Dentists are encouraged to understand that in early RMGI development, competing setting mechanisms and the timing of light activation can adversely impact the constitution of the material.

**Background:** Glass ionomers (GIs), a dental filling material first introduced in 1972 by Wilson and Kent, “set” via an acid-based reaction between polymers of polyacrylic acid and fluoroaluminosilicate bases. The material is desirable because it is tooth-colored, often used for small restorations in children, releases fluoride, and has the unique ability to bond chemically to tooth structure. Disadvantages include low early strength and moisture sensitivity during setting. To correct these deficiencies, resin-modified glass ionomers (RMGIs) were developed to improve mechanical properties, decrease setting time, and ease moisture sensitivity. RMGIs are a hybrid of GIs and composite resin. It properly sets by at least 2 mechanisms dependent upon reactant diffusion prior to gelation.

**Objective:** To determine, with differential scanning calorimetry (DSC), the extent of the setting reaction using various timings at which light-activation is initiated following the mixing of the RMGI.

**Methods:** The RMGI material studied was Fuji II LC and was prepared according to the manufacturer's instructions. Visible Light Activation (VLC) was performed for 20 seconds as prescribed. Curing unit irradiance was 600 mW/cm², as measured with a commercial radiometer. Immediately after being mixed, the RMGI was put in a weighed aluminum crucible and transferred to the DSC at 37°C, synchronized in time with mixing initiation. Four groups were then investigated. Three of the groups were investigated using VLC simultaneously while on the sensor, then 5 and 10 minutes following, and finally, using no VLC at all. Measurements were conducted in a closed-light environment except during the visible light curing.

**Results:** The results indicate that RMGI acid-base reaction and visible light polymerization reactions compete with and inhibit one another during early RMGI development, which has been postulated, but to what extent, was still unknown.

**Conclusions:** This study showed that the VLC initiation time affected the acid-base reaction rate and extent. Conversely, the polymerization reaction was affected by the polar nature of the GI environment.

**Reviewer's Comments:** These findings lend credence to the observed structural differences reported with a RMGI differentially exposed to light. Whether RMGI phase separation occurs still remains a source for further study. This study's cited attribution to all relevant GI and RGMI studies that preceded it, then layering these good findings on top, allows all dental practitioners the ability to consider a revised best-practices application of RMGI for maximum material effectiveness. The clinical application of these findings might lead us to allow some of the self-curing GI reaction to take place, at least for many seconds, prior to light curing. This might enhance the unique benefits of the GI component of the RMGI. (Reviewer-Joel H. Berg, DDS).

Keywords: Glass Ionomers, Resin Modified Glass Ionomer, Polymerization, Acid-Base Reaction

Print Tag: Refer to original journal article
Although the literature has multiple references to techniques for inducing apical barriers and strengthening these teeth after endodontic therapy, little of the evidence is of good quality.

**Objective:** To evaluate the effectiveness of techniques for inducing an apical plug and strengthening roots after endodontic treatment with an interest in immediate and long-term outcomes.

**Methods:** This review tested the following hypotheses: (1) there is no difference between apexification and apical plug techniques as an intervention for inducing an apical barrier; (2) there is no difference in the proportion of teeth exhibiting clinical and/or radiographic failure after a procedure to induce an apical barrier; and, (3) there is no difference in the proportion of treated teeth with root fractures whether strengthening techniques are used or not.

**Results:** On the basis of their literature search and review, the authors were not able to reject any of the 3 null hypotheses.

**Conclusions:** The authors concluded that there is weak, unreliable evidence to support the use of apexification, apical plug, or other techniques for creating an apical barrier in immature necrotic permanent incisor teeth. Similarly, outcomes for techniques for strengthening roots after an apical barrier is formed have not been assessed in randomized controlled trials.

**Reviewer’s Comments:** Necrotic immature permanent incisors are one of the most challenging clinical situations that I encounter in clinical practice. Conventional root canal therapy is not possible, and when alternative endodontic therapies are completed, a fragile compromised tooth that is prone to fracture is the outcome. These incisors have uncertain long-term outcomes and are of particular concern to the adolescents affected by the injury, as the affected incisors play a large role in esthetics. Multiple techniques have been proposed for endodontic management of these teeth as have multiple methods been proposed to strengthen the resultant thin walls of the roots. These techniques have been reported at some length in the dental literature. However, questions remain. How well do any of these procedures work? Does good evidence of clinical efficacy exist? It was surprising to me that techniques that I have used on a regular basis had such minimal evidentiary underpinning. It is important to note that the authors did not state that techniques for inducing an apical barrier are ineffective, but rather that there is little data about many of the parameters that dental clinicians would like to know. High-quality, randomized, controlled trials that take into consideration pain, time required for induction of apical barrier, material choices, long-term outcomes, esthetics, and patient satisfaction with function are clearly indicated before any technique can be demonstrated as the superior method for management of necrotic immature incisors. (Reviewer-Michael J. Casas, DDS).

**Keywords:** Necrotic Incisor, Root Canal, Apexification, Apical Plug

**Print Tag:** Refer to original journal article
16 Tips and Lessons From the University of Washington Post-Retention Studies

Clinical Implications of the University of Washington Post-Retention Studies.

Sinclair PM, Little RM:

J Clin Orthod 2009; XLIII (October): 645-651

Retention, retention, retention; after orthodontic treatment, plan on life-long retention.

Background: The gold-standard reference in terms of orthodontic retention and relapse is the University of Washington post-retention sample, which consists of >900 long-term follow-up records collected over 30 years.

Objective: To summarize the lessons learned from the University of Washington Post-Retention Studies.

Results: The following includes 16 tips and lessons of the aforementioned data as listed by Robert M. Little, DDS. (1) Plan on lifetime permanent retention. Although the ability to predict relapse is poor, after 20 years post-retention, 90% of cases have unacceptable alignment. (2) Avoid increasing mandibular arch length and width during treatment. Most cases that underwent arch enlargement showed significant relapse. (3) Expect minimal relapse in cases that have adequate or excess pretreatment arch length. Cases with generalized spacing or normal alignment before treatment showed mild relapse. (4) Lifetime permanent retention is the only way to ensure mandibular arch alignment stability. The mandibular arch tends to constrict and crowd significantly in the late teens and 20's. (5) Rotation and position change will occur for all mandibular incisors during and after retention. Rotated teeth tend to relapse toward their initial positions. (6) Bond each lower incisor to the lower fixed retainer. The direction of relapse, lingual vs labial, is unpredictable. (7) Lifetime permanent retention is the only reliable method to ensure long-term stability. Retention postpones the inevitable relapse tendency. (8) Regardless of the presence, extraction, or congenital missing of third molars, always plan on lifetime retention. Relapse will occur. (9) Early treatment does not improve stability. Outcomes seem no better or worse when treating early or late. (10) Upper retainer wear can be reduced. The upper arch fares much better than the lower arch in terms of stability of arch alignment. (11) Arch development poses several dilemmas. It is the riskiest treatment in terms of stability, and there are periodontal repercussions, such as dehiscence. (12) Treat to the patient's initial mandibular arch form. Arch form typically reverts and relapses toward the original pattern. (13) Do not count on the occlusion to maintain lower arch expansion. A lower arch widened to match a normal or expanded upper arch typically relapses. (14) Maintain leeway space for incisor alignment. Mixed dentition maintenance of leeway space appears successful in preventing post-retention relapse. (15) Do not count on normal growth to aid in correction of alignment or improved stability. There is no intra-arch, growth-only constriction. (16) Retention blocks normal physiologic constriction of the lower arch. "Return to normal physiology" may be a more correct description of "relapse."

Conclusions: Orthodontic corrections involving lower incisor crowding or rotations are highly unstable over a period of 10 to 20 years. After orthodontics, plan on life-long retention.

Reviewer's Comments: This is a great, easy-to-read article that summarizes the main findings of the University of Washington Post-Retention Studies. (Reviewer-Jonathon Everette Lee, DDS).

Keywords: Incisor Irregularity, Relapse, Retention, Orthodontics

Print Tag: Refer to original journal article
More Evidence Needed to Validate Efficacy of Athletic Mouthguards

Effectiveness and Fabrication of Mouthguards.

Maeda Y, Kumamoto D, et al:

Dent Traumatol 2009; 25 (December): 556-564

Properly fitted mouthguards improve breathing and speaking and are more likely to be worn.

**Objective:** To review the literature on the effectiveness of mouthguards in preventing oral injuries.

**Design:** Literature review.

**Methods:** The authors reviewed the current literature on athletic mouthguard efficacy and fabrication.

**Results:** Much of the data reported on mouthguard efficacy is based on questionnaires or subjective opinion and lacks rigorous research design and appropriate statistical analysis. The authors acknowledge the reservations of the Centers for Disease Control and Prevention about mouthguard efficacy due to the lack of research data from randomized controlled trials and point up the controversial results from several different studies. While recognizing the many reports stating that mouthguards prevent or reduce the severity of dental trauma, they call for better scientific evidence based on well-controlled study designs. Three types of mouthguards are currently available: (1) stock type mouthguards, which comes in standard sizes and have no ability to adapt to an individual's mouth; (2) mouth-formed ("boil and bite") mouthguards; and (3) custom-formed mouthguards made of single or multiple layered laminates. The first 2 types are available directly to the public over the counter (OTC), while the custom guards must be fabricated by a dentist. The authors presented no evidence that custom mouthguards are more effective at reducing injuries than the OTC types, but did report that they are more comfortable and less likely to restrict breathing and speaking. Ethylene vinyl acetate (EVA) is the most preferred material for fabricating custom mouthguards due to its elastomeric softness and flexibility and because it can be easily processed. EVA is available in many colors and thicknesses, and studies report that its shock absorption capability is directly related to its thickness. Optimal thickness for an EVA mouthguard is 3 to 4 mm, and care should be taken when making the appliance to avoid thinning, particularly in the upper anterior area. To avoid deformation of the appliance, the plaster cast should be thoroughly dried and the mouthguard should be allowed to cool on the cast before separation. The authors point up the need for better materials with higher shock absorbing capability and rigidity. There is no evidence that mouthguards reduce the incidence or severity of concussions.

**Reviewer's Comments:** These authors favored the use of custom mouthguards because of their comfort and the greater likelihood that they will be worn, but they fail to mention the important cost-differential between OTC and custom mouthguards. Costing up to 10 times as much, it is clear that custom mouthguards will never be as accessible to the public as the OTC types. This is all the more reason to work toward better research to conclusively answer questions about the effectiveness of mouthguards. This will not be a simple task because in vitro research models are fairly crude representations of complex dental injuries and no ethically feasible in vivo model exists. (Reviewer-Dennis J. McTigue, DDS, MS).

Keywords: Mouthguards, Dental Trauma, Concussion Prevention

Print Tag: Refer to original journal article
Objective: To quantify the contribution of urban corner store purchases to energy intake in fourth- through sixth-grade children.

Design: Observational study.

Participants: Children who attended grades 4 through 6 in urban K-8 schools with ≥50% of the students eligible for free/reduced-price lunch program and with proximity to ≥2 corner stores within 4 blocks.

Methods: Children were interviewed (January to June 2008) as they came out of the store, and purchases were recorded by trained staff. Nutritional information and energy content on the items was calculated.

Results: 10 of the 12 schools selected agreed to participate in the study. Eighty percent of the children were eligible for the free/reduced-price lunch program; 54% were black and 23% were Hispanic. A total of 833 contacts were made during the 6-month period. The average purchase was equal to 356 kcal per purchase and $1.07 ($1.19 in the morning and $0.94 in the afternoon). The average number of items was 2.1, with almost 3 times more food items than beverages. The average percent of calories from items was 30% from fat, 5.2% from protein, and 66% from carbohydrates. The most common purchases included chips (34%), candy (21%), and beverages (19%). Fifty-three percent of the children shopped daily, 22% shopped at least 2 to 4 times per week, and 42% shopped at least twice daily.

Conclusions: This was the first study to document purchases made by grade-school children from urban corner stores, to determine the types of items purchased, and to determine the daily caloric impact. The items most frequently purchased were energy-dense, low-nutritive foods and beverages.

Reviewer’s Comments: Recent reports have stated that 32% of school-aged children are overweight and 16% are obese. Obesity has become the number one health problem in the United States. Snacking has increased in all age groups from 1977 through 1996. There has been an increase of 30% in calories, with 20% of a child’s total energy intake coming from snacks. In this study, 82% of the children were eligible for free/reduced-price lunches, and yet some children had up to $2.13 to spend at the stores. Was this the lunch money for the reduced-price lunch programs? In this study, 19% of the purchases were for beverages, 34% were for chips, and 21% were for candy, which shows more calories coming from foods than from beverages. So, is it the beverages that are the problem or the chips and candies? We have heard a great deal on sugar-sweetened beverages being the problem and the efforts to either remove vending machines from schools or close them during the lunch period. Maybe our efforts need to be directed to the corner store? Based on the results of this study, it would appear that corner stores contribute more to the overweight/obesity crisis than do schools? (Reviewer-Arthur J. Nowak, DMD).

Keywords: Corner Store Purchases, Snacking, Overweight/Obesity

Print Tag: Refer to original journal article
Cariogenic Bacteria May Be Transmitted Between Unrelated Children

*Horizontal Transmission of Mutans Streptococci in Children.*

Doméjean, Zhan L, et al:

J Dent Res 2010; 89 (January): 51-55

Mutans streptococci are transmitted both vertically and horizontally.

**Background:** Education of parents and other care providers about the etiology of dental caries generally involves a discussion of mutans streptococci and its transmission from mother to child. This vertical transmission of bacteria is thought to be the main method of acquisition of mutans streptococci in young children. There have been a few studies that document horizontal transmission of bacteria within families, but there is very little evidence to show that mutans streptococci can be transmitted between unrelated children.

**Objective:** To investigate the transmission of mutans streptococci between unrelated children.

**Participants:** 96 children who attended public school in the San Francisco Bay area were included. Subjects were healthy and had English-speaking parents.

**Methods:** A dental examination and caries status were performed for each child. Scores for decayed, missing, or filled teeth and tooth (DMFT) surfaces were recorded. A saliva sample was collected to test for mutans streptococci colonization. Swab samples were diluted in buffered saline, plated on selective medium, and incubated for 72 hours. Colonies were counted under a dissecting microscope. DNA was extracted from a number of isolates from each child and analyzed using a polymerase chain reaction (PCR) assay. Amplified isolates underwent electrophoresis, and then the resulting fingerprint patterns were compared between children. Fingerprints with identical major bands were considered similar.

**Results:** Of the 96 subjects, 38 were girls and 58 were boys and were between 5 and 6.5 years of age. There were 5 pairs of twins, in separate classrooms, and all other children were unrelated. Approximately 50% of the children had detectable levels of mutans streptococci. Three different pairs of unrelated children shared the same mutans streptococci amplitype. Two of the pairs were in the same classroom, while the 2 children in the third pair were in separate classrooms. Only 1 twin had detectable levels of mutans streptococci, and this individual shared the mutans streptococci amplitype with an unrelated child from a different classroom.

**Reviewer’s Comments:** In previous studies documenting horizontal transmission between unrelated children, the children were between the ages of 2 months and 4 years, when salivary transfer is more likely. This is the first study to demonstrate this phenomenon in older children. The data in this study suggest a horizontal transmission rate of 13% among the children who were positive for mutans streptococci. The possible modes of transmission include sharing food or utensils. Saliva samples were not collected from caregivers, and therefore, the possibility of transmission from a shared caregiver cannot be ruled out completely. This is clear evidence that horizontal transmission occurs between unrelated children, but it is unclear how this is happening. (Reviewer-Rebecca L. Slayton, DDS, MS, PhD).

Keywords: Mutans Streptococci Genetics

Print Tag: Refer to original journal article
In children, premolars associated with dentigerous cysts do not always erupt following conservative treatment with marsupialization, and certain factors and conditions may predict this non-eruption and the need for orthodontic intervention.

**Background:** Children develop dentigerous cysts (DCs) that are most often of inflammatory origin. These cysts predominately involve the mandibular second premolars and are treated conservatively to preserve the teeth and promote their eruption.

**Objective:** To examine the duration of eruption of premolars associated with a DC and to evaluate the factors that affect their eruption following surgical marsupialization.

**Participants/Methods:** This was a retrospective analysis of 21 subjects (12 males and 9 females; mean age, 10.8 years) with DC-associated premolars diagnosed using clinical, radiographic, and histopathological findings. All were treated with marsupialization and followed at Kyushu University Dental Hospital using dental and panoramic radiographs. Preoperative panoramic films were used to provide baseline measurements of the depth, degree of root formation, inclination angle, and available eruption space for the impacted premolars. Statistical analysis included the chi2 test or Mann-Whitney U test with P values <0.05 considered significant.

**Results:** Following marsupialization, 15 of 21 (72%) of the impacted premolars were 50% erupted in 3 months and completely erupted within 10 months. The remaining 6 impacted premolars did not erupt 50% in 3 months or completely erupt within 12 months. The mean age for subjects who experienced successful eruption was 9.8 years, which was statistically significant compared to 13.2 years for the unerupted group. The impacted tooth depth was rated shallow in 95% (14 to 15) of the erupted premolars and deep in 66% (4 to 6) of the unerupted group, with the erupted group significantly shallower than the unerupted group. For the measureable 12 erupted and 5 unerupted premolars, the tooth inclination angle for the erupted group was 60°, which was significant, compared to 26° for the unerupted group. There was no significant difference in the degree of immature root formation between the erupted (6 of 15) and unerupted (1 of 6) groups. The ratio of eruption space to crown width in the erupted group (1.14) was not significantly different than that of the unerupted group (1.14).

**Conclusions:** Successful eruption of premolars associated with DCs without orthodontic intervention may be predicted 3 months following marsupialization. The age of the patient, tooth depth, and angle of inclination have significant effects on eruption, while neither the degree of root formation nor eruption space available affect eruption.

**Reviewer's Comments:** This retrospective analysis had a relatively good sample size. The measurements were well defined, but no information was given as to the time period that the patient information was collected or how often they were followed and evaluated postoperatively. No information was given as to the number of examiners who participated and how inter-examiner standardization was evaluated. The majority of the findings were consistent with similar investigations with the exception of immature root formation. (Reviewer-Erwin G. Turner, DMD).

**Keywords:** Odontogenic Jaw Cysts, Dentigerous Cyst

**Print Tag:** Refer to original journal article
25% of Sexually Active Adolescent Females Have a STI

Prevalence of Sexually Transmitted Infections Among Female Adolescents Aged 14 to 19 in the United States.

Forhan SE, Gottlieb SL, et al:

Pediatrics 2009; 124 (December): 1505-1512

Early sex education and sexual health care is essential to reducing the burden of sexually transmitted infections among teenage female adolescents.

**Background:** Most young women initiate sexual activities during adolescence, and the risk for acquiring sexually transmitted infections (STIs) is possible. Most STIs are minor, but some may lead to pelvic inflammatory disease, infertility, and even cervical cancer. In addition, some STIs can increase the risk for acquiring HIV infection.

**Objective:** To estimate the prevalence of STIs among females aged 14 to 19 years in the United States.

**Materials:** Using data from the National Health and Nutrition Examination Survey (NHANES) for 2003-2004, the authors had access to >800 survey participant responses and biological test results.

**Methods:** Survey participants were interviewed, underwent a physical examination, and submitted biological specimens. Sexual history information was collected by means of an audio computer-assisted self-interview. "Sex" was defined as vaginal, oral, or anal sex. "Sexual experience" was identified as a positive response to the question, "Have you ever had sex?" The prevalence of several STIs was assessed.

**Results:** The prevalence of any of the 5 STIs among all participants was 24% and 38% among "sexually experienced" female adolescents. Human papillomavirus (HPV) was the most common STI noted in all adolescents sampled, followed by chlamydia. The prevalence for an STI in 14- to 15-year-old adolescent females was 14%. Non-Hispanic black participants were more likely to have at least 1 of the 5 STIs surveyed.

**Conclusions:** Due to the substantial burden for STIs among adolescent females, access to sex education and sexual health care prior to beginning sexual activity should be ensured.

**Reviewer's Comments:** Health-care providers, including pediatric dentists, who see adolescent female patients, need to be aware of the likelihood of sexual activity experience and the prevalence of STIs. In addition, the efficacy of antibiotic treatments may be rendered ineffective in adolescent females taking birth control medications. (Reviewer-Paul O. Walker, DDS, MS).

Keywords: Sexually Transmitted Diseases, Adolescent, Prevalence

Print Tag: Refer to original journal article
Plaque development can no longer be thought of as a generic process. Microbial ecology tells us it could stem from a highly individualized process, with ramifications for the treatment of the diseases it causes.

**Background:** Research tells us that the human oral microbiome is comprised of hundreds of micro-organisms that colonize on a variety of surfaces, including dental plaque, which grows as a biofilm on the tooth surface. These oral biofilms develop under a range of different conditions. Advances in molecular techniques make us aware that plaque development may no longer be thought of as a generic process, but rather as a highly individualized process that impacts the treatment of the diseases it causes.

**Design:** This paper reviewed emerging concepts in microbial ecology and how they relate to oral biofilm development and the treatment of oral diseases.

**Methods:** These review authors researched and closely examined a host of new concepts in microbial ecology, its role in biofilm development, and how oral diseases are categorized and treated. They investigated specific ecological factors that impact oral biofilm development. Some of these factors include: the ecology of dental plaque in health and disease; metagenomic analysis of the oral microbiome; interindividual variation in plaque development and the progression of disease; the role of microbial aggregates; biofilm structure, altruistic behavior and antimicrobial treatment; and, new-generation therapeutics. Advances in molecular techniques have given rise to a much greater understanding of the diversity and complexity of human microbiota communities, including dental plaque. For decades, oral diseases were thought of as relatively simple diseases, with the etiological agents identified and treatments developed accordingly.

**Results:** This review advances the hypothesis that the microbial ecology of dental plaque and the diseases it causes are actually far from simple and far from being understood. Bacteria interacting within a biofilm behave differently than when they are in isolation.

**Conclusions:** This article presents an exciting and extremely comprehensive review of the human oral microbiome, shining light on newly emerging biofilm theories that may eventually change the way we diagnose and treat oral disease. Gone are the days when the development of cavities is tied generically to consuming too much candy, not brushing enough, or not getting enough fluoride.

**Reviewer’s Comments:** Dental practitioners everywhere will want to watch how these emerging concepts in microbial ecology evolve. For example, new work in biofilms in the mouth has led us to understand that bacteria of different types within oral biofilms communicate with one another. The mechanisms and extent of this communication are not yet well understood. However, as rapidly developing work with biofilms allows us to understand these communication mechanisms, steps will be taken to create interventions that will disrupt the communication within biofilms that might lead to reduction in oral disease. Imagine that we might be characterizing our infants’ and toddlers’ caries risk merely by accurately characterizing their unique oral biofilm. (Reviewer-Joel H. Berg, DDS).

**Keywords:** Oral Biofilms, Caries, Microbial Ecology

**Print Tag:** Refer to original journal article
Food allergy-related visits to physicians have nearly tripled from 1993 to 2006.

**Background:** Allergy to foods is a serious health issue that can have a life-threatening outcome. Other reports suggest that the prevalence of food allergy, particularly to peanuts, may be increasing.

**Objective:** To estimate the prevalence of food allergy and to describe food allergy prevalence trends.

**Design/Participants:** Cross-sectional survey on food allergy among children ≤18 years of age.

**Methods:** The investigators utilized data from the 1997-2007 National Health Interview Survey, the 2005-2006 National Health and Nutrition Examination Survey, the 1993-2006 National Hospital Ambulatory Medical Care Survey and National Ambulatory Care Survey, and the 1998-2006 National Hospital Discharge Survey. Reported food allergies, serum immunoglobulin E (IgE) antibody levels for specific foods, and hospitalizations were assessed.

**Results:** In 2007, 3.9% of U.S. children ≤18 years of age had reported a food allergy. In the 10 years from 1997 to 2007, the prevalence of food allergy increased 18%. This increase was due to both food allergy awareness and prevalence. Serum IgE antibody levels to peanuts were detectable in approximately 9% of U.S. children. The number of food allergy-related ambulatory care visits to emergency departments and physicians’ outpatient offices increased 3-fold from 1993 to 2006.

**Conclusions:** Using data from several national health surveys, the authors concluded that food allergy prevalence and/or awareness has increased among U.S. children.

**Reviewer’s Comments:** Although the authors did indicate that how much of the apparent increasing prevalence of food allergies noted in various national health surveys was due to actual increases in the clinical disease and how much was due to increased awareness, this was a definite shortfall of the article. (Reviewer-Paul O. Walker, DDS, MS).

Keywords: Food Allergy, Food Hypersensitivity, Surveys

Print Tag: Refer to original journal article
Tax Sugar Sweetened Beverages That Drive the Obesity Crisis


Brownell KD, Farley T, et al:


There are many compelling reasons to tax sugar-sweetened beverages to reduce their consumption.

**Background:** Consumption of sugar-sweetened beverages (SSBs) has been associated with higher risks for obesity, diabetes, and heart disease. Overweight is the number one health problem in the United States, and there is a need to reduce consumption of SSBs. Taxing tobacco products has reduced their use.

**Objective:** To examine the trends in the consumption of SSBs, links to consumption and chronic disease, and proposing a tax on SSBs.

**Design:** Review and expert opinion.

**Methods:** A review of the current literature was performed.

**Results:** SSB consumption has a positive association with body weight, both in longitudinal and cross-sectional studies not funded by the beverage industry. Consumption of refined carbohydrates, such as sugar, elevates triglyceride levels and blood pressure and lowers HDL levels, which increases the risk of coronary heart disease. SSBs have a high glycemic load due to sugar, and they increase the risk of diabetes, causing insulin resistance. Intake of SSBs may cause increased weight gains in part due to the poor satiation properties of sugar in a liquid form. SSB consumption may satisfy thirst and social pressures in the absence of hunger, as well as cause an adverse affect on taste preference and food compliance. Medicaid costs for overweight and obesity is estimated at $147 billion (9%) of the U.S. health care expenditure. Currently 33 states have sales tax on soft drinks, with a mean tax of 5.2% per purchase. A national tax of 1 cent per ounce on SSBs would raise $14.9 billion in the first year. Public support for a tax on SSB is increasing. For example, in New York State, 52% survey respondents support a tax. Taxes on tobacco products are routine in both state and federal levels, with a total high in New York State of $3.76 per pack to the low of $1.06 in South Carolina.

**Conclusions:** The reasons to proceed with a tax on SSBs are compelling. The science linking SSB consumption and the risk for chronic diseases is clear (does that include dental disease?). Escalating health care costs and the rising burden of disease related to poor diet creates an urgent need for a solution. A tax on SSBs would have a profound effect on reducing consumption, and these taxes can generate substantial revenue to prevent obesity and fund other health-related programs

**Reviewer's Comments:** If SSBs are in fact linked to obesity, heart disease, and diabetes, how can we reduce the intake of these beverages? Estimates for sweetened beverages have been as high as 42 gallons per person per year in the United States. In January 2010, it was reported that obesity has overtaken cancer as the number one health problem in the United States. Reports are that 32% of school-aged children are overweight and 16% are obese. This cannot go on and something has to be done. (Reviewer-Arthur J. Nowak, DMD).

Keywords: Sugar Sweetened Beverages, Obesity, Health Economics

Print Tag: Refer to original journal article
Mothers of children with asthma are concerned as to how their child's condition affects family relationships.

**Background:** The prevalence of pediatric-onset asthma is increasing globally. In Jordan, there has been an 8.3% increase in the prevalence of wheezing, as well as a 4% increase in asthma diagnoses in children aged 6 to 12 years. Previous studies have demonstrated that children with asthma (and their families) face a significant impact on quality of life (QoL) from the disease.

**Objective:** To assess the QoL of Jordanian parents of children with asthma.

**Design:** Cross-sectional, survey-based study.

**Methods:** Parents for this study were derived from a patient list involved in a previous asthma study. The original selection was done by random sampling of ordered lists from 3 hospitals in northern Jordan. Children were 7 to 17 years of age with a diagnosis of bronchial asthma; all were taking daily medications. Patients with other chronic illness were excluded. Parents completed the Pediatric Asthma Caregivers Quality of Life Questionnaire (PACQLQ), which consists of 13 items designed to measure how a child's asthma has impaired the parents functioning in 4 domains (activity, emotional, and 2 QoL domains). Each item was scored on a 7-point Likert scale. A higher score on the PACQLQ indicated a better parental health-related QoL.

**Results:** Data were collected from 326 parents of 200 children. A total of 289 (89%) of parents reported having >1 child. There was no significant difference in the overall QoL between mothers and fathers; however, mothers had a significantly lower emotional QoL ($P=0.02$). Within the mothers surveyed, 19% had to change their plans often due to the child's asthma (compared to 11% of fathers). More mothers were affected by the concern of how their child's asthma affected family relationships and their child's daily activities. Age of the child and severity of asthma were the most important factors associated with parental QoL. Older mothers were more likely to have a higher QoL irrespective of their child's disease severity.

**Conclusions:** A child's asthma may impact their parents overall QoL.

**Reviewer's Comments:** The central core of this paper imparts a valuable message—chronic illness (eg, asthma and early childhood caries) are often family-based diseases. I do have some reservation in the actual execution of this paper, as there were 1.5 parents surveyed for every child, and for this reason, the statistical analysis should have involved some form of repeated measures/cluster analysis. Finally, the paper does a disservice by not framing the results in the social context of Jordanian culture. My assumption is that mothers are still very much the primary caregivers, but I would like to know the prevalence of dual-income households (if any). This may explain the results of mothers being 'more affected' than fathers (ie, they spend more time with the sick child). (Reviewer-S. Thikkurissy, DDS).

**Keywords:** Asthma, Quality of Life

Print Tag: Refer to original journal article
Prematurely born children with high peak total serum perinatal bilirubin are more likely to present with ECC than their unaffected counterparts.

**Background:** Prematurity has been a well-reported factor in the developmental of dental defects in children. Specific defects, such as enamel hypoplasia, have been suggested to increase a child's susceptibility to early childhood caries (ECC). Neonatal jaundice has been specifically cited as a condition of prematurity predisposing children to enamel hypoplasias.

**Objective:** To assess if there is an association between severities of unconjugated hyperbilirubinemia (UH) during the first 2 postnatal weeks of life and ECC.

**Design:** Retrospective, case-control design.

**Participants/Methods:** Children included in the study were born between 2001 and 2005 and admitted to the neonatal ICU (NICU) at Children's Hospital in Strong, Rochester. These children also received at least 1 comprehensive dental examination by 71 months of age. Exclusion criteria included documented genetic disorders, cleft palate, conjugated hyperbilirubinemia, and incomplete NICU records.

**Results:** Data were collected from 76 children. Of these children, 42 (55%) had ECC, with a mean decayed, extracted, and filled teeth (DEFT) score of 7.1. There were 34 control subjects included, and no significant difference in gestational ages between the 2 groups was noted. Children with ECC were significantly more likely to have higher peak total serum perinatal bilirubin ($P = 0.01$). All other neonatal risk factors were insignificant. The odds of developing ECC increased with each 1-mg/dL increase in peak total serum bilirubin by 17%.

**Reviewer's Comments:** The valuable premise of this paper underscores that there are events in the prenatal, natal, and immediate postnatal life of a child that can impact the onset of ECC. The authors point out the major weakness as being the retrospective nature of the paper (even though a prospective study might not necessarily add any information). However, many of the neonatal risk factors studied are poorly powered to make any conclusive statements. A post-hoc power analysis would have been nice to see how well this study is powered to make statements about the bilirubin of subjects. Having said that, I would have liked some more discussion on whether it is indeed the hyperbilirubinemia or the poor systemic health it suggests that is behind the ECC onset. Finally, as the title suggests, some children with compromised birth histories may need dental intervention earlier than the "year 1 visit." (Reviewer-S. Thikkurissy, DDS).

Keywords: Prematurity, Hyperbilirubinemia, ECC

Print Tag: Refer to original journal article
Stem cells from exfoliating deciduous teeth have been shown to differentiate into odontoblasts in vivo.

**Background:** Due largely to the media, the lay person has become considerably more interested in the implications of stem-cell therapy in medicine and dentistry.

**Objective:** To review postnatal dental stem cells and their relation to regeneration of craniofacial tissues.

**Results:** Postnatal stem cells (adult) are also known as somatic stem cells. These cells are characterized by 2 properties, multipotency and self-renewal. With respect to self-renewal, it is critical to note that following division while one daughter cell becomes a “committed progenitor cell,” the other daughter remains a stem cell. Historically, hematopoietic stem cells (HSC) were used due to their easy access and success in treating malignancies such as leukemia. These cells are also known as mesenchymal stromal cells (MSC) and have a wide range of uses. MSCs have also been isolated from odontogenic components, such as pulp, periodontal ligament, and dental follicle. These stem cells (dental pulp stem cells [DPSC]) can produce a dentin/pulp resembling complex. Exfoliated deciduous teeth contain vital pulp remnants containing stem cells known as SHED. These cells are very fragile and cannot live long after exfoliation. These SHED cells demonstrate a higher rate of biologic activity when compared to DPSCs; it is suggested that the SHED cells can differentiate into odontoblasts in vivo. Periodontal ligament stem cells (PDLSCs) have the capability to differentiate into adipocytes, chondrocytes, and osteocytes. There have been successful animal models in which, specifically PDLSCs, have been used to restore alveolar bone height as well as cranium/mandible repair. While there are currently NO human trials using dental postnatal stem cells, there are already companies, such as the Bioeden Tooth Cell Bank, that will harvest and store stem cells from deciduous teeth. Major barriers to stem-cell therapy include obtaining a sufficient number of viable cells. Furthermore, there is the relatively unstudied risk of graft versus host disease that would be possible in these types of scenarios. There is also an unknown, namely the tumorigenicity of MSC (and likewise DPSC/SHED/PDLSC). Finally, one needs to consider additional morbidity to the donor site, which makes the use of exfoliating teeth so desirable.

**Reviewer’s Comments:** This review was well done. It is a very significant point that irrespective of our knowledge base, patients are coming in with what they hear on CNN, and, as we all well know, patients are much more demanding that their physicians and dentists be abreast of current therapies and controversies in medicine. This review makes a good point that while therapies are promising, there are still major morbidities/postoperative risks that need to be studied and considered. (Reviewer-S. Thikkurissy, DDS).

Keywords: Stem Cells, Transplantation

Print Tag: Refer to original journal article
In post-medical school residency, pediatricians report receiving <2 hours of formal instruction on oral health.

**Background:** While the use of fluoridated water and improved access to dental care has reduced dental caries in certain populations (primarily along socioeconomic lines), there has also been an increase in oral health disparities. One theorized way of improving access to traditionally “excluded” populations (namely the poor and ethnic minorities) is to involve pediatricians in oral health assessment in early childhood. The basis for this thought is that pediatricians see a child as many as 6 times in the first year and 10 times by 3 years of age. There is also a goal to reinforce that oral health is an integral part of systemic health from birth onwards.

**Objective:** To evaluate the role of the pediatrician in the oral health care of children in Indiana.

**Participants/Methods:** Members of the Indiana State Medical Association (ISMA), who identified themselves as pediatricians, were surveyed with a 31-item instrument that covered domains such as oral health knowledge, prevention, guidance, and use of preventive dental measures (eg, sealants).

**Results:** 138 pediatricians responded to the survey (response rate, 46%). Twenty percent of respondents were over 30 years from their pediatric residency, with only 21% <10 years from their training. The majority of respondents saw >100 patients per week in their office (44%). The mean number of hours of oral health instruction received was recorded for medical school (1.4), residency (1.6), and continuing education (2.4). The major barrier pediatricians identified to a child's oral health was insurance status (51%) and parental lack of compliance (49%). A total of 61 respondents (44%) said they rarely saw caries in their practices, 66% correctly identified the first visit recommendation by American Academy of Pediatric Dentistry/American Academy of Pediatrics as 12 months. While 93% responded they counseled on going to a dentist at well-child visits, only 30% felt that referral to a dentist should be part of a child's well visit.

**Reviewer’s Comments:** This paper highlights that a major component of the obstacle to physician involvement in oral-health is training. Most pediatricians received the most training AFTER graduation as part of CE courses and only received 1.6 hours total in residency. Also, it is of interest to note that while many counsel on going to a dentist, only one-third of pediatricians feel they should refer a child to a dentist during a well-child visit. (Reviewer-S. Thikkurissy, DDS).

**Keywords:** Physician-Based Oral Health, Public Health

**Print Tag:** Refer to original journal article
RSV and Influenza--Equally Destructive to Young Children?

Relative Impact of Influenza and Respiratory Syncytial Virus in Young Children.
Bourgeois FT, Valim C, et al:

Pediatrics 2009; 124 (December): e1072-e1080

Background: Nearly 100% of American children are infected with respiratory syncytial virus (RSV) by the time they turn 3 years of age. For many of these children, the RSV infection can progress to a life-threatening bronchiolitis or further illness. In addition to those infected with RSV, approximately 40% of preschool-aged children also experience an influenza-based illness. Currently, much of the resources in managing early childhood respiratory illness are directed at the outpatient clinic. However, emergency department (ED) visits for the same illnesses may be 30 times more common.

Objective: To measure the impact of influenza and RSV on preschool-aged children in terms of ED visits and resource utilization.

Participants/Methods: 3 cohorts were studied within the 0- to 7-year-old age group. The first cohort was the respiratory illness (RI) cohort, which included patients in whom acute respiratory illness (ARI) was evaluated from a study ED in Massachusetts. Secondly, a viral test (VT) cohort was evaluated, and the total yearly ARI rate was evaluated among patient visits to the study EDs. The third cohort was the Database (DT) cohort, in whom the mean yearly incidence of ARIs was evaluated from U.S. EDs.

Results: Data from 210 children were accumulated in the RI and VT cohorts. Children <23 months old were significantly more likely to have a diagnosis of RSV, while children 24 to 84 months old were more likely to be diagnosed with an influenza-based ARI. The RSV patients made up 24% of total ED visits compared to 11% for influenza. Children with RSV were significantly more likely to have medications administered, a radiological study, and were more likely to be admitted. However, it should be noted that approximately 90% of all children with an RSV or influenza-based illness required additional health care.

Conclusions: RSV has a much greater impact on young children than influenza.

Reviewer's Comments: I have come across many young children with a history (and active) RSV, primarily in the oral sedation clinic I run in our graduate residency program. It is an illness that dentists, particularly those that do any pharmacological behavior management of young children, need to be keenly aware of. Not only can RSV increase baseline airway reactivity, but it can impact treatment outcomes, and in children with a concomitant history of prematurity, can significantly increase morbidity. (Reviewer-S. Thikkurissy, DDS).

Keywords: RSV, Influenza, ED Visits

Print Tag: Refer to original journal article
Nitrous oxide-oxygen therapy can alter the pain perception of minor medical procedures, making them less stressful for children and adolescents.

**Objective:** To discuss published evidence regarding the assessment, management, and factors of pediatric pain control in the United Kingdom.

**Results:** Current British guidelines state that children in moderate to severe pain should wait no more than 20 minutes for triage and administration of analgesia. Assessment of pain has been accomplished through several standardized instruments. For younger children, faces scales and visual analogue scales are most commonly used. In an acute setting, behavior is the main way that infants and preverbal children communicate pain; this is done through classically described behaviors such as crying, grimacing, posturing, and inconsolability. These behaviors are translated specifically in scales such as the Children’s Hospital of Eastern Ontario pain scale (CHEOPS) and faces, legs, activity, cry and consolability (FLACC) scales. Of further interest is that the perception of how much pain a child is in often differs between parents and physicians, and while parental presence during procedures did not alleviate pain, it did reduce parental anxiety about procedures being performed. There is a body of literature to suggest that nonpharmacological techniques (eg, hypnosis, play, distraction, and even the use of familiar television programs) can reduce needle-related pain and distress in children and adolescents. British authorities put forth that children with all levels of pain will benefit from acetaminophen 10 to 15 mg/kg every 4 to 6 hours. Severe pain should be treated with IV opiates, as oral drugs have a delayed onset of action and a variable absorption. The authors discuss that the use of nitrous oxide and oxygen mix (Entonox) can make minor procedures less stressful for children and adolescents. In preterm infants, oral sucrose was found to reduce the behavioral and physiological pain responses. The use of procedural sedation and analgesia is a core competency for emergency physicians and anesthetists in the United Kingdom. The literature discussed also comments that the judicious and routine use of local anesthesia for procedures can improve treatment outcomes.

**Reviewer’s Comments:** There is rapidly growing literature on pain assessment and management in children. I have reviewed several articles in past months dealing with this. Dentists, and particularly those who work with children, need to become well trained in the risk/benefits and morbidities associated with analgesia in children. This includes conscious sedation and post-general anesthesia analgesia. (Reviewer-S. Thikkurissy, DDS).

**Keywords:** Pain, Analgesia, Pediatric

**Print Tag:** Refer to original journal article
Has Allergy Prevalence Really Increased 300% since 1880?

Introduction of Oral Vitamin D Supplementation and the Rise of the Allergy Pandemic.

Wjst M:


The reported prevalence of allergies has increased from 0.1% at the end of the 19th century to >30% in 1980.

Background: In 1999, the process of allergic sensitization was first associated with immune effects of oral vitamin D supplementation. This hypothesis suggests that the initial sensitization against allergens in the newborn is associated with immunologically-based side effects for vitamin D supplementation, which is used for prevention of rickets.

Objective: To outline the prevalence of rickets, vitamin D supply, and allergy prevalence present in the literature since 1880.

Methods: A systematic analysis of articles in PubMed since 1950 was reviewed in conjunction with issues of Science and Nature from 1869 onwards.

Results: In 1880, allergy was rarely documented/reported, which caused it to be considered an “orphan disease.” Much of the literature of the day was concerned with more pressing and life-threatening medical issues such as tuberculosis, cholera, and typhoid. Hay fever was the first allergic disease described in the literature and was done so in 1819. At the end of the 19th century, the estimation was that 0.1% of the population in the U.K. and U.S. suffered from “Allergie,” a term coined in 1906. Likewise, at this time, there was no knowledge of vitamin D, and the initial source was actually cod liver oil, although its medicinal properties were unclear. Rickets was a common disease, although it was conspicuously absent from southern Spain, Turkey, and Greece. In 1930, the reported prevalence of hay fever was 1% to 3%. Concurrently, there was a steady increase in the cod liver oil production, which was commercially available from Merck in 1927. At this time in history, cod liver oil was regularly given to toddlers. The estimated prevalence of rickets in this population was 38%. In 1980, the prevalence of allergies was reported to be as high as 30% of the population. It should also be noted that most newborn foods contain vitamin D2 or D3 and cod liver oil, although it is less frequently used in toddlers. As a result of this, clinically manifested rickets has become a rarity. It is unlikely that LOW levels of vitamins are related to the allergy increase. Studies have related more significant immunologic changes to hypervitaminosis as opposed to vitamin deficiencies.

Reviewer's Comments: This was a fascinating historical piece outlining a theory, which although not firmly represented by studies, is intuitive and “makes sense.” It also underscores that even vitamins, when taken at inappropriate developmental stages or excessively, can have adverse physiologic effects. The exact immunologic mechanisms behind allergy development are poorly understood, and this paper presents a provocative theory. I do have to wonder, however, whether some of this is just related to us understanding allergies a little better and knowing what we are looking for. (Reviewer-S. Thikkurissy, DDS).

Keywords: Allergy, Vitamin D, Rickets

Print Tag: Refer to original journal article
Older mothers are significantly more likely to have DS children than are younger mothers.

**Background:** Down syndrome (DS) occurs in >5000 U.S. children per year, making it the most common chromosomal disorder. The long-term survival of DS children has vastly improved, with >90% living past 5 years of age. The median age of death for DS patients in 1997 was 49 years, which is a dramatic improvement from age 25 years in 1983. This is in spite of the fact that DS children have a reported increased risk for endocrinologic, hematologic, neurologic, and respiratory issues. There is only 1 report in the current literature that estimates the prevalence of DS children/adolescents in an urban population, with the reported prevalence being 8.3 per 10,000 children 0 to 19 years of age.

**Objective:** To estimate DS prevalence among children and adolescents in 10 regions within the United States.

**Methods:** Data were collected from population-based birth defects surveillance programs in select counties within Arkansas, Georgia, California, Colorado, Iowa, North Carolina, New York, Oklahoma, Texas, and Utah between 1979 and 2003.

**Results:** The pooled DS prevalence increased a mean of 0.9% per year to end in 2003 at 11.8 DS births per 10,000 births. The DS prevalence increased significantly among older mothers and decreased slightly among younger mothers. The state with the highest prevalence was Utah with 13.7 DS births per 10,000 births, with the older mother prevalence nearly 5 times that of younger mothers. DS prevalence in all years and regions was consistently higher among males. Congenital heart disease was present in 61% of DS children in Oklahoma (with the low end being 37% in Georgia).

**Conclusions:** The prevalence of DS births has increased in the past 20 years, particularly among older birth mothers.

**Reviewer's Comments:** Down syndrome is a common disorder, and many of these patients stay with the same dental provider well into adulthood. This paper highlights several significant points. DS patients are living longer, often have a myriad of comorbid health conditions, and may have aging caregivers as well. (Reviewer-S. Thikkurissy, DDS).

Keywords: Down Syndrome, Regional Prevalence

Print Tag: Refer to original journal article
Using a short-gauge needle for an IA block is a risk factor for needle breakage.

**Background:** The development of the modern hypodermic needle in the 1960’s has significantly impacted how dental anesthesia is delivered. Previously, needles were sterilized, made of carbon steel, and subject to fracture. In fact, many of the older needles had a stopper in the form of a ball or disk that prevented one from inserting the needle too far to be recovered if it broke. Historically, artery forceps were an essential part of a dentist’s armamentarium to facilitate immediate grasping of broken needles. With the advent of the modern needle, the commonplace frequency of broken needles is a thing of the past; however, the broken needle has not completely been eliminated.

**Objective:** To review cases with reported broken needles at 1 institution during the past 25 years.

**Methods:** This was a retrospective chart review of all cases of broken local anesthetic needles referred to the Oral and Maxillofacial Surgery Department at the University of California, San Francisco between 1983 and 2008.

**Results:** 16 cases were identified; 15 from the local community and 1 from the dental student clinic. In 94% of cases, needle breakage occurred during an inferior alveolar block (IA). One-third of the patients were <10 years old. The most frequently noted comment by practitioners was the patient “suddenly moved at the time of injection.” In 60% of cases, the operator had bent the needle prior to usage. In all cases, the patient was admitted and removal was facilitated in the operating room, with some of the procedures taking as long as three hours. In all the cases, separation occurred at the hub of the needle, and typically, there was incorrect needle placement prior to breakage.

**Conclusions:** To avoid needle breakage, the author makes the following recommendations: (1) avoid using 30-gauge needles for IA blocks; (2) avoid bending the needle; (3) avoid burying the needle in the tissue to the hub; (4) be vigilant for movement in patients (especially children).

**Reviewer’s Comments:** This was a very well done piece, and while it only looks at 1 institution, it does provide valuable information and is universally applicable. The fact that the majority of practitioners were general dentists and that 33% of patients were younger children also reinforces that this needs to be a part of the local anesthesia curriculum in schools. (Reviewer-S. Thikkurissy, DDS).

**Keywords:** Broken Needles, Recommendations

**Print Tag:** Refer to original journal article
Reversal agents for opioids and benzodiazepines can be given intranasally, which allows for easier access and quicker onset than intramuscular administration.

**Background:** Moderate sedation through the use of enteral or parenteral medications is a behavior management technique used in pediatric dentistry. Potential adverse effects include respiratory depression, airway obstruction, and progression of patient into deep sedation/general anesthesia states. This case report discusses one such event and the management of the case.

**Results:** A healthy (ASA I) 3-year-old female presented for dental treatment under sedation. The child weighed 14 kg. Following an unremarkable history and physical by an attending pediatric anesthesiologist, the child was given 0.3 mg/kg (5 mg) midazolam and 1 mcg/kg (15 mcg) sufentanil intranasally (IN). Following a 15-minute latency period, the child was placed in a dental chair and a papoose board was used for stabilization. Monitors included a pulse oximeter and noninvasive blood pressure (NIBP). Her behavior at this time was uncooperative, as she was agitated and actively struggled. A second dose of IN midazolam was administered (2.5 mg), and she was supplemented by 50% nitrous oxide-oxygen through a nasal mask. Twenty minutes after receiving the second midazolam dose, the child was recorded as a Ramsay Score (RS) of 6 (no response to light glabellar tap), and the child desaturated to 80% to 85% oxygen. Treatment was stopped, 100% supplemental oxygen was administered, and a jaw thrust and chin lift were applied. Her heart rate remained between 140 and 150 bpm. An oral airway was placed, and her oxygen returned to normal. When the oral airway was removed, her oxygenation level decreased to 90% to 95%. While there was observed chest movement, there was no movement of the reservoir bag, and a preliminary diagnosis of laryngospasm was made. The laryngospasm resolved with 100% positive pressure ventilation. The child remained at RS 6, and the decision was made to reverse the child with naloxone 0.4 mg and 100 mcg flumazenil IN. Within 3 minutes, the child was awake and responsive. After 2 hours of observation, the child was discharged without further incident.

**Reviewer's Comments:** This paper highlights some important points to consider; namely, re-dosing a sedative medication in children is subject to varying absorption times and latencies. Indeed oral and IN formulations are NOT modes where reliable titration is an option. Furthermore, as stated in the American Academy of Pediatric Dentistry guidelines, a practitioner must always be ready to rescue a patient from a deeper level of sedation than intended. This case also reminds us that adverse effects commonly associated with deeper levels of sedation/general anesthesia, such as a laryngospasm, are possible even when moderate sedation is intended. (Reviewer-S. Thikkurissy, DDS).

**Keywords:** Sedation, Reversal, Intranasal

**Print Tag:** Refer to original journal article