The American Academy of Pediatric Dentistry (AAPD) Foundation is dedicated to the advancement of research related to improving children's oral health and the specialty of pediatric dentistry. To fulfill part of this mission, the Foundation supports many research awards, grants, and fellowships. The following research abstracts have been chosen by the AAPD Council on Scientific Affairs subcommittee and will be presented during the 2005 AAPD Annual Session in Orlando on May 29, 2005.

Note: These research abstracts have not been edited by the AAPD editorial staff. The abstracts are published as received from the authors, except for changes in style. Any errors in content are the responsibility of the contributors, not of Pediatric Dentistry, *the journal of the American Academy of Pediatric Dentistry.*

AAPD Graduate Student Research Award Competition Abstracts

The Graduate Student Research Awards (GSRA) competition is comprised of current and recent pediatric dentistry postdoctoral students/residents. Following an application process, up to 8 finalists are chosen to present their research at the Annual Session. The recipient judged to have accomplished the most outstanding research (based on their manuscript and presentation) will receive the Ralph E. McDonald Award. The following are the 2004-05 GSRA recipient abstracts:

Effectiveness of Two Nasal Hoods in Removing Waste Nitrous Oxide. Chrysikopoulou A*, Matheson P, Milles M, Shey Z, Houpt M (UMDNJ-New Jersey Dental School, Newark, NJ)

Purpose: This study compared the effectiveness of two nasal hoods (Porter/Brown and Accutron) in reducing waste nitrous oxide gas during conscious sedation for routine pediatric dental treatment.

Methods: Thirty children, ages 3 to 8 years (mean 5.4 ±1.2 yrs.) participated in this study which was approved by the UMDNJ IRB. Fifteen randomly selected children started with the Porter/Brown mask which was then switched to the Accutron mask, and the remaining children used the reverse order of masks. Four measurements of ambient nitrous oxide were recorded with a Miran 205B Portable Ambient Air Analyzer, five minutes after each of the following: administration of nitrous oxide, placement of the rubber dam, change of the nasal hood, and reduction of the vacuum. Samples were taken 8 inches above the nose of the patient and in the room 5 feet away from the patient.

Results: Nitrous oxide levels were significantly lower *(P<.05)* with the Porter/Brown device (31± 40 ppm for the patient and 8 ± 10 ppm for the room) compared with the Accutron device (375±94 ppm for the patient and 101± 37 ppm for the room). When the suction was reduced, there was an increase in nitrous oxide levels with the Porter/Brown nasal hood (169±112 ppm for the patient and 28±18 ppm for the room), whereas the levels with the Accutron nasal hood remained high (368±107 ppm for the patient and 121±50 ppm for the room).

Conclusions: This study demonstrated that removal of waste nitrous oxide was greater with the Porter/Brown device and that recommended suction levels must be used for optimum effectiveness.

Effects of Chronic Fluoride Exposure on Bone Density of Mice. Dalia A*, Everett E, Dean J, Eckert G (Indiana University School of Dentistry; Riley Children's Hospital; Indiana University Purdue University Indianapolis, Indianapolis, IN;)

Research supported by NIH / NIDCR 5R01DE014853-02

Purpose: Ingestion of large doses of fluoride may lead to adverse systemic effects, and may be based on genetic susceptibility. The purpose of this study is to determine fluoride's effect on bone density of mice based on genetic strain, gender, and dose of fluoride ingested in order to help future research explain why responses to fluoride ingestion may vary between individuals.

Methods: Four strains (A/J, 129P3J, C3H/HeJ, C57BL/6J) were examined. In total 256 mice were used. Strains were selected based on previous studies with disparate dental fluorosis susceptibilities and normal bone densities. Each strain was randomly divided into groups of 8 males and 8 females, and given different concentrations of fluoride in drinking water (0, 25, 50, and 100 ppm) over 60 days, beginning at weaning. The mice were euthanized and the skeletons harvested. Total axial skeleton, femur and lumbar spine densities were measured using the PIXImus bone densitometer.

Results: The data was analyzed using a 3-way ANOVA. The following relationship for bone density was found: C3H/HeJ > 129P3/J > C57BL/6J and A/J. Fluoride level comparisons showed statistical significant differences in C3H/HeJ in axial skeleton density between 0ppm and 100 pm (P<.0001 for females); and 25ppm versus 100ppm (P=.0019 for males). Smaller differences were noted between

* Denotes lead author.

0 and 50ppm; and 50 and 100ppm. Gender relationships showed differing responses within each strain in both total axial bone density and femoral bone density.

Conclusions: Fluoride's effect on bone density is based on gender, genetic susceptibility, and dose of fluoride ingested.

The Safety and Efficacy of an Oral Transmucosal Fentanyl Citrate/Hydroxyzine Pamoate Regimen. Gormley H*, Briskie D, Ignelzi M, Majewski R, Reynolds P (University of Michigan, Ann Arbor, MI; Mott Children's Health Center, Flint, MI)

Research supported by OMNII Pharmaceuticals, Mott Children's Health Center, and the University of Michigan School of Dentistry

Purpose: The purpose was to compare the safety and efficacy of an oral transmucosal fentanyl citrate (OTFC)/ hydroxyzine pamoate regimen with a placebo lozenge/hydroxyzine pamoate regimen for the sedation of uncooperative pediatric dental patients.

Methods: Uncooperative pediatric dental patients (age 42-60 months) were treated with either a 10-15 μg/kg OTFC/ 2 mg/kg hydroxyzine pamoate or a placebo lozenge/ 2 mg/kg hydroxyzine pamoate regimen in a double blind, randomized, crossover design study. Patients were monitored with a pulse oximeter, blood pressure cuff, and capnographer. Throughout both appointments trained raters assessed behavior using a modified Houpt Behavior Scale. A modified Vancouver Recovery Scale was used to assess recovery quality and time to discharge.

Results: Thirty-three patients completed both the first and second sedation appointments. There were no clinically significant differences in respiratory rate, heart rate, blood pressure, and oxygen saturation between the OTFC/hydroxyzine pamoate and placebo/hydroxyzine pamoate groups. Adverse effects, including respiratory depression and vomiting, were minimal and clinically manageable. The percentage of patients with disruptive crying was significantly lower in the OTFC/hydroxyzine pamoate group than in the placebo/hydroxyzine pamoate group (58% vs. 30%, respectively) (*P*=.035). The mean sleep ratings (*P*=.026), crying ratings (P=.017), and overall behavior ratings (*P*=.003) were significantly lower (indicating better behavior) in the OTFC/ hydroxyzine pamoate group. Recovery time was less than 10 minutes for both the OTFC/hydroxyzine pamoate and placebo/hydroxyzine pamoate groups.

Conclusions: The addition of 10-15μg/kg OTFC to 2 mg/kg hydroxyzine pamoate significantly improved patient cooperation but did not compromise safety.

Mechanisms of Sanguinarine Induced Carcinogenicity in Human Oral Mucosa. Karp JM*, Rodrigo KA, Pei P, Pavlick MD, Andersen JD, McTigue DJ, Fields HW, Mallery SR (The Ohio State University College of Dentistry, Sections of Pediatric Dentistry, Orthodontics, and Oral Maxillofacial Surgery, Pathology, and Anesthesia, Columbus, OH; The Ohio State University Comprehensive Cancer Center, Columbus, OH; Columbus Children's Hospital, Columbus, OH)

Research was supported by NIDCR PO1 DE12183, NCI RO1 CA95901 and NCI P30 CA16058. The aforementioned research presenter was supported by the American Cancer Society Ohio Division Postdoctoral Research Fellowship Program

Purpose: Sanguinaria canadensis extract, an active ingredient in many herbal oral health formulations, displays anti-inflammatory and anti-plaque properties supporting its use in treating plaque-induced gingivitis in children and adults. Clinical studies have implicated its active metabolite, sanguinarine, as a procarcinogen in human oral mucosa after prolonged exposure in susceptible individuals. This study's purpose was to elucidate sanguinarine's molecular mechanisms of action in human oral mucosa and its potential for initiating carcinogenesis.

Methods: Sanguinarine was hypothesized on the basis of its structural resemblance to tobacco-associated carcinogens (TAC) to utilize similar pathways of carcinogen metabolism in human oral mucosa. Carcinogen metabolism of TACs uses the aryl hydrocarbon receptor (AhR), its signaling pathway, and the nuclear regulation of Phase I (bioactivation) and Phase II (detoxification) enzymes. In vitro, electromobility shift assays and polymerase chain reactions were conducted on human oral squamous cell carcinoma cells to elucidate sanguinarine metabolism. Competitive inhibition of TAC-associated Phase I activity by sanguinarine was evaluated in healthy oral mucosal explants using high performance liquid chromatography.

Results: Sanguinarine elicited comparable AhR signaling to the standard AhR ligand, TCDD. A 10-fold molar excess of sanguinarine inhibited oral mucosal TAC metabolism ($p<0.010$,Yates-corrected Chi square test where <0.017 is significant).

Conclusions: Sanguinarine activates the AhR signaling complex, induces Phase I and II enzymes, and competitively inhibits TAC-associated Phase I activity. Individuals expressing an upregulation of Phase I bioactivating enzymes are at greater risk for sanguinarine-associated carcinogenesis. We conclude that removal of sanguinarine from human oral care products is the prudent course of action.

A Retrospective Study of Vitapex Pulpectomy Treatment in Primary Teeth. Ko H* Makhija S, Dasanayake A, Jackson J, Thornton J, Eleazer P, Rahemtulla F, Ruby J (The University of Alabama at Birmingham, Birmingham, AL; New York University, New York, NY)

Purpose: This retrospective study evaluated the clinical and radiographic success of Vitapex pulpectomy in primary teeth.

Methods: Dental records of patients who received Vitapex pulpectomy from 2000 to 2004 were reviewed and

* Denotes lead author.

demographic data were extracted. Vitapex pulpectomy used the following protocol: debride pulp tissue without mechanical enlargement of the root canals using a 5.25% sodium hypochlorite irrigant; dry pulp canals and chamber with sterile paper points and cotton pellets; insert Vitapex into the canal(s) and cover the pulp chamber floor of posterior teeth; place zinc oxide eugenol over the Vitapex and restore the tooth with a stainless steel crown. Follow-up examinations of treated primary teeth were evaluated clinically and radiographically. Survival analysis was used for determining survival probability of the treated teeth.

Results: A total of 68 treated teeth (23 anterior teeth, 45 posterior teeth) were available for post-operative clinical examinations and 56 teeth (16 anterior teeth, 40 posterior teeth) for post-operative radiographic examinations. The clinical success was 99%, with 100% in anterior teeth and 98% in posterior teeth. The radiographic success was 95%, with 88% in anterior teeth and 98% in posterior teeth. The mean survival time based on radiographic evaluations was 40 months (probability of survival after 33 months was 0.81).

Conclusions: The clinical and radiographic treatment outcomes of Vitapex pulpectomy indicate that this treatment is effective in the management of bacterial infections of primary teeth, and may be considered as an alternative treatment for pulpotomy in anterior primary teeth.

Educating Dentists to Recognize and Respond to Domestic Violence. Kwon-Hsieh NK*, Herzig K, Danley D, Gansky S, Gerbert B (University of California San Francisco, School of Dentistry, Division of Behavioral Sciences, San Francisco, CA)

Research supported by the National Institute of Dental and Craniofacial Research grant #P60 DE 13058

Purpose: Witnessing marital violence is a risk factor for children to willingly use violence themselves. Pediatric dentists have a unique opportunity to address the problem of domestic violence. Our goal was to test the effectiveness of a brief, interactive, multimedia tutorial, designed to educate dentists to identify and respond to domestic violence (DV), through the AVDR (Ask, Validate, Document, Refer) Model. With 50% of child abuse signs appearing in the head and neck region, pediatric dentists can utilize the AVDR approach with their patients and families.

Methods: To help dentists learn the AVDR model, we created a brief, interactive, multimedia tutorial. Next, we developed an instrument that included a series of 24 questions, to assess the participant's knowledge, attitudes, and practice behaviors related to DV. Finally, we conducted two randomized, controlled trials: one with dental students (n=161), one with dentists (n=174), in which the intervention groups took the tutorial and the control groups did not.

Results: Experimental groups in both trials demonstrated significantly greater improvement in scores on most items, including knowledge, attitudes, and behaviors, relative to control subjects (Bonferroni *P*-values all < .005 for dental students; all <.001 for dentists).

Conclusions: Dentists were introduced to simple intervention strategies that enable them to respond to domestic violence in their clinical practices. The domestic violence tutorial is equally effective in helping dental students and dentists learn how to identify and help patients who are victims of abuse. We believe our tutorial could be disseminated to help dentists and their patients across the country.

Caries Rates Among Developmentally Disabled Patients. Lucas LD*, Gilbaugh GJ, Vargas KG, Kanellis MJ (The University of Iowa College of Dentistry, Department of Pediatric Dentistry, Iowa City, IA)

Purpose: To determine if the dental caries rate is higher in developmentally disabled patients that live at home or among those living in group settings.

Methods: After IRB approval was obtained, charts for developmentally disabled patients were reviewed retrospectively. Patients were seen over a three month period by graduate students at the Center for Disabilities and Development Dental Clinic at the University of Iowa Hospitals and Clinics. Patients 14 years and older were included to ensure permanent dentition. The following variables were recorded for each patient: name, sex, date of birth, place of residence, number of decayed, missing and filled teeth. The data was analyzed using SAS computer software.

Results: 89 subjects aged 14 and older were identified. From this group 43 were living at home and 46 were living in a group home. Based on the nonparametric Wilcoxon rank-sum test the data showed there was no significant difference in numbers of decayed, missing or filled teeth between subjects living at home and in a group home, with the *P*-values=.5327,.3624,.1614.

Conclusions: When developmentally disabled patients obtain modern preventive and restorative pediatric dental care, the historically recognized difference in decayed, missing, and filled rates between at-home and group-home patient populations is no longer seen.

Pediatric Medical Residents' Oral Health Education: Effects on Caregivers' Knowledge and Behavior. Rossitch MA*, Quiñonez RB, Rozier RG, Sagerman PJ, Vann WF (University of North Carolina, Chapel Hill, NC; Wake Forest University, Winston-Salem, NC)

Research supported by Maternal and Child Health Bureau (MCH Grant # 5 T17 MC 00015-12 0), the AAPD Foundation and OMNII Oral Pharmaceuticals through the OMNII Graduate Research Fellowship Program

Purpose: To evaluate changes in caregiver dental knowledge and reported behaviors following an oral health educational curricular intervention for pediatric medical residents at the University of North Carolina at Chapel Hill (UNC-CH).

* Denotes lead author.

Methods: The educational intervention included a didactic and clinical-based overview of children's oral health curriculum conducted by faculty and residents in the Department of Pediatric Dentistry. We relied upon an untreated control group design using pre- and post-intervention samples over a 12-month period. The experimental and control sites were the Pediatric Continuity Care Clinic at UNC-CH and the Pediatric and Adolescent Medicine clinic at Wake Forest University (WFU) Schools of Medicine, respectively. Both clinics served primarily low-income populations staffed by pediatric medical residents. Structured interviews of parents with children ranging from 9-60 months, conducted by fluently bilingual calibrated interviewers, were used to assess caregiver knowledge and behavior at both sites.

Results: A total of 493 parent-child dyads met the inclusion criteria for the pre- and post-intervention groups combined. Following the intervention, the mean caregiver knowledge and behavior scores at UNC increased from 71% to 74% and 75% to 76% respectively. The mean caregiver knowledge and behavior score at WFU decreased from 69% to 63% and 68% to 52%, respectively. The post-intervention group scored significantly higher in knowledge (P<.001) and behavior (P<.001) versus the control group.

Conclusions: Under the conditions of this educational intervention for pediatric medical residents, there were positive and statistically significant changes in caregivers' oral health knowledge and reported behavior scores.

AAPD Foundation Research Award Competition Abstracts

The AAPD Foundation Research Award (FRA) competition is comprised of clinicians, researchers, and academicians in pediatric dentistry. Following an application process, up to 4 recipients are chosen to present their research at the Annual Session. The recipient judged to have accomplished the most outstanding research (based on their manuscript and presentation) will receive an overall award. The following are the 2004-05 recipient abstracts:

Infant Oral Health Education for Pediatric and Family Practice Residents. Douglass JM*, Douglass AB, Silk HJ (University of Connecticut School of Dental Medicine, Farmington, CT; Middlesex Hospital Family Practice Program, Middletown, CT; University of Connecticut School of Medicine, Farmington, CT)

Research supported by the Connecticut Health Foundation and Children's Fund of Connecticut

Purpose: This study investigated whether an infant oral health curriculum implemented in pediatric and family practice residency programs could increase physician's oral health knowledge and promote the age one dental visit.

Methods: Residents and faculty completed a baseline current practices survey and knowledge test before receiving a one- or two-hour training session followed by a knowledge post-test. Existing well child care forms were updated with oral health prompts to reinforce newly learned skills. At one year of follow-up (1yr FU), participants completed a current practices survey and knowledge test. In addition to the residency programs, medical students and advanced practice registered nurses participated in baseline data collection, training and immediate post-test data collection.

Results: A total of 245 people participated with 78% trained in person and 22% trained via the web. Of these, 120 were the targeted residents and faculty of whom 82% completed 1yr FU. Practice behaviors improved from baseline to 1yr FU with only 28% of practitioners at baseline referring children to the dentist at age one compared to 73% at 1yr FU ($P<.05$). Knowledge scores were greater at 1yr FU than at baseline ($P<.05$) and the mode of training showed no difference in knowledge outcomes. Knowledge and prescribing practices regarding fluoride were poor at baseline and showed limited improvement at 1yr FU.

Conclusions: An infant oral health education program can improve physicians practice behaviors and knowledge with web based training having similar success to in person training. However, behavior changes regarding fluoride prescribing appear harder to achieve.

Indirect Pulp Treatment in Young Permanent Molars: A Randomized Study. Silva DR* (University of Florida, College of Dentistry, Gainesville, FL), Straffon LH (University of Michigan, Ann Arbor, MI), Feigal RJ (University of Minnesota, Minneapolis, MN), Amaral DC (School of Dentistry of Anapolis, Brazil)

Purpose: To evaluate the effectiveness of indirect pulp treatment (IPT) on young permanent molars with deep carious lesions using two dentin-liner systems.

Methods: Twenty-five children aged 6-12 years with at least one permanent molar with radiographically deep carious lesion, absence of spontaneous pain or swelling were selected to the study. After partially removal of the necrotic and demineralized dentin, a layer of calcium hydroxide or resin modified glass ionomer randomly covered the dentin and a final resin-based restoration was placed. Teeth were followed up clinically and radiographically for 6, 12 and 24 months. To assess the decrease on the size of the remaining carious dentin zone, radiographs were digitized and graphically analyzed using two softwares: AdobePhotshop and Image-Pro Plus. All images were measured 6-10 times and blinded evaluated for the liner material used.

Results: Thirty-six young permanent molars received IPT and 35 were followed 9 to 12 months. Of those, only

* Denotes lead author.

2 molars failed (5.7%), with a 95% confidence interval of 0.68%-18.66%.The resultant measurements of the remaining carious dentin showed a definite decrease in its amount (83%); showing a strong indicator of a healthy physiological response. After 24 months no other failure had occurred; the measurements and analysis of those remaining carious dentin are still in process.

Conclusions: The IPT was an effective pulp therapy for young permanent molars with deep carious lesions. The success rate did not differ in relation to the amount of the carious dentin left behind, neither to the liner applied.

In Vitro Caries Formation in Primary Tooth Enamel: Role of Argon Laser and Remineralizing Fluid. Westerman G*, Hicks J, Flaitz C, Powell L (Creighton University, Omaha, NE; Texas Children's Hospital, Baylor College of Medicine, University of Texas HSC-Houston, Houston, TX; University of Utah, Salt Lake City, UT)

Purpose: *In vitro* caries formation in primary tooth enamel was evaluated to determine the treatment effects of argon laser and a remineralizing fluid alone and in combination.

Methods: Caries-free primary tooth enamel surfaces (n=10) underwent a fluoride-free prophylaxis. Acid-resistant varnish was placed leaving 4 windows of sound primary enamel exposed for study. Each sound enamel window was assigned to a treatment group: 1) Remineralizing Fluid for 2 minutes [Remin+, Raintree Essex], 2) Argon Laser (10s, 231mW, 11.5J/cm^2); 3) Argon Laser and Remineralizing Fluid; 4) No Treatment Control. The tooth specimens were sectioned into quarters, rinsed in distilled/deionized water, and then exposed to synthetic saliva for 24h. *In vitro* caries were formed (modified ten Cate, 7 days) and longitudinal sections obtained. The longitudinal sections (3/tooth quarter, 30/treatment group) were evaluated for lesion depth (water imbibition, polarized light microscopy, ANOVA, DMR).

Results: Following lesion formation, mean lesion depths were: 1) 179$\pm$16μm for no treatment control; 2) 137$\pm$19μm for Argon Laser Alone; 3) 87$\pm$9μm for Remineralizing Fluid Alone; and 4) 68$\pm$12μm for Argon Laser and Remineralizing Fluid. All treatment groups had mean lesion depths that were significantly less than that for the control group ($P<.05$). Argon laser irradiation alone was less effective than the Remineralization Fluid alone in resisting caries formation *($P<.05$).* The combination of Argon Laser and Remineralization Fluid Treatment significantly reduced lesion depth compared with Argon Laser Alone or Remineralization Fluid Alone Treatments ($P<.05$).

Conclusions: A remineralizing fluid containing calcium, phosphate and fluoride in a carbopol base enhanced caries resistance against *in vitro* caries formation in primary tooth enamel when combined with argon laser irradiation.

* Denotes lead author.

Investigator-Initiated Research Grant Presentation Abstract

The AAPD Investigator-Initiated Research Award provides $30,000 over a 2-year period to advance the knowledge base of the specialty and improve children's oral health, while promoting innovation and creativity within the research community. The following abstract will be presented at the Annual Session by the 2003-05 Investigator-Initiated Research Grant recipient:

Genetic studies to improve the diagnosis, treatment, and prognosis of patients suffering from amelogenesis and dentinogenesis imperfecta. Hu JCC[1]*, Kim JW[2,3], Lin BPL[4], and Simmer JP[2] ([1]Orthodontics and Pediatric Dentistry, University of Michigan, [2]Biologic and Material Sciences, University of Michigan, [3]Department of Pediatric Dentistry and Dental Research Institute, Seoul National University, [4]Department of Growth and Development, University of California, San Francisco)

Research is supported by the AAPD Foundation

Purpose: Our goals are to identify the specific genes and mutations that cause inherited dental disorders, and to characterize the dental phenotypes and responses to treatment, associated with each gene mutation. In this investigation, we focused on two inherited dental disorders: amelogenesis imperfecta (AI) and dentinogenesis imperfecta (DGI). Both of these disorders are believed to be caused by defects in a variety of genes, mostly genes that are specifically expressed during dentin and enamel formation. We hypothesize that identifying the gene defect causes the dental malformations in a given family will improve the diagnosis, treatment plan, and prognosis.

Methods: We set out to identify and recruit families suffering from AI and DGI. Blood samples or buccal swabs were obtained from participating family members for genomic DNA isolation, which was used to perform mutational analyses of the candidate genes associated with inherited dental malformations. Each sequence variation found in the proband was analyzed to determine the predicted effect on protein expression, and was also characterized in other family members to determine if the variation correlated with the disease.

Results: Two mutations in the amelogenin gene (AMELX), two mutations in the enamelin gene (ENAM) and one mutation in the enamelysin gene (MMP20) were identified that resulted in amelogenesis imperfecta. Three different disease-causing mutations were identified in the dentinsialophosphoprotein gene (DSPP) that caused dentinogenesis imperfecta. Sequence variations were found in other candidate genes in other kindreds, but their association with the disease remains unclear.

Conclusions: This investigation has generated significant new information concerning the etiologies of inherited

dental defects (AI and DGI). We hope to make dentists aware that research advances in the genetics of inherited diseases may soon make mutation analyses a routine laboratory test that will be ordered by dentists to determine the exact cause of disease affecting their patient, and will provide a basis for making a treatment plan and managing patients with AI or DGI. Treating patients with genetic diseases by first determining the gene and mutation involved will ultimately become a routine practice and the appropriate standard of care.

Poster Presentation Research Abstracts

The following will be presented as a poster presentation at the Annual Session:

Outcomes Assessment of ZOE Pulpectomies on Vital Maxillary Primary Incisors. Ahmadi A*, Primosch R, Setzer B, Guelmann M (University of Florida, Gainesville, FL)

Purpose: The objective of this study was to evaluate the clinical and radiographic outcomes of ZOE pulpectomies on vital maxillary primary incisors successfully restored with resin-based crowns.

Methods: Records of 104 maxillary primary incisors, clinically and radiographically diagnosed with vital pulps and a restorable crown, pre-op and immediate post-op radiographs, and at least 6 months of follow-up were included. Reason for treatment (caries or trauma), filling extent (at apex, overfilling or underfilling) and type of restoration (strip crown[SC], SC with core build-up [SCCB] and SCCB with electrosurgical gingivectomy), patient's age, tooth-type and treatment outcome were the variables assessed. Pulpectomies were performed by a sole operator using a standardized protocol in a private practice setting. Data collection from progress notes and evaluation of digital pictures of radiographs were performed by a calibrated investigator.

Results: Caries comprised 77% of the cases, while trauma comprised 23%. Traumatized incisors had a statistically higher failure rate (P=.021) than carious incisors. SC was the main restorative method used (85%) and significantly correlated with treatment failure (P=.047) when compared to the other methods. Overfilling of ZOE was also significantly related to failure (80%, P=.001). Eleven cases of delayed eruption of the permanent tooth were observed and significantly related to pulpectomy failure (P<.001). Age at treatment, tooth-type, and evaluation interval were not statistically related to failure.

Conclusions: Trauma, extrusion of ZOE paste from the canal and conventional resin-based crown restorations negatively affected treatment outcome. Delayed eruption of the succedaneous tooth might be expected when ZOE pulpectomy failure occurs.

* Denotes lead author.

Cost-Effectiveness of a Pit and Fissure Sealants Program in a School-Based Setting in Saudi Arabia. Alkhadra T (King Saud University, Riyadh, Saudi Arabia)

Purpose: The issue of the cost-effectiveness of pit and fissure sealants in Saudi Arabia has not been addressed by any study. The aims of the study were to construct a decision tree model for dental caries prevention using pit and fissure sealants and to estimate the cost effectiveness of a 4 year hypothetical cohort of children in a school based pit and fissure sealants program in Riyadh, Saudi Arabia.

Methods: Two hundred children were divided into two groups, experimental and control. One hundred children in the experimental group received pit and fissure sealants on their first permanent molars, plus routine dental care consisting of annual check-ups and oral hygiene instruction through a videotape presentation, and the other one hundred children in the control group received only routine dental care consisting of check-ups and oral hygiene instruction through a videotape presentation.

Results: The incremental cost of sealant treatment was 36,254 Saudi Riyals, equivalent to 9,667 US dollars. The incremental benefit of the sealant treatment was saving of 220 teeth. This yields a cost-effectiveness ratio per tooth saved of $44 (165 Saudi Riyals).

Conclusions: Future research is needed on access to dental care especially for the lower socioeconomic population, and establishing prevention programs such as pit and fissure sealants and fluoridation of water where it is needed across Saudi Arabia.

Sedation Techniques Used Among Pediatric Dentists in New York State. Allen S*, Perinpanayagam MK, Bernat JE, Choi J (University at Buffalo, Buffalo New York)

Purpose: This study surveyed pediatric dentists in NYS to evaluate those who use oral sedation.

Methods: A survey was sent to 212 NYS pediatric dentists.

Results: Thirty seven percent of surveys were returned, of which 92% had private practices, 80% practiced full time, 60 % practiced in a community >100,000 people, 3% were ABPD certified and 80% had hospital privileges. N2O sedation was used by 83% of respondents. Only 38% sedated orally. Of those who don't use oral sedation, 67% feared health risks as a reason for not using oral sedatives. The majority, 66% of practioners always used oral sedatives with N2O. The most commonly used oral sedative agents were chloral hydrate (57%), midazolam (33%), hydroxyzine (16%), diazepam and meperidine (10%). Most doctors, 97%, used visual observation and a pulse oximeter during sedations. Fewer used prechordial stethoscopes (47%), monitored blood pressure (43%) and used capnography (17%). Of doctors utilizing oral sedation, 47% considered 50-74% of their sedations as successful and 33% felt like >75% of their sedations were successful. The most common

adverse reaction was emesis 53% followed by respiratory depression 13%, over sedation 7%, and airway blockage 3%. Most sedated patients were between 2-4 years of age. Sixty four percent of respondents treat children in the operating room under general anesthesia. Some, 4%, have an anesthesiologist come into their private office.

Conclusions: Only 38% of pediatric dentists use oral sedatives in their offices, but 80% of these dentists believe >50% of their sedations are successful.

Light Penetration and Bond Strength of *Magicfil* to Primary Molars. Jafarnia B*, Söderholm KJM, Guelmann M (University of Florida, Gainesville, FL)

Purpose: To test the hypothesis that differences in light absorption of pigments cause variations in light transmission between the four colors of Magicfil(MF), a dual-cure compomer. We also hypothesize that a self-etching adhesive (Prompt-L-Pop[PLP]) does not bond as well as a separately etched adhesive system (Single Bond Plus[SB]) to a dual-cured material such as MF.

Methods: To determine light absorption, aluminum molds with diameters of 6.0 mm in different thicknesses were prepared. A total of 5 samples per color and thickness were made resulting in a total of 5x4x5 specimens. Each sample of MF was allowed to self-cure for one hour at room temperature. Specimen thickness was measured with a caliper and light transmission with a light meter. Light absorbance was plotted as a function of sample thickness and analyzed by use of linear regression analysis.

Shear bond strength to dentin was determined on 48 extracted primary molars, divided in 8 groups. For each color-group, 6 samples of MF were bonded with PLP and 6 with SB. The shear bond strength results were analyzed using non-parametric statistics.

Results: Using a mathematical formula ($A=ke^d$ in which A=absorbance, K=constant, =constant and d=depth) to calculate light absorption, the absorption of the different colors were: yellow > purple > white > blue. PLP had significantly ($P<.0001$) lower shear bond strengths (0.5 ± 1.0 MPa) than SB (3.1 ± 2.8 MPa). No statistical significant difference was found between colors and bonding agent.

Conclusions: The results obtained in the study supported the two hypotheses tested.

Continuous Versus Interrupted Nitrous Oxide Administration on Behavior of Children. Beavers NK*, Brackett RL, Guelmann M, Primosch RE (University of Florida, Gainesville, FL)

Purpose: The purpose of this study was to determine the effect of interrupted administration of nitrous oxide (N_2O), after obtaining profound local anesthesia and rubber dam placement, on the behavior of mild to moderately anxious pediatric dental patients.

Methods: Healthy 5 to 8 year old children, with no previous dental experience, requiring inhalation sedation and bilateral mandibular restorative treatment to be performed in 2 separate appointments under local anesthesia were recruited. In the beginning, patients breathed 50% N_2O for 5 minutes prior to an inferior alveolar and long buccal injection. After profoundness of anesthesia checked, mouth prop and rubber dam isolation placed, treatment was completed alternately and randomized using Protocol A (50% N_2O) or Protocol B (100% oxygen) for first and second visits. Pulse rate, oxygen saturation and behavior changes were continuously recorded every minute having patient and evaluator blinded for the regimen in use.

Results: Seventeen patients with a mean age of 81 months (range= 63 to106) were treated by 2 operators. Protocol A was used as first visit 9 times, while Protocol B 8 times. Oxygen saturation remained constant with no episodes of oxygen desaturation recorded. No statistically significant difference ($P>.05$) in pulse rate and behavior change was noted for both protocols during drilling and restorative phases despite operator differences.

Conclusions: This pilot study concluded that for mild to moderately anxious pediatric patients, no beneficial effect of continuous administration of N_2O inhalation was found after profound local anesthesia was obtained.

Effectiveness of Povidone Iodine Against Cariogenic Bacteria in Children. Brambila NE*, Zhan L, Featherstone JDB, Hoover CI, DenBesten PK (University of California, San Francisco, CA)

Research partially supported by a fellowship from OMNII Oral Pharmaceuticals

Purpose: To evaluate the effectiveness of a single-dose treatment with povidone iodine/fluoride (PVP-IF) foam to reduce mutans streptococci (MS) and lactobacilli (LB) in children with active caries.

Methods: Forty children aged 6-9 years, with active caries, were randomly assigned to treatment or control groups. Following saliva sampling and a dental prophylaxis the treatment group received a 4-minute application of a PVP-IF foam (10% PVPI, 2% NaF), and the control group a fluoride-only (F) foam. Salivary MS, LB and total viable bacteria (TVC) levels were measured by selective media before treatment and after 1 week, 1 and 3 months. DMFS/dmfs scores were recorded at baseline and 3 months.

Results: No statistically significant reductions ($P>.05$) in mean logMS, logLB or logTVC were observed after one month. The mean (SD) differences for logLB from baseline showed a non-significant decrease at 1 week [-0.34 (1.94)] for PVP-IF and no change [0.02 (1.51)] for F. However, 90% in PVP-IF had reduced MS% at 1 week compared to 27% in the F group. All subjects with 0 LB stayed 0 for at least 1 month in PVP-IF, whereas in F 50% of the subjects with 0 LB at baseline showed LB infection within 1 month.

* Denotes lead author.

Conclusions: A single application of PVP-IF foam showed a strong trend to reduce cariogenic bacterial levels for 1 week but not after 1 month, indicating multiple treatments at weekly intervals may be effective in lowering cariogenic bacteria levels in children with active caries.

Management of Dental Trauma and Follow-up in a Children's Hospital. Bruns T*, Perinpanayagam H (University at Buffalo and Women and Children's Hospital of Buffalo, Buffalo, NY)

Purpose: The purpose of this study was to determine if dental trauma that require emergency treatment and splinting in a Children's Hospital are effectively followed up for the completion of treatment.

Methods: All 5 to 19 year olds that suffered trauma to permanent dentition and received emergency treatment and splinting at Children's Hospital in 2001 and 2002 were identified. Records and radiographs were reviewed, and telephone contact and recall examinations were attempted.

Results: There were 79 patients with dental injuries that received emergency treatment and splinting at Children's Hospital in 2001 and 2002. The most common cases were lateral luxations (66%), followed by avulsions (35%) and extrusions (32%), and the most commonly affected teeth were the maxillary central incisors (54%). There were more than twice as many boys (68%) as girls (32%). Accidental falls were a common cause of trauma in girls (44%) and boys (26%), followed by recreational sports in girls (28%) and organized sports in boys (26%). Emergency treatment included replantations (27%), rigid (15%) and semi-rigid splints (86%), and sutures (18%). All cases had been scheduled for follow-up evaluation and treatment. However only 42 (53%) patients completed all follow-up treatment, 23 (29%) attended some visits and 14 (18%) failed all of their subsequent appointments.

Conclusions: Dental trauma that require emergency treatment and splinting at Children's Hospital most often involve avulsions and luxations of maxillary central incisors from sports and falls in boys. Despite the seriousness of these injuries, half may fail to return for follow-up evaluation and treatment.

The Mother-Child Dyad: Relationship Between Stress and Oral Health. Cantu L*, Roldan R, Trujillo MI, Holguin L, Thomas HF (University of Texas Health Science Center at San Antonio, San Antonio, TX)

Purpose: The purpose was to determine if high levels of stress in low SES mothers and children predispose them to high levels of dental disease.

Methods: Forty-eight mother-child pairs attending a community clinic were enrolled. Two questionnaires (Cohen Perceived Stress Scale and Life Events Scale) were provided to the mother to assess perceived stress. An oral examination was performed on the mother and child to determine the prevalence of dental disease, and salivary samples were collected to measure flow rates, levels of cariogenic bacteria and the level of the hormone cortisol.

Results: Forty-eight mother-child pairs were enrolled. The average age of mothers was 28.2 years; the average age of children was 3.2 years. Ninety-eight percent of the pairs were Hispanic and 2% were Caucasians. Ninety-four percent of the mothers had a DMFT ≥1, and the average DMFT was 7.5. Fifty-four percent of the children had a deft ≥1 and the average deft score was 3.0. Eighteen percent of mothers experienced a stressful event in the last year; however, 86% were perceived to have stress. Elevated levels of salivary cortisol between mother (≥1μg/dL) and child (≥0.9μg/dL) were congruent *(P*=.001*)*. Elevated levels of cortisol in the children correlated with increased deft score *(P*=.05). Thirty-two percent of children had a diminished salivary flow rate (<0.2ml/min).

Conclusions: The mother-child dyad had a high prevalence of dental disease. A significant number of mothers experience high levels of stress. Cortisol levels between mother-child were comparable. The children's cortisol levels correlated with an elevated dental caries experience.

Caries on First Permanent Molars of Children in Rural Honduras. Gonzalez CD*, LeMay W, Okunseri C (Marquette University School of Dentistry, Milwaukee, WI; State of Wisconsin, Department of Health and Family Services, Madison WI)

Purpose: To describe the caries status of first permanent molars in rural school children in Honduras.

Methods: Participants in the project were part of a dental sealant program for children aged 6 to 15 years old in the Village of Las Vegas, Department of Santa Barbara, Honduras. A cross-sectional study of five hundred and forty school children utilizing a convenience sampling method was used to recruit children for the study in March 2000. Dental examination was done by two trained and calibrated dentists following WHO protocol. Examiners used visual-tactile methods, natural light, mirrors and dental explorers to diagnose caries. Caries was diagnosed at the cavitation stage. Data was collected and entered onto SPSS and descriptive statistics were done. A significance level of 0.05 was used in all analysis.

Results: Overall 54% were males and 46% females with the mean age 9.36 ± 1.8. Two hundred and seventy eight (52 %) of the rural children had dental caries in at least one first permanent molar. Sixty-seven (12 %) had all four first permanent molars diagnosed with caries. One hundred and thirty six (61%) of older children (11 to 15 years) had dental caries on their first permanent molars compared to 142 (45%) of children in the younger group (6 to 10 years). This was found to be statistically significant (*p=.001)*.

Conclusions: Half of the children examined showed evidence of dental caries on their first permanent molars. Appropriate interventions should include both prevention and treatment of teeth already affected.

* Denotes lead author.

Dental Trauma: Milwaukee Public School Educators Knowledge of Initial Management. Govoni RA*, Vergotine RJ (Children's Hospital of Wisconsin, Milwaukee, WI)

Purpose: To compare the knowledge of physical education teachers/athletic coaches to academic teachers in their ability to initially manage dental trauma.

Methods: Questionnaires were sent all high schools (16) and all middle schools (20) in the Milwaukee Public School System. Surveys were distributed to all the physical education teachers and approximately 20 academic teachers per school. The 3 part, multiple choice, questionnaire evaluated demographics and dental trauma knowledge.

Results: Of 1080 surveys, 295(27%) were returned. From the 281 usable surveys, 162 were academic teachers and 119 were physical education teachers/athletic coaches. One hundred twenty two academic teachers (76%) and 77 (65%) physical education teachers/athletic coaches indicated that a cut lip was the least important injury compared to Class I/II tooth fractures and Class III fractures (P=.0075). Regarding treatment of avulsions, 54 (46%) of physical education teachers/athletic coaches and 90 (56%) of academic teachers thought immediate professional help was necessary (P=.2382). In regards to the transportation of the avulsed tooth, 65 (55%) of physical education teachers/athletic coaches and 73 (45%) of academic teachers chose "in a cup with liquid" (P=.2595). Of those that chose "in a cup with liquid", 27 (23%) of physical education teachers/athletic coaches chose milk as did 39 (24%) of academic teachers (P=.485).

Conclusions: This study showed that there was a statistical difference between the two groups in recognizing severity of dental injuries. No other statistical differences were found. Educational campaigns for all teachers are necessary to improve their emergency management of dental injuries.

Oral Health Services in an Academic Pediatric Medical Setting. Grant, JS*, Quiñonez, R (University of North Carolina, Chapel Hill, NC)

Purpose: Expanding the role of primary care physicians has been proposed as means to improve access to care for children's oral health. The purpose of this study is to describe the implementation of "North Carolina's (NC) Dental Varnish and Screening Project" for the delivery of preventive dental services by pediatric medical residents in an academic primary care setting.

Methods: Retrospective audit of patient charts and administrative records related to preventive oral health services provided by pediatric residents for Medicaid recipients ages 6-36 months at UNC's primary care clinic over a 20 month period.

Results: Five hundred and fifty-six visits and 377 patients were documented during the study period with two-thirds of children from African American descent. Approximately 40% received at least one follow-up visit. Eighteen (5%) children were reported to have one or more carious teeth, but only 2 of the 18 children (11%) had documented referrals for decay. Most children (91%) received education and fluoride varnish at the end of the screening. Documented utilization in the clinic was compared to actual processed charges from the financial office. This data revealed a record of 681 visits and 404 patients. Over 20 months, revenue excluding indirect costs from this program totaled ~$27,000 dollars or 2% of the clinic's financial revenues.

Conclusions: NC Dental Varnish and Screening Program in an academic setting provides access to oral health preventative services to underserved children and can contribute to the financial well-being of the clinic. Future research is needed to evaluate long-term effects of such intervention.

Training Physicians in Oral Health Through Internet Based Learning Modules. Karen J*, Lewis P, Perlstein D, Eng N, Rosenberg D (St. Barnabas Hospital, Bronx, NY)

Purpose: To study the success of training pediatricians and family practitioners about pediatric oral health through the use of internet based learning modules.

Methods: Twenty-nine physicians completed a series of 16 modules concerning dental care created at www.toothpicks.info as part of their continuing education. Their knowledge was monitored with online pre and post-tests. Two hundred seventy-eight primary caregivers of children who were initially accessing the dental clinic and 93 patients from medical clinics completed a survey of early childhood dental care. We looked at caregivers' knowledge in hopes that the knowledge of the physicians would be transferred to the patients over time.

Results: Pre-test responses about physicians performing oral exams found 71% of pediatricians and 63% of family practitioners in favor of this concept. Post-test results revealed a substantial increase in acceptance of this with 90% of pediatricians and 100% of family practitioners. Physicians in pre-test responses referred patients for their first dental visit at mean ages of 1.62 years for pediatricians and 1.38 years for family practitioners, and 1.4 years for pediatricians and 1.0 years for family practitioners in post-test responses. There was no corresponding significant change over time in caregivers knowledge and opinions about early childhood dental care (P>.05).

Conclusions: Web base learning appears to be a viable means to improve physician knowledge base and improve attitudes about physician roles in early childhood dental care. The knowledge gained by the physicians did not affect caregivers' knowledge or opinions during the course of this study.

Relationship Between Obesity and Caries in Children. Kiening J*, Roldan R, Trujillo MI (The University of Texas Health Science Center at San Antonio, San Antonio, TX)

* Denotes lead author.

Purpose: The purpose was to establish the relationship between obesity and caries rates in children between 6 and 12 years of age.

Methods: The preliminary sample consisted of 300 children between 6 and 12 years of age. Data collected comprised child's age, ethnicity, weight, height, and number of teeth with caries, restored, and extracted. Children with a history of dental trauma were excluded. Body Mass Index (BMI) was calculated and children were divided into four groups: I: obese (≥ 95%), II: overweight (94%-85%), III: average (84%-5%), and IV: underweight (< 5%).

Results: Three hundred children were enrolled. The mean age was 9.1 years. Ninety-three percent were Hispanic, 5% Caucasian, and 2% African-American. Fifty-five percent were females and 45% were males. The mean BMI was 17 (35-42 %) and the mean def/DMFT was 4.1.The def/DMFT score decreased from 48% in children between 8 to 10 years to 22% in children between 10 and 12 years (P<.001). Twenty percent of the children had a def/DMFT=0, while 80% had a def/DMFT ≥1. Fourteen percent of the children were obese, 13% overweight, 72% average, and 1% underweight.

Conclusions: Caries and obesity are two epidemics affecting children in disproportionate numbers. From this preliminary data: 1) The caries rate is 30% higher than the national average. 2) The number of children suffering from obesity and overweight is higher than the national average. 3) A relationship between BMI and caries rates could not be established. 4) It appears that the def/DEFT scores decrease as children age.

Effect of Layering Techniques on Polymerization Shrinkage of Composite Resin. Lee SS*, Lee NY, Lee CS, Lee SH (College of Dentistry, Chosun University, Korea)

Purpose: The purpose of this study was to evaluate the effectiveness of layering technique on the polymerization stress and the degree of conversion of composite resin.

Methods: Samples in the first experiment (N_1=30) were devided by the depth of acrylic mold (2mm, 3mm, 4mm). Acrylic molds were filled with composite resin and cured by plasma arc light. The strain gauge method and microhardness test were used to determination of polymerization stress and microhardness. In the second experiment, samples (N_2=50) were devided into 5 groups according to filling methods (bulk, horizontal, vertical, oblique, bulk filling with lining flowable resin). Same tests were done as above.

Results: The lowest polymerization stress was found in 4mm sample (P<.05), 2mm and 3mm samples did not reveal a significant difference (P>.05). The microhardness of the 2mm and 3mm samples did not reveal a significant difference (P>.05), microhardness of the 4mm sample was lower than other groups (P<.05). The lowest polymerization stress was found in bulk filling group with lining flowable resin. Similar polymerization stress was found in the bulk filling group and oblique incremental filling group. The highest polymerization stress was found in vertical incremental and horizontal incremental filling group (P<.05).

Conclusions: The bulk filling technique with flowable resin lining (3mm or less deep) and incremental filling techniques (3mm or more deep) show the least polymerization shrinkage.

Acetaminophen Toxicity in Children Seeking Care for Dental Caries-Related Emergencies. Milton JT*, Amini H, Rashid R, Fields H, Coury K, Casamassimo P (The Ohio State University; Columbus Children's Hospital, Columbus, OH)

Purpose: Over-the-counter (OTC) acetaminophen toxicity is dangerously common in pediatric emergency departments, but little research describes OTC acetaminophen for dental caries pain-related emergencies (DCRP). We surveyed parents of children with DCRP at emergency visits about their knowledge, practices and dosage of pain medication.

Methods: A convenience sample of healthy 1-18 year-old children with DCRP were identified over 6 weeks at their emergency visit. A trained examiner administered a previously published questionnaire modified to include demographics and child weight to 205 DCRP parents and 55 parents of healthy caries-free (CF) children, included to assess social medication in the study population. Data were analyzed using chi-square and t-tests with significance at P<.05.

Results: DCRP and CF samples did not differ significantly by weight, sex, or patient and parent age. Sixty-three percent (129) of DCRP patients had taken analgesics in the previous 3 days, compared to only 4% (2) of CF children, ruling out endemic social medication. Acetaminophen was the most common drug, 57% (73). Improper medication occurred in 86% (111) of those taking medications; 83% (107) under-dosed for age/weight and 3% (4) over-dosed. Most caretakers, 51% (104), felt it acceptable to continue pain medication until pain stopped. DCRP parents who believed their children could not get sick from OTC medication also tended to believe it safe to give as much medication needed to stop pain (P=.002). Caretaker age was not significant in knowledge or analgesic administration.

Conclusions: DCRP parents under-dosed OTC acetaminophen, believed their child couldn't be harmed, and medicated as long as pain lasted.

Trends of Oral Piercing in Buffalo, New York High Schools. Pearose MM*, Chin-Kit Wells MD, Perinpanayagam MK (University at Buffalo, Buffalo, New York)

Purpose: The purpose was to examine the trend of high school aged adolescents obtaining an oral piercing without understanding the long term effects of the piercing on overall oral health.

* Denotes lead author.

Methods: A questionnaire was sent to 5 high schools in Buffalo, New York. The questionnaire consisted of 29 questions regarding demographic, piercing, procedure, care after piercing, maintenance of piercing and education regarding piercing.

Results: Of the 508 questionnaires returned, 10% had an oral piercing. The majority of high school students first oral piercing was their tongue 73%, 6% on their upper lip, 15% lower lip, and 6% on their cheek. Only 16% got written permission from a parent or guardian. The main reasons students got the oral piercing, 36% answered was for fun, 27% spur of the moment, and 14% to be different. Most oral piercing/tattoo places used infection control; however, 72% reported no anesthetic was given. Post piercing included 37% swelling, 22% tenderness, 13% numbness, 11% loss of taste, 10% bleeding, and 7% pus. Oral piercing maintenance was minimal, or non-existent. The most frequent reported dental trauma/piercing related injuries were 33% with bruised upper mouth and secondarily 24% a chipped tooth. The primary reason for a piercing removal was due to parental dissatisfaction or change of mind.

Conclusions: Oral piercing trend in Buffalo's high schools is small; however, those receiving oral piercings do so without parental consent and often show signs of infection due to poor education.

Polymerization Contraction Stress of Composite Resins by Soft-start Light Curing. Oh YH*, Lee NY, Lee CS, Lee SH (College of Dentistry, Chosun University, Korea)

Purpose: This study was to evaluate the influence of soft-start light curing on contraction stress and hardness of composite resin.

Methods: Contraction stress was measured using strain gauge method and Vickers hardness was measured 24 hours after polymerization at the top and bottom of specimens. Composite resin mold (inner diameter 7mm,outer diameter 10mm, height 2mm) was cured using the one-step continuous curing method with three difference light sources; conventional halogen light curing for 40 seconds at 400 mw/cm^2, plasma arc light curing for 6 seconds at 1300 mW/cm^2 and LED light curing for 10 seconds at 700 mW/cm^2. For the soft-start curing method ; 2 seconds light exposure at 650 mW/cm^2 followed by 3 seconds at 1300 mW/cm^2 and exponential increase with 5 seconds followed by 10 seconds at 700 mW/cm^2 were used. Data were analyzed using one-way ANOVA/Turkey test at significance level .05.

Results: Contraction stress 10 min after polymerization was significantly reduced by the soft-start curing (P<.05). Soft-start plasma arc light curing resulted in the lowest polymerization stress, but showed lower hardness (P<.05). Soft-start LED light curing showed statistically significant reduction of contraction stress compared with the one-step continuous halogen and LED light curing (P<.05). Microhardness of specimens cured with soft-start LED light was equivalent to that of produced by the one-step continuous halogen and LED light curing (P>.05).

Conclusions: The results showed that soft-start LED light curing provide the reduction of polymerization contraction stress and the adequate hardness of surfaces.

Remineralization of Prenatal and Postnatal Enamel of Primary Central Incisors. Ritchie DP*, Abadeer L, Amaechi B (University of Texas Health Science Center at San Antonio, San Antonio, TX)

Purpose: The purpose was to compare the remineralization potential of prenatal and postnatal enamel tissue of maxillary primary incisors.

Methods: Tooth sections were cut from ten extracted primary maxillary incisors using a hard tissue microtome. Each section was examined under polarized light microscopy for the location of neonatal line. Sections were then painted on all surfaces with acid resistant nail varnish, except on two locations on labial surface corresponding to prenatal and postnatal enamel. Caries-like lesions were then produced on the exposed surfaces by 24-hour demineralization in acid gel (pH 4.5) system. Sections were then microradiographed and the images were analyzed to quantify the baseline mineral loss (ml) and lesion depth (ld). The lesions were then subjected to remineralization with 5% NaF fluoride varnish (Cavity Shield) and artificial saliva (changed 48-hourly). During remineralization, sections were microradiographed at one, two and four week intervals, and the changes in ml and ld relative to the baseline were determined.

Results: At baseline, demineralization was greater in postnatal (ml=1365 %vol.mμ, ld=50 mμ) than prenatal (ml=1241 %vol.mμ, ld=49 mμ) enamel. Although not statistically significant, in overall, remineralization (as measured by percentage decrease in ml) was greater in postnatal [31% (week), 42% (week 2), 54% (week 4)] compared to prenatal [28% (week), 43% (week 2), 53% (week 4)] enamel. Similar trend was observed with ld.

Conclusions: Postnatal enamel demonstrated a greater potential for remineralization of early caries than prenatal enamel. Future research with larger sample size is needed to confirm the result of this study.

Effects of EDTA on Microleakage of Root Canal Filling Materials. Salama F* (University of Nebraska Medical Center, Omaha, NE)

Purpose: The purpose of this study was to the evaluate effects of 17% ethylenediamine tetra acetic acid (EDTA) on microleakage of root canal filling materials and root canal surfaces of primary teeth. In addition, the quality of filling (voids and defects) was evaluated.

Methods: Fifty-six extracted primary anterior teeth were distributed into 7 groups. Four experimental, one negative control, one positive control and one used for SEM

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examination. Root canals were instrumented with and without irrigation with17% EDTA. Zinc Oxide and Eugenol (ZOE) and Vitapex were then inserted into the root canals. All teeth were then subjected to a dye leakage test and linear dye penetration was measured. The quality of fillings was also recorded. The cleaning qualities and smear layer removal were evaluated using scanning electron microscopic (SEM).

Results: The highest dye penetration was recorded for teeth filled with ZOE without and with application of EDTA with mean values of 9.94 $\pm$ 1.20 mm and 7.05 $\pm$ 1.15 mm, respectively. For Vitapex without and with application of EDTA, the mean values were 4.95 $\pm$ 1.21 mm and 3.24 $\pm$ 1.39 mm, respectively. Comparison between ZOE and Vitapex groups irrigated with EDTA showed significant difference (P<.0001). There were no significant differences among the groups when quality of filling (voids and defects) was evaluated. SEM examination showed less debris and more removal of the smear layer when EDTA was used.

Conclusions: All the root canal filling materials used showed microleakage. The use of 17% EDTA showed more removal of the smear layer and less microleakage.

General Anaesthesia Follow-up at United Dental Hospital, Sydney, Australia. Sawyer PN*, Lim J, Sawyer JE (University of Sydney, Sydney, NSW, Australia)

Research supported by Dental Alumni Association, University of Sydney

Purpose: To explore post-general anaesthesia (GA) follow-up attendance patterns in conjunction with oral health knowledge and behaviour at United Dental Hospital (UDH), Sydney.

Methods: Collection of data was in person or by telephone by an interviewer-administered questionnaire of carers of children who received comprehensive dental treatment under general anaesthesia. The questionnaire was similar to the one employed by Dr K Hood, Glasgow University.

Results: There were 81 respondents from 123 carers of children. 67.9% of the participants reported having attended the post-GA follow-up. This is comparatively high with respect to similar studies. Participants displayed a high mean age amongst carers, a high education status, longer than expected period of residence in Australia and almost exclusive fluoride-containing toothpaste use. These factors may account for the apparent success of comprehensive treatment under general anaesthesia provided at this hospital. Lifestyle changes such as the avoidance of cariogenic foods and brushing with adult supervision are not as widely practiced as is desired, but it must be borne in mind that daily habits are resistant to change.

Conclusions: Despite the apparent success of dental treatment under GA at UDH, persistence is necessary in the reinforcement of dietary guidelines and oral hygiene instruction in order to facilitate change to dentally-threatening practices.

Proper Age Children Can Effectively Brush Their Teeth: Parent's Beliefs. Sonday B*, Hodgson B, Post AC, Barbeau L, Vergotine R, Studders E (Children's Hospital of Wisconsin)

Purpose: To assess parental knowledge concerning the need to assist children in brushing, and document the use of electric toothbrushes.

Methods: A total of 500 randomly selected surveys were completed at 10 different urban and suburban locations. Four hundred were completed at pediatric dental offices and one hundred at area grocery stores. The survey assessed the following; (a) the actual age at which parents stopped brushing their child's teeth; (b) the age at which parents believe children can effectively brush their own teeth, and (c) the use of manual versus electric toothbrushes. SAS statistical software was utilized for analysis.

Results: Most parents (75 %) stopped brushing their child's teeth at 5 years or younger, although only (55%) believed that children 5 and younger could brush effectively. The average age at which parents believed children could effectively brush is 5.7(+/-2.2) years. There were significant differences between suburban and urban parental practices and beliefs. Parents from suburban offices allowed children to begin brushing independently 4.92(+/-1.6) years versus urban grocery store parents 3.52(+/-1.7) years (p=0.0014). Suburban parents believed children could effectively brush independently at an average age of 6.2(+/-2.9) years versus urban parents 5.1(+/-2.0) years (p=0.0001). Only (5%) used electric toothbrushes exclusively.

Conclusions: Overall, parents stopped brushing significantly prior to the accepted age of 10 years. Parents in urban locations are more likely to allow children to brush on their own at a younger age. The appropriate age for independent toothbrushing needs to be stressed to parents.

Child Temperament and Risk Factors for Early Childhood Caries. Seiser-Spitz A*, Weber-Gasparoni K, Qian F, Kanellis M (The University of Iowa Pediatric Dentistry, Iowa City, IA)

Research supported by the Department of Pediatric Dentistry, The University of Iowa, Iowa City, IA

Purpose: The purpose of this study was to determine if a relationship existed between a mother's perception of her child's temperament and the child's risk factors for Early Childhood Caries (ECC).

Methods: Data was collected from 629 records of children ages 0 to 4 who were patients of the University of Iowa's Infant Oral Health Program. Data included maternal report of child's temperament, dietary and oral hygiene habits and clinical evidence of cavitated/non-cavitated lesions and visible

* Denotes lead author.

plaque on maxillary incisors. Mantel-Haenszel chi-square tests and logistic regression models were used to analyze data.

Results: Bivariate analyses showed that children reported as "calm" were more likely to be younger (*P*= .001), breastfed to sleep (*P*=.046) and throughout the night (*P*=.012), and have their teeth brushed daily and two times per day (*P*=.002, *P*= .006). Children reported as "difficult" were more likely to be bottlefed to sleep (*P*=.002) and have non-cavitated lesions (*P*=.044). Logistic regression analysis showed that children reported as "calm" were less likely to be bottlefed to sleep (OR = 1.74; *P*= .016) and more likely to be breastfed throughout the night (OR = 1.77; *P*= .016).

Conclusions: Children perceived as "calm" by their mothers were more likely to have their teeth brushed daily and less likely to be bottlefed to sleep compared to "difficult" children. Maternal reported child temperament may be related to important risk factors for ECC.

Reasons for Extraction of Primary Teeth. Whalen SR*, Kanellis MJ (The University of Iowa College of Dentistry, Department of Pediatric Dentistry, Iowa City, IA)

Purpose: To determine the most commonly extracted teeth in the primary dentition and the diagnosis prior to extraction.

Methods: A retrospective chart review was done for pediatric patients receiving extractions at the University of Iowa, College of Dentistry over a three month period. The following variables were recorded: teeth extracted, age, gender, pre-operative diagnosis and space management treatment plan. Data was analyzed using SPSS computer software.

Results: Over the three month period review 239 were extracted. The most common teeth extracted were primary first molars (32.2%) followed by maxillary incisors (25.9%) and primary second molars (20.1%). More extractions were done on males (55.6%). The three most common diagnoses prior to extraction were caries non-restorable (28.9%) loose or over retained (23.8%) and orthodontic request or ectopic eruption (19.2%). The most commonly extracted teeth by age group were: 0-5 years of age – maxillary primary incisors (66.7%); 6-12 years of age – primary first molars (41%); 13 years and older – cuspids (44%). The most common diagnosis by age group was: 0-5 years of age – caries non restorable (63%); 6-12 years of age – loose or over-retained (39%); 13 years and older – loose or over-retained (95%). Space maintenance or active orthodontic treatment was treatment planned in 35.6% of cases.

Conclusions: The most commonly extracted tooth was the first primary molar. Both diagnosis and type of tooth varied by age.

Survey of Iowa Dentists Regarding the Age One Dental Visit. Wolfe J*, Weber-Gasparoni K, Kanellis MJ (The University of Iowa, Iowa City, IA)

* Denotes lead author.

Research supported by the Department of Pediatric Dentistry, The University of Iowa, Iowa City, IA

Purpose: The primary purpose of this survey was to assess Iowa dentists regarding the age one dental visit. An additional purpose was to determine where knowledge about the first dental visit was obtained.

Methods: A 15-item survey was mailed to 1521 licensed dentists to address their knowledge, attitudes, and behavior regarding the age one dental visit. Descriptive statistics were analyzed using SPSS statistical program.

Results: Five hundred and fifty-six (37%) useable surveys were returned after the first mailing. Most respondents were general practitioners (81%) and Iowa graduates (81%). Four hundred and three (73%) dentists were familiar with the AAPD age one dental visit recommendation, and reported obtaining this information most frequently through continuing education (43%). Twelve percent believed the first dental visit should occur between 0 and 11 months of age, and 29% between 12 and 23 months. Sixty percent of respondents actually reported they see children under 2 years of age in their practice. The most common reasons for not seeing infants (0-23 months) were: "prefer to refer infants to a pediatric dentist" (18%), "parents do not request appointments" (14%), and "not comfortable seeing infants" (12%).

Conclusions: The majority of Iowa dentists are aware of the AAPD guidelines. While only 40% of respondents believe children need to be seen before 2 years of age, 60% reported seeing children this young in their practice.

Case Report of a Female Child with Multiple Allergies. Yang B*, Vergotine R (Children's Hospital of Wisconsin, Milwaukee, WI)

There have been studies that claim that nickel is the most common allergic contact dermatitis, especially in women. There are concerns regarding nickel use in dentistry and in vitro studies have demonstrated that nickel is released from simulated orthodontic appliances.

Case: A 7.8 year old Caucasian female with a medical history that indicates responses to a substantial amount of different products. This list includes: nickel products, latex products, Thiuram mix products, quaternium products, neomycin, Isothiazolinone containing products, and foods that contain chestnuts, avocado, kiwi, mango, paprika, and coconut. On examination, it was determined that the patient needed multiple restoration including pulpal treatment of tooth #B. Standard protocol indicate a SSC for the pulpotomized tooth. The patient was extremely apprehensive for the exam and radiographs. The company who made our stainless steel crowns reported traces of nickel in the stainless stain crowns and advised against using it for this patient. There are a number of dental instruments that contain nickel: syringe, burs, rubber dam frame, rubber dam clamps, hand instruments. The proposed treatment protocol consisted of using nitrous oxide

(with latex-free components), latex-free rubber dam and gloves, nylon rubber dam frame, plastic rubber dam clamp. Ferric sulfate was used as the pulpal medication. All decayed areas were restored with either glass ionomer or composite. Latex and nickel allergy patients pose a significant dilemma when they present for dental treatment.

Case Presentation of a Neonatal Tooth in an Infant. Young DC*, Vergotine RJ (Children's Hospital of Wisconsin, Milwaukee, WI)

Case: Natal teeth (present at birth), and neonatal teeth (erupt within the first month after birth) most commonly affect the mandibular incisors. Indications for the extraction of neonatal teeth include hypermobility and risk of aspiration, difficulty breast feeding, and traumatized soft tissue of the lip or ventral surface of the tongue (Riga-Fede disease). Persistence of odontogenic remnants, space loss, and esthetics are of concern when natal and neonatal teeth are extracted. This is a case report of a retained neonatal tooth during the patient's first year of life.

A three month-old African American female presented at the dental clinic with a neonatal tooth. The patient's mother was concerned only with the early eruption and color of the tooth. The patient is bottle-fed and has a negative history of oral tissue trauma. Upon clinical examination, all extraoral and intraoral soft tissues were within normal limits. The neonatal tooth (left primary mandibular central incisor) had erupted 1mm, was slightly mobile and decalcified. Radiographic evaluation revealed delayed crown and root development. The infant was monitored monthly in the dental clinic, at which time fluoride varnish was applied to the neonatal tooth. At one year old, the root of the neonatal tooth had developed to match the adjacent central incisor and was no longer mobile. The crown remained decalcified but structurally intact. Future treatment will include a full coverage restoration in the absence of pulpal and periapical inflammation.

Recommendations: Careful monitoring of neonatal teeth in the absence of excessive mobility, infant feeding problems or Riga-Fede disease, may allow for long term retention.

2004 OMNII Pediatric Dentistry Postdoctoral Research Fellowship Abstracts

Up to 3 pediatric dentistry students/residents are selected for the OMNII Pediatric Dentistry Postdoctoral Research Fellowshpi, based on proposal submissions. Recipients conduct a yearlong research fellowship and present their research at the AAPD Annual Session. The following research abstracts will be presented:

An Evaluation of Toothprints DNA Yield and Bite Registration. Ellis, M*, Dean, J, Windsor, J, Fontana, M, Parks, T, Sanders, S, Eckert, G (Indiana University, Indianapolis, IN)

Research supported by OMNII pharmaceuticals and AAPD Foundation

Purpose: The purpose of this study was to examine the ability of Toothprints to capture DNA and then to determine the amount of this DNA, as well as to analyze any inaccuracies in the wafer impression technique.

Methods: Adolescents, 7-12 years of age, with mixed dentition were asked to participate in four different steps. First, saliva samples containing exfoliated cells were obtained by an oral rinse. Secondly, a Toothprints wafer impression and bite registration were recorded per manufacturer's instructions and placed in the provided plastic zipper bag. Thirdly, cheek cells were obtained using a cytology brush. The genomic DNA samples were then extracted from all three of the above methods and quantified using picogreen. The DNA concentrations were determined utilizing a DNA standard curve. Finally, a maxillary alginate impression was made. Stone models were then poured utilizing the alginate and Toothprints wafer impressions. Both models were then scanned into a computer to overlay outlined bite registrations.

Results: The amount of DNA from the participants isolated from the buccal swab and mouthwash was in the mg range, whereas the amount of DNA from the Toothprints was in the mg range. Toothprints bite registration outline corresponded to the outline of the alginate recorded bite.

Conclusions: Toothprints appear to capture DNA, but not in large quantities. In concurrence with previous studies, DNA extraction methods such as oral rinses and buccal swabs prove to yield high DNA concentrations. Toothprints wafer impression material appears to be a valid bite registration material and was able to produce an accurate representation of the dentition.

A Comparison of DIFOTI (Digital Imaging Fiber Optic Transillumination) Images Versus Radiographs in Primary Molars. Johannsen K*, Berg J, Hollender L, Ramsay D, Lin JY, Mancl L (University of Washington, Seattle, WA)

Research supported by OMNII pharmaceuticals and AAPD Foundation

Purpose: This study evaluates the validity and reproducibility of DIFOTI (Digital Imaging Fiber-Optic Transillumination) images versus bite-wing radiographs in diagnosing interproximal caries in primary molars.

Methods: Images of the unrestored primary molars of eighty children were captured using both the DIFOTI device and bite-wing radiographs. All images were evaluated by two observers for carious lesions on the interproximal surfaces of the teeth.

Results: Based on preliminary data, observers diagnosed "definite" enamel caries on 9% of the tooth surfaces with radiographs versus 1% with DIFOTI. Observers reported "probable" enamel caries in 5% of radiographs versus 13%

* Denotes lead author.

of DIFOTI. "Definite" and "probable" caries in dentin was diagnosed in 4% and 1% of radiographs and 3% and 12% of DIFOTI, respectively. Percent agreement between radiographs and DIFOTI ("definite" and "probable" combined) was 78% for enamel caries and 84% for dentin caries. Similar results were observed when the data was analyzed by tooth surface (distal or mesial) and by examiner.

Conclusions: Observers reported the same frequency of enamel caries with both radiographs and DIFOTI; however, observers expressed more certainty utilizing radiographs. There was a higher rate of caries diagnosis in dentin with radiographs than DIFOTI. Overall, the preliminary data suggest a moderate agreement between DIFOTI images and bitewing radiographs.

Determinants of Dental Referrals Among WIC Nutritionists in North Carolina. Shick EA*, Lee JY, Rozier RG (Departments of Pediatric Dentistry and Health Policy, University of North Carolina, Chapel Hill, NC)

Research supported by AAPD Foundation and OMNII Pharmaceuticals through the OMNII Postdoctoral Research Fellowship and MCH Grant # 2 T17 MC 0015-12

Purpose: The objective of this study was to examine the determinants of dental referral practices among WIC nutritionists in North Carolina.

Methods: A questionnaire composed of 118 items was administered to all WIC nutritionists (n=355) in the state. The survey instrument contained questions on 3 major domains: oral health knowledge (25 items), oral health confidence (22 items), and dental referral practices (15 items).

Results: Completed questionnaires were received from 324 nutritionists in 82 agencies yielding a response rate of 92% and 96%, respectively. Nutritionists were the most confident in counseling about dental visits (90%), followed by confidence in general oral health counseling (84%), expected outcomes for general oral health counseling (81%), getting parents to seek dental care for their child when advised (76%), and performing risk assessments (46%). Most (96%) made dental referrals for 1-5 year old children. Logistic regression revealed that confidence in performing oral health risk assessments (OR=2.04; 95% CI=1.1, 3.9), confidence in counseling about dental referrals (OR=3.39; 95% CI=1.1-10.0), confidence in expected outcomes that parents would seek dental care when advised to do so (OR=2.78; 95% CI 1.4, 5.5) and more years working experience as a WIC nutritionist were significantly associated with the likelihood of making dental referrals ($P<.05$).

Conclusions: The more confident WIC Nutritionists feel about oral health, the more likely they are to make dental referrals. Professional education of WIC nutritionists should include strategies to increase confidence. Oral health screenings and referrals by WIC workers may benefit children by helping them see a dentist earlier.

* Denotes lead author.