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Abstracts

THE RESTORATION OF TEETH IN THE AESTHETIC ZONE: MY POINT OF VIEW

Domenico Massironi

Master Educational Group (MEG): Founder and lead educator at this center dedicated to clinical dentistry and microscopy.

European Academy of Esthetic Dentistry (EAED): Active Member and member of the editorial board for the European Journal of Esthetic Dentistry (EJED).

The modern prosthetic dentistry currently uses techniques and materials that are increasingly conservative and respectful to the biology of dental tissues, with the goal of a predictable result in the long term. With the advent of minimally invasive techniques, modern esthetic dentistry is basically new, especially with regard to the requests of the patients for treatments of increasing value in terms of quality and oriented towards a rapid and optimal solution, also of large and complex cases.

ADHESIVE RESTORATIVE DENTISTRY: DIRECT AND INDIRECT APPROACHES IN ANTERIOR AND POSTERIOR TEETH

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Modern restorative dentistry enables clinicians to treat a wide spectrum of cases - from single partial restorations to full-arch rehabilitations - by combining different approaches within the same treatment plan, both direct and indirect. It is essential to understand the priorities when restoring a single tooth and integrating it harmoniously into an existing smile, as opposed to cases where the entire smile must be redesigned by modifying tooth shape, morphology, and color. The ultimate goal is to achieve the ideal balance between biology, esthetics, and function through a minimally invasive approach supported by adhesive techniques and precise treatment planning.

PROTOCOL FOR COMPLEX ORAL REHABILITATION: INTEGRATION OF PERIODONTAL, FUNCTIONAL AND AESTHETIC THERAPY

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Complex oral rehabilitation requires a structured, predictable clinical protocol that integrates
periodontal stability, functional harmony, and aesthetic outcomes. This lecture presents a step by-step approach to comprehensive oral rehabilitation, guided throughout by one exceptionally demanding clinical case. The case is used as a continuous reference to illustrate diagnostic decision-making, interdisciplinary planning, and the transfer of periodontal, functional, and aesthetic parameters from planning to definitive restorations. Both analog and digital workflows are discussed, highlighting their respective roles and indications within complex rehabilitation. The clinical case is completed using a fully digital protocol, allowing a critical evaluation of contemporary digital workflows and demonstrating how digital technologies can be applied predictably in the most challenging oral rehabilitation scenarios.

DO WE HAVE TO COMPLETELY REPLACE DEFECTIVE RESTORATIONS? RATIONALES BEHIND CORRECTIVE "REPAIR" MEASURES

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The repair of defective dental restorations is becoming increasingly important in conservative dentistry and is being integrated more and more into the range of dental treatments. Repeated complete replacement of existing restorations may often jeopardize the remaining tooth structure and the pulp. In contrast, corrective fillings and filling repairs are minimally invasive treatment concepts that can extend the functional life of the existing restoration and, under certain circumstances, the life of the affected tooth. In addition to reducing consequential damage, functional, aesthetic, and economic aspects can also influence the treatment decision in favor of repair. Especially in geriatric and pediatric dentistry, repair measures can be a useful addition to the range of dental services, as they are usually less time-consuming and stressful and thus represent a simplified, cost-effective treatment. Of course, the repair, which involves only removing the insufficient portion of the restoration and replacing it, must meet clinical quality standards. The presentation will explain the advantages and disadvantages, procedures, and limitations of corrective measures so they can be implemented in routine practice.

REGENERATIVE ENDODONTICS: WHAT DO WE KNOW AND WHAT CAN WE DO?

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In the lecture, a detailed protocol for the treatment of a patient who has suffered dental trauma from emergency admission to the planning of long-term treatment that will fulfill the patient's wishes, but also the wishes of the dentist from a functional and aesthetic point of view. The most

common cause of loss of tooth vitality and delay in root growth and development in children is dental trauma. The first step should always be appropriate emergency treatment after the injury, from the first contact with the traumatized patient until the end of the first visit. Taking medical history from patients (children) or from an adult accompanying a child is an extremely important factor in assessing the psychophysical status of a traumatized patient. An element that certainly needs to be considered when we treat a child is the aspect of physical trauma in terms of abuse or neglect. Clinical examination, X-ray diagnostics, and pulp vitality testing precede the clinical diagnosis, after which the patient can be optimally treated, as emergency management on the traumatized tooth is of utmost importance for further treatment and long-term prognosis. A very important aspect of treating dental trauma is monitoring, which must be continuous and in accordance with the established diagnosis. A definitive treatment plan is more certain after reviewing what has been achieved so far, and it should consider potential collaboration with other specialist branches (prosthetics, orthodontics). The lecture will also cover topics on splinting and stabilization of injured teeth, as well as restoring crown fractures with adhesives and composite materials, with all endodontic aspects of traumatized young permanent teeth, as well as possibilities in the prevention of dental injuries

MODERN ENDODONTIC SURGICAL APPROACH IN THE FUNCTION OF SMILE PRESERVATION

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Endodontic surgery for the purpose of preserving the smile plays a key role in modern dentistry, the aim of which is to preserve natural teeth and the aesthetic harmony of the face. A smile is important not only for physical appearance, but also for the patient 's self-confidence and psychological health. When conservative endodontic treatment fails, surgical procedures are necessary to remove the source of infection and preserve the tooth's function and aesthetics. This method allows the tooth to be retained in the jaw, thereby avoiding the need for extraction and prosthetic or implant-prosthetic restorations, thereby preserving a natural smile. Special attention is paid to the anterior teeth, which are the most aesthetically visible and most important for a harmonious appearance, and also play a key role in phonetics and function. Thanks to advances in diagnostics, microsurgical techniques, the use of dental microscopes, ultrasound instruments, and advanced biocompatible materials, endodontic surgery today has a high success rate and is minimally invasive. Postoperative care, proper hygiene, and regular check-ups further increase the procedure's long-term success. Ultimately, endodontic surgery is not only a medical procedure but also an aesthetic intervention that allows the preservation of the natural beauty of the smile. With this approach, dentists offer patients the opportunity to keep their own teeth as the best possible solution for the patient, and thus their authentic, healthy, and confident smile.

IMPROVING OUR DAILY PRACTICE WITH DIRECT RESTORATIONS

Rafael Piñerio Sande
Dental Clinic Dental Piñeiro Sande

Direct restorative procedures require materials and clinical protocols that reliably combine efficiency, mechanical performance, long-term integrity, and aesthetic outcomes. This lecture presents reproducible, evidence-based workflows for everyday direct restorations and explains how the latest Ivoclar composite Tetric Plus represents an evolutionary step in material design that addresses these clinical demands.

CONTEMPORARY PROTOCOL FOR PLANNING IMPLANT-PROSTHETIC THERAPY – THE KEY TO SUCCESS

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Implant-prosthodontic therapy has become the gold standard for treating edentulous patients, with success depending on a precise and multidisciplinary approach to planning. The modern protocol is based on a prosthetically guided approach that integrates digital technologies, three-dimensional imaging, and virtual simulation to achieve predictable and stable long-term results. The digital workflow begins with data acquisition using CBCT and intraoral scanning, enabling three-dimensional reconstruction of anatomical structures and precise assessment of bone volume. The goal of the prosthetically guided approach is to achieve an optimal threedimensional position of the dental implant, which enables an aesthetically and functionally satisfactory superstructure, i.e., prosthetic work. Virtual planning in specialised software allows for precise determination of the position, angulation, and depth of the implant while considering future prosthetic work. Artificial intelligence significantly contributes to the automated segmentation of anatomical structures and the optimisation of surgical protocols. Research shows that computer-guided implantation achieves accuracy with average linear deviations of less than 1.0 mm and angular deviations of 2–4 degrees. Surgical guides made using 3D printing or CAD/CAM milling play a key role in transferring the virtual plan. Static surgical guides have shown excellent predictability, with implant success rates exceeding 95% over a five-year period. A multidisciplinary approach, involving a dental prosthodontist, surgeon, periodontist, and dental technician, ensures a comprehensive assessment of biological, functional, and aesthetic parameters. CAD/CAM technologies enable the fabrication of precise zirconia ceramic restorations with survival rates of over 98% over a six-year period. A modern digital planning protocol enables predictable outcomes, reduces invasiveness, optimises aesthetic results, and shortens treatment duration, which represents the foundation of successful implantology in the twenty-first century.

EVIDENCE–BASED ORAL HYGIENE

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Except for purely aesthetic procedures, dentistry is generally focused on treating the consequences of biofilm-associated diseases - caries, periodontitis, and, as a more recent challenge, peri-implantitis. These diseases are multifactorial in origin, arising from the complex interaction of microbial, environmental, and host-related factors. While the ability to influence host susceptibility remains limited, the outcomes of these oral pathologies can be significantly affected by controlling environmental factors, including diet, smoking, and oral hygiene, and, above all, by the mechanical disruption of the biofilm. The lecture will present the scientific foundations of mechanical and chemical biofilm control performed by patients at home, oral hygiene, and its impact on disease prevention and treatment outcomes, with an emphasis on inflammatory diseases of the periodontal and peri-implant tissues. It will also highlight the importance of a clinical approach, communication skills, and behavioral techniques to promote positive changes in patient behaviour and improvements in oral hygiene.

DOING WHAT IS BEST OR WHAT PAYS THE BEST?

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In Germany in the 70s and 80s, the consumption of gold in dentistry was higher than in any other country. This was largely due to a specific, high-reimbursement system for prosthetic restorations. In the last 30 years,

the system has changed extensively, and prevention has become more frequent. This decreased not only prosthetic work significantly but also the number of fillings, root canal treatments, and extractions per year. Still, restorative dentistry is a major source of income for most dentists. The statutory insurance system (SIS) pays only a basic fee for amalgam restorations, and patients who want tooth-colored restorations have to cover the additional cost. Since 1.1.2025, the EU has banned amalgam, and other basic materials have been included in Germany in the SIS.

MINIMALLY INVASIVE APPROACH TO COMPLICATED TRAUMATIC CROWN-ROOT FRACTURE: A CASE REPORT

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Dental injuries, though not typically life-threatening, can lead to significant complications such as infections, abscesses, tooth discoloration, and ankylosis. Consequently, prompt intervention is crucial. This case involves a patient who experienced a complicated crown-root fracture of the upper right incisor due to an accidental impact with an umbrella. Following a thorough clinical examination and radiographic assessment, it was decided to proceed with endodontic treatment utilizing ProTaper Gold (Dentsply Sirona, Charlotte, North Carolina, USA). The root canal was successfully instrumented and obturated during a single appointment. Considering the tooth's position in the aesthetic zone, a minimally invasive crown restoration was performed during the subsequent appointment. Gradia Direct Anterior (GC Company, Tokyo, Japan), renowned for its remarkable chameleon effect, which allows it to blend seamlessly with the surrounding tooth color, was used. This characteristic ensures aesthetically pleasing and durable restorations, which is particularly advantageous in cases requiring ongoing monitoring of healing before the final prosthetic restoration. The objective of this case report is to demonstrate the successful integration of endodontic and restorative dental treatments in the management of complex dental trauma.

Keywords: tooth trauma, root canal treatment, single-shade composite

IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE (AI) SYSTEMS IN THE DIAGNOSIS OF EAGLE SYNDROME

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Eagle syndrome or styloid process syndrome is a clinical condition of complex etiology, which occurs due to the extension of the styloid process or calcification of the stylohyoid ligament. Due to the pressure of the styloid process on the surrounding structures, pain appears as the most important symptom. Although of complex etiology, it is easily diagnosed by X-ray or CT scans on which an elongated styloid process is found. The ability of AI to analyze large amounts of data can lead to a better understanding of the disease at an individual level, allowing treatment to be planned to the specific needs of patients. Measurements are performed on digital orthopantomographic images (OPT), but the availability of artificial intelligence (AI) compares the accuracy of the obtained data on the reviewed images. The goal is to determine the precision of the measurements, and thereby predict the possibility of developing symptoms.

Keywords: AI, Eagle syndrom, radiology, oral surgery

TIME-DEPENDENT TRANSLUCENCY CHANGES OF DENTAL MATERIALS AFTER EXPOSURE TO COMMON BEVERAGES

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The aim of this study is to determine and compare the translucency change (ΔTP) of different esthetic monolithic monochromatic materials: nanoceramic (GC Cerasmart270), lithium disilicate ceramic (IPS e.max CAD), polymer (Telio CAD), composite (Tetric CAD) and polymer-infiltrated ceramic (Vita Enamic) after they have been thermocycled and treated with staining solutions.

Forty samples of each material were prepared in the form of plates, resulting in a total of 200 samples. Of the 40 samples of each material, 20 had a thickness of 1 mm (12 mm x 14 mm x 1 mm) and 20 had a thickness of 2 mm (12 mm x 14 mm x 2 mm). The test samples were divided into groups and thermocycled in distilled water. They were then stored for 4 weeks at 37°C in distilled water as a control liquid, then in black tea, instant coffee and red wine. The translucency parameters, i.e. the TP values, were determined by calculating the color difference between the measured values against a black and a white background for the same sample. The results of this study were statistically analyzed. The mean value and the standard deviation are used to describe the change in translucency for different materials, col-orants, sample thicknesses and aging stages. A mixed factorial ANOVA model was used to test the differences in the change in translucency between different materials, colorants, sample thicknesses and aging levels.The results showed that all materials tended to change to varying degrees.

The comparison of the effects of the material type on the translucency change clearly indicates the following order: Telio CAD > Tetric CAD ≥ Vita Enamic = GC Ceraasmart270 > IPS e.max CAD, while the comparison of the influence of the staining solution type on the translucency change reveals the following order: Red wine > Instant coffee > Black tea > Distilled water.

It can be concluded from the results that the change in translucency is influenced by the type of material, the staining solution, the thickness of the sample and the aging time.

Keywords: translucency, dentistry, esthetic materials, monochromatic materials, monolithic materials, CAD/CAM materials

This research was funded by the European Union – NextGenerationEU through the National Recovery and Resilience Plan (NPOO), within the project " Advanced Dental Materials: Characterization, Clinical Applications, and Emerging Challenges, PRO, grant number SFZG-13-2025.

EFFECT OF OPTICAL MAGNIFICATION ON THE ACCURACY OF TOOTH PREPARATION FOR FIXED PROSTHODONTIC RESTORATIONS: A 3D DIGITAL ANALYSIS

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Introduction The development of minimally invasive procedures, dental materials and technologies, together with increasing patient expectations, emphasises the importance of precision in dental medicine. The aim of this study was to compare the accuracy of tooth preparation for fixed prosthodontic restorations performed with and without magnification loupes, under identical preparation criteria. Materials and Methods The study included 30 doctors of dental medicine and 30 third-year dental students. Participants prepared an acrylic mandibular right second premolar (tooth 45) for a full crown according to strictly defined preparation parameters: a shoulder finish line 1.0 mm in width and a total convergence angle of 4°. Each participant performed two preparations: (1) without optical magnification and (2) using Galileo binocular loupes (2.5× magnification; working distance 35 cm). Each preparation was scanned

using an intraoral scanner (Cerec Omnicam, Dentsply Sirona) and analysed using software (PrepCheck 3.0, Dentsply Sirona). Data were statistically analysed using inferential statistics and correlation analyses at a significance level of 0.05. Results The mean finish line width across all four tooth surfaces in both groups was closer to the target value of 1 mm when loupes were used ($p < 0.001$). For "acceptable " convergence angle, significantly higher values were recorded when loupes were used in both groups ($p = 0.031$ for doctors; $p = 0.019$ for students). The surface area with a "non-acceptable" convergence angle was marginally greater without magnification ($p = 0.064$ for doctors; $p = 0.056$ for students). No statistically significant differences were found between students and doctors for either variable. Conclusion The use of magnification loupes increased the precision of tooth preparation for fixed prosthodontic restorations among doctors of dental medicine. Loupes enabled more precise control of marginal preparation and convergence angle.

Keywords: dental loupes, digital analysis, fixed prosthodontics, preparation accuracy

ORAL HYGIENE HABITS AMONG STUDENTS OF BIOMEDICAL FACULTIES: A CROSS-SECTIONAL STUDY

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Objectives: This study aimed to explore and compare oral health behaviors among students of the School of Dental Medicine (SFZG), School of Medicine (MEF), Faculty of Veterinary Medicine (VEF), and Faculty of Pharmacy and Biochemistry (FBF). Materials and Methods: A cross-sectional study was conducted using an anonymous online questionnaire distributed to all undergraduate biomedical students at the University of Zagreb, Croatia. The questionnaire collected demographic and oral hygiene practices data. Descriptive statistics were used to summarize the demographic characteristics and oral hygiene habits. Categorical variables were analyzed using the chi-square (χ^2) test to assess differences between faculties. Statistical significance was set at $p<0.05$. Results: A total of 639 students participated (SFZG: 142; MEF: 187; VEF: 170; FBF: 140; mean age 21.7 ± 2.1 years; 87.5% females). Most oral hygiene practices did not differ significantly among students from different faculties. Notably, the use of dental floss was significantly higher among SFZG students (69%) compared to MEF (39%), VET (33%), and FBF students (46%) ($p<0.001$). Tongue cleaning was most frequently performed by VEF and SFZG students (64% and 62%, respectively). SFZG students rated their oral hygiene as "good" and "very good" more often (98%) than other students (MEF: 90%; VEF: 88%; FBF: 83%; $p=0.007$), and reported more frequent dental visits (at least once per year) (82%) compared to MEF (63%), VEF (54%), and FBF students (65%) ($p<0.001$). Conclusion: The results of this study indicate that while fundamental oral hygiene practices are relatively satisfactory among all students, significant differences exist in more advanced preventive behaviors and awareness. Best oral hygiene practices and more favorable preventive behaviors were demonstrated by SFZG students, likely due to their professional education. Results highlight the importance of targeted oral health education programs for non-dental university students to promote long-term oral health.

Keywords: Oral hygiene, Preventive Dentistry, Students, Health Occupations, Cross-Sectional Studies

IN VITRO EVALUATION OF THE SURFACE ROUGHNESS OF AN EXPERIMENTAL RESIN MODIFED GLASS HYBRID WITH FOUR ION-RELEASING RESTORATIVE MATERIALS OVER SIX MONTHS

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Aim of the study: Resin-modified glass hybrid (LRGH-90) is an experimental material formulation hypothesised to offer competitive surface properties. Surface roughness is a clinically relevant parameter directly linked to biofilm accumulation and the risk of secondary caries. This study aimed to evaluate and compare the surface roughness of LRGH-90 with four commercially established ion-releasing restorative materials over a six-month period.

Methods: Five materials were tested: LRGH-90, Equia Forte HT Fil, Riva Light Cure, Cention Forte, and GC Fuji II LC). Twelve disk-shaped specimens per material (8 mm × 2 mm) were stored in phosphate-buffered saline at 37°C. Surface roughness (Ra, µm) was measured using a contact profilometer (Surftest SJ-210, Mitutoyo) at 24 h, 7 days, and 6 months. The Kruskal-Wallis test with Bonferroni-corrected pairwise comparisons and the Friedman test were used ($\alpha = 0.05$).

Results: At 24 h, LRGH-90 recorded Ra = 0.41 ± 0.11 µm — lower than Equia Forte HT (0.82 ± 0.23 µm; $p = 0.002$) and Cention Forte (0.55 ± 0.16 µm), and similar to Riva Light Cure (0.34 ± 0.12 µm) and GC Fuji II LC (0.40 ± 0.13 µm). At 6 months, LRGH-90 increased to 0.64 ± 0.19 µm, remaining lower than Equia Forte HT (1.39 ± 0.34 µm; $p = 0.009$), Cention Forte (0.80 ± 0.32 µm), and above Riva Light Cure (0.46 ± 0.18 µm) and GC Fuji II LC (0.47 ± 0.08 µm). All materials showed a significant increase in roughness over time ($p \leq 0.046$).

Conclusion: LRGH-90 showed lower surface roughness than the glass hybrid Equia Forte HT and the alkasite Cention Forte at all time points, and values close to established RMGICs throughout the observation period. Despite an increase at 6 months, its surface roughness remained within the range of commercial RMGICs in clinical use. These results indicate that LRGH-90 has surface properties suitable for further evaluation in clinical studies.

Funding: This study was supported by the Croatian Science Foundation project IP-2022-10-6065.

Key words: glass-hybrid, surface roughness, ion-releasing restorative materials, alcasite, resin-modifed materials

DEPTH OF CURVE OF SPEE IN RELATION TO CRANIOFACIAL AND DENTAL MORPHOLOGY

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Objectives: The Curve of Spee, first described by Ferdinand Graf von Spee in 1890, represents the concave curvature of the occlusal line connecting the buccal cusps of the mandibular molars and the incisal edges of the incisors. According to Andrews, it is the sixth key of occlusion, with optimal static occlusion achieved by flattening the curve. This study aimed to determine the average depth of the Curve of Spee in pretreatment orthodontic patients, assess its relation to Angle's classes, and compare it with various dental and skeletal parameters. Materials and Methods: Digital intraoral scans and cephalograms from 240 orthodontic patients aged 10-17 years with complete permanent dentition, without pronounced crowding and no history of orthodontic treatment were

analyzed using OrthoCAD and AX.Ceph software. The sample was divided according to Angle classes into Class I, Class II/1, Class II/2 and Class III. Curve of Spee depth was measured as the perpendicular distance from the deepest point on the lower arch to the line connecting the lower incisor incisal edge and the distal cusp of the most posterior tooth, averaged across the left and right sides. Statistical analysis: Statistical analyses included ANOVA, Tukey post-hoc tests, Pearson correlations, and multiple regression. Results: The mean Curve of Spee depth was 2.18 mm, with significant differences among Angle classes ($F(3,236) = 8.16$, $p < 0.001$): deepest in Class II/2 (2.49 mm), followed by Class II/1 (2.42 mm), Class I (2.00 mm), and shallowest in Class III (1.82 mm). Significant positive correlations were found with overbite ($r=0.406$) and overjet ($r=0.303$), as well as skeletal Class II indicators such as ANB ($r=0.228$) and Wits appraisal ($r=0.367$). Significant negative correlations were observed with vertical skeletal parameters such as M-Go-Ar ($r = –0.209$) and N-Go-M ($r = –0.203$). In multivariate analysis, overbite and sagittal skeletal indicators remained significant predictors of Spee depth ($R^2 = 0.294$, $p < 0.001$). Conclusion: The depth of the Curve of Spee is primarily associated with sagittal skeletal discrepancies and deep bite characteristics, while vertical skeletal morphology shows a weaker influence. These findings underline its clinical relevance in orthodontic diagnosis and treatment planning.

Keywords: Curve of Spee, Angle classes, occlusion

MANDIBULAR ADVANCEMENT DURING PUBERTY AND SLEEP: PHARYNGEAL AIRWAY CHANGES AND SUBJECTIVE SLEEP QUALITY

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Aim: To evaluate changes in sleep quality after functional appliance treatment in adolescents with skeletal Class II malocclusion during pubertal growth acceleration and to investigate the relationship between sleep quality and airway changes. Materials and Methods: A total of 49 cases were analyzed, aged 11–14 years (median 12; 43% female). Patients were randomly assigned to treatment with a Twin Block (N=25) or a Sander Bite-Jumping Appliance (N=24). Morphological changes were assessed on lateral cephalograms before and after one year of therapy. They included sagittal positions of the incisors and mandible, as well as sagittal dimensions of nasopharynx, oropharynx, and hypopharynx. The influence of treatment on sleep quality and sleep behaviour was assessed using the Adolescent Sleep Wake Scale (ASWS), while breathing-related sleep pathology was evaluated using the Pediatric Sleep Questionnaire (PSQ). Results: According to ASWS, 70% of subjects did not experience a change in sleep quality. Improvement in breathing during sleep (PSQ) was reported in 25% of subjects. Changes in sleep quality were not associated with appliance type, sex, or treatment success (when overjet reduction ≥40% was used as a criterion). No linear correlation was found between dentoskeletal changes and sleep quality outcomes. However, a moderate negative linear correlation was observed between changes in ASWS score and changes in hypopharyngeal dimension ($r=-0.345$; $p=0.046$). A decrease in the distance between the hyoid bone and the lower mandibular border—suggesting reduced hypopharyngeal collapsibility—was associated with improved sleep quality. Conclusion: Reducing hypopharyngeal airway collapsibility may improve perceived sleep quality without necessarily alleviating symptoms of sleep-disordered breathing. Keywords: sleep; deficient mandible; mandibular advancement, airways

Keywords: sleep,deficient mandible,mandibular advancement,airways

DYNAMIC FATIGUE RESISTANCE OF CO–CR DENTAL FRAMEWORKS FABRICATED USING DIFFERENT TECHNOLOGIES – AN IN VITRO PILOT STUDY

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Objectives The aim of this study was to evaluate the dynamic fatigue resistance of cobalt–chromium (Co–Cr) dental frameworks fabricated using different manufacturing technologies under cyclic compressive loading simulating functional masticatory forces. Materials and Methods Co–Cr dental frameworks with ceramic veneering and a pontic of nominal thickness 0.3 mm were fabricated using three technologies: conventional casting, CAD/CAM milling, and selective laser melting (SLM) 3D printing. Dynamic fatigue testing was performed using cyclic compressive loading ranging from 100 to 1000 N at a frequency of 15 Hz for a total of 5×10^6 cycles. The loading protocol was designed to simulate functional occlusal conditions in the posterior region. Statistical Analysis Descriptive analysis was used to evaluate the mechanical response and failure occurrence during dynamic loading. Results All tested Co–Cr dental frameworks, regardless of fabrication technology, successfully withstood the applied dynamic loading protocol. No fractures, permanent deformations, or changes in mechanical response were observed during the testing period. Conclusion Co–Cr dental frameworks fabricated using both conventional and digital technologies demonstrate sufficient dynamic fatigue resistance under simulated functional conditions.

Keywords: Cobalt–chromium alloy, dynamic loading, fatigue resistance, dental frameworks, manufacturing technology

INFLUENCE OF TREATMENT-INDUCED CHANGES OF THE DENTAL ARCHES, SEX, AND AGE ON MANDIBULAR INCISORS IRREGULARITY TWO YEARS AFTER COMPREHENSIVE ORTHODONTIC TREATMENT

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Abstract Aim: Treatment-induced changes in dental arch dimensions may affect the stability of orthodontic outcomes during the retention period; therefore, this relationship was investigated. Materials and Methods: A total of 93 subjects were included in the analysis. Participants were randomly allocated into three groups according to the type of mandibular retainer used: a removable vacuum-formed retainer (VFR), a bonded twist round fixed wire retainer, or a rectangular wire retainer. Changes in mandibular arch dimensions, incisor irregularity, and retainer failure were recorded. Results: Changes in incisor alignment were observed in 39% of subjects, predominantly minor (<1 mm in 31% of cases). The magnitude of incisor irregularity was greater in the VFR group compared with the round ($p=0.027$) and rectangular wire groups ($p<0.001$), with no significant difference between the latter two. Incisor irregularity occurred in 30% of patients without retainer failure and in 48% of those with failure. Males exhibited incisor irregularity more frequently than females (50% vs. 28%; $p=0.042$), and subjects aged ≤15 years at the start of retention showed higher prevalence compared with older individuals (58% vs. 24%; $p=0.002$). Irregularity was present in 46% of cases with an increase in arch length ≥2 mm and in 32% of cases without such increase. A linear correlation was found between the increase in incisor irregularity during retention and treatment-induced expansion of intercanine width ($r=0.263$; $p=0.011$), whereas no association was observed with

other changes in mandibular arch dimensions. Conclusion: Mandibular incisor irregularity during retention appears to be associated with male sex, younger age at retention onset, retainer type, and treatment-induced increases in intercanine width. It was not related to the amount of crowding resolved, incisor proclination, or posterior arch expansion. Keywords: orthodontic treatment; retention; relapse

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Keywords: orthodontic treatment,retention,relapse

SEX DIFFERENCES IN HAND GRIP RECOVERY AND POSTOPERATIVE NAUSEA AND VOMITING AFTER ELECTIVE INTRAORAL SOFT-TISSUE SURGERY: A SECONDARY ANALYSIS

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Abstract Objectives: In this secondary analysis we examined whether sex was associated with recovery of hand grip strength, bite force, postoperative pain (QoR-40 Pain domain), and with complications (PONV, shivering) in adults undergoing elective intraoral soft-tissue surgery. Materials and Methods: Secondary analysis of a single-center cohort (N=50; 24 male, 26 female). Outcomes: hand grip and bite force at baseline, 1 h, 24 h, and 30 days; QoR-40 Pain domain at the same time points; PONV and shivering (binary). Linear mixed-effects models with fixed effects for sex, time, and sex-by-time interaction and random intercept by subject were used for continuous outcomes; Fisher exact test for PONV and shivering by sex. Two-sided alpha = 0.05. Results: Hand grip strength was significantly higher in men than in women (main effect of sex $p < 0.001$) and showed a significant sex-by-time interaction ($p = 0.001$): recovery trajectory differed between sexes (men had higher values at all time points with a larger drop at 1 h and faster return). Bite force and Pain domain did not differ significantly by sex ($p > 0.16$ for main effect and interaction). PONV incidence differed significantly by sex (Fisher exact $p = 0.010$), with higher incidence in women (27%) than in men (0%); shivering did not ($p = 0.72$). Conclusion: In this secondary analysis, men had higher hand grip strength and a different recovery trajectory than women; bite force and pain did not differ by sex. PONV was more frequent in women than in men. The findings may inform counselling and expectations after intraoral surgery.

Keywords: sex; hand grip strength; bite force; intraoral surgery; postoperative nausea and vomiting

DEGREE OF CONVERSION AND POLYMERIZATION KINETICS OF SINGLE-SHADE AND SIMPLE-SHADE COMPOSITES

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Abstract Objectives: The aim of this study was to measure the degree of conversion (DC) and changes in polymerization kinetics in single-shade and simple-shade composite materials compared to polyshade composite. Materials and Methods: Six restorative composite materials were used: Essentia Universal (GC), Simplishade Bulk Fill (Kerr), Tetric Plus Fill A2 (Ivoclar), and Omnichroma (Tokuyama Dental). Empress Direct Dentin A2 and Empress Direct Enamel A2 (Ivoclar) served as reference polyshade materials. Attenuated Total Reflectance Fourier transform infrared spectroscopy (Nicolet iS50) was used to measure the DC and maximum polymerization rate (Rmax). Unpolymerized cylindrical specimens (n=5; d=3mm, h=2mm) were prepared and illuminated for 20 seconds (1000 mW/cm^2). The FTIR device measured the DC changes over a 5-minute period. Statistical Analysis: Data were analyzed using one-way ANOVA and Tukey post-hoc test ($\alpha = 0.05$). Results: The measured DC was highest for SimpliShade and lowest for Essentia Universal. All tested materials showed statistically significant difference in DC. Rmax was highest for Tetric Plus Fill, followed by SimpliShade. There was no statistically significant difference in Rmax between Omnichroma and Essentia Universal, nor between the dentin and enamel variants of the Empress Direct reference material. Conclusion: Conversion and the polymerization reaction rate were material- and composition-dependent and not related to the material classification by color adjustment potential.

Funded by Croatian Science Foundation (project number HRZZ-IP-2024-05-2884).
Keywords: composite resins; degree of conversion; maximum reaction rate

ATTITUDE TOWARD DENTAL FLOSS AMONG STUDENTS IN AAB COLLEGE

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Abstract Objective: The aim of this study was to evaluate the attitude toward dental floss among students in AAB College. Material and Methods: A web-based survey was constructed to respond to statements regarding flossing habits. The 15-question survey was distributed via Google Forms to students with various academic majors. All academic majors were divided in three groups: dental students, nursing/radiology students, and other majors. Comparisons between answers were carried out using the Chi-square test of independence. P value < 0.01 was considered significant. Results: 285 responders participated in the survey. Based on the results, the majority (67%) of students brushed their teeth twice daily, but only 59% said they also use dental floss. 41% of respondents thought using dental floss would lead to tooth diastema, and 49% said their dentist had not encouraged the use of dental floss. There was a significant statistical difference between answers of dental and other major academics ($p < 0.0001$). Conclusion: There is a moderate attitude regarding dental floss usage among students. Additional oral health education to improve knowledge and awareness is needed. Dentists should practice recommending dental floss more frequently.

Keywords: Dental floss; oral hygiene; university students; oral health education

PREVALENCE OF DENTAL ANXIETY AND CORRELATION WITH OTHER FACTORS IN A SAMPLE OF ADULT PATIENTS

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Abstract Research Objectives: Dental anxiety is a common phenomenon that affects a significant part of the population. Using the MDAS (Modified Dental Anxiety Scale) questionnaires, we analyzed the

prevalence of anxiety in part of the Croatian population and examined possible correlations with other factors. Materials and Methods: A cross-sectional study was conducted on 269 adult patients in several dental public health practices in Zagreb and Zagreb County. Dental anxiety was measured using the MDAS questionnaire before the dental procedure, alongside a general questionnaire with 31 questions covering socioeconomic, demographic, oral hygiene, oral, and cariogenic nutrition status. Statistical Analysis: Data were processed using non-parametric analysis of variance (Friedman and Kruskal-Wallis tests). Reliability was verified using Spearman's correlation coefficient and Cronbach's alpha. Results: Cronbach's alpha for the MDAS scale was 0.884. Mild anxiety was reported by 67.9% of respondents, moderate by 26.5%, and severe anxiety/phobia by 5.6%. Respondents satisfied with their oral health and those whose finances do not affect treatment showed significantly lower levels of anxiety ($p<0.001$). No significant difference was confirmed by age, gender, oral hygiene, or oral status. Statistical significance was found regarding cariogenic diet ($p<0.05$). No statistical features were found regarding socioeconomic status. Conclusion: The study showed that over 30% of respondents have elevated anxiety levels, correlating with global data. The variables affecting anxiety were cariogenic diet, satisfaction with oral health, and finances, while other factors showed no connection, implying a need for future research.
Keywords: Dental anxiety; MDAS test; prevalence; dietary habits; behaviour management

BONDED RESTORATIONS IN THE REHABILITATION OF THE ESTHETIC ZONE

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Abstract Aim: This case report presents a minimally invasive bonded restoration as a temporary esthetic solution following traumatic loss of an anterior tooth, used until definitive prosthetic rehabilitation. Materials and Methods: The operative field was isolated with cotton rolls and cellulose pellets. No grooves were prepared, as the restoration was temporary. Adjacent enamel was etched with 37% orthophosphoric acid, rinsed, dried, and treated with Scotchbond™ Universal Plus Adhesive according to the manufacturer's instruction. A polyethylene fiber ribbon (InFibra®, Bioloren) was bonded to the palatal/lingual surfaces for reinforcement. The missing tooth was directly built up with Gradia™ Direct Anterior A2 composite (GC Corporation) using a layered technique, followed by finishing and polishing for optimal esthetics and comfort. All steps were performed in accordance with the manufacturer's instructions and clinical guidelines. Results: The bonded restoration showed good stability and esthetic integration, with proper contour, color match, and adjusted occlusion. The patient reported high functional and esthetic satisfaction. Conclusion: Bonded fiber-reinforced restorations offer a conservative, minimally invasive temporary solution for esthetic rehabilitation after traumatic tooth loss, providing acceptable function and esthetics until definitive treatment.
Keywords: bonded restoration; fiber-reinforced composite; esthetic zone; traumatic tooth loss; minimally invasive dentistry

ENDODONTIC TREATMENT IN MEDICALLY COMPROMISED PATIENTS: OPTIMIZATION OF THERAPY

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Abstract Aim: This case report presents an optimized single-visit endodontic procedure for a medically compromised patient with multiple systemic conditions and extensive medication use. Materials and Methods: A patient with type II diabetes mellitus, obstructive sleep apnea, and a history of nine coronary stent placements underwent endodontic treatment. The patient was on long-term anticoagulant, cardiovascular, antidiabetic, and lipid-lowering therapy. A single-visit endodontic treatment of teeth 31 and 41 was performed under local anesthesia. Both incisors had two canals. Root canals were instrumented with Procodile 020 (Komet) using a reciprocating technique, disinfected with 2.5% NaOCl, saline, and 17% EDTA, enhanced by EndoActivator sonic activation (Advanced Endodontics), and obturated with Procodile gutta-percha and FillRoot bioceramic sealer (Dental World). Post-endodontic restoration was completed with GC Fuji IX GP Extra (GC Corporation). Results: All procedures were completed successfully in a single visit without complications, with good patient tolerance and adequate canal preparation and obturation. Conclusion: Optimized single-visit endodontic treatment using reciprocating instrumentation is safe and effective in medically compromised patients when clinical protocols and risk management are properly applied.
Keywords: medically compromised patient; endodontic treatment; single-visit therapy; diabetes mellitus; cardiovascular disease

LIGHT TRANSMITTANCE OF UNIVERSAL AND MONOSHADE RESIN COMPOSITES

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Abstract Objectives: This study aimed to analyse the light transmission efficiency and total energy delivery of new monoshade and universal composite materials compared with polyshade composites. Materials and Methods: Six materials were analysed: Essentia Universal (GC), Omnichroma (Tokuyama Dental), Tetric Plus Fill A2 (Ivoclar), and SimpliShade (Kerr). Empress Direct Enamel A2 and Empress Direct Dentin A2 (Ivoclar) served as reference materials. Disk-shaped specimens (6x2 mm) were polymerized for 20 seconds using a Bluephase curing unit (1000 mW/cm^2). A calibrated spectrometer (MARC Light Collector) measured the total, blue, and violet light transmitted through the specimen. Data were statistically analysed using one-way ANOVA and Tukey post-hoc test. Results: The lowest total transmitted energy was observed in Empress Direct Dentin A2 (3.9 ± 0.5 J/cm^2) followed by Empress Direct Enamel A2 (10.5 ± 0.6 J/cm^2), Essentia Universal (15.4 ± 0.9 J/cm^2), and SimpliShade (17.8 ± 1.0 J/cm^2). The highest irradiance values were recorded for Omnichroma (19.0 ± 0.8 J/cm^2) and Tetric Plus Fill (19.7 ± 0.7 J/cm^2), with no significant difference between them. Violet light transmission was 15 to 386 times lower than blue light, with the highest violet transmittance in Tetric Plus Fill. Conclusion: The new generation of universal and monoshade composites showed higher transmitted light energy than both opaque dentine and enamel shades of the reference polychromatic composite.

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Keywords: composites; light transmittance; polymerisation

HALITOSIS PREVALENCE AND GAS PROFILE ANALYSIS IN SIBO/IMO PATIENTS: PRELIMINARY FINDINGS

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Abstract Aim: This study aimed to determine halitosis prevalence and its origin in patients diagnosed with SIBO/IMO and explore associations between oral VCSs and intestinal gas production. Materials and Methods: The study enrolled individuals diagnosed with SIBO/IMO using breath testing for hydrogen (H_2) and methane (CH_4). Participants underwent periodontal examination and assessment of tongue coating. Oral malodor was evaluated using OralChroma to measure VSCs: hydrogen sulfide (H_2S), methyl mercaptan (CH_3SH), and dimethyl sulfide ($(CH_3)_2S$). Halitosis was classified as intraoral, extraoral, or mixed. Results: 41 patients (IMO n=10; SIBO n=3; IMO/SIBO n=28) were included. Halitosis prevalence was 56.1% (23/41). Based on clinical parameters and VSC analysis, the etiology was predominantly mixed (47.8%), followed by intraoral (30.4%) and extraoral (21.7%). Pseudohalitosis was present in 31.7% of patients. No significant linear correlations were observed between VSCs and intestinal gases. However, categorical analysis revealed that patients with isolated IMO (n=15) had 4.6-fold higher dimethyl sulfide levels compared to those with combined SIBO/IMO (n=24) (62.7 vs 13.6 ppb, p=0.044). Conclusion: More than half of SIBO/IMO patients presented with halitosis, the majority of which was of mixed origin, requiring multidisciplinary treatment. While linear oral-intestinal correlations were absent, categorical differences suggest distinct metabolic phenotypes, particularly in isolated IMO.
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Keywords: Halitosis; SIBO; IMO; Volatile sulfur compounds; Periodontitis

THE EFFECT OF THE AQUEOUS ENVIRONMENT ON MASS CHANGES IN NEWLY SYNTHESIZED DENTAL COMPOSITES CONTAINING ZINC-DOPED BIOACTIVE GLASS

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Abstract Objectives: Evaluating water-induced changes in experimental dental composites containing zinc-doped mesoporous bioactive glass nanospheres (Zn-MBGN) is essential to optimize the balance between mechanical stability and bioactivity. This study aimed to investigate the effect of an aqueous environment on the mass change of experimental composites during 28 days of immersion. Materials and Methods: Twelve experimental Bis-GMA/TEGDMA-based composites were prepared by incorporating MBGN with 0%, 1%, or 5% zinc at several filler loadings (1, 3, 5, and 7%), along with a reference material. Disk-shaped specimens (6 mm × 2 mm) were prepared and immersed in distilled water at 37 °C. Each sample was weighed before and after water exposure for 1, 3, 7, 14, and 28 days. Statistical analysis was performed using ANOVA and Tukey post hoc test ($\alpha = 0.05$). Results: All materials showed a statistically significant increase in mass during 28 days of immersion. The material 1-1ZnBG had the lowest mass increase, while 7-1ZnBG had the highest. Materials with the highest amount of MBGN and the reference material demonstrated the highest water sorption. A higher amount of zinc did not affect mass changes during the test period. Conclusions: Although all materials showed a significant increase in mass, composites with lower MBGN concentrations exhibited water sorption comparable to or lower than the control material. Fine-tuning the MBGN concentration and zinc content can help develop a composite with controlled water sorption and long-term stability.
Funded by Croatian Science Foundation (project number HRZZ-IP-2024-05-2884).
Keywords: composites; water sorption; mass change; bioactive glass; zinc

IS THERE A REPRODUCIBILITY CRISIS? - THE CASE OF COMPOSITE MECHANICAL PROPERTIES

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Abstract Background: Flexural strength is a widely investigated and commonly reported mechanical property of resin composites. The large volume of data available from published in vitro studies enables evidence synthesis, but substantial dispersion in reported values may indicate limited reproducibility. Therefore, this work aimed to quantify inter-study variability in flexural strength for selected composites and contrast independent research findings with manufacturer-reported values. Materials and methods: A Bayesian network meta-analysis framework was applied using rigorous eligibility screening, including explicit documentation of excluded studies. From included studies (n=44), summarized flexural strength data were extracted and observed ranges across studies were calculated for most commonly investigated composites. These ranges were contrasted with values reported in manufacturer technical documentation. Results: Reported flexural strength varied markedly across studies. Observed ranges spanned 105.6 to 259.3 MPa (Filtek Z250), 126.0 to 256.2 MPa (Filtek One Bulk Fill), 85.0 to 226.3 MPa (everX Posterior), 64.0 to 138.2 MPa (Filtek Supreme XTE), 64.5 to 135.2 MPa (Filtek Z350 XT), and 24.9 to 131.4 MPa (Tetric EvoCeram Bulk Fill). Manufacturer documents typically provided single-point values, which represented only part of the range reported in independent studies. Conclusions: Flexural strength data for resin composites show extremely wide inter-study dispersion, limiting confident material ranking and supporting concerns regarding reproducibility. Although the main causes of this variability cannot be reliably identified from the current literature, raising awareness of the problem should be the first step towards improving methodological consistency and reporting.
Keywords: Resin composite; Flexural strength; Inter-study variability; Reproducibility; Bayesian network meta-analysis

HEALING OF PERIAPICAL LESIONS IN PATIENTS WITH ESSENTIAL HYPERTENSION: A ONE- YEAR PROSPECTIVE FOLLOW- UP STUDY

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Abstract Aim: This study evaluated the healing of periapical lesions after root canal treatment in patients diagnosed with essential hypertension. Materials and Methods: A total of 89 patients were divided into two groups: a control group (healthy patients) and a group of patients diagnosed with primary (essential) hypertension. The outcomes of endodontic treatment were assessed at six months (T1) and twelve months (T2) after root canal treatment using periapical radiographs. Follow-up radiographs were compared with baseline radiographs to evaluate lesion healing. Periapical status was assessed using Periapical Indeks (PAI) described by Østavik et al. Results: At the 6-month follow-up, a reduction in PAI compared with baseline was observed in 97.8% of patients with hypertension and 93.2% of patients without hypertension, while no change was recorded in 2.2% and 6.8% of patients, respectively. The difference was not statistically significant (Fisher's exact test, $p = 0.361$). At 12 months, periapical healing (PAI ≤ 2) was achieved in 88.9% of patients with hypertension and 93.2% of those without hypertension; healing was not achieved in 11.1% and 6.8% of patients, respectively. No significant difference was found between the groups ($\chi^2 = 0.501$; $p = 0.479$). Analysis of PAI distribution using the Mann–Whitney U test also showed no significant differences between hypertensive and non-hypertensive patients at 6 months ($p = 0.624$) or 12 months ($p = 0.625$). Conclusion: The results suggest that essential hypertension did not affect periapical healing or delay its progression at either the early follow-up or one year after the completion of endodontic treatment.

Keywords: PAI; hypertension; periapical lesions; root canal treatment; X-ray

STAGED HARD AND SOFT TISSUE RECONSTRUCTION FOR IMPLANT-SUPPORTED PROSTHETIC REHABILITATION IN A PARTIALLY EDENTULOUS MAXILLA: A CASE REPORT

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Abstract Objective: To present a staged surgical and prosthetic approach for managing

failing implants and severe hard and soft tissue deficiencies in the anterior and posterior maxilla. Materials and Methods: A 65-year-old female patient presented following detachment of an implant-supported fixed prosthesis. Examination revealed caries on anterior teeth, three failing implants in the left posterior maxilla, and horizontal bone loss. Initially, failing implants were removed, followed by horizontal ridge augmentation using guided bone regeneration (GBR) with autologous scraped bone, bovine xenograft, and a resorbable magnesium membrane (NOVAMag). After six months, three implants (Nobel Biocare) were placed. Three months later, soft tissue augmentation was performed using the strip technique with a free gingival graft and a porcine-derived collagen matrix (mucoderm). During posterior healing, anterior teeth 12 and 22 were extracted, and immediate implant placement with horizontal GBR was performed. Results: Adequate horizontal bone volume and stable peri-implant soft tissues were achieved. Final prosthetic rehabilitation restored function and esthetics with segmented zirconia FP1 prostheses. Conclusion: A staged regenerative approach using GBR with autologous bone, xenografts, resorbable membranes and soft tissue grafting allows predictable implant placement and esthetic rehabilitation in complex cases with hard and soft tissue deficiencies.

Keywords: Implant rehabilitation; Guided bone regeneration; Soft tissue augmentation

ROOT CANAL TREATMENT THROUGH THE EYES OF ADULT PATIENTS IN CROATIA: KNOWLEDGE, FEAR, AND DECISION-MAKING

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Abstract Aim: This study aimed to evaluate the knowledge and attitudes of adult citizens of Croatia regarding endodontic treatment and factors influencing treatment acceptance. Materials and Methods: A cross-sectional anonymous online survey was conducted among adults in Croatia. The questionnaire included demographic data, knowledge and attitudes toward endodontic treatment, and previous dental experiences. Data were analyzed using descriptive and inferential statistics. Results: Endodontic treatment had been experienced by 37.5% of respondents, while 58.6% of all participants considered it effective for tooth preservation. Pain was the main concern (49.8%). Among those who had undergone treatment, 61.4% reported complete satisfaction. The procedure was most commonly performed by a general dentist (73.9%) and less frequently by an endodontic specialist (18.4%). Conclusions: Endodontic treatment was generally perceived as effective; however, fear of pain remains a significant barrier. High satisfaction among treated participants highlights the importance of patient education and effective communication to improve treatment acceptance.

Keywords: Root canal therapy; Adult population; Patient attitude; Dental fear; Oral health behavior

IRREGULAR TOOTH BRUSHING AND SUBSTANCE CONSUMPTION AMONG CROATIAN SCHOOL CHILDREN

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Abstract Introduction: Irregular tooth brushing and the consumption of alcohol, cigarettes, e-cigarettes, and energy drinks significantly impair both oral and general health. This study aimed to determine the associations between multiple substance consumption and toothbrushing habits among Croatian school children. Materials and Methods: Data were analyzed from the 2022 Croatian sample of the HBSC survey (N=5,337; ages 11, 13, and 15). A multiple consumption variable was created, ranging from "no risk" to "high risk". Statistical analysis involved Pearson's Chi-square tests and multinomial logistic regression. Results: Girls brushed their teeth significantly more often than boys across all age groups ($p < 0.001$). By age 15, 45.3% of boys and 45.9% of girls had been drunk at least once. At age 15, girls smoked cigarettes and e-cigarettes significantly more often than boys ($p = 0.001$). For boys, increased substance use was a significant predictor of irregular brushing. In 11-year-old boys, each increment in substance use was associated with 1.22 times higher odds of brushing less than twice a day. No such association was found for girls. Conclusion: A clear clustering of substance consumption exists among boys who brush their teeth irregularly. Dental offices provide a vital opportunity to screen for and educate youth on the risks of substance use, with special attention to boys with impaired oral health.

Keywords: Oral health; Croatian School Children; Substance consumption; Toothbrushing; Preventive dentistry

RETREATMENT AND REMOVAL OF INSTRUMENT FRAGMENT FROM THE ROOT CANAL: A CASE REPORT

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Abstract One of the common complications during endodontic treatment is instrument separation. This occurrence is challenging for the operator as the fragment makes thorough cleaning of the root canal system difficult or impossible. This case involved a female patient requiring retreatment of tooth 23 as preparation for prosthetic treatment. Radiographic examination revealed a broken hand instrument extending from the coronal third to the apex. The plan was to attempt direct retrieval using ultrasonic instruments. After removal of the composite restoration and gutta-percha, the fragment was visualized. Dentinal walls surrounding the fragment were removed using an ultrasonic tip. After cleaning and widening the canal, the broken file was caught, rotated with forceps, and successfully removed. In the subsequent visit, the root canal was instrumented using ProTaper Gold rotary files, irrigated with 5.25% hypochlorite and 20% EDTA, and obturated with gutta-percha and AH plus sealer using the cold lateral condensation technique. The objective of this case report is to demonstrate successful removal of an instrument fragment to preserve the tooth.
Keywords: retreatment; separated instrument; root canal treatment

ENDODONTIC MANAGEMENT OF ROOT FRACTURE OF MAXILLARY INCISORS: A CASE REPORT

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Abstract Traumatic dental injuries involving root fractures represent a significant challenge, particularly in maxillary incisors. Early diagnosis and appropriate management are essential for tooth preservation. This case report describes a patient who sustained root fractures of teeth 11 and 21 due to direct trauma. Initial emergency treatment involved repositioning and stabilization with a flexible composite wire splint (14 to 24). Two months later, CBCT imaging revealed extensive fracture lines and signs of root resorption. Endodontic treatment was initiated, using calcium hydroxide as an intracanal dressing over five visits to achieve a dry working field and maintain antimicrobial activity. Working length was confirmed radiographically as electronic apex locators were unreliable in this case. Mechanical preparation was performed using the ProTaper Next rotary system. Final obturation was completed using mineral trioxide aggregate (MTA Angelus). Trepanation cavities were restored with GC Gradia Direct composite. The patient was scheduled for long-term follow-up at 3, 6, 12, and 24 months. The aim of this report is to highlight the importance of proper diagnosis, intracanal medication, and the use of modern materials like MTA in the successful management of traumatic root fractures.
Keywords: root fracture; dental trauma; maxillary incisors; endodontic treatment; calcium hydroxide; mineral trioxide aggregate; CBCT

MEASUREMENT OF SERUM AMYLOID A (SAA) IN SALIVA IN PATIENTS WITH CAROTID STENOSIS: A PILOT STUDY

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Abstract The main goal of this study was to determine the presence of serum amyloid A (SAA) in saliva and to examine the connection of SAA levels in saliva regarding levels of SAA in serum. A total of 70 specimens (35 serum, 35 saliva) were collected. SAA was detected in all specimens, but only six patients with asymptomatic stenosis of the inner carotid artery (ICA) were included in the final results. Three were edentulous and three had periodontitis. Measurements were performed at three time points: 1-2 days before eversive carotid endarterectomy (ECEA), two days postoperatively, and one month after the procedure. Enzyme-linked immunoassay (ELISA) was used for measurement. This was the first detection of SAA in saliva in all specimens. There was a statistically significant negative correlation between changes of salivary and serum levels of SAA ($r = –0.976$, $p = 0.004$). A significant time effect was observed for salivary SAA ($p = 0.005$). In conclusion, SAA is detectable in the saliva, and salivary SAA levels do not correlate with serum SAA levels. While further research is required, these results highlight the potential utility of salivary SAA in follow-up assessments, as it appears unaffected by serum SAA levels or general inflammatory status.
Keywords: carotid stenosis; SAA; salivary; saliva

DIFFERENCES IN CEPHALOMETRIC CHARACTERISTICS OF ORTHODONTIC PATIENTS ACCORDING TO OBSTRUCTIVE SLEEP APNEA RISK

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Abstract Introduction: This study aimed to investigate cephalometric characteristics in orthodontic patients at risk for obstructive sleep apnea (OSA). Materials and Methods: A total of 130 subjects aged 8–17 years at the start of orthodontic treatment were included. Standardized diagnostic records were obtained, including lateral cephalometric radiographs analyzed using the Zagreb 82 MOD analysis. Parents completed the Pediatric Sleep Questionnaire (PSQ), with scores ≥7 indicating possible OSA risk. Group differences were analyzed with the independent samples t-test ($p < 0.05$). Results: In the younger group (≤ 13 years), children without OSA risk had significantly higher ANB values compared to those at risk (3.42 ± 3.03° vs. 1.96 ± 2.44°; $p = 0.026$). In the older group (> 13 years), subjects without OSA risk showed significantly higher Wits values compared to those at risk (0.24 ± 4.12 mm vs. –3.91 ± 5.37 mm; $p = 0.046$). Furthermore, the PSQ ≥ 7 group demonstrated significantly greater mandibular angle values (130.86 ± 4.30° vs. 126.27 ± 6.23°; $p = 0.036$), increased maxillary incisor inclination (115.90 ± 8.56° vs. 111.19 ± 10.71°; $p = 0.039$), and greater maxillary incisor protrusion (6.71 ± 2.99 mm vs. 4.00 ± 3.15 mm; $p = 0.028$). Statistically significant differences were also found for overjet ($p = 0.025$) and overbite ($p = 0.011$). Conclusion: Orthodontic patients at risk for OSA exhibit distinct sagittal cephalometric differences and maxillary incisor positions. These findings suggest that cephalometric analysis may play a valuable role in the early identification of patients at increased risk for OSA.
Keywords: obstructive sleep apnea; cephalometrics; orthodontic patients; PSQ; Zagreb 82 MOD