 3D-printed inlays. It optimizes clinical time and provides essential data to bridge the current literature gap regarding the long-term performance of new composite materials.

FIVE-YEAR PROSPECTIVE CLINICAL EVALUATION OF A FULL-DIGITAL PROTOCOL FOR IMPLANT-PROSTHETIC REHABILITATION OF MAXILLARY LATERAL INCISOR AGENESIS

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Aim: to evaluate the survival and success rates of single implant-supported zirconia crowns fabricated through a full-digital workflow for the rehabilitation of patients with unilateral or bilateral maxillary lateral incisor agenesis over a five-year follow-up. Technical and biological factors potentially affecting prosthetic outcomes were also analyzed, together with patient satisfaction.

Methods: twenty-two patients with unilateral or bilateral maxillary lateral incisor agenesis were enrolled, and thirty narrow-diameter implants were placed. Each case was restored with a screw-retained monolithic cubic zirconia crown (5Y-TZP) with T-bases (internal connection). Objective clinical outcomes were assessed using the Functional Implant Prosthodontic Score (FIPS), whereas patient satisfaction was evaluated using

a Visual Analog Scale (VAS). Descriptive statistics were computed, and the Kaplan-Meier method was used to estimate survival and success rates.

Results: at the five-year follow-up, the mean FIPS was 9.2 and the mean VAS score was 8.7. Kaplan-Meier analysis showed a cumulative success rate of 93.3% and a cumulative survival rate of 100%.

Conclusions: rehabilitation of maxillary lateral incisor agenesis through a full-digital workflow for implant-supported zirconia crowns appears to be an effective treatment option, providing both functional and aesthetic benefits. Further long-term clinical evidence is needed to confirm the reliability of this digital implant-prosthetic approach.

TWELVE-YEAR CLINICAL OUTCOMES OF CERAMIC-VENEERED CAD/CAM CO-CR SINGLE CROWNS ON POSTERIOR NATURAL TEETH

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Aim: to evaluate the 12-year clinical performance, survival, and success rates of ceramic-veneered CAD/CAM Co-Cr single crowns (SCs) on posterior teeth abutments.

Methods: eighty-nine patients received 120 ceramic-veneered CAD/CAM Co-Cr SCs. Standardized tooth preparations were performed by two expert prosthodontists. CAD/CAM Co-Cr frameworks were digitally fabricated, layered with veneering ceramic, and cemented with a self-etching, dual-cure resin cement. At the 12-year follow-up, survival and success were evaluated. Technical and esthetic outcomes were assessed according to USPHS criteria. Biological outcomes at abutment and contralateral teeth were analyzed descriptively.

Results: three SCs were unavailable at follow-up. Cumulative survival and success rates were 99.2% and 92.5%, re-

spectively. One failure occurred due to root fracture of a maxillary first premolar. Two cases of loss of retention were observed; both SCs were cemented again and remained functional at the 12-year follow-up. In addition, six ceramic chippings were recorded; none impaired function, all affected SCs were polished intraorally and left in situ. A total of 112 restorations were rated Alpha for all parameters. Except for occasional gingivitis, no significant differences were observed between the periodontal parameters of test and control teeth.

Conclusions: CAD/CAM Co-Cr SCs appear to represent a reliable treatment option and a feasible alternative to noble metal-ceramic restorations and metal-free ones in posterior regions after 12 years of clinical service.

THE INJECTABLE RESIN COMPOSITE TECHNIQUE

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Introduction: the injectable Resin Composite (IRC) technique is a minimally additive invasive, and predictable restorative approach. It employs a transparent silicone index with high-filled flowable composites to reproduce anterior dental anatomy. This prospective clinical study aimed to evaluate the effectiveness of the technique in esthetics and function in post-orthodontic patients with persistent diastemas, conoid teeth, or irregular morphologies.

Materials and methods: a digital workflow was adopted: intraoral scanning and STL file processing for the creation of a digital diagnostic wax-up. Following 3D model printing a transparent silicone index and a thermoformed acetate sheet, for the procedure. Restorations were evaluated at T0, T3, T6 and T12 months according to the FDI World Dental Federation criteria. Statistical analysis included the Friedman test, Durbin-

Conover post-hoc analysis, Wilcoxon signed-rank test, and Kaplan-Meier survival curves.

Results: a total of 48 anterior restorations were performed in 15 patients (mean age: 16,7 years). Follow-up assessments were completed for 10 restorations at 18 months and 38 at 12 months. FDI scores demonstrated excellent clinical performances, particularly in biological parameters and functional stability (F5). Kaplan-Meier analysis showed a survival rate of 94,7% at 3 months, 89,5% at 6 months and 87,6% at 12 months for the F1 category.

Conclusions: the IRC technique represents a minimally invasive approach for the esthetic and functional rehabilitation of the anterior region. While short-to-medium-term outcomes indicate strong clinical stability, further research with larger samples and longer follow-up is needed to validate long-term success.

A FULLY DIGITAL APPROACH FOR MONITORING EDENTULOUS PATIENTS: FROM INTRAORAL SCANNING TO THE DEVELOPMENT OF A DIGITAL HYGIENE INDEX FOR 3D-PRINTED COMPLETE DENTURES

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Aim: this study aimed to assess the impact of a structured professional training protocol on plaque control in patients rehabilitated with complete dentures and to validate a novel digital hygiene index.

Methods: thirty edentulous patients rehabilitated with 3D-printed complete dentures, manufactured through a fully digital workflow, were randomly assigned to a trained group (TG) or a control group (CG). TG received individualized in-person instruction combined with practical demonstrations, whereas CG received written guidelines only. At baseline and at the 2-year follow-up, plaque disclosure was performed on the intaglio surface, followed by standardized photographic acquisition using an intraoral scanner (IOS). Digital datasets were processed using MeshLab to compute the digital hy-

giene index, defined as the percentage of denture surface covered by plaque.

Results: power analysis confirmed statistical adequacy. Data satisfied assumptions of normality and homogeneity of variance. The Welch test showed significant differences ($p < 0.001$) between TG at baseline and follow-up, and between TG and CG at follow-up. No significant changes were observed within the CG over time.

Conclusions: within a fully digital workflow, structured patient training significantly improves denture hygiene maintenance over a 2-year follow-up compared to written instructions alone. Within the limitations of this study, the proposed digital index enables objective and reproducible plaque quantification, supporting improved monitoring and strengthening clinician-patient interaction.