

ARTIFICIAL INTELLIGENCE-ASSISTED DETECTION OF CARIOUS LESIONS ON DENTAL RADIOGRAPHS: PRELIMINARY CLINICAL EVALUATION OF ALLISONE SOFTWARE IN UNDERGRADUATE DENTAL SCHOOL SCENARIO

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Aim: to preliminarily assess the diagnostic performance and clinical utility of Allisone, an artificial intelligence-based software for detecting carious lesions on dental radiographs, in undergraduate Dental School scenario.

Methods: hundred consecutive patients undergoing clinical and radiographic examination were enrolled. Radiographic images were independently assessed by 4 undergraduate students, supervised from two experienced clinician and subsequently analyzed by Allisone. Lesions flagged by the software but not identified at the initial evaluation underwent verification through repeat clinical examination and supplementary radiographs (bitewing and/or periapical) to confirm or exclude disease. False-positive and false-negative findings were also recorded.

Results: AI-assisted analysis identified a mean 22% increase in detected carious lesions compared with the initial clinical-

cal-radiographic assessment. Additional findings were predominantly small lesions located in interproximal areas. All lesions additionally flagged by the software were confirmed on further clinical and/or radiographic evaluation. False positives mainly occurred in the presence of tooth overlap, marked malalignment, and older radiolucent restorative materials, whereas false negatives were chiefly associated with suboptimal image quality and motion artifacts.

Conclusions: Allisone cannot replace clinical judgment; however, it showed potential as an adjunctive diagnostic aid and second-reader tool, particularly for early or difficult-to-detect lesions, also to improve undergraduate perception. Larger prospective studies are needed to validate its diagnostic accuracy and define its role in routine caries detection.

AWARENESS ASSESSMENT OF ORAL HYGIENE STATUS IN FIRST- AND SECOND-YEAR DENTAL SCHOOL STUDENTS: QUESTIONNAIRE-BASED OBSERVATIONAL STUDY

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Aim: to assess the level of awareness and oral hygiene habits in students in the First- and Second-year of the degree course in Dentistry and Dental Prosthetics at Link Campus University, by means of a structured questionnaire.

Methods: a cross-sectional observational survey was conducted by a standardized anonymous questionnaire. The questionnaire collected demographic data (age, sex), behavioral data (oral hygiene habits, frequency and methods of brushing, use of auxiliary devices), lifestyles (smoking, diet) and self-reported clinical indicators (gingival bleeding, use of occupational hygiene). The reasons for purchasing oral hygiene devices and the perception of the general state of health were also investigated.

Results: the results highlight a significant variability in oral hy-

giene habits among students. Although most report daily toothbrush and toothpaste use, less adherence is observed with regular use of interdental instruments. The frequency and duration of brushing are not always in accordance with the recommendations. A non-negligible share of students reports occasional gingival bleeding and an unsystematic use of professional hygiene sessions. The criteria for selecting devices are mainly influenced by economic factors and external advice.

Conclusions: the study highlights a non-uniform level of awareness in first-year students, more uniform in the second-year group, suggesting the need for early and targeted educational interventions within the university curriculum, to improve preventive skills and promote correct oral hygiene behaviors.

SCHOOL-AGE DENTAL PREVENTION PROJECT: INCIDENCE OF ENAMEL DEMINERALIZATION AND CARIOUS LESIONS

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Aim: to evaluate the oral health status of a segment of the pediatric population through a local screening program, analyzing the level of oral hygiene and the incidence of enamel demineralization (the initial loss of enamel minerals representing the first stage of tooth decay) and carious lesions, in order to highlight the importance of early prevention.

Materials: schools within the province of Ancona were contacted. Subjects were invited to undergo free dental examinations at the hospitals of Jesi, Fabriano, Loreto, and Senigallia, and at the “Bonarelli” clinic in Ancona. Out of the total eligible population, approximately 700 subjects were examined.

Results: the screening provided general observations useful for

describing the oral health status of the examined pediatric population. The collected data showed a satisfactory level of oral hygiene, with enamel demineralization present in a small percentage of cases.

Conclusions: the local screening project represents a significant tool for systematic data collection and the early identification of potential risk factors in the pediatric population. The initiative highlights the importance of promoting prevention and oral health education programs starting from early childhood, with the goal of encouraging proper habits and contributing, over time, to reducing the incidence of oral diseases and their related impact on the national healthcare system.

NITROUS OXIDE AND DENTAL HYGIENE: PRELIMINARY RESULTS OF A NATIONWIDE SURVEY AMONG DENTAL HYGIENISTS

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Aim: although inhalation conscious sedation with nitrous oxide (N₂O) may be useful in dental hygiene, the role of dental hygienists in this practice varies across regulatory contexts. In Italy, the administration of N₂O is restricted to dentists, whereas in countries such as the United States and UK, appropriately trained dental hygienists are permitted to administer and monitor inhalation sedation. This study aims to assess the level of knowledge and the educational interest related to inhalation conscious sedation with N₂O among Italian dental hygienists.

Methods: an anonymous 19-item multiple-choice questionnaire was developed and distributed via Google Forms. Participation was restricted to individuals holding a degree in Dental Hygiene.

Results: the preliminary analysis included 388 respondents. The sample had a mean age of 41.1 years. Regarding education, 31.7% of respondents were introduced to the technique during university training and 39.5% reported no knowledge of the N₂O titration procedure. A large majority (89.7%) expressed willingness to attend a training course on conscious sedation. Overall, 36.9% reported using inhalation sedation with N₂O.

Conclusions: according to these preliminary results, dental hygienists recognize inhalation conscious sedation with nitrous oxide as a clinically relevant issue; however, current Italian regulations allow its administration only by dentists.

SALIVARY BIOMARKERS OF AUTISM SPECTRUM DISORDER: A SYSTEMATIC REVIEW OF MULTI-OMICS EVIDENCE

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Aim: the present systematic review aimed to evaluate current evidence on salivary biomarkers for the diagnosis and characterization of autism spectrum disorder (ASD), focusing on their diagnostic accuracy and clinical applicability.

Methods: a systematic search was conducted in Medline, Scopus, and Web of Science using the following MeSH terms and free-text keywords: “autism”, “autism spectrum disorder”, “salivary biomarkers”, “salivary diagnosis”, combined with Boolean operators. Full-text assessment was performed according to predefined inclusion and exclusion criteria. After data extraction, the methodological quality was assessed using the JBI Critical Appraisal Checklist for case-control studies.

Results: after duplicate removal and screening, 30 full-text articles were assessed, and 28 studies were included. Studies showed high heterogeneity in design and biomarkers, includ-

ing microRNAs, proteins, hormones, and immunological markers. MicroRNAs were associated with neurodevelopmental pathways and showed good diagnostic performance (AUC up to 0.87-0.88). Inflammatory markers (IL-6, TNF- α) and cortisol variability showed strong diagnostic potential (AUC $\approx$ 0.89-0.93), while combined biomarker models achieved excellent performance (AUC up to 0.97). According to the JBI critical appraisal, 17 studies were classified as having moderate risk of bias, while the remaining studies showed low risk of bias. However, variability in sample size, analytical methods, and control of confounding factors was observed.

Conclusions: salivary biomarkers represent a promising non-invasive tool for ASD diagnosis, but current evidence is limited by heterogeneity and methodological issues. Further large-scale, standardized studies are needed to validate their clinical utility.

THE IMPACT OF ORAL HABITS AND PARAFUNCTIONS ON DENTAL AND SKELETAL DEVELOPMENT IN PEDIATRIC POPULATIONS: A LITERATURE REVIEW

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Aim: this study aimed to critically review the literature on harmful oral habits and parafunctions in pediatric patients and to assess their impact on dentoskeletal growth and the development of malocclusion traits, particularly anterior open bite, posterior crossbite, increased overjet, and transverse maxillary discrepancies.

Methods: a literature review was conducted using the PubMed database (1990-2024), including articles published in English and Italian using the keyword combination “oral habits AND malocclusion”. Based on title and abstract screening, 23 studies were selected that investigated the association between oral habits or parafunctions and occlusal characteristics in children and adolescents.

Results: digit sucking and prolonged pacifier use were the

most frequently reported habits and showed consistent associations with anterior open bite, posterior crossbite, increased overjet, reduced intercanine and intermolar width, and high-arched palate, with severity related to frequency and duration. Early discontinuation significantly reduced the risk of persistent malocclusion. Parafunctions such as bruxism, dysfunctional swallowing, and oral or oronasal breathing were associated with anterior open bite, increased overjet, Class II and III malocclusions, whereas onychophagia mainly produced localized incisor changes.

Conclusions: available evidence supports the etiological role of harmful oral habits and parafunctions in malocclusions and highlights the need for early diagnosis and a multidisciplinary approach to promote craniofacial development.

ORTHODONTIC TREATMENT OF GROWING PATIENTS WITH OPEN BITE: A SYSTEMATIC REVIEW OF THE LITERATURE

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Aim: the aim of this work is to present a literature review on the treatment of open bite in growing patients.

Methods: a systematic literature review was performed using the MEDLINE database. Keywords included “openbite” (28), “openbite treatment” (24), and “early treatment” (8). After removing duplicates, 45 relevant articles on etiology, diagnosis, treatment, and outcomes were selected.

Results: anterior open bite (AOB) is a vertical malocclusion caused by dental or skeletal factors, often associated with thumb sucking, atypical swallowing, or airway obstruction. Its multifactorial etiology may also include genetic growth patterns and abnormal tongue posture. In growing patients, interceptive functional therapy aims to eliminate harmful habits and guide craniofacial development. Common appliances include

palatal grids, bite blocks, high-pull headgear, Bionator II, and Frankel regulators, which control posterior tooth eruption, promote mandibular rotation, and encourage anterior bite closure. In selected cases, premolar or molar extractions may be used to correct incisor inclination and overbite.

Conclusions: early identification of AOB is essential for effective interceptive treatment and to prevent more complex therapies. AOB may involve anteroposterior and transverse discrepancies. Orthodontic appliances guide eruption, control vertical development, redirect skeletal growth, and promote anterior teeth extrusion, improving outcomes and long-term stability. However, further randomized controlled trials with long-term follow-up are needed to assess long-term outcomes.

CLINICAL EFFECTIVENESS OF ELECTRIC AND MANUAL TOOTHBRUSHING IN ORTHODONTIC PATIENTS: A FIVE-YEAR EVIDENCE SYNTHESIS

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Aim: to evaluate whether the use of an electric toothbrush represents a more effective option than a manual toothbrush in preventing dental plaque accumulation and managing daily oral hygiene in patients undergoing fixed orthodontic treatment, considering the increased cleaning challenges associated with the presence of orthodontic appliances. This study provides a comprehensive five- year literature update on the subject.

Methods: a thorough literature search was conducted on PubMed for the articles published from January 2020 and June 2025. This retrospective review was designed according to the guidelines of the Cochrane Handbook for Systematic Reviews and is reported following the PRISMA guidelines. To evaluate the methodological quality of the included randomized controlled trials, the Risk of Bias 2 (RoB 2) tool was employed.

Results: out of 666 identified articles, four met the inclusion criteria. RoB 2 assessment showed three studies with some concerns and one with low risk of bias. Short-term results indicated that electric toothbrushes significantly improved plaque removal, reduced gingival inflammation, and decreased bleeding on probing compared to manual toothbrushes. However, long-term differences were less consistent.

Conclusions: electric toothbrushes may provide superior short-term plaque control in orthodontic patients, but long-term outcomes depend on multiple factors. Effective oral hygiene is influenced not only by the brushing device but also by patient compliance, education, and regular professional follow-up. Therefore, electric toothbrushes should be considered as part of an individualized preventive approach.

CRANIOFACIAL AND MORPHOLOGICAL PATTERNS OF PEDIATRIC OSA PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Aim: this study aimed to evaluate the association between craniofacial characteristics and the risk of onset and severity of OSA in growing subjects.

Methods: this systematic review was conducted according to PRISMA and Cochrane guidelines, with a protocol registered in the PROSPERO database. A search on PubMed, Web of Science, and Scopus databases was performed without time limits. Eleven observational studies were included, counting over 1000 patients, comparing non-syndromic growing OSA patients confirmed by polysomnography and craniofacial assessment using 2D, 3D, or stereophotogrammetry, with non-OSA controls. Risk of bias was assessed using the ROBINS-I tool. A random-effects meta-analysis was performed to compare ANB angle values between groups, expressing the effect

as the mean difference (MD) with a 95% confidence interval (CI). Heterogeneity was assessed using the I² index.

Results: the statistical analysis showed that patients with OSA showed a tendency toward higher ANB values compared to controls (MD = +1.25°; 95% CI = -0.11–2.32), without statistical significance and with high heterogeneity (I² = 78.3%). Qualitative analysis highlighted a tendency toward mandibular retrognathia, increased mandibular plane inclination, a vertical facial profile, and an inferior position of the hyoid bone in patients with OSA.

Conclusions: growing individuals with OSA show a vertical, retrognathic craniofacial profile with higher ANB angles. This potential risk phenotype may aid early diagnosis and management of pediatric OSA.

MICRO- AND NANO-PLASTICS FROM POLYMER DENTAL RESTORATIVE MATERIALS: SOURCES, RELEASE MECHANISMS AND BIOLOGICAL IMPLICATIONS

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Aim: this narrative review summarizes current evidence on the generation, release, and biological (local and systemic) effects of micro- and nano-plastics (MNPs) from polymer dental restorative materials, especially resin-based composites, CAD/CAM materials, and denture resins.

Methods: evidence from English-language studies investigating polymer-derived MNPs using multiple analytical methods was obtained via an electronic search (PubMed, Scopus, WoS, to April 2026), study selection, and qualitative synthesis.

Results: polymer dental restorative materials release MNPs (~150 nm–100 µm) via mechanical procedures (grinding, polishing, CAD-CAM milling) and chemical-enzymatic degradation (hydrolysis, oxidation, enzymatic activity), as well as (<100 nm) from intraoral wear, with aggregation likely underestimating the nanoparticle burden.

MNPs sized 20–100 µm are clinically relevant and may induce both local and systemic effects, including oxidative stress, inflammation, and tissue dysfunction, thereby potentially promoting a tumor-associated microenvironment.

In addition, MNPs' persistence, high reactivity, and “Trojan horse” behavior enable contaminant adsorption and the release of residual methacrylate monomers (e.g., Bis-GMA, UDMA, TEGDMA), thereby enhancing Bisphenol A-related exposure.

Conclusions: polymer dental restorative materials may represent a clinically relevant source of MNP through clinical use and material degradation, with both local and systemic biological implications, beyond environmental ones, but their identification, quantification, and long-term impact remain limited by analytical challenges.

VARIABILITY IN MIH DIAGNOSTIC CRITERIA AND ITS IMPACT ON PREVALENCE ESTIMATES

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Aim: Molar incisor hypomineralization (MIH) represents one of the most prevalent developmental enamel defects in childhood, with significant implications for oral health and clinical management. The aim of the present study was to evaluate the variability of diagnostic indices used in epidemiological studies on MIH and its impact on prevalence estimates.

Methods: a structured review of the literature was conducted across 3 databases (PubMed, Scopus, and Google Scholar) covering the period from 2015 to 2025. Observational studies reporting MIH prevalence in paediatric populations and specifying diagnostic criteria were included. Data extraction focused on the type of diagnostic index, sample characteristics, and reported prevalence.

Results: a total of 106 studies were included. The European Academy of Paediatric Dentistry (EAPD) criteria were the most frequently applied diagnostic system (approximately 70% of studies), followed by alternative indices, including the modified Developmental Defects of Enamel index (mDDE), Mathu-Maju and Wright, Wetzel and Reckel, MIH-SSS, MIH TNI, and FDI criteria. Substantial variability in prevalence estimates was observed across studies, ranging from 4.5% to 18.2%, depending on the diagnostic criteria adopted.

Conclusions: the heterogeneity of diagnostic indices represents a major limitation in MIH epidemiological research, affecting data comparability. The adoption of standardized MIH-specific criteria, supported by appropriate examiner calibration, is essential to improve consistency and reliability in future studies.

FROM PREVENTION TO SUSTAINABILITY: REDEFINING CARIES MANAGEMENT THROUGH ENVIRONMENTALLY RESPONSIBLE MATERIALS IN THE WHO AMALGAM PHASE-DOWN AND GLOBAL ORAL HEALTH AGENDA

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Aim: oral diseases affect ~3.5 bn people worldwide, with untreated dental caries in permanent teeth impacting ~2.5 bn individuals and an economic burden exceeding USD 710 bn annually. Within the framework of the WHO Global Oral Health Action Plan and the Minamata Convention, this study evaluates the environmental impact of mercury-free dental materials for caries management.

Methods: a life-cycle assessment was applied to compare:

- *preventive interventions:* fluoride varnish, topical fluorides, silver diamine fluoride, fissure sealants; and:
- *restorative interventions:* resin-based composites/comonomers and glass ionomer cements. Outcomes were carbon footprint, cumulative energy demand and environmental release.

Results: preventive interventions showed the lowest impact (fluoride varnish ~3.3-5.5 kg CO₂-eq per application; sealants ~8.6 kg CO₂-eq). Restorative pathways - resin-based composites - demonstrated the highest burden (~14.7 kg CO₂-eq per restoration), up to 8-fold higher energy demand than glass ionomers, and documented release of microplastics/monomers into wastewater systems. At the population level, repeated restorative cycles amplify environmental impact, whereas prevention interrupts this trajectory.

Conclusions: in the WHO amalgam phase-down era, sustainability cannot rely on material substitution alone. The evidence supports a shift from restoration-driven care to prevention-led systems. Prevention is the only scalable strategy to reduce disease burden and environmental impact, requiring integration of sustainability into oral health policy and practice.

ARTIFICIAL INTELLIGENCE AND PALATAL RUGAE: A NARRATIVE REVIEW ON THE EFFECTIVENESS OF BIOMETRIC RECOGNITION SOFTWARE FOR HUMAN IDENTIFICATION

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Aim: human identification in forensic dentistry increasingly utilizes palatal rugae due to their unique, trauma-resistant nature. This study provides a narrative review of Artificial Intelligence (AI) integration in palatal rugoscopy, evaluating its potential to standardize workflows, enhance diagnostic accuracy, and minimize human error through automation.

Methods: a systematic literature search was conducted across PubMed, Web of Science, and Scopus, focusing on machine learning and deep learning algorithms. The analysis prioritized the integration of digital inputs — such as intraoral scans and 3D photography — with segmentation and modeling protocols similar to those used in guided surgery and rapid prototyping to ensure high data fidelity.

Results: from an initial pool of 25 articles, 15 met the inclusion criteria. The findings demonstrate that AI-driven software achieves precision rates exceeding 90% in palatal pattern recognition. High-resolution digital scans, comparable to stereolithographic models, proved essential for reliability. Furthermore, automated processing significantly reduced analysis time relative to traditional analog methods.

Conclusions: AI represents a transformative frontier in biometric identification. Much like computer-aided surgery, the primary benefits include millimetric precision in digital fitting and the efficient management of complex forensic databases. Despite the initial learning curve, adopting these digital technologies is essential for the evolution of forensic medicine and digital dentistry.

DIGITAL INNOVATION IN ORAL HYGIENE: INTRAORAL SCANNERS, PATIENT COMMUNICATION AND TELEDENTISTRY

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Abstract: digital workflows are increasingly relevant for dental hygienists because they improve visual communication, support patient adherence, and enable longitudinal documentation of soft-tissue changes. A literature-guided workflow was therefore structured around intraoral scanning, serial STL acquisition, qualitative and volumetric comparison, and remote follow-up. Recent evidence supports the use of 3D models for accurate recession quantification, peri-implant soft-tissue monitoring, and volumetric assessment after periodontal therapy.

Aim: to define a literature-guided clinical workflow in which intraoral scanning, STL superimposition and teledentistry support patient communication, adherence to preventive care, and longitudinal monitoring of soft-tissue changes in dental hygiene practice.

Methods: clinical workflow, Digital tools, Sample, timing and monitored parameters.

Results: 3D digital models support accurate gingival recession quantification and repeated soft-tissue assessment. Serial STL acquisition improves visual communication and documents changes that may be underestimated in 2D images. Volumetric analysis is particularly relevant after periodontal treatment and in peri-implant soft-tissue monitoring. Teledentistry can extend review pathways through remote sharing, interdisciplinary discussion and adherence-oriented feedback.

Conclusions: intraoral scanning and STL-based superimposition can be integrated into dental hygiene workflows to improve communication, adherence and soft-tissue monitoring.

USAGE OF *LACTOBACILLUS REUTERI* IN THE TREATMENT OF THE PATIENT WITH BLACK STAINS

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Aim: this pilot study aimed to evaluate the effectiveness of an oral probiotic, *Lactobacillus reuteri* DSM 17938 and *L. reuteri* ATCC PTA 5289, to avoid the recurrence of black stains (BS) in children and young adults. The purpose of this work is also to propose an oral hygiene protocol that could hinder or slow down the formation of these pigments.

Methods: twenty patients aged between 8 years and 24 years with extrinsic pigmentations on one or more dental elements and with black lines attributable to chromogenic bacteria were divided into two groups randomly: the first (group I with 10 patients,

test group) received a professional oral hygiene session and a therapy with a probiotic food supply containing *L. reuteri* for a duration of 2 months. The second group (group II with 10 patients, control group) received only a professional oral hygiene session. Data were collected using the Lobene modified index.

Results: the mean Lobene index is lower in the test group compared to the control group after both 1 and 2 months from the beginning of the treatment.

Conclusions: black stain formation could be prevented by administering an *L. reuteri*-based probiotic food supply.

RAPID PALATAL EXPANSION AND RESPIRATORY FUNCTION: A CLINICAL CASE REPORT

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Aim: this study aims to investigate respiratory function and the possible beneficial effects of rapid palatal expansion (RPE) on airway patency through a representative clinical case. RPE acts orthopedically by correcting skeletal and dental deficiencies and may also promote the restoration of physiological nasal breathing, reduce upper airway resistance and improve patient's systemic health.

Methods: the analyzed patient presented with transverse maxillary hypoplasia and was treated with Hyrax rapid palatal expander. Respiratory function was assessed using rhinomanometry to measure nasal resistance and airway patency before and after treatment. The activation protocol consisted of two turns per day for 15 days, followed by a stabilization phase lasting six months.

Results: RPE increased the transverse dimension of the maxilla and positively influenced respiratory function. Rhinomanometry provided objective and reproducible measurements of nasal resistance and therefore represents a useful tool to support functional evaluation of patients with transverse maxillary deficiency.

Conclusions: in the presented clinical case, a reduction in nasal resistance can be observed following therapy with a rapid palatal expander (1.12 vs 0.19 in terms of total resistance). These results indicate that respiratory function can be objectively evaluated using standardized methods such as rhinomanometry, and the parameters obtained are highly relevant for assessing the health of the entire stomatognathic system.

ASSESSING ORTHODONTIC TREATMENT NEED IN ADOLESCENTS: THE ROLE OF SELF-PERCEPTION AND PSYCHOSOCIAL IMPACT

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Aim: to assess the association between clinically evaluated malocclusion severity and adolescents' self-perception, and to determine the agreement between clinician- and patient-rated aesthetic impairment.

Methods: in this cross-sectional study, 160 adolescents aged 12-17 years undergoing first orthodontic evaluation were included. Malocclusion severity was assessed using IOTN-DHC and IOTN-AC. Self-perceived severity, aesthetic impact, and functional impact were recorded using numeric rating scales, while psychosocial impact was assessed with PIDAQ. Correlations, weighted kappa, and multivariable regression analyses were performed.

Results: clinical malocclusion severity was moderately associated with self-perceived severity. Associations were stronger for aesthetic and psychosocial outcomes than for functional complaints. Agreement between clinician- and self-rated aesthetic impairment was fair to moderate, and adolescents generally rated their dental appearance more negatively than clinicians.

Conclusions: clinical severity and self-perception were significantly associated but reflected partly different dimensions of orthodontic treatment need. Integrating normative indices with patient-reported outcomes may provide a more comprehensive and patient-centred assessment of malocclusion.

INTERDISCIPLINARY MANAGEMENT OF ECTODERMAL DYSPLASIA THROUGH ORTHODONTIC AND PROSTHETIC TREATMENT: A CASE REPORT

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Aim: ectodermal dysplasia is a rare inherited disorder affecting ectoderm-derived structures such as teeth, hair, nails, and sweat glands. This case report describes the interdisciplinary management of a pediatric patient treated with combined orthodontic and prosthetic approaches to improve speech, mastication, and facial esthetics.

Materials and methods: hypohidrotic ectodermal dysplasia, the most common form, is often associated with severe oligodontia. A 12-year-old Italian female presented with only ten teeth, including upper canines, central incisors, first permanent molars, one upper second primary molar, one lower primary canine, and the lower permanent canines. Clinical examination showed a wide midline diastema, deep bite, and thin

resorbed alveolar ridges with reduced vestibular depth, especially in the mandible. Panoramic radiography confirmed multiple permanent tooth agenesis. Treatment included limited orthodontic closure of the diastema between teeth 11 and 21 using a sectional fixed appliance with esthetic brackets, followed by a fixed retainer. Oral rehabilitation was completed with conventional full removable prostheses.

Results and conclusions: the combined orthodontic-prosthetic approach improved oral function, facial esthetics, and psychological well-being. When carefully planned, removable dentures are a reliable option for growing patients with ectodermal dysplasia, providing both functional and esthetic benefits.

ORAL HEALTH IN THE REMOTE ARCHIPELAGO OF TUVALU

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Aim: this study examines the oral health crisis in Tuvalu, a Pacific archipelago of 11,000 inhabitants, identifying the geographic, climatic, and socioeconomic determinants of early childhood caries (ECC) and periodontal diseases, and proposing innovative strategies to overcome systemic isolation.

Methods: a narrative review (2000-2025) was conducted, integrating WHO epidemiological data (2022). The analysis focused on nutritional transition, workforce shortages, and the role of digital health in mitigating limited air connectivity.

Results: a critical scenario emerges: about 4.6 dentists per 10,000 inhabitants, with no specialists. Climate change has disrupted local agriculture, driving a shift toward imported, ultra-processed, and cariogenic foods. Geographic isolation

limits access to specialized care, requiring infrequent and costly air transfers to Fiji or Australia.

Conclusions: traditional models are ineffective in remote settings. A shift toward teledentistry and digital health is essential to overcome structural barriers. In this context, AI-based chatbots represent a scalable solution to enhance oral health awareness, support behavioral change, and provide continuous, personalized education in underserved populations. By reducing dependence on physical infrastructure and human resources, these technologies can strengthen prevention strategies and enable earlier intervention. Furthermore, regional airport-based dental hubs may complement digital approaches by improving access to specialized care, contributing to a more integrated and resilient health system.

EVALUATION OF THE NASAL CYCLE IN CHILDREN USING RHINOMANOMETRY

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Aim: to evaluate the nasal cycle in pediatric subjects using rhinomanometry and to describe its characteristics, considering possible orthodontic and respiratory implications.

Methods: ten subjects were examined using a rhinomanometer (Markos NR 4), a device that measures unilateral nasal airway resistance. For each subject, ten recordings were performed over five hours at 30-minute intervals. Measurements were carried out at constant airflow rates (50, 100, and 150 cm³/sec) and at a pressure of 100 Pa.

Results: the two nostrils showed an inverse relationship in re-

sistance, with a cyclic pattern over time. The duration of the nasal cycle could not be clearly determined in all subjects. A high degree of variability was observed both between different subjects and within individual subject over time.

Conclusions: rhinomanometry is a non-invasive and useful tool in orthodontic diagnosis and treatment. Measured values may be altered in the presence of maxillary transverse deficiency. More recent evidence suggests that maxillary constriction is correlated with increased nasal resistance, whereas rapid maxillary expansion may enhance nasal airflow and overall respiratory function.

MULTIDISCIPLINARY EVALUATION OF SLEEP-RELATED BREATHING DISORDERS IN SMITH-MAGENIS SYNDROME: A PILOT CLINICAL STUDY OF 10 PATIENTS

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Aim: Smith-Magenis Syndrome (SMS), caused by a 17p11.2 microdeletion, is a rare multisystem disorder characterized by intellectual disability, distinctive craniofacial morphology, and melatonin-related sleep-wake disturbances. This case-series describes the clinical and dental evaluation of 10 SMS patients and assesses their risk of suffering from obstructive sleep apnea (OSA).

Methods: ten patients (4 males, 6 females; ages 5-32) underwent complete dental and orthodontic examination and OSA-risk assessment using the Pediatric Sleep Questionnaire (PSQ) in children ($n = 7$) and the STOP-BANG questionnaire in adults ($n = 3$).

Results: dental and orthodontic analysis revealed skeletal Class III malocclusion, mandibular prognathism, and anterior open bite in 90% of cases. Ninety percent of patients were also found to be at high risk for OSA. Among children, 6/7 exceeded PSQ thresholds (0.39-0.61); all adults were high risk (STOP-BANG 5-6). One adult patient respiration of being diagnosed with OSA and described undergoing successful OSA management with CPAP despite no improvements in daytime symptoms.

Conclusions: patients with SMS often present with orthodontic abnormalities and high risk of OSA; therefore a multidisciplinary management is needed to provide the best care.

INTEGRATING ORAL CARE INTO PRIMARY HEALTHCARE IN VACCINATION CENTERS

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Aim: oral diseases share modifiable risk factors with major NCDs, including high added sugar intake, poor hygiene, smoking, and sedentary behavior. The WHO recommends cost-effective strategies based on the Common Risk Factor Approach. This project aims to: (i) assess the feasibility and effectiveness of integrating oral health counseling into pediatric vaccination visits for children aged 2-12 months and their caregivers; (ii) evaluate changes in added sugar intake and parental oral hygiene practices; (iii) promote interprofessional education among university students and collaboration among health professionals; and (iv) collect epidemiological data.

Methods: this monocentric prospective cohort study will enroll 400 participants (200 intervention, 200 control) during vaccination visits, with follow-ups at 2, 4, 10, and >12 months.

The intervention group will receive 15-minute counseling sessions on hygiene, diet, teething, and healthcare use, supported by questionnaires. Outcomes include cost, sustainability, sugar intake, hygiene practices, acceptability, and behavioral and educational impact. Analyses will use t-tests, longitudinal ANOVA, and regression models.

Expected results: the intervention group is expected to show reduced added sugar intake, lower consumption of sugary drinks, and improved oral hygiene practices compared to controls, while generating robust epidemiological data.

Conclusions: integrating oral health counseling into vaccination services may be a feasible and scalable strategy to improve early oral health behaviors and address shared risk factors.

ORAL HEALTH IN THE CONTEXT OF GENDER-AFFIRMING CARE: A QUESTIONNAIRE BASED-STUDY

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Aim: oral health arises from complex interactions between individual factors and microbiological control, with increasing evidence highlighting the role of hormonal status in oral homeostasis. Despite this, oral health in gender-affirming contexts remains underexplored, particularly regarding long-term hormone therapies. This study aimed to evaluate the impact of gender-affirming hormone therapy on oral health.

Methods: a cross-sectional observational design was adopted. Data were collected through an anonymous, self-administered validated online questionnaire, approved by the Bioethics Committee of Bologna and distributed nationwide in Italy via a registered association. Eighty adults undergoing hormone therapy were enrolled. Additional domains included oral hygiene habits, access to den-

tal care, and the psychological impact of oral conditions.

Results: approximately 40% of participants reported perceived oral changes following therapy initiation. Preventive behaviors showed suboptimal trends: only one-third regularly used interdental devices, and 30% reported inadequate brushing frequency. Furthermore, 59% attended dental check-ups less than annually, and 62% did not regularly undergo professional oral hygiene sessions. Despite these findings, most participants (90%) reported positive dental experiences, while 6.8% indicated communicative or relational barriers.

Conclusions: these results highlight the need for further research and support the development of inclusive, targeted preventive oral health strategies.

PORPHYROMONAS GINGIVALIS VIRULENCE FACTORS IN ACTIVE PERIODONTAL POCKETS OF PATIENTS WITH STAGE III AND IV PERIODONTITIS AS AN INCREASED RISK FACTOR FOR THE ONSET OF AD: “THE GINGIPAINS”

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Aim: emerging evidence suggests that *Porphyromonas gingivalis* and its cysteine proteases, gingipains, may contribute not only to periodontal tissue destruction but also to neuroinflammation involved in Alzheimer's disease (AD). This study aimed to quantify gingipains in saliva and gingival crevicular fluid (GCF) of periodontitis patients and explore their potential as biomarkers.

Materials and methods: fourteen adults were enrolled: seven with stage III-IV periodontitis and seven healthy controls matched for age, sex, and smoking. Clinical parameters included FMPS, FMBS, probing pocket depth (PPD), and Periodontal Inflamed Surface Area (PISA). Saliva and GCF samples were analyzed by ELISA using monoclonal antibodies against

arginine-specific gingipains (RgpA/RgpB). Statistical analyses included linear regression and Pearson's correlation.

Results: gingipains were undetectable in controls but significantly elevated in periodontitis patients (saliva: 119 pg/mL; GCF: 62 pg/mL; $p < 0.001$). Strong positive correlations were observed between saliva and GCF levels ($R = 0.87$) and with inflammatory indices: FMPS ($R = 0.95$), FMBS ($R = 0.98$), PPD > 5 mm ($R = 0.97$), and PISA ($R = 0.97$; $p < 0.001$).

Conclusions: gingipain detection in oral fluids reflects periodontal inflammatory burden and may represent a biological link between periodontitis and AD. Their quantification could support future longitudinal studies on biomarkers of neurodegeneration.

HYPERSENSITIVITY REACTIONS TO ORAL HYGIENE PRODUCTS: INSIGHTS FROM A SURVEY OF DENTAL HYGIENISTS' CLINICAL OBSERVATIONS

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Aim: chemical home oral hygiene aids, including toothpastes, mouthwashes, tooth mousses, and gels, may contain allergens that could induce hypersensitivity reactions. This cross-sectional study aimed at assessing, through a questionnaire administered to Italian dental hygienists, the frequency of hypersensitivity reactions reported by their patients.

Methods: the questionnaire was distributed using Google Forms via social media and email. The study population included dental hygienists in Italy registered in 2021 ($n = 7,854$), who were asked to report their clinical observations about patients' hypersensitivity reactions to oral hygiene products; the calculated sample size was 367.

Results: 446 responses were collected (374 females, 84%; 72 males, 16%). Most respondents worked in Lombardia (123), fol-

lowed by Veneto (54) and Emilia-Romagna (44). Overall, 58% ($n = 258$) reported hypersensitivity reactions in clinical practice. Chlorhexidine (CHX) accounted for 36% ($n = 177$) of cases, mainly in mouthwash formulation, followed by fluorides (23%; $n = 117$), especially in toothpaste. Adults aged 18-65 years were mostly affected (338 cases, 68%). Most reactions were local, presenting as intraoral lesions; however, 27 cases involved anaphylactic shock. CHX was the main suspected causative agent (40%; $n = 109$ for intraoral lesions and 51%; $n = 14$ for anaphylaxis).

Conclusions: hypersensitivity reactions to chemical home oral hygiene products are not negligible and appeared most frequently associated with CHX-based products. Dental hygienists should be aware of ingredients and the potential hypersensitivity risk for patients.

ACCESS TO FREE IMPLANT-SUPPORTED OVERDENTURE CARE AND ORAL HEALTH-RELATED QUALITY OF LIFE IN SOCIALLY VULNERABLE GERIATRIC PATIENTS: PRELIMINARY FINDINGS FROM SARDINIA

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Aim: to assess oral health-related quality of life (OHRQoL) in socially vulnerable geriatric patients who received free implant-supported overdentures within a regional social dentistry program.

Methods: this cross-sectional study included 46 patients aged 65 years or older rehabilitated with overdentures and re-evaluated after long-term follow-up. Data on medical status, prosthetic history, perceived prosthetic stability, implant loss, and maintenance needs were collected through a structured questionnaire. OHRQoL was assessed using two validated questionnaires, GOHAI and OHIP-EDENT.

Results: mean age was 75 years. GOHAI was 43.07 ± 6.98 , indicating an overall acceptable perception of oral health-related quality of life, although residual functional limitations were still

reported by a relevant proportion of patients. Mean OHIP-EDENT was 25.37 ± 10.66 , suggesting a persisting negative impact on functional, psychological, and social domains. Long-term follow-up also showed substantial maintenance needs: 72% reported prosthetic instability, 59% attended follow-up visits, 78% of them required corrective interventions, and 50% reported loss of at least one implant over time.

Conclusions: in this socially vulnerable geriatric population, access to free implant-supported overdenture care was associated with an overall acceptable OHRQoL after long-term follow-up. However, the persistence of functional limitations, perceived instability, and frequent maintenance needs highlights that equitable access to treatment should be coupled with structured long-term supportive care.

PARENTAL SOCIOECONOMIC PROFILE AS A PREDICTOR OF PEDIATRIC ORAL HEALTH OUTCOMES

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Aim: oral diseases are highly prevalent worldwide and can negatively affect children's well-being and family life. Parental socioeconomic factors, especially education and employment, may influence children's oral health. This study evaluated the association between parental socioeconomic background and oral health-related quality of life in children.

Methods: a cross-sectional study was conducted on healthy children and adolescents aged 0-16 years and their caregivers attending the Dental Clinic of the University of Campania L. Vanvitelli. Parents completed the Italian version of the Early Childhood Oral Health Impact Scale (I-ECOHIS), which measures the impact of oral conditions on children and families. Linear regression analyses assessed associations between ECOHIS scores and parental education and employment, ad-

justing for child age and sex. Statistical significance was set at $p < 0.05$.

Results: paternal unemployment was significantly associated with higher total I-ECOHIS scores ($\beta = 4.004$; 95% CI: 1.531-6.554; $p = 0.002$) and higher child impact scores ($\beta = 3.279$; 95% CI: 1.290-5.268; $p = 0.002$). Higher paternal education was associated with lower total ECOHIS scores ($\beta = -1.388$; 95% CI: -2.562 to -0.214; $p = 0.021$). Higher maternal education was also associated with lower child domain scores ($\beta = -0.972$; 95% CI: -1.909 to -0.034; $p = 0.042$).

Conclusions: lower parental education and paternal unemployment were associated with poorer oral health-related quality of life in children, highlighting the need for preventive strategies targeting vulnerable families.

ASSOCIATION BETWEEN EDUCATIONAL BACKGROUND AND ORAL HYGIENE BEHAVIORS: A CROSS-SECTIONAL STUDY AMONG DENTAL AND NON-DENTAL UNIVERSITY STUDENTS

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Aim: to investigate whether dental students (DS) exhibit different personal oral hygiene habits compared with students enrolled in other degree programs (NDS) across five universities in Milan.

Methods: a cross-sectional study was conducted using an anonymous online questionnaire promoted across universities over five days via QR codes and peer sharing. Self-reported variables including toothbrushing frequency, use of floss/interdental brushes, and smoking status, were collected and used to compute the primary outcome, the "Hygiene Score", an evidence-based metric assigning standardized values to these habits. Inclusion criteria were enrollment at Milan universities; exclusion criteria included incomplete surveys and age >40 years. A sample size of 200 participants was calculated a prio-

ri (80% power). DS vs NDS groups were compared using an independent Student's t-test ($\alpha = 0.05$).

Results: hygiene Scores ranged from 2 to 41 and were approximately normally distributed, with DS values shifted toward higher scores. A statistically significant difference was observed ($p < 0.05$): DS showed a higher mean score (29.70 ± 4.62) than NDS (24.90 ± 4.89). Greater use of interdental aids and longer brushing duration contributed most to this difference.

Conclusions: higher Hygiene Scores in DS group may be largely attributed to academic training, although factors such as baseline interest, family background, and health awareness may also contribute. Longitudinal studies are needed to clarify causality and assess educational interventions promoting preventive behaviors across university programs.

THE ILLUSION OF THE GAP: ACADEMIC RANK, AND BIBLIOMETRIC PERFORMANCE IN ITALIAN DENTISTRY

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Aim: to assess whether a gender gap in bibliometric performance exists among Italian academic dentists and whether age and geographic location influence academic rank across genders.

Methods: 286 Italian dentistry professors (224 men, 62 women; April 2024) were analyzed. Bibliometric indicators (H-index, citations, publications) were compared by gender using t-tests and Mann-Whitney U tests. Age was calculated from date of birth. A multivariable logistic regression included gender, standardized H-index, standardized age, and geographic macro-area (North, Centre, South) as predictors of academic rank.

Results: no significant differences were found between men and women in any bibliometric indicator (all $p > 0.45$; Cohen d

$= 0.05$ - 0.10) or age (58.3 ± 8.9 vs 57.4 ± 8.8 years; $p = 0.47$; $d = 0.10$). In logistic regression (McFadden $R^2 = 0.25$; accuracy = 77.5%), H-index (OR = 3.04; $p < 0.001$) and age (OR = 2.81; $p < 0.001$) were strong independent predictors of full professorship; Central Italy showed higher odds vs North (OR = 3.01; $p = 0.002$). Gender was non-significant (OR = 0.96; $p = 0.91$).

Conclusions: among Italian academic dentists, no gender-based differences in bibliometric performance or age were observed. Women remain underrepresented (21.7%), suggesting that disparities are structural rather than performance-driven. Even after controlling for seniority and research output, gender did not predict academic rank.

COMPARISON OF ORAL HEALTH STATUS IN ITALIAN AND TURKISH ADULT POPULATIONS: A CROSS-SECTIONAL STUDY

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Aim: to evaluate and compare oral health status and related behavioral and lifestyle factors among patients attending dental faculty clinics in Türkiye and Italy.

Methods: this cross-sectional study was conducted at the dental clinics of Ondokuz Mayıs University (Türkiye) and Sapienza University of Rome (Italy). Ethical approval was obtained prior to study initiation. DMFT and Simplified Debris Index (DI-S) were recorded for 822 adults (Türkiye $n = 416$; Italy $n = 406$) through clinical examinations, and sociodemographic, behavioral, and lifestyle data were collected using a questionnaire. Statistical analyses were performed using independent-samples t-tests and one-way ANOVA with Tukey post-hoc tests ($p < 0.05$; SPSS v22.0, Illinois USA).

Results: mean DMFT was significantly higher in Turkish participants compared to Italian participants (9.96 ± 5.25 vs 8.82 ± 4.37 ; $p = 0.001$), whereas DI-S scores were significantly higher in Italian participants (0.843 ± 0.53 vs 0.639 ± 0.45 ; $p < 0.001$). Lower education level and less frequent toothbrushing were associated with higher DMFT and DI-S values in Turkish participants ($p < 0.001$). Participants who had not visited a dentist for a longer period showed higher DI-S scores in Italy ($p < 0.001$).

Conclusions: a significant difference was observed between Turkish and Italian adults in DMFT and DI-S values. Although the study was conducted in a limited population, the findings may be useful for dentists and health authorities in developing oral health policies in both countries.

ASSOCIATION BETWEEN SMALL INTESTINAL BACTERIAL OVERGROWTH, ORAL MICROBIOTA AND EARLY PERIODONTAL INFLAMMATORY MARKERS: A PROSPECTIVE OBSERVATIONAL STUDY

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Background/aim: oral health is closely linked to systemic conditions through the oral–gut axis. Small Intestinal Bacterial Overgrowth (SIBO) is characterized by intestinal dysbiosis, leading to inflammation and metabolic alterations. Evidence suggests that gut microbiota imbalance may influence oral microbial composition and inflammatory status, potentially contributing to early periodontal changes even in clinically healthy individuals. This study aims to evaluate the association between SIBO, oral microbiota, and early inflammatory markers of periodontal disease.

Materials and methods: a prospective observational study based on a PECO model was conducted. Twenty adults (>18 years) undergoing breath testing (BT) were enrolled and divided into SIBO-positive (n = 10) and SIBO-negative (n = 10)

groups, matched for age and sex. All subjects underwent periodontal evaluation (FMPS, FMBS, PPD). Salivary samples were analyzed for cytokines (IL-1 β , IL-6, IL-8, IL-17A, TNF- α) and oral microbiota profiling through 16S rRNA sequencing (MiSeq Illumina). Bioinformatic analyses assessed microbial diversity and group differences.

Results: recruitment is ongoing. SIBO-positive subjects are expected to show a pro-inflammatory salivary profile and altered oral microbiota compared to controls, despite the absence of clinical periodontal disease.

Conclusions: these findings may support a role of gut dysbiosis in early oral inflammation, highlighting the oral-gut axis and suggesting potential biomarkers for preclinical periodontal risk.

SHORT PROLINE-BASED LIPOPEPTIDES AS NOVEL ANTIMICROBIAL AGENTS FOR PREVENTIVE DENTAL APPLICATIONS

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Aim: antimicrobial resistance is one of the world's major health emergencies, partly linked to the inappropriate use of antibiotics, an issue in which dentistry plays a leading role in terms of both responsibility and impact. Antimicrobial peptides (AMPs) are promising alternative to antibiotics due to their rapid membrane-disrupting activity and broad spectrum, but their clinical use is limited by cytotoxicity and poor stability. The study aimed to design ultra-short lipopeptides with improved selectivity, stability and safety for the prevention of dental infections.

Methods: starting from a minimal Arg-Pro-Arg core, a library of lipopeptides was developed through lipidation and structural optimization, varying lipid chain length, number, and linker properties. Compounds were grouped into three series to as-

sess amphiphilic organization. Antimicrobial activity was tested *in vitro* against Gram-positive and Gram-negative bacteria and effects on biofilm viability were evaluated.

Results: lipidation and spatial arrangement of hydrophobic and cationic domains strongly influenced antimicrobial activity. Several compounds displayed broad antimicrobial effects and reduced biofilm viability. The lead compound exhibited high efficacy, good serum stability, and moderate cytotoxicity.

Conclusions: ultra-short lipopeptides are promising candidates for preventive dentistry. Their activity against planktonic and biofilm-associated bacteria supports potential use in mouthwashes, gels, and biomaterials, offering an alternative strategy to conventional antibiotics.

IN VITRO EVALUATION OF AN EXPERIMENTAL GRAPE SEED-BASED REMINERALIZING AGENT ON DEMINERALIZED ENAMEL SURFACES

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Aim: to evaluate the remineralization potential of grape seed-based hydrogels, at different concentrations and with or without fluoride, on artificially demineralized enamel surfaces.

Methods: four galenic hydrogels were prepared: 40% grape seed hydrogel (40U), 40% grape seed hydrogel with 1450 ppm sodium fluoride (40U+F), 50% grape seed hydrogel (50U), and 50% grape seed hydrogel with 1450 ppm sodium fluoride (50U+F). Ten extracted human molars were cleaned, sectioned, artificially demineralized in 0.1 M lactic acid at pH 4.4 for 10 days, and etched with orthophosphoric acid for 30 seconds. Samples were treated daily for 10 days with the assigned hydrogel. Surface morphology and elemental composition were analyzed using scanning electron microscopy and energy-dispersive spectroscopy.

Results: SEM analysis showed different enamel surface patterns among the groups. The 50U samples displayed a well-defined prismatic enamel organization, while 40U+F showed globular amorphous deposits and fewer aprismatic areas. The 50U+F formulation reduced interprismatic spaces, although EDS revealed minimal fluoride incorporation. The 40U group showed the most favorable morphology, with a smoother surface, high density of hydroxyapatite crystals, reduced interprismatic spaces, and a wavy prismatic organization, suggesting enhanced remineralization.

Conclusions: within the limitations of this exploratory *in vitro* study, grape seed-based hydrogels showed promising remineralizing potential on demineralized enamel. The 40% grape seed formulation produced the most favorable results and may represent a customizable galenic platform for preventive dental applications.

A MULTIDIMENSIONAL DIAGNOSTIC FRAMEWORK FOR MASTICATORY DYSFUNCTION: DEVELOPMENT OF A CLINICAL RISK ASSESSMENT MODEL

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Aim: to develop a multidimensional framework for assessing masticatory dysfunction by integrating objective, subjective, and systemic determinants into a single diagnostic model.

Methods: a pilot study was conducted on adults undergoing masticatory function assessment using a standardized checklist. Variables included age, ASA status, prosthetic condition, residual teeth, posterior functional units (FTU), occlusal and periodontal conditions, symptoms, and self-reported function. Objective performance was assessed with the two-color mixing ability test, expressed as Variance of Hue (VoH), indicating bolus homogeneity. Pearson correlation analysis explored associations between VoH and clinical variables. Significant predictors were entered into a multiple linear regression model. Based on these determinants, a radar chart (Masticatory Dysfunction Risk Assessment Radar)

was created to visually represent individual risk profiles.

Results: twenty-one subjects (mean age 53.7 ± 20.1 years) were included. Mean VoH was 0.319 ± 0.176 . VoH showed a negative correlation with FTU ($r = -0.52$) and positive correlations with age ($r = 0.39$) and ASA ($r = 0.35$). The regression model was significant ($F = 4.19$, $p = 0.007$), explaining 76.4% of VoH variability ($R^2 = 0.764$). FTU was the strongest predictor ($p = 0.024$). The radar model enabled simultaneous visualization of determinants, allowing intuitive risk stratification.

Conclusions: masticatory function is a multifactorial process influenced by anatomical, functional, and systemic factors. The proposed framework provides an integrated assessment of dysfunction, supporting risk stratification and personalized treatment planning. This approach may contribute to a more predictive and preventive model in dentistry.

PRACTICAL CAREGIVER MANUAL FOR ORAL HEALTH CARE IN SPECIAL NEEDS PATIENTS: AN EXPERIMENTAL EDUCATIONAL PROJECT

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Aim: oral health in patients with special needs is often compromised by motor, cognitive, or behavioral difficulties. In these cases, the caregiver is the central figure in providing assistance. However, the literature highlights a lack of practical educational tools, leading to caregiver insecurity and increased risk of oral diseases. This project aims to develop an intuitive and accessible manual to support caregivers in daily oral health management, improving prevention and standardizing hygiene techniques.

Methods: a comprehensive literature review was conducted to identify the primary oral health challenges and barriers faced by caregivers. Based on clinical evidence and pedagogical principles, an educational manual was developed. The design focused on simplified iconography, standardized step-by-step procedures, and specific communication strategies tai-

lored for different types of disabilities to ensure high usability and clinical relevance.

Results: the manual, titled “Protect Their Smile”, provides a structured educational pathway adaptable to various levels of disability. The inclusion of visual aids and clear protocols enables caregivers to gain operational confidence, reducing errors and facilitating the early recognition of oral risk signs. The dental hygienist is positioned as the essential educational guide for ensuring continuity of care and professional support.

Conclusions: this manual represents an innovative tool to enhance the quality of life for special needs patients. By establishing a structured bridge between dental hygienists and caregiver associations, the project promotes personalized educational pathways integrated within care systems, emphasizing that oral health is inseparable from general well-being.

ADVANCED POLLEN-BASED NANOPLASMONIC BIOSENSING PLATFORMS FOR SALIVARY TNF- α MONITORING: TOWARD POINT-OF-CARE ORAL DISEASE DIAGNOSTICS

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Aim: saliva is a human biofluid that can be collected non-invasively and analysed for diagnosing and monitoring oral diseases; however, the reliable assessment of inflammatory biomarkers may be challenging, because their concentrations often approach or fall below analytical detection limits. Tumor necrosis factor- α (TNF- α) is a crucial cytokine linked to several oral diseases of both neoplastic and inflammatory origin. This research introduces a pollen-based nanoplasmonic biosensor for a highly sensitive detection of TNF- α in saliva.

Methods: the sensing platform exploits the natural micro- and nano-structure of sunflower pollen covered with a gold nano-film to enhance sensitivity through hybrid plasmonic effects. The antibody-functionalized biosensor detects TNF- α at atto-

molar concentrations, with a limit of detection of 3.4×10^{-19} M and high specificity.

Results: through appropriate sample dilution, this approach broadens the detectable concentration range of the cytokine and extends applicability across concentrations encountered in clinical settings. Salivary samples from a healthy subject and two patients with inflammatory (peri-implantitis) and neoplastic (oral squamous cell carcinoma) diseases showed distinct TNF- α profiles.

Conclusions: these results support the feasibility of pollen-derived nanoplasmonic biosensors as point-of-care devices for non-invasive early detection and monitoring of oral diseases, aligning with the principles of preventive and community medicine.

IMPROVING ACCESS TO CARE AND MANAGEMENT OF VULNERABLE PATIENTS: THE S.O.L.E.I.L. PROJECT

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Aim: the S.O.L.E.I.L. project focuses on promoting social inclusion by increasing knowledge of the rights of individuals with socio-economic vulnerabilities and fostering integrated care for at-risk populations.

Methods: the project organized prevention campaigns and scientific awareness by holding monthly seminars, involving both healthcare professionals and vulnerable patients. It was conducted in collaboration with Combonian Association for Services of Emigrants (ACSE), an NGO that offers dental services through volunteer professionals. The seminars provided training on the recognition and management of oral diseases and offered preventive practices and access to dental services through practical guidance on oral hygiene.

Results: the first seminars were well received by participants,

with many reporting increased knowledge of oral health risks and prevention strategies. Healthcare professionals (n = 12) strengthened their diagnostic and management skills, particularly regarding early detection of potentially malignant lesions and the use of innovative salivary biomarker devices, while patients (n = 11) showed improved understanding of common oral diseases and prevention methods.

Conclusions: the S.O.L.E.I.L. project contributed to improving awareness, early diagnosis, and access to oral healthcare, combining professional training with patient education. As the project is ongoing, an increase in participant numbers is expected over the next 13 scheduled seminars, resulting in a further strengthening of its impact on vulnerable populations.

FROM DATA TO DECISION IN DENTISTRY: DIGITALIZATION, AI, AND TELEMEDICINE SUPPORTING THE HUB & SPOKE NETWORK OF THE UNIVERSITY OF MILANO-BICOCCA DENTAL CLINIC FOR PATIENTS WITH SPECIAL NEEDS

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Aim: the aim of the study is to describe how the transition to digital systems, the adoption of AI tools and the development of telemedicine pathways can support clinical decision-making within a Hub & Spoke dental network, with particular attention to patients with special needs.

Methods: a digital infrastructure was implemented to integrate structured clinical documentation, images and reports, in compliance with data security and protection requirements, and to provide the basis for the use of AI algorithms capable of supporting pattern recognition, risk stratification, and case prioritization. Telemedicine was used for teleconsultation, telerriage, and telemonitoring, while a three-level triage system (green, yellow, red) and standardized PDTA guided patient transitions between the Spoke and Hub; KPIs and audit procedures were defined to monitor processes, near-misses, and outcomes.

Results: digitalization made care delivery more documentable and comparable, reducing reliance on improvisation and enabling better traceability of diagnostic and therapeutic pathways, even in complex cases. The integration of AI and telemedicine facilitated the management of patients with special needs by improving the selection of cases requiring referral to the Hub, reducing inappropriate access, and enabling safe remote follow-up, while keeping final decision-making firmly under the clinician's responsibility.

Conclusions: the transition "from data to decision" requires not only technologies, but also a governance model that considers digitalization, AI, and telemedicine as parts of a single organizational system. In a Hub & Spoke network focused on vulnerable patients, technology should not shift risk toward the periphery, but rather enable it to be shared transparently, traceably, and measurably throughout the entire care pathway.

DRAWING-BASED ASSESSMENT OF A HEALTH PROMOTION INTERVENTION IN PRESCHOOL SETTINGS

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Aim: assessing how pre-school children understand and internalize health-promotion messages is challenging. Our aim was to assess the impact of an oral-health educational intervention for pre-school children, l'Università Va all'Asilo, through the analysis of their drawings, interpreted according to the principles of narrative medicine.

Methods: the project, conducted in Milan between September 2021 and January 2022, involved 5-year-old children attending pre-schools. University students delivered an interactive role-play activity on oral hygiene, healthy diet, and physical activity. At the end of the session, children were invited to draw their experience. Drawings were analyzed using predefined thematic and qualitative indicators, including the presence of positive or negative health elements and graphic fea-

tures such as relative size, color use, spatial placement, orientation, and level of detail.

Results: a total of 806 children participated; 674 drawings were collected, and 490 met the inclusion criteria. Most drawings depicted elements related to diet and oral hygiene, whereas physical activity was less frequently represented. Qualitative analysis revealed symbolic associations between healthy behaviors and healthy teeth, suggesting a meaningful internalization of the educational messages.

Conclusions: these findings indicate that health interventions in pre-school children can be effective and that children's drawings can provide valuable insights into the impact of health-promotion interventions, supporting the relevance of preventive education from early childhood.

EVALUATION OF THE EFFECTIVENESS OF TACTEE DEVICES ON ORAL HYGIENE AND AUTONOMY IN SPECIAL NEEDS PATIENTS

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Aim: TACTEE magnetic devices, designed to facilitate gripping for individuals with motor deficits, represent a potential innovation for special needs patients with reduced prehensile functionality. The primary aim of this study is to evaluate the clinical impact of TACTEE magnetic assistive devices on oral hygiene outcomes and functional autonomy in patients with special needs and impaired manual dexterity.

Methods: a prospective, low-risk interventional study was conducted on five patients with reduced manual skills. At baseline (T0), periodontal indices, standardized photographic records, and microbiological samples (via salivary swab) were collected. Participants were provided with a TACTEE device and instructed on its daily use.

Follow-up assessments were performed at 1 (T1), 3 (T2), and 5 months (T3). Primary endpoints included changes in periodon-

tal indices and bacterial load from T0 to T3. Secondary endpoints comprised autonomy in oral hygiene practices, treatment adherence, quality of life, usability, satisfaction, and psychological impact, assessed through validated questionnaires and qualitative analysis.

Results: the use of TACTEE devices is expected to result in improved periodontal parameters and a reduction in bacterial load. Increased patient autonomy, better adherence to oral hygiene routines, and high satisfaction levels among patients and caregivers are also anticipated, supporting the clinical relevance of assistive technologies in daily care.

Conclusions: TACTEE devices represent a promising strategy in special care dentistry, with the potential to reduce care dependency, improve clinical outcomes, and promote a more inclusive, patient-centered model of oral healthcare.

“PUT A SMILE TO THE TABLE”: A UNIVERSITY THIRD MISSION PROJECT

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Aim: this work reports on the University's Third Mission Project, “Add a Smile to the Table”, addressing head and neck lesions (oncological, traumatic, congenital), that severely compromise masticatory capacity, nutritional balance, and psychological well-being, affecting quality of life. The project establishes an integrated therapeutic pathway involving a multidisciplinary team: dentists, maxillofacial surgeons, oncologists, nutritionists, psychologists, speech therapists and physiotherapists.

Methods: forty patients were included, who completed digital questionnaires (DASS-21, WMQ, IPARLS, MNA, CAQ) at baseline (T0), after removable (T1) and implant-supported prosthetic rehabilitation (T2).

Results: pre-treatment, women were more stressed than men, with no gender differences in cognitive functions or

loneliness. Stress was associated with attention and executive functions. Nutritional vulnerability was present. Significant correlations linked difficulty of chewing hard foods and chewing discomfort to higher levels of depression and anxiety. Post-rehabilitation, some patients showed lower depression and more efficient working memory. A specific correlation emerged between food getting stuck in the prosthesis and WMQ scores. While the majority had severe masticatory limitations at T0, improvement occurred at T1. Implants yielded 6 times greater reduction in chewing discomfort than removable prostheses.

Conclusions: findings highlight the need for integrated, patient-centered care pathway to restore oral function and quality of life through nutritional and psychological support.

ORAL HEALTH AND MIGRANTS: A RETROSPECTIVE STUDY OF SURGICAL NEEDS IN A VOLUNTEER- BASED POPULATION

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Aim: oral health in migrant populations is a sensitive indicator of socio-health disparities and of access to healthcare services. This retrospective observational study outlines the surgical dental needs of patients attending ACSE, a charitable dental clinic and partner of Sapienza University of Rome, in 2024-2025.

Methods: a total of 111 clinical records were reviewed. Recorded demographic and clinical variables included age, sex, the number and type of extractions (urgent vs elective), and conservative treatments. Descriptive analysis was conducted.

Results: a high prevalence of advanced oral pathology was observed: 165 teeth were extracted (mean of 1.5 per patient), accompanied by approximately 220 non-extractive treatments. Extractions predominated (136 emergency *versus* 31

elective), suggesting delayed access to dental care, often caused by pain or infection. Lower molars were most commonly extracted in emergency situations, whereas elective procedures primarily involved third molars. The demographic profile was mainly male (70%) and included young adults aged 18 to 30. Moreover, a longer duration of patients' residence in Italy was associated with a higher need for conservative treatments rather than extractive procedures.

Conclusions: the increased rate of extractions indicates that access delays are primarily due to economic and socio-cultural barriers rather than biological factors, reflecting a reactive healthcare approach. Preventive strategies and more accessible, inclusive health systems are crucial for reducing reliance on invasive treatments in vulnerable groups.

SEDATION AND GENERAL ANESTHESIA IN NON-COOPERATIVE DENTAL PATIENTS: AN ITALIAN CLINICAL EXPERIENCE

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Aim: the aim of the present study was to describe the clinical characteristics, sedation protocols, and short-term outcomes of dental treatments performed under conscious or deep sedation in non-cooperative patients, and to contextualize these findings within the current scientific literature on sedation-assisted dental care.

Methods: we combined a retrospective observational analysis from a single Italian academic center with a narrative review of the literature. Consecutive sedation-assisted dental treatment sessions in non-cooperative patients aged ≥ 6 years were analyzed. Clinical records provided data on patient characteristics, sedation modalities, procedures, treatment completion, and adverse events. Descriptive and exploratory subgroup analyses were performed.

Results: a total of 41 sedation-assisted dental treatment sessions were included, involving both pediatric and adult patients. Non-cooperation was related to neurodevelopmental or intellectual disabilities in 48.8% of cases and to severe dental phobia in 51.2%. Intravenous sedation was the most frequently used modality (46.2%), followed by oral (30.8%) and combined approaches. Benzodiazepine-based oral or intravenous sedation, sometimes combined with low-dose propofol, enabled completion of all planned procedures without major adverse events or conversion to general anesthesia.

Conclusions: an individualized stepped-care model integrating behavioral management, sedation, general anesthesia, and structured preventive recall may optimize access and outcomes within the Italian context and strengthen long-term post-treatment attendance.

ARTIFICIAL INTELLIGENCE IN DENTAL RADIOGRAPHIC ANALYSIS: PERFORMANCE EVALUATION AND CLINICAL INTEGRATION OF DIAGNOSTIC SOFTWARE

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Aim: this study evaluated the diagnostic accuracy and efficiency of an AI-based system (Diagnocat) for panoramic radiograph analysis compared with humans at different training levels.

Methods: fifty anonymized OPTs representing common dental conditions were retrospectively selected and independently assessed by undergraduate students, oral surgery residents and the AI system. An expert-validated reference standard was used for comparison.

Results: primary outcomes included sensitivity, specificity, accuracy and F1-score, while secondary ones involved inter-reader agreement and time efficiency. Undergraduate students showed good performance (sensitivity 0.919, specificity 0.991, accuracy 0.983) but lower sensitivity, indicating more missed findings. The postgraduate residents demonstrated

slightly improved sensitivity (0.925) and high specificity (0.989), reflecting greater clinical experience. Diagnocat achieved the highest performance overall, with sensitivity 0.933, specificity 0.992, accuracy 0.985 and a F1-score of 0.934. It also showed the lowest variability across radiographs and required only 25 seconds per analysis, compared to 181 sec for students and 57.9 sec for residents.

Conclusions: overall, diagnostic performance improved with clinical experience, but the AI system consistently matched or exceeded human results. It provided an optimal balance between sensitivity and specificity, reducing both missed findings and false positives. Additionally, its speed and consistency highlight its potential to enhance diagnostic reliability and efficiency in clinical practice.