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american academy of cariology

9th ANNUAL
AAC CONFERENCE
Sep 25-26, 2025

Buffalo
NY

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POSTER
PRESENTATIONS

SUBMIT YOUR ABSTRACT
DEADLINE: APRIL 30, 2025

NEW AWARDS

AAC - COLGATE
EARLY CAREER FACULTY
TRAVEL AWARD

AAC - ELEVATE ORAL CARE
STUDENT TRAVEL AWARD

AAC - SHOFU
BEST POSTER AWARD

7:30 - 8:00 AM

LIGHT BREAKFAST AND BADGE PICKUP
Grand Aeries Room

8:00 - 8:10 AM

WELCOME ANNOUNCEMENT
Dr. MARCELLE NASCIMENTO, AAC PRESIDENT
Grand Aeries Room

SECTION 1: There is no Health Without Oral Health
Grand Aeries Room

8:10 - 8:40 AM

Salivaomics in Caries and Systemic Disease Detection
DR. DAVID WONG, UNIVERSITY OF CALIFORNIA

8:40 - 9:10 AM

Integrating Caries and Systemic Health Screening into Practice
Dr. JULIE FRANTSVE-HAWLEY, IMPACT HEALTH STRATEGIES

9:10 - 9:40 AM

SECTION DISCUSSION
MODERATORS: DR. BENNETT AMAECHI AND DR. ANCHAL MALIK

9:40 - 10:00 AM

COFFEE BREAK
Grand Aeries Room

SECTION 2: Expanding the Workforce
A Collaborative Approach to Comprehensive Oral Health
Grand Aeries Room

10:00 - 10:30 AM

Unbound and Unleashed: Transforming the Dental Hygienist's Impact on Caries Management
PROF. MARTHA MCCOMAS, UNIVERSITY OF MICHIGAN

10:30 - 11:00 AM

Strengthening Collaborative Care through 100 Million Mouths Campaign
DR. SHENAM TICKU, HARVARD UNIVERSITY

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CONFERENCE VENUE
500 Pearl

HEADQUARTER HOTEL
ALOFT MARRIOTT

Buffalo, NY

11:00 - 11:30 AM

Interprofessional Integration and Early Oral Health Interventions

DR. HUGH SILK, UNIVERSITY OF MASSACHUSETTS

11:30 - 12:00 PM

SECTION DISCUSSION

MODERATORS: DR. BENNETT AMAECHI AND DR. ANCHAL MALIK

12:00 - 1:00 PM

LUNCH BREAK

Forbes Theater

1:00 - 2:00 PM

POSTER PRESENTATIONS

Forbes Theater

SECTION 3: Value-Based Care in Caries Management
The Role of Insurance in Supporting Preventive Services

Grand Aeries Room

2:00 - 2:30 PM

The Shift to Value-Based Care in Dentistry

DR. CHERAG SARKARI, LIBERTY DENTAL

2:30 - 3:00 PM

Data-Driven Advocacy for Expanding Preventive Coverage

DR. ERIC TRANBY, CAREQUEST INSTITUTE

3:00 - 3:30 PM

Building the Future of Value-Based Care: Practical Steps Forward

DR. ELEANOR FLEMING, UNIVERSITY OF MARYLAND

3:30 - 3:45 PM

COFFEE BREAK

Grand Aeries Room

3:45 - 4:30 PM

SECTION DISCUSSION

MODERATORS: DR. CARLOS GONZÁLEZ-CABEZAS AND DR. RICHARD NIEDERMAN

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Discover Buffalo!

Experience the wonder of Niagara Falls

Feel the excitement at a Buffalo Bills game

Enjoy performances at Shea's Theater

PROGRAM
Sep 25, 2025

4:30 - 5:00 PM
Meet the AAC Founders
Dr. MARCELLE NASCIMENTO, AAC PRESIDENT
Grand Aeries Room

5:00 - 7:00 PM
RECEPTION
Exchange Room

PROGRAM
Sep 26, 2025

7:30 - 8:00 AM
LIGHT BREAKFAST
Grand Aeries Room

SECTION 4: Artificial Intelligence in Caries Management
Grand Aeries Room

8:00 - 8:30 AM
Integrating AI in Clinical Workflow for Caries Risk Assessment, Diagnosis and Treatment
DR. JAY SURESHBHAI PATEL, TEMPLE UNIVERSITY

8:30 - 9:00 AM
AI-Powered Caries Prevention Programs: Engaging Patients and Communities
DR. JIN XIAO, UNIVERSITY OF ROCHESTER

9:00 - 9:30 AM
SECTION DISCUSSION
MODERATORS: DR. ADRIANA MANSO AND DR. AMAL NOURELDIN

9:30 - 9:50 AM
COFFEE BREAK
Grand Aeries Room

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PROGRAM
Sep 26, 2025

SECTION 5: Fluoride and Oral Health - Science, Challenges, and Advocacy
Grand Aeries Room

9:50 - 10:20 AM
Evaluating Fluoride Safety and Efficacy
DR. LIVIA TENUTA, UNIVERSITY OF MICHIGAN

10:20 - 10:50 AM
The Impact of Fluoride Removal on Buffalo's Oral Health
DR. ELLYCE CLONAN, UNIVERSITY AT BUFFALO

10:50 - 11:20 AM
Strategies to Combat Fluoride Hesitancy: Engaging Communities and Policymakers
DR. SCOTT TOMAR, UNIVERSITY OF ILLINOIS

11:20 - 12:00 PM
SECTION DISCUSSION
MODERATORS: DR. ADRIANA MANSO AND DR. AMAL NOURELDIN

12:00 - 1:00 PM
LUNCH BREAK
Fuhrmann Room

1:00 - 1:45 PM
BUSINESS MEETING
Grand Aeries Room

1:45 - 2:00 PM
COFFEE BREAK
Grand Aeries Room

2:00 - 3:30 PM
ACADEMIC SYMPOSIUM
Current Challenges in Cariology Education in the USA
Grand Aeries Room

Session 1: Addressing the Challenges of Fluoride Use Amid Misinformation
Invited Panelists: **Dr. Margherita Fontana**
Dr. Scott Tomar
Moderator: **Dr. Apoena Ribeiro**

Session 2: Bridging the Gap Between Didactic and Clinical Education in Cariology
Invited Panelists: **Dr. Marcelle Nascimento**
Dr. Carlos González-Cabezas
Dr. Mark Wolff
Moderator: **Dr. Andréa Ferreira-Zandoná**

#2025-001

Silver Diamine Fluoride Treatment Outcomes in Diverse Patient Demographics: A Retrospective Analysis

*Joseph Yim, Zaher Jabbour, Paula Ortega-Verdugo**

Silver Diamine Fluoride (SDF) is a non-invasive treatment that has demonstrated superior efficacy in arresting caries compared to alternative non-operative methods, yet research has primarily focused on pediatric populations. This study aims to fill this gap by exploring the effectiveness of SDF on adult patients, offering a more thorough assessment of its benefits and potential drawbacks across different age and demographic groups. This retrospective analysis utilized Axium electronic dental records from UCLA School of Dentistry clinics. Inclusion criteria encompassed patients aged 18 to 85 who received SDF treatment from January 2019 to January 2024. Descriptive analysis summarized treatment outcomes and patient characteristics. Bivariate analysis was conducted to explore the relationships between patient characteristics and SDF treatment outcomes. A total of 470 teeth, including incisors, premolars, and molars, were analyzed, and descriptive methods summarized treatment outcomes and patient demographics. Approximately 45.5% of the participants were aged 66-77 years. 39.1 % of the participants were female. Of all participants, 69.4% were self-pay, while 7.9% had Medicaid (DentiCal). Categorical variables were examined using frequency distributions and percentages within the descriptive analysis, with a higher success rate in the youngest adult age group (18-30) compared to the oldest group (75-85). The results of this study highlight the potential of SDF in treating dental carious lesions across various age groups. The treatment demonstrated a success rate of 78.5% when applied biannually. This study reinforces the hypothesis that SDF represents a viable option for caries management for adults, highlighting the need for further exploration of its application across demographics. Continuous evaluation of its long-term effectiveness and patient acceptance is essential. Integrating SDF into standard dental care could enhance preventive strategies and significantly restore oral health throughout an individual's lifespan, making it a valuable addition to dental practices.

#2025-002

Longitudinal Patterns of Salivary Immune Markers in Early Childhood Caries

Nora Alomeir, Xinyue Mao, Tong Tong Wu, Kevin Fiscella, Jin Xiao*

This study aims to assess longitudinal patterns of salivary immune marker levels from birth to two years of life among a cohort of 160 infants and evaluate the association between salivary immune marker levels and the development of early childhood caries (ECC). Infants (n=160) in Upstate New York were enrolled in the study and followed at 7 time points in the first two years of life (1, 2, 4, 6, 12, 18, and 24 months). Stimulated saliva samples were collected, and infants were examined for ECC using the American Academy of Pediatric Dentistry definition of ECC. Levels of 23 immune markers in saliva were measured using a multiplex cytokine Luminex assay. Association between salivary immune markers (converted to natural log for statistical analysis) and ECC incidence was assessed. Univariate and latent class analyses were used to identify distinct salivary immune marker patterns. We observed a high detection rate of immune markers in infants' saliva. Infants with ECC had lower levels of anti-inflammatory marker IL-1ra in early infancy (4 and 6 months) than caries-free children. EGF levels at 2 and 12 months were higher in ECC infants than in caries-free infants (p<0.05). Pro-inflammatory immune markers, including IL-6, IL-9, IL-12 (p40), IL-17a, IP-10, MCP-1, MCP-3, VEGF-A, sCD40L, Eotaxin, FLT-3L, Fractalkine, G-CSF, GROα, IFNγ, IL-1α, and IL-1β, were elevated in infants with ECC in early life compared to caries-free infants, were elevated in infants with ECC in early life compared to caries-free infants. While most markers declined with age as the immune system matured, infants who later developed ECC exhibited persistent differences in immune markers, compared to caries-free children, at several key child developmental stages (2 and 12 months). Our study suggested the predictive and diagnostic potential of salivary immune markers for ECC in early life. Further analysis is warranted to assess the underlying mechanisms linking immune markers and caries risk.

#2025-003

Dental caries and proinflammatory factors in saliva of adult patients with Cystic Fibrosis

Elzbieta Paszynska, Dorota Kopycka-Kedzierawski, Justyna Otulakowska-Skrzynska, Amadeusz Hernik, Hanna Winiarska, Daria Springer, Magdalena Rataj, Magdalena Roszak, Monika Dmitrzak-Weglarz, Szczepan Cofta*

Cystic Fibrosis (CF) is a life-limiting condition reaching 1:2,500 live births and affecting more than 70 000 of relatively young individuals. Recently introduced CF modulators-based therapy, (combination of elexacaftor, tezacaftor and ivacaftor) provides new opportunity for better health outcomes and longer life. The aim of this study was to determine oral health status of adult CF patients, treated with CF modulators (CFTR-T), and with no modulators as CFTR-0 in comparison to the healthy individuals (Ctrl) matched for sex/age. Among total of 52 CF adult outpatients (male n=24/ female n=28, 18-49 y.) 34 were treated with newly introduced CFTR-T therapy. Oral assessments included caries prevalence (Decayed, Missing, Filled teeth DMFT), dental hygiene (Plaque Control Record PCR), bleeding on probing (BOP) and salivary components including mucin 5B, mucin 7, lysozyme, alpha-amylase (ELISA PCR tests). There was statistically significant difference between the CF and Ctrl groups in relation to decayed teeth (respectively median (min-max) 1 (0-12) vs. 0 (0-3) p<0.001, Mann-Whitney U-test) and the mean percentages of sites with dental plaque as PCR% index (respectively 22.5 (0-100) vs. 10 (0-60) p<0.001, Mann-Whitney U-test) and the presence of bleeding on probing BOP% index (respectively 0 (0-39) vs. 0 (0-30) p<0.006, Mann-Whitney U-test). Dental plaque retention was significantly higher in the CFTR-T subgroup (respectively, 31.5 (1-100) vs. 10 (0-60), p<0.001, Mann-Whitney U-test). Significantly higher concentrations of mucins 5b,7 and lysozyme were observed when compared to healthy controls (respectively, 0.9 (0.3-20.9), 2.8 (0.9-12.8), 11.1 (5-31), all p<0.001, Mann-Whitney U-test). In CRTR-T subgroup only lysozyme was increased (8.8 (5-15.5), p<0.001, Mann-Whitney U-test). Adult patients with CF showed higher susceptibility to dental caries and poorer oral hygiene. Poor oral health may sustain proinflammatory status among CF patients as reflected in salivary components composition.

#2025-005

Dental Resin Loaded with ZnO Nanoparticles and Ruthenium Towards Antimicrobial Photodynamic Therapy

*Zahra Abbasiparashkouh, Maria Luisa Leite, Patricia Comeau, Ya Shen, Neil Branda, Adriana Manso**

Evaluate the effects of loading photosensitizers (PSs), zinc oxide nanoparticles (ZnO), and ruthenium (II) complex (Ru) on the chemo-physical properties and antimicrobial photodynamic therapy (aPDT) potential of an experimental dental resin (DR). Ru (0, 0.28, or 0.56 wt%) and/or ZnO (0 or 10 wt%) were loaded (alone or combined) into a DR. Degree of conversion (DC; n = 5), followed by flexural strength (FS) and flexural modulus (FM) at 24 hours and 4 months (n = 12), were tested. Antimicrobial potential was assessed (dark or light, 81 J/cm^2) against dual-species biofilms (S. mutans and C. albicans) on fresh and 4-month aged DR disks (n = 9). Data were statistically analyzed (ANOVA/Tukey; p < 0.05). All groups with PSs showed similar or increased DC compared to the control. Groups containing Ru alone and the 10% ZnO + 0.28% Ru group had a statistically significant DC increase. At 24-hour storage, there was no significant difference in FS between groups. However, FS values increased significantly across all formulations after 4 months. At 4-month storage, FS values were significantly lower than the control for all groups except 0.28% Ru. The highest concentrations combined (10% ZnO + 0.56% Ru) resulted in the lowest FS values. In FM, the 10% ZnO resin showed significantly higher values than the control. For immediate results, antimicrobial effects were observed against S. mutans in ZnO-containing resins under dark conditions. All groups treated with light showed significant reductions in CFU for both species compared to dark controls, except for 10% ZnO against C. albicans. Even after 4 months of aging, significant CFU reductions were detected in groups containing PSs treated with light. These findings highlight sustained antimicrobial properties when PSs are associated with blue light treatment. The study demonstrated that ZnO and/or Ru loaded into a dental resin and combined with blue-light aPDT may represent a feasible approach to achieve long-term antimicrobial properties without compromising physical properties over time.

#2025-006

Treatment Patterns in Adults with Rampant Caries: A Retrospective Study

Manal Al Zahrani*, Justine Kolker, John Warren, Maria Hernandez, Shareef Dabdoub, Ariene Leme Kraus

Rampant caries is a particularly severe and aggressive form of caries characterized by rapid and widespread decay across multiple teeth. The aim of this study was to evaluate treatment patterns and identify factors associated with care completion among adult patients diagnosed with rampant caries at the University of Iowa College of Dentistry and Dental Clinics (UICOD) between 2010 and 2024. This retrospective exploratory study included patients aged 16 years or older who initially presented with at least eight cavitated teeth, including one or more anterior teeth. Patients were classified into six treatment groups: complete dentures (CUCL), one-arch complete denture (OACD), removable partial dentures (RPD), extractions only (EO), restorative care only (REST), and less-than-needed treatment (LTN). Data were extracted from the AxiUm electronic health record system. Bivariate comparisons were performed using Fisher's exact test and the Kruskal-Wallis test with Holm correction. Logistic regression and a Random Forest model were used to identify predictors of treatment completion. Out of 7,227 patients, 56% received less-than-needed treatment. Incomplete care was significantly associated with younger age (16–49 years), Black race, Medicaid or self-pay insurance, fewer teeth remaining at the end of care, and longer time to final treatment. The Random Forest model identified number of teeth at the end of care as the most influential predictor, followed by treatment duration, number of medications, and distance to the clinic. This study highlights critical disparities and care gaps in managing rampant caries. A high rate of incomplete care was observed among patients with rampant caries, particularly among socially and medically vulnerable groups. These findings underscore the importance of targeted strategies to improve treatment completion, including patient education, financial assistance, culturally competent care, and system-level policy reform. Addressing these disparities is essential to improving oral health outcomes in high-risk populations.

#2025-007

Potential of *Streptococcus oligofermentans* as a Targeted Prevention for Dental Caries

Hyunseong Ahn*, Emiri Michishita, Ashely Lowder, Jennifer Diaz Rivera, Chuwen Liu, Hunyong Cho, Kimon Divaris, Di Wu, Apoena Ribeiro

Dental caries ranks as the most prevalent chronic disease in both pediatric and adult populations. While they can be effectively prevented, high costs, a limited number of clinicians, and restricted access to oral health education hinder treatment availability. This study aimed to evaluate *Streptococcus oligofermentans* (So) as a promising probiotic to disrupt the growth, aciduricity, and acidogenicity of the cariogenic bacterium *Streptococcus mutans* (Sm). Metagenomic and meta-transcriptomic profiling of supragingival biofilm samples from 300 children, half of whom had dental caries, was conducted to investigate associations between the oral microbiota and caries development. We identified an inverse relationship between Sm DNA and the RNA/DNA log ratio of So. To further explore this interaction, we employed a discovery–validation framework incorporating in vitro models. Sm (NCTC 10449) and So (LMG 22279) were cultured alone or together, with or without 1% sucrose, to assess growth dynamics and characterize aciduric and acidogenic behavior at 37 °C in 5% CO_2 under both acidic (pH 5.5) and neutral (pH 7.1) conditions. In co-culture, So significantly hindered the growth of Sm. Aciduricity assays revealed that both species could thrive at an initial pH of 5.5, with mean optical densities (OD_{650} nm) of 0.31 ± 0.01 for Sm, 0.23 ± 0.02 for So, and 0.35 ± 0.03 for the Sm–So co-culture. While Sm in mono-culture decreased the medium's pH from 5.5 to 4.6, this acidification was prevented in the presence of So, suggesting a potential inhibitory interaction. *Streptococcus oligofermentans* (So) therefore appears to inhibit the growth, aciduricity, and acidogenicity of *Streptococcus mutans* (Sm). These findings support the need for further research to evaluate the potential of So as a probiotic candidate for caries prevention by selectively suppressing cariogenic bacteria while preserving commensal oral microbiota.

#2025-008

Comparative evaluation of techniques for detecting early occlusal carious lesions

Kerry Hegarty*, Felicity Crombie, LaTonya Kilpatrick, Juliana Gomez, Roger Ellwood

The aim of this study was to compare the performance of ICDAS, Near Infrared Light Transillumination (NILT) with DIAGNOcam™, and the BlueCheck™ caries detection product in identifying occlusal carious lesions in extracted molar and premolar teeth, using histological analysis (polarized light microscopy) as the reference standard. Teeth were assessed for carious lesion presence according to ICDAS criteria, with surfaces scored between code 0 and code 3. White light, DIAGNOcam™, and BlueCheck™ images of the occlusal surfaces were captured; regions of interest for sectioning were marked on the white light images. A total of 48 teeth were included in the study: n = 16 ICDAS code 0, 9 ICDAS code 1, 12 ICDAS code 2, and 11 ICDAS code 3. In most teeth, lesion activity was assessed with histology (24 of 28 were active) and BlueCheck (37 of 48 were active). Activity assessment using histology was not performed on all sections. Comparison of data is reported between ICDAS, DIAGNOcam™, BlueCheck™, and histology. Two-by-two sensitivity/specificity matrices were created for each comparison, showing positive and negative agreement. Key outcomes: Of the 24 active lesions identified by histology, the BlueCheck™ technology identified 23 of these lesions. DIAGNOcam™ and BlueCheck™ performed similarly against ICDAS (76% agreement). Sensitivity of the three techniques against histology (including activity) ranged from 76–96%, with specificities in the range of 41–50%. This study provides insight into the differences in detection methods and their inherent limitations (driven by preparation artifacts, optical factors, and the heterogeneous nature of caries lesions). Future studies will further exploit this protocol to continue exploring and improving the ability to detect active carious lesions.

#2025-009

Turning the Tide on Rampant Caries: Advancing Comprehensive Strategies in Dental Education

Hiromi Saisho*, Marcela Hernandez

Rampant caries remains a significant challenge across young and middle-aged populations, often resulting in tooth loss, diminished quality of life, and reduced self-esteem. The purpose of this project is to present a personalized, minimally invasive, and comprehensive protocol for managing rampant caries developed within the D4 Comprehensive Clinic at the University of Iowa College of Dentistry. The approach emphasizes patient-centered care by integrating disease control, behavioral change, and tooth-preserving restorative techniques. Key strategies include risk assessment, patient education, motivational interviewing, caries risk management, selective carious tissue removal, and the use of adhesive restorative materials aimed at pulp preservation. Multidisciplinary collaboration ensures that both systemic and local factors are addressed. Clinical cases managed by D4 students are presented, supported by photographs, radiographs, and follow-up data at 12 months. The protocol also incorporates dietary counseling, fluoride therapies, and maintenance programs to promote long-term stability. Preliminary outcomes demonstrate improved patient adherence, enhanced caries control, and successful tooth preservation. Students involved in the protocol reported increased confidence in managing complex caries cases using minimally invasive strategies. This project highlights the importance of embedding cariology education into clinical training, emphasizing the value of conservative intervention, early diagnosis, and personalized patient engagement. Our approach shows promise in supporting sustainable oral health outcomes and in shaping a future generation of dentists who view caries management as both a preventive and restorative endeavor.

#2025-011

Microhardness and Antibiofilm Effects of Silver Diamine Fluoride Application Methodologies

Jessica Fuessley*, Erika Araujo, Fang Qian, Robert Bowers

This study aims to evaluate the effects of different SDF application methodologies, including variations in application protocol duration and the use of adjunctive materials, on dentin surface microhardness recovery and biofilm formation. Forty dentin samples (4 × 4 × 3 mm) were sectioned from human premolars. Artificial carious lesions, approximately 100 μm in depth, were created under a demineralization–remineralization solution cycling for 14 days. The samples (n = 4 per group) were assigned to respective groups: dentin control, dentin control with artificial lesion, 30-second SDF, 2-minute SDF, acid etch (A/E) + 30-second SDF, A/E + 2-minute SDF, 30-second SDF + potassium iodide (KI), 2-minute SDF + KI, A/E + 30-second SDF + KI, and A/E + 2-minute SDF + KI. Surface microhardness was measured before and after treatment using a Vickers microhardness tester. Formation of a multispecies cariogenic biofilm (Streptococcus mutans, Lactobacillus acidophilus, and Actinomyces naeslundii) was assessed over 4-, 8-, 12-, and 15-day growth periods. Biofilm assessments were conducted using Live/Dead staining under confocal microscopy and scanning electron microscopy (SEM) following fixation. Data were analyzed using mixed-model ANOVA and post hoc pairwise comparisons ($p < 0.05$). Statistically significant increases in microhardness from pre-treatment to post-treatment were observed in the groups treated with 30-second SDF (8.77 ± 0.99 vs. 11.73 ± 0.82; change: 2.96 ± 0.27 Hv; $p = 0.002$), 2-minute SDF (8.84 ± 1.25 vs. 12.82 ± 0.89; change: 3.99 ± 0.83 Hv; $p = 0.017$), A/E + 30-second SDF (8.75 ± 1.20 vs. 15.26 ± 0.37; change: 6.51 ± 0.97 Hv; $p = 0.007$). All treatment groups had lower live and dead fluorescence measurements compared to controls, with minimal biofilm presence observed under SEM across all incubation periods. While specific methods of SDF application resulted in statistically significant increases in dentin microhardness, the clinical significance of these findings is questionable considering the percentage recovery relative to non-carious dentin. A more substantial benefit of SDF may lie in its inhibition of subsequent dental biofilm formation; however, the use of adjunctive treatments (A/E and KI) and extended SDF application times did not appear to impact biofilm formation.

#2025-012

Targeted Biopolymer Particles: A System for No-Drill Dentistry

Nathan Jones*, Li-Chi Pan, Kai Jones, Brian Clarkson, Wendy Bloembergen, Steven Bloembergen

Minimally invasive, no-drill dentistry relies on early detection and non-surgical management of caries, yet effective treatment and monitoring tools remain limited. This study introduces a targeted biopolymer nanoparticle system designed to enable both remineralization and point-of-care monitoring of early carious lesions. Extracted human teeth with non-cavitated smooth-surface lesions (n = 40) were assessed for lesion porosity/activity using a fluorescent starch nanoparticle formulation (FSP). Teeth with fluorescence-positive lesions were randomized into three groups: (1) negative control (DI water, n = 10), (2) fluoride control (1000 ppm NaF, n = 10), and (3) fluoride-free mineral-loaded starch particles formulated in dissolvable dental strips (FF-MSP, n = 20). Over 20 days, samples underwent daily treatments, storage in artificial saliva with amylase, and lactic acid (pH 5.0) challenges. Lesions were re-assessed with FSP fluorescence and analyzed using micro-computed tomography (MicroCT) for mineral changes at specified depths (0–0.1 mm, 0.1–0.25 mm, 0.25–0.45 mm). FF-MSP–treated lesions showed significantly greater remineralization by MicroCT assessment ($+73.0 \pm 53.5\%$) compared to fluoride ($+2.63 \pm 53.4\%$) and negative ($-21.3 \pm 71.1\%$) controls (ANOVA, $p < 0.05$). Tomography further confirmed substantial mineral recovery in FF-MSP–treated lesions across all depths (0–0.1 mm: $+47.0 \pm 39.3\%$; 0.1–0.25 mm: $+84.2 \pm 53.8\%$; 0.25–0.45 mm: $+77.7 \pm 60.2\%$; ANOVA, $p < 0.05$). FSP fluorescence also decreased markedly after treatment with FF-MSP and fluoride compared to negative control ($74.1 \pm 23.9\%$ and $64.1 \pm 29.4\%$ vs. $-0.2 \pm 20.5\%$; ANOVA, $p < 0.05$). This targeted biopolymer particle system enabled both non-invasive remineralization and lesion activity monitoring in vitro, critical steps toward no-drill management of early caries. These findings support the continued study of biopolymer nanotechnologies to advance minimally invasive dental care and warrant further clinical investigation. Continued development of imaging tools will facilitate clinical use of this no-drill dental system.

#2025-013

Medical-Dental Integration for Children in Foster Care and Adoption to Decrease Caries Risk and Barriers to Dental Care

Yvette Reibel*, Judith Eckerle, Kimara Gustafson, Cyndee Stull

The purpose of this medical-dental integration is to reduce barriers for screening and assessment of oral health, including caries risk, by dental providers. Adoption Medicine is a specialized patient care clinic that provides care for pediatric patients who have unique needs due to their early childhood adverse experiences, unstable housing, transitions in caregivers, institutionalization, neglect, physical, emotional, psychological, and sexual abuse. The goal of this medical-dental integration program was to 1) understand the dental needs of this patient population and 2) provide interventions and education to high risk caries pediatric populations. A dental hygienist was embedded on a medical team of pediatricians, occupational therapists, and mental health providers in a special needs pediatric patient population clinic. The dental hygienist's main role was to complete dental patient reported outcomes regarding their current oral health, complete a caries assessment using the CAMBRA risk assessment instrument, conduct visual exams, perform nutritional counseling, oral health care education, and provide referrals to pediatric dental providers as needed to establish a dental home. During the 12 month pilot program, the dental team provided dental service to 15% of the patients with a mean age of 7.4 years old. Seventy nine percent of the patients reported having medicaid and 20% have no established dental home due to difficulty finding a Medicaid provider within a reasonable distance. The majority of patients were classified as moderate or high risk for caries. Many of the characteristics were related to past experiences and white spot lesions present, current home care and frequency of snacks/sugar containing beverages, special needs, and lack of established dental home.

#2025-014

OCT-Based 6-Month Follow-Up of Marginal Integrity in Class-I Composite Restorations

Maha Salah*, Dina Elsherbini, Eman Albelasy, Hooi Pin Chew

Polymerization stress distributions at the cavosurface margin play a critical role in the marginal integrity of resin composite restorations. This in vivo study evaluated the 6-month performance of two Class I cavity preparation designs. A randomized, single-blind clinical trial was conducted involving 36 patients, each receiving one of two cavity designs (n = 18): a lesion-specific design, either with a 90° cavosurface angle (G1), or a wide bevel along the occlusal margins (G2). All preparations were restored using warmed bulk-fill composite. Six-month OCT B-scans were examined by four calibrated examiners for intact margins (S), enamel microcracks (CR), debonding (DE), ditching (DI), and gap (GA) at the cavosurface margin. The primary outcome measures were the prevalence of S, CR, DE, DI, and GA along the buccolingual, mesiodistal, and combined (full perimeter) cavosurface. These outcome measures were not normally distributed, and the Mann–Whitney test was used to compare them between G1 and G2. For the full perimeter, total defects were statistically significant ($p < 0.05$) between the two groups, G1 (26.5%) and G2 (13%), with the main significance attributed to CR and DE. Their prevalence was 3.8% and 10.9% (CR), and 0.6% and 4.7% (DE) for G1 and G2, respectively. There was no statistical difference for DI (2% vs. 4.4%) and GA (11.7% vs. 7.7%). Along the buccolingual margins, debonding was statistically more frequent in G1 (11.5%) than in G2 (3.7%), while along the mesiodistal margins, microcracks were significantly more prevalent in G1 (4.6%) than in G2 (0.26%). Although the prevalence of the full perimeter gap defect was not statistically different between the two groups, G1 showed significantly more gap defects at the buccolingual margins than G2 (14% vs. 7.3%). Results suggest that Class I composite restorations with a wide cavosurface bevel exhibit fewer marginal microcracks and less debonding after six months, potentially reducing the risk of secondary caries.

#2025-015

Influence of Non-staining Chitosan-based Nanosilver fluoride on Shear Bond Strengths of Restorations

Thais S. Phillips*, Sima Abdollahi, Amos C. Obiefuna, Temitayo Omoniyi, Bennett T. Amaechi

The authors investigated the influence of chitosan-based nanosilver fluoride (CNSF) treatment of tooth tissues on shear bond strength (SBS) of resin composite (RC) and resin-modified glass ionomer (RMGI) restorations. Ninety extracted human molars were collected. The buccal surface of each tooth was flattened until dentin exposure. Specimens were randomly assigned to three groups (n = 30): non-pretreated (NPT), pretreated with either CNSF, or pretreated with SDF. Each group was further subdivided into two restorative subgroups (n = 15): RC and RMGI.Specimens in CNSF and SDF groups were pretreated according to their manufacturers' instructions. Then specimens in all groups were etched, treated with chlorhexidine, and, for RC, additionally treated with adhesive. A cylindrical restoration (2.38 mm diameter × 2 mm height) of RC or RMGI was fabricated with a standardized mold and light-cured on all specimens according to the manufacturers' instructions. After 24-hour storage in water in an incubator at 37 °C, SBS was measured using the Ultradent UltraTester. The peak bond strength (MPa) was recorded upon restoration debonding. Data were analyzed statistically (α = 0.05) using ANOVA/Tukey's comparisons. There was no statistically significant difference in SBS among the RC restorations in the three treatment groups: NPT (17.48 ± 3.96), CNSF (18.38 ± 5.59), SDF (14.03 ± 6.56). For RMGI restorations, SBS was significantly (p < 0.05) higher in NPT (15.99 ± 3.59) compared to CNSF-treated (11.45 ± 5.48), but no significant difference was found between NPT and SDF-treated (14.27 ± 2.17) or between SDF- and CNSF-treated groups. Within NPT and SDF groups, no significant difference in SBS was observed between RC and RMGI; however, within the CNSF group, RC exhibited significantly higher SBS than RMGI. The present study demonstrated that there was no difference in SBS of resin composite or resin-modified glass ionomer restorations when dentin tissue was pretreated with either chitosan-based nanosilver fluoride or silver diamine fluoride.

#2025-016

Bond Strength to Sound and Eroded Dentin After Desensitizer Application

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This study investigated the effect of desensitizing agents on the bond strength of both sound and eroded dentin. Extracted sound premolars had the dentin exposed on the buccal surface and were randomly assigned into sound and eroded groups. Erosion was induced through citric acid cycling (1%, pH = 2.4, 5 min, 3×/day) and specimens were kept in simulated body fluid (SBF) between cycles. All teeth, sound and eroded, received the following desensitizing treatments: (1) No treatment (control), (2) Glutaraldehyde (Gluma), (3) Silver diamine fluoride with potassium iodide (SDF + KI, RivaStar), and (4) Nanohydroxyapatite-based gel (Predicta Bioactive). After desensitizer application, specimens were stored in SBF for 7 days and restored with resin-based composite (Filtek Supreme) using a universal adhesive system (Scotchbond Universal). Microtensile bond strength was tested after 24 hours at a 0.5 mm/min crosshead speed using a universal testing machine (Zwick). Statistical analysis was performed using two-way analysis of variance (ANOVA) and Scheffé's post hoc test for multiple comparisons (α = 0.05). Bond strength was significantly affected by material and tooth condition (p < 0.001), with no significant interaction (p = 0.208). Sound dentin had higher bond strength than eroded dentin (p < 0.001). Regardless of being sound or eroded dentin, control and Gluma groups showed significantly higher bond strength than SDF + KI (p < 0.001). SDF + KI showed the lowest bond strength values. The application of desensitizing agents significantly influenced the immediate bond strength to dentin. Desensitizing treatment with Gluma achieved bond strength similar to control, while application of SDF + KI resulted in the lowest bond strength, especially in eroded dentin. Therefore, understanding the interaction of desensitizing agents with dentin is critical when restoring teeth affected by erosion.

#2025-017

Caregiver's Political Affiliation and Opposition to Topical Fluoride and Water Fluoridation

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Despite long-established public health policies and scientific evidence supporting fluoride as an effective measure against dental caries, opposition to topical fluoride and community water fluoridation (CWF) has increased, driven by political polarization and misinformation. This cross-sectional study aimed to explore the association between caregivers' political affiliation and their opposition to topical fluoride and water fluoridation for their children. This study was conducted at the University of Washington (UW) in collaboration with the University of California Los Angeles, Boston Children's Hospital, University of Iowa, and through social media platforms. Caregivers who spoke English and with at least one child under 18 participated in the study by completing an online questionnaire. The survey included questions about their beliefs regarding CWF (oppose or in favor), topical fluoride (oppose or in favor), political views (conservative, moderate, or liberal), and demographic information. Descriptive, bivariate, and adjusted logistic regression analyses were conducted using RStudio (version 12.1), with a significance level set at p<0.05. Findings suggest that conservative caregivers are more likely to oppose topical fluoride but not CWF. Future studies are needed to identify underlying reasons.

#2025-018

Interdisciplinary Collaboration to Improve Dental Care for Children with Disabilities

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Children with intellectual and developmental disabilities (IDD) face significant barriers to accessing dental care, including limited provider experience and discomfort in treating this population. TeamSmile, a nonprofit that partners oral health providers with professional sports teams, delivers free dental services to underserved communities. In 2025, a new program at TeamSmile events in Buffalo, NY, and Pittsburgh, PA, integrated care for 45 children with IDD, enabling evaluation of interdisciplinary collaboration between dental and occupational therapy (OT) professionals and students. This pilot study used an observational, cross-sectional design to: 1) Assess changes in provider comfort and preparedness in treating children with IDD, 2) Evaluate understanding of interprofessional care models and OT-dental collaboration, and 3) Identify training needs for providers caring for patients with special healthcare needs. Pre- and post-event surveys were administered to 32 participants including dentists/dental students (12.5%), hygienists (21.5%), OT students (53.1%), and OT professionals (9.4%). Surveys captured demographics, experience, comfort, collaboration practices, and familiarity with SBAR communication and the biopsychosocial model. Post-event responses assessed perceived changes in skills and attitudes. Following the event, 88.5% reported expanded hands-on experience in treating or interacting with children with IDD. Comfort levels improved, with 53.9% feeling "much more comfortable." Familiarity with the biopsychosocial model rose to 69.2% (from 59.4%), and 50.1% reported being "very confident" using SBAR. Understanding of OT interventions increased from 46.9% to 65.4%. Most participants (73.1%) observed mutual respect across disciplines, and 84.6% reported improved understanding of team-based care. Two-thirds (65.4%) rated the experience as "extremely valuable" for professional development. This study supports interprofessional, experiential learning as a strategy to improve provider preparedness and collaboration in caring for children with IDD. Community-based outreach events like TeamSmile bridge training gaps and foster collaborative, inclusive care models for underserved populations.

#2025-019

Clinical Pharmacology of 38% SDF in Children to Age 1

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This study was conducted to characterize the pharmacokinetics (PK) of 38% silver diamine fluoride (SDF) in children aged 1–6 years. It was conducted under FDA IND 124808 and IRB approval from WCG IRB. Two single-dose population PK trials with the application of SDF were conducted in participants aged 13 months to 13 years. Thirty-eight percent silver diamine fluoride was applied. The amount of SDF applied was determined by weighing the brush, plastic dappen dish, and SDF once before and once after application. Children were block-randomized to blood sampling time points. At Site 1 (UW), children 13 months to 6 years had two samples obtained: an early time point (2, 4, or 6 hours post-SDF application) and a late time point (7, 14, or 21 days post-SDF application). At Site 2 (UCSF), children 3 to 6 years had one blood sample taken at 2, 4, 6, 24, 48, 96, or 168 hours post-SDF application. Silver is primarily eliminated via biliary excretion, and it would be impractical to collect fecal samples for 2 months or longer to accurately determine silver excretion. Serum fluoride and silver concentrations were determined using a fluoride ion-selective electrode and inductively coupled plasma–mass spectrometry (ICP-MS). After SDF treatment, participant serum fluoride concentrations (<5–36 ng/mL) were similar to previously observed fluoride concentrations in adults following SDF treatment (10–50 ng/mL) and were lower than reported concentrations after fluoride varnish or fluoride gel treatments. Extensive safety data on fluoride exposures in children already exist. In children, the peak silver concentrations (range: 0.5–31.8 ng/mL) overlapped with the range of adult peak concentrations (4-hour adult PK: 3–29 ng/mL; 24-hour adult PK: 0.13–2.2 ng/mL). Silver was eliminated with a half-life of approximately 7.2 days (95% CI: 6.2–8.2 days). None of the silver or fluoride concentrations observed were of clinical or toxicological concern.

#2025-020

Economic burden and regional disparities of dental caries in Chinese children

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This study aimed to conduct a quantitative analysis of the economic burden of dental caries in Chinese children and characterize its regional disparities. This study used data sourced from the 3rd and 4th National Oral Health Surveys, population and economic statistics from the National Bureau of Statistics Yearbook, current medical service pricing regulations issued by local health administrations of each province, municipality and autonomous region of China, and open-access data from the World Bank. Direct economic burden was modeled using the unit cost method with low-cost and high-cost treatment scenarios, while the indirect economic burden was calculated using the human capital approach. Under the low-cost treatment scenario, the direct economic burden of dental caries among 5-year-old children in China was approximately 4.62 billion Chinese Yuan (CNY) in 2005 and 4.63 billion CNY in 2015. Under the high-cost scenario, the direct burden remained around 6.23 billion CNY for both years. The indirect economic burden increased from approximately 1.97 billion CNY in 2005 to 4.44 billion CNY in 2015. Central-western and remote regions exhibited higher per capita direct burdens, while rural children consistently faced higher direct burdens than urban counterparts in most regions. The economic burden of childhood dental caries in China remains substantial with no signs of reduction. Children in central-western, remote, and rural areas disproportionately bear heavier economic burdens.

#2025-021

The more the better? Fluoride in saliva after prescription toothpaste/fluoride rinse

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High-fluoride concentration (prescription) toothpastes have been recommended for patients at increased risk for caries. However, it is unknown if a fluoride rinse used after an over-the-counter (OTC) toothpaste could provide a similar increased intraoral fluoride bioavailability, which could be more affordable. It is also unknown what effect results from combining a prescription toothpaste with a fluoride rinse. This study assessed the effect of rinsing with an OTC fluoride mouthrinse after the use of OTC or prescription toothpastes on salivary fluoride concentration. In a crossover in vivo study consisting of four experimental periods, 20 participants underwent the following treatments: G1: brushed with OTC toothpaste alone (1,100 ppm F), G2: brushed with the OTC toothpaste followed by a 1-minute rinse with an OTC fluoride rinse (226 ppm F), G3: brushed with prescription toothpaste alone (5,000 ppm F), and G4: brushed with the prescription toothpaste followed by the OTC fluoride rinse. Unstimulated saliva was collected for 2 minutes before and at 5, 15, 30, and 60 minutes after the end of the treatments. Fluoride concentration was determined with a fluoride electrode, and the area under the curve (AUC) of salivary fluoride concentration over time was calculated. The highest fluoride bioavailability (AUC, µg F/mL × min) was found in G3 (272.1 ± 199), followed by G4 (238.8 ± 138), G2 (142.2 ± 102), and G1 (60.7 ± 41). All groups differed from each other, except G3 and G4 ($p > 0.05$). Fluoride rinsing after an OTC toothpaste increases intraoral fluoride concentration, but using a prescription toothpaste results in the highest fluoride bioavailability. A fluoride rinse after a prescription toothpaste does not enhance its effect.

#2025-022

Effect of varnishes containing natural compounds on preventing enamel caries lesion formation

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Previous studies demonstrated antimicrobial benefits of varnishes containing the natural compounds tt-farnesol, quercetin, and theobromine. This laboratory study assessed the ability of these varnishes to prevent enamel caries lesion formation using a chemical model to determine whether these natural compounds interfere with de- and remineralization processes in the absence of a cariogenic biofilm. Sixty bovine enamel specimens were selected according to their initial Knoop surface microhardness. The specimens were allocated to the following groups in a random manner (n = 15): NC (negative control): experimental varnish without active compounds, E1: experimental varnish containing tt-farnesol, quercetin, and theobromine at 1.5% each, E2: experimental varnish containing tt-farnesol, quercetin, and theobromine at 4.5% each, and D (Duraphat™): 5% sodium fluoride (gold standard). After applying the varnishes, the specimens remained in artificial saliva for 6 hours. They were then subjected to eight days of pH cycling (4 hours of demineralization and 20 hours of remineralization per day). Surface microhardness was measured again to calculate the percentage of surface hardness loss (%SHL). Three specimens from each group were examined using scanning electron microscopy. Comparisons were made using ANOVA ($p<0.05$). D demonstrated a significantly lower %SHL (75.5 ± 7.9%) than all other groups ($p<0.05$). E1 (86.3 ± 5.3%) was statistically similar to NC (81.8 ± 4.0%) but lower than E2. E2 showed the highest %SHL (91.6 ± 3.6%) compared to the other groups. Surface demineralization was evident in all specimens after pH cycling. The bioactive varnishes containing tt-farnesol, quercetin, and theobromine at concentrations of 1.5% and 4.5% did not exhibit anticaries properties in the absence of a cariogenic biofilm.

#2025-023

Fluoride content in tea: effects of type, brand, and brewing time

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This study investigated how the type, brand, and brewing time affect the fluoride content in tea. A convenience sample of six different types of tea (black, green, oolong, Pu-erh, white, yellow) and three different brands of each type were chosen. The yellow teas were loose, whereas all others came in teabags. Bagged teas were brewed using freshly boiled deionized water (one teabag/200 mL). Yellow teas were prepared using 1 teaspoon of tea/200 mL. One-mL samples were collected after 1, 5, and 10 minutes (teabags were not squeezed). All teas were prepared in triplicate and analyzed in duplicate. A fluoride ion–selective electrode was used in conjunction with an ion-specific meter to determine fluoride concentration of each tea. Data were analyzed using three-way ANOVA with factors for tea type, brand, and brewing time. There was a significant interaction between the three factors ($p < 0.0001$). When comparing tea types, oolong (mean ± standard deviation, 4.08 ± 1.29 ppm) displayed the highest fluoride concentration followed by black (3.83 ± 1.39 ppm), green (2.09 ± 1.37 ppm), white (1.44 ± 1.01 ppm), Pu-erh (0.53 ± 0.21 ppm), and yellow (0.28 ± 0.14 ppm), with only oolong vs. black and green vs. white not being significantly different from one another. When comparing brands within tea types, statistically significant differences in fluoride content were observed for all tea types. For example, fluoride concentrations ranged from 2.93 ± 0.49 ppm to 5.16 ± 1.43 ppm between oolong tea brands and from 0.45 ± 0.12 ppm to 3.46 ppm between green tea brands. While there were no statistically significant differences between brewing times overall (1 min: 1.52 ± 1.34 ppm; 5 min: 2.22 ± 1.88 ppm; 10 min: 2.38 ± 2.04 ppm), fluoride concentrations increased in 15 out of 18 teas with increasing brewing times. For example, fluoride concentrations in oolong brand B increased from 3.44 ± 0.12 ppm (1 min) to 5.48 ± 0.39 ppm (5 min) to 6.56 ± 0.19 ppm (10 min). Fluoride concentrations in tea vary greatly depending not only on the type of tea but also on the brand and the duration of brewing.

#2025-024

Brillouin spectroscopy for analysis of dental enamel

Brecken Blackburn*, Matthew McPheeters, Fabio Rizzante, Steven Burns

A longstanding challenge in preventive dentistry is the accurate detection of carious lesions. If detected during an early stage of development, when the lesion is limited to the dental enamel, there is an opportunity to restore the integrity of the enamel using noninvasive or minimally invasive techniques. However, dental radiography has low sensitivity to caries in this early stage of development. We present work on the use of Brillouin spectroscopy to noninvasively and quantitatively detect early carious lesions. Brillouin spectroscopy is a noninvasive method of using light to detect the local longitudinal modulus of a sample. This modulus is closely related to the microstructural change and demineralization in carious lesions. A handheld Brillouin spectroscopy probe is under development to give dentists a non-damaging and quantitative readout of the local longitudinal modulus. This work is a technology development project and explores the spatial resolution, depth penetration, and demineralization sensitivity of Brillouin spectroscopy in enamel samples. A 532 nm Brillouin spectroscopy system was used to analyze enamel samples. Samples were noninvasively analyzed using the Brillouin spectrometer at varying stages of demineralization. The spatial resolution and depth penetration of the technique were characterized using both engineered phantoms as well as enamel samples. For validation, the mineralization states of the samples were additionally assessed with micro-CT. Statistically significant ($p < 0.05$) and progressive differences were found between enamel samples at sequential stages of demineralization. Brillouin spectroscopy is capable of detecting clinically relevant changes in enamel mineralization in a spatially localized manner.

#2025-025

AI tool for personalized awareness and education, preventive and treatment plans for dental patients

Elham Fawzi*

The current work is a novel AI tool aiming to provide dentists and patients with personalized preventive and dental treatment plans for each patient. It could deliver a clinical report based on a decision-tree flow with immediate results. The suggested work will allow sparing of working hours and speeding up the dental assessment process for the dentist by integrating all data to deliver the best outcome and recommendations for the patient. Research ethics approval was obtained, and data were collected from 500 participants aged 15–18 years. Data included general personal information, socioeconomic, behavioral, dietary, and salivary data. Recording of clinical assessment and diagnosis of different tooth structure defects as well as gingival and periodontal status was done after training four examiners who followed the WHO protocol (1997). The charting was based on the novel Comprehensive Dental Status Index (Elham's Index, 2024), which used specific codes to denote decay, attrition, abrasion, erosion, hypoplasia, hypocalcification, fluorosis, abfraction, missing teeth, as well as fractures, sealants, restorations, veneers, crowns, and implants—including different defects in the same tooth. Integration of gathered data and clinical assessment was then performed, and two paths were followed for developing the AI tool: a machine learning model and the Orange data mining tool. Personalized awareness and education programs were developed for each patient, as well as tailor-made preventive and treatment plans encompassing the emergency phase, disease control phase, restorative phase, and maintenance/recall phase. Another major outcome will be the ability to provide detailed information on materials needed (e.g., fissure sealants, restorative materials) to address and treat each case, along with the time and cost required to execute a comprehensive treatment plan.