



Sharing Early Preventive Oral Health With Medical Colleagues: A Dental Pain Prevention Strategy

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ABSTRACT An alarming number of children suffer from preventable dental pain and infections. Untreated caries may cause severe discomfort and grave systemic problems. Using this article as a curriculum of fundamentals, all dental professionals are encouraged to share current best practice oral health prevention strategies with their local community medical providers. Subject matter includes rudimentary pathophysiology, very early oral health risk assessment, anticipatory guidance, fluoride varnish, and establishing a dental home by age 1.

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Common sense tells us the best dental pain management strategy would be to steer clear of the cause. In countries with no prevention protocol, pain often precipitates the first dental visit.¹ This can establish a pain-fear cycle that remains throughout life.² Outdated paradigms on the appropriate age of the first dental visit vary from age 3 to 5, to when there's a problem, to "don't worry about it, they're just baby teeth." These archaic and ill-informed approaches may explain why caries remains the most common chronic disease of children throughout the world.³

Nine years ago the surgeon general of the United States reported, "The social impact of oral diseases in children is

substantial. More than 51 million school hours are lost each year to dental-related illness. Poor children suffer nearly 12 times more restricted-activity days than children from higher-income families. Pain and suffering due to untreated diseases can lead to problems in eating, speaking, and attending to learning."⁴ Significant improvement in what he referred to as "the silent epidemic" of oral disease has not occurred.

In fact, the problem continues to get worse. National Health and Nutrition Examination surveys showed the number of children age 2 to 4 years who have caries in their primary teeth recently increased by 6 percent. The rate rose from 18 percent during 1988-1994 to 24 percent during 1999-2004.⁵



FIGURE 1. Dental infection.



FIGURE 2. Healthy 7-month-old baby.



FIGURE 3. Biofilm or plaque.

It has been estimated that half a million California children miss school each year due to dental problems.⁶ The 2006 California Smile Survey indicated that 28 percent of children in the state have untreated decay and 19 percent have extensive decay. By kindergarten, more than half of California children have experienced tooth decay. In this study of more than 21,000 California kindergartners and third graders, many adverse manifestations of caries were found, including 4 to 8 percent of the students suffering from dental pain and infections⁷ (**FIGURE 1**).

The new millennium brought a new paradigm of treating caries as a non-classical infectious bacterial disease.⁸ It is now recognized that caries can be addressed most successfully with non-surgical, preventive modalities. However, due to the timing of inoculation, high-risk individuals must be identified and interventions begun within the first year of life. The American Academy of Pediatric Dentistry, AAPD, and the American Academy of Pediatrics, AAP, recognize this fact. Policy statements of both organizations advocate establishment of a dental home no later than 12 months of age.^{9,10}

Evidence-based science shows that early preventive strategies decrease the need for invasive surgical procedures, increase access to all, and cost less.¹¹ Numerous programs aspiring to control the growing caries problem have been developed. Between 2004 and 2008, more than 16,000 California dental and medical professionals and members of local community service organizations participated in the California Dental Association Foun-

dation and Dental Health Foundation's joint effort, First Smiles — Dental Health Begins at Birth.¹² This program trained California health providers to perform early oral evaluations, anticipatory guidance, and fluoride varnish applications on toddlers and infants. Other states have programs that build partnerships between dental and medical providers.^{13,14} Recently, the American Dental Association Foundation awarded an educational grant to the AAP to train pediatricians who will become oral health advocates and lead oral health prevention movements for each of the academy's 66 chapters in the United States, Canada, and Puerto Rico.¹⁵

Many California dentists embrace early preventive efforts and understand the importance of establishing a dental home prior to age 1. They have taken the opportunity to reach families already in their practices. However, individuals in their community who do not regularly seek nonemergent dental care but maintain well-child visits with their physician may be left out. A first-time mother may not realize how her oral care profoundly impacts the health of her baby.¹⁶

Furthermore, pediatric medical providers are well-versed in general prevention, but may not be as familiar with the specifics of oral disease prevention. Results of the 2006 Annual Survey of (Pediatric Medical) Graduating Residents revealed that 35 percent had no oral health training in their residency programs. Seventy-five percent of those who had training received less than three hours.¹⁷

Nondental health providers, including physicians and nurses, are far more

likely to see new mothers and infants than dentists. Pediatricians see healthy children up to eight times by age 1 and 13 times by age 3¹⁸ (**FIGURE 2**). Based on the essential nature of early preventive approaches, our medical colleagues are advantageously positioned to exert a positive influence on oral health education and early childhood caries prevention. This may be especially true among members of communities who have little or no access to dental care providers.

Recently, the oral health policy statement of the AAP was updated and reflects new recommendations pursuant to primary care pediatric practitioners integrating oral health into their practices¹⁰ (**TABLE 1**).

Consequently, nondental health professionals are more interested in early childhood caries than ever before and have many questions. Regardless of dental practice type, all California dentists can make inroads in dental pain prevention by serving as resources of information and by providing fundamental education of the critical components of preventive oral health visits. A rudimentary summary of the caries as a transmissible, communicable disease is a good starting point.

Basic Cariology

Health providers "traditionally define diseases on the basis of clinical presentations rather than on pathogenesis. This practice thwarts attempts at effective prevention."¹⁹ Controlling caries begins with a foundational understanding of etiology.

Caries is defined as a nonclassical infectious disease. Like other multifactorial diseases (diabetes, cancer, heart disease,



FIGURE 4. Various stages of visible caries.

and certain psychological illnesses), it has no simple causation pathway.⁸ A familial resemblance of caries experience was documented many years ago.²⁰ Studies now demonstrate a high degree of concordance between a mother's oral flora and that of her child.²¹ Saliva transmits cariogenic bacteria from generation to generation.²²

The timing of inoculation and acquisition of cariogenic bacteria occurs very early in life. The previous assumption that the presence of tooth enamel in an infant's mouth is required for cariogenic bacteria to be present is no longer considered to be true. These microorganisms have been detected in 2-month-old babies.²³

Once in the mouth, bacteria adhere to erupting teeth and form a biofilm, commonly referred to as plaque (**FIGURE 3**). A complicated bacterial ecosystem interacting with the host comes into existence and preferably homeostasis prevails. Dental disease involves a multifactorial relationship between the etiological factor (bacteria), microbial deposits and tooth surfaces interacting with social factors and biological determinants²⁴ (**TABLE 2**).

Describing the complexities of the myriad of interactions of the numerous variables that produce caries goes far beyond the scope and intent of this paper. Basically, if pathological factors predominate, the unseen initial stages of the caries process begin. When an abundance of unhealthy bacteria overrun the biofilm, components of ingested food and drink become more readily metabolized into acid. This causes a consequential drop in pH and the subsurface enamel crystals of teeth start to dissolve.

TABLE 1

AAP Policy Recommendations For Primary Care Pediatric Practitioners¹⁰

1. An oral health risk assessment should be administered periodically to all children.
2. Oral health risk assessment training should be recommended for medical practitioners who are in training programs and those who currently administer care to children.
3. Dietary counseling for optimal oral health should be an intrinsic component of general health counseling.
4. Anticipatory guidance for oral health should be an integral part of comprehensive patient counseling.
5. Administration of all fluoride modalities should be based on an individual's caries risk. Patients who have a high risk of caries are candidates for consideration of more intensive fluoride exposure after dietary counseling and oral hygiene instruction as compared with patients with a lower risk of caries.
6. Supervised use of fluoride toothpaste is recommended for all children with teeth.
7. The application of fluoride varnish by the medical practitioner is appropriate for patients with significant risk of dental caries who are unable to establish a dental home.
8. Every child should have a dental home established by age 1.
9. Collaborative relationships with local dentists should be established to optimize the availability of a dental home.

On the other hand, when protective factors outweigh deleterious components, caries is halted and sometimes even reversed. Fluoride, inherent enamel restorative properties of free-flowing saliva, and other beneficial variables help maintain homeostasis. Teeter-tottering back and forth between remineralization and demineralization (healthy and disease processes) occurring in the mouth has been called the caries balance.²⁵

Frequently unnoticed, the first visible clinical sign of ongoing caries is the tell-tale white spot enamel lesion. These decalcified enamel areas often appear in the form of dull or chalky white lines located in cervical (gumline) areas of the maxillary primary incisors. Prudent practitioners register these findings as warning signals that a once invisible disease process is now progressing to detrimental stages (**FIGURE 4**).

The American Academy of Pediatric Dentistry defines early childhood caries, ECC, as the presence of one or more decayed (noncavitated or cavitated lesions) in a child less than 6 years old.

In children younger than age 3, any sign of smooth-surface caries, even a single white spot lesion, is indicative of severe early childhood caries.²⁶ This definition acknowledges that ECC can be detected long before a frank cavity (aka, hole, decay) is seen or felt. Getting this point, the true definition of caries, across and into the minds of all health providers and the public, is critical to the success of any preventive intervention. It is important to distinguish the bacterial disease, caries, from the resulting cavities. Health professionals should emphasize that tooth restoration (filling a cavity) does little or nothing to stop the bacterially caused and behaviorally driven caries process.

Explaining this complicated multifactorial disease process in plain language helps improve caregivers' and patients' understanding. This can increase chances that they will take personal responsibility for their children's oral health as well as their own. The importance of caregiver compliance cannot be underestimated. Appropriate simple scripts for nonprofessionals may be of help (**TABLE 3**). Inconsistent or

TABLE 2

Tooth, Bacteria, and Host Interactions (adapted from Dental Caries, 2008²⁴)

Individual and population social factors	Biological determinants acting at tooth surface
Social class	Saliva flow rate and composition
Income	Diet composition and frequency
Knowledge	Fluoride
Attitudes	Microbial species
Behaviors	Buffer capacity
Education	Sugar clearance rate
	Time

absent home oral hygiene, unhealthy daily dietary intake choices, inadequate fluoride exposure, and early colonization of cariogenic organisms accelerate and exacerbate dental disease. These, along with many other variables, including those previously mentioned, are referred to as risk factors.

Risk Factors

Reviewing the literature on risk factors can be overwhelming.²⁷ The origin, rate of progress, and destructive potential depend on an abundant number of determinants. “Big picture” views depicting causative factor interrelationships have been published.²⁸ The disease process is very complex and everyone has some degree of susceptibility. Primary behavioral influences are social and lifestyle variables.

Familiarity with and early identification of individuals falling into a social high-risk category is essential in targeting preventive efforts. Research indicates that in the United States, 70 percent of childhood caries can be found in approximately 20 percent of children.²⁹ Significant social risk factors include infants of low socioeconomic status whose mothers have a low educational level and whose diet includes sugar-rich foods. Lifestyle variables such as poor oral hygiene result in a failure to disrupt plaque, which promotes tooth decay. This obvious infant risk factor generally relates to parenting skills and practices.

Risk factors unique to infants and young children, which are listed in the AAP policy, include perinatal considerations, establishment of oral flora, host-defense systems, susceptibility of newly erupted teeth, dietary transitioning from breast and bottle feedings to cups and solid foods, and the establishment of childhood food preferences.¹⁰ Other factors that may be of particular interest to medical colleagues include middle ear and respiratory infections, asthma, and antibiotic use prior to 18 months of age.^{30,31}

Children with special health care needs have the greatest risk of caries having an impact on systemic disease.^{32,33} Many take medications that have a high sugar content and side effects that include decreased salivary flow. Oral hygiene challenges and compromised immune systems are common. Often oral health takes low priority until other problems are stable. This can lead to life-threatening acute infections and pain.

Certain people groups such as Native American Indian and Latino children have extremely high rates of caries. The *ADA News* quoted a researcher, “Native Americans have one of the worst cavity rates in the world. It is not uncommon to see a less-than-2-year-old Native American child with completely decayed teeth.”³⁴ In California, Latino children have the highest risk for dental health problems.⁷ Learning about these and other facets of caries help health providers identify

TABLE 3

Simple Talking Points on Understanding the Cause of Cavities

- Dental disease process starts whenever food or drink enters mouth. Known as “acid attacks.”
- About one in four or five people have bad germs or bacteria that can change the foods we eat and drink into powerful tooth-dissolving acids.
- Cavities are the result of bacterial acids that literally burn holes into teeth.
- A cavity is a hole. Caries is the bacterial disease that causes cavities.

individuals most vulnerable to experiencing dental pain in their lives. Understanding the disease and its determinants can aid in reducing population disparities.³⁵

Key Early Prevention Strategies

Persuading caregivers to perform consistent home care for themselves and their children is of paramount importance. Thoroughly brushing for two minutes with a soft-bristled brush and a “smear” of an ADA-approved fluoridated toothpaste the size of the child’s pinky fingernail (**FIGURE 5**) at least twice daily (after breakfast and just before bed) is all that is required.¹⁰ This may be the best and most practical dental pain prevention approach an individual can utilize.

Nondental professionals benefit greatly from hearing hallmarks of preventive dentistry such as brushing with fluoride toothpaste. However, fundamental knowledge can become second nature and easily forgotten to be mentioned. Sharing key early oral health prevention strategies may be likened to teaching others how to ride a bike. It helps trainees when the nuts and bolts of procedures are taught. Try to keep this in mind when sharing the well-known and effective preventive strategies highlighted below with medical colleagues.

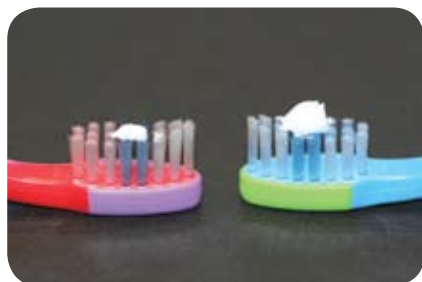


FIGURE 5. Pinky nail-size (left) and pea-size (right) smear of toothpaste.

Fluoride

Nondental health providers and the public in general often have questions about how fluoride prevents cavities. Promoting remineralization of decalcified enamel, inhibiting cariogenic microbial activity in dental plaque, and increasing tooth resistance to acid dissolution comprise three explanations of its beneficial effects.³⁶ Commonly used words to describe the prophylactic and/or therapeutic utilization of fluoride refer to topical (directly on the enamel of a tooth present in the mouth) and systemic (ingested and absorbed into the blood stream leading to higher levels of fluoride in the plasma, which theoretically results in fluoride incorporation into developing permanent teeth making them more resistant to decay). Note that systemic fluoride has a topical effect as it passes through the mouth and over enamel surfaces. It also becomes topical again in saliva.

In the past decade, fluoride varnishes have emerged as an effective way to provide topical fluoride for at-risk pediatric patients. By integrating them into their practices, medical providers and dentists can reduce caries incidence and noninvasively repair incipient carious lesions. Essentially, this product consists of an organic or synthetic resin material with incorporated fluoride.

After being applied to the enamel with a brush (**FIGURE 6**), the resin sets and forms a coating on the teeth. This serves as a matrix that slowly releases fluoride over time. The material remains on the enamel surface for a period of days to weeks and then



FIGURE 6. Fluoride varnish application.

must be reapplied if additional fluoride exposure is desired. Professional application of varnish and other topical fluoride modalities, together with oral health education, is supported by the scientific literature for the prevention and therapeutic/nonsurgical treatment of caries.³⁷

Furthermore, research finds children who do not receive fluoride varnish and caregiver education are four times more likely to develop tooth decay than those receiving two yearly treatments and twice as likely than those receiving annual applications.³⁸ Apparent in a recent survey, use of topical fluoride varnish treatment has increased dramatically in pediatric dental offices across the United States.³⁹

A systematic review of fluoride varnish concluded that it is safe, an unlikely contributor to fluorosis, and that related allergic reactions are rare.⁴⁰ Providers need to assure the safety of their patients, as well as their own safety when using fluoride varnish products. Care must be taken to avoid ingestion and contact with eyes or skin. As with all dental and medical materials, adherence to the manufacturer's instructions and precautions is important for successful outcomes. There are a number of different fluoride varnish products on the market and some variation in the instructions for use.

A bare minimum supply list for fluoride varnish applications may include gloves, eye protection, tongue blade, disposable mouth mirror, light source (otoscope or small flashlight), and 2x2 gauze. The fluoride varnish often comes in individual packets with an applicator brush. The tip

of the brush can be bent at a 90-degree angle, which facilitates reaching areas of difficult access. A 2x2 gauze can be used to remove superfluous saliva from the teeth before applying. Simply paint a thin coating over the enamel. It is important that excess fluoride varnish not pool in the mouth or migrate beyond the intended tooth surfaces. The varnish hardens with moisture contact. The material must be reasonably well-set (most varnishes require one to two minutes to harden) before the patient is dismissed. Considerations and general instructions (**TABLE 4**) for patients include the avoidance of brushing or flossing for four to six hours to allow for the complete setting of the material.⁴¹

The timing of application is critical. Obviously, most benefits can be obtained before the enamel surface loses its integrity. Success also depends on applying the topical fluoride where lesions most likely occur. Targets for varnish (and oral hygiene) are enamel surfaces upon which caregivers/patients often allow biofilms (plaque) to mature and remain for prolonged periods of time, such as along marginal gingival enamel, interproximal areas below contact points, and occlusal surfaces (especially during the prolonged eruption into functional occlusion).⁸ Furthermore, focusing fluoride varnish application on teeth comprising the typical pattern of ECC, upper incisors and upper first molars of babies and toddlers, is ideal. These teeth are highly susceptible to early decay that consequently can cause infections and pain.

Systemic fluoride and judicious supplementation generate the interests of health providers and the public. A child's daily total fluoride intake can be difficult to determine, especially in consideration of contemporary family lifestyles in which children receive food and drink from a number of different locations and a wide variety of sources. An individual's exposure to fluoride (fluoride

TABLE 4

Considerations and Instructions for Fluoride Varnish Application⁴¹

Preapplication	Review medical history Do not use if: Ulcerative gingivitis, stomatitis Apthous ulcers, other open lesions Allergic to colophony/rosin Allergic to pine or possibly nuts Multiple allergic sensitivities Explain risk, benefits, and alternatives Disclose alcohol content (vaporizes upon application) Receive written permission prior to application Remove obvious calculus or plaque (optional)
Apply	Mix varnish until appears homogeneous Eliminate excess moisture on teeth with gauze Paint very thin layer on enamel, only 0.1 ml (1 drop) per arch Varnish begins to harden upon contact with saliva or water Floss to get varnish between teeth (optional)
Postapplication caregiver instructions /messages	Leave on 4 to 6 hours for maximum effect Eat only soft foods day of treatment No brushing for 4 to 6 hours Avoid hot beverages Some brands leave a light yellow tint and/or feel sticky Stop supplemental fluoride, including fluoride tabs for 2 or 3 days Patients can be told teeth may feel “furry” for a short time
Anticipatory guidance and oral health education	
Periodicity of next application	

halo) from ingestion of multiple varied sources of drinking water and diverse food sources depends on many variables.⁴²

New guidelines for prescribing fluoride have been proposed but not released. A recent *Journal of the American Dental Association* article concluded that the use of supplemental fluorides during the first six years of life should be re-examined.⁴³ Authors Ismail and Hasson found evidence of dental caries being prevented in permanent teeth but the efficacy of using supplements to prevent caries in primary teeth was described as weak and inconsistent. It is clear that current discussions about fluoride supplementation recommendations will lead to revision of the current supplementation guidelines.

Conjecture of new guidance on the horizon, which will decrease current dosage, might be garnered from the fact that, at the time of writing, it is becoming more and more difficult to obtain the 1.0 mg dose. Perhaps methods for tracking dental, medical, and school varnish applications will be mentioned. Future recommendations for prescribing fluoride will be predicated on caries risk assessment.⁴⁴

Oral Health Risk Assessment and Evaluation

Medical providers can initiate and maintain oral homeostasis or balance with early oral health risk assessments, OHRA, and oral evaluations. The term OHRA may not be familiar to dentists or physicians. Dentists normally think

in terms of a caries risk assessment and complete oral examination. These are the comprehensive procedures and definitive diagnoses that take place when children visit or are referred to a dental home. The OHRA and oral evaluation occur in a medical practice setting. “History and physical” is a common term in the medical vernacular. For all intents and purposes, an OHRA and oral evaluation are a brief history and physical for the mouth. They can easily be integrated into routine well-child medical visits.

Basically, the “history” or OHRA starts with auxiliary staff collecting data. Next, a short dental and oral evaluation by the physician or other health provider comprises the “physical” component. Risk level (low, moderate, or high caries risk) is determined based on information gathered and observations made. A categorization of risk allows clinicians to formulate individually customized plans of action. Personalized preventive strategies and interventions targeted specifically to a child’s particular risks are more likely to control caries.

A risk assessment instrument is a fundamental preventive strategy. The AAPD has developed a caries risk assessment tool, CAT, which is straightforward and helps dentists categorize patient risk factors.^{45,46} Health providers can access free comprehensive descriptions and forms online that focus on integrating oral health in practice settings. For example, New Hampshire’s program includes forms of parent dental questionnaires and even scripts of appropriate provider responses and actions.⁴⁷ *The Journal of the California Dental Association* has dedicated four entire publications to caries prevention and risk assessment.⁴⁸⁻⁵⁰ Recently, the American Dental Association Councils on Scientific Affairs and Dental Practice posted user-friendly caries risk assessment forms online.⁵¹

TABLE 5

Oral Health Assessment Rapid Checklist — Birth to Age 3⁵²

Parent factors

- Mother/caregiver's oral health
- Does mother/caregiver have a dental home?
- Does patient have a dental home?

Action

- Education
- Referral to dental home

Child factors

- Caries
- White spot lesions
- Plaque
- Swollen gums
- Night feedings
- Frequent snacking/juice intake from bottle or sippy cup
- Medicaid eligible
- Special health care need

Although the tools mentioned above are excellent, they may not meet the needs of the medical providers whose goal is a cursory oral evaluation, quick assessment, and fast documentation. Physicians may be more amenable to using rapid check lists (TABLE 5) that can be added to routine patient encounter forms.⁵²

Traditionally, physicians have looked past the teeth as they depress patients' tongues with a wooden blade to view the pharynx. It only takes another minute to perform an oral health evaluation. Lifting the child's upper lip allows the provider to assess the hard and soft tissues. A small disposable mirror can be used to visualize various surfaces of the teeth and to check for any discoloration. These include white or brown spots, and other early warning signs of high risk or apparent loss of enamel integrity. The mirror surface can be moistened on the cheek mucosa to prevent fogging.



FIGURE 7. Knee-to-knee position.

Clinicians can “teach while they treat” by showing caregivers how to lift the child's lip and regularly check the teeth at home. While performing the evaluation, providers can point out plaque, enamel defects, white spots, and erupting teeth. If the child has been detected to be at high or moderate risk and does not have access to a dental home, a fluoride varnish application (previously described) is indicated. These activities should be repeated with appropriate periodicity being determined by risk level. The frequency of recommended appointments increases along with increasing risk level. Although third-party carriers have been slow to acknowledge this, it is still the best practice approach.⁵³

Untoward child movements during the evaluation and varnish application can be minimized with the popular knee-to-knee position (FIGURE 7). The child's legs can be placed under the caregiver's arms and their hands or arms can be held and stabilized. Operators can hold the child's head with the palms of their hands while manipulating a toothbrush or instruments with the thumbs and forefingers. Be sure to warn inexperienced providers to take care not to get bitten. Newly erupting baby teeth are extremely sharp and pointy. A child-sized brush can be used for parental tooth brushing instruction and the handle utilized as an effective mouth prop. Demonstration videos may be accessed online.^{54,55}

Anticipatory Guidance

Anticipatory guidance encompasses basic and age-appropriate oral health education topics such as transmission, oral hygiene, nutrition, fluoride, and the

use of xylitol products. Letting caregivers know about what to expect next and what to be on guard for as their child grows helps guide home care preventive efforts. An ideal time to educate intimate child caregivers is during well-child visits. Specific learning objectives aspire to promote healthy infant oral flora inoculation and maintenance of oral homeostasis in the child's and adult caregiver's mouths.⁵⁶ Education about how to avoid transmitting acid-producing bacteria indirectly or directly by behaviors such as sharing utensils, licking pacifiers, or prechewing the baby's food is essential. If not already accomplished prenatally, having a mother's active caries lesions removed tops the priority list.

Medical providers typically focus on total health with all of the attendant assessments and interventions. Incorporating comprehensive anticipatory guidance into already full schedules may not be possible. However, a few inspirational words from a physician about oral health could positively influence caregivers to make healthy choices. This may be especially true in regard to impressionable first-time mothers. Intimate caregivers who heed the simple advice and carryout home care instructions can minimize the probability of their child experiencing dental pain and/or the need of costly dental-surgical interventions later in life.

The ready availability of practical and concise information facilitates the integration of oral health education. Messages can be presented in the form of motivational questions or menus. A Baltimore program used just three motivational questions: “Does the child go to sleep with a bottle containing something other than water?” “Does the child drink undiluted juice or soda during the day?” “Have you started brushing your child's teeth in the

TABLE 6

Rainbow Smiles Motivational Interviewing Menu⁵⁸

Do not add anything sweet or sugary to the baby's bottle.

Wean your child from bottle at night-time first.

Clean your baby's teeth as soon as they appear.

Use a smear of fluoride toothpaste.

Hold your baby when feeding.

If your baby awakens at night, give them water.

Limit sipping and snacking.

Bring your baby to the dentist twice a year for fluoride varnish.

morning and at night?"⁵⁷ Giving caregivers a menu of healthy choices demonstrates another way to educate in a succinct fashion⁵⁸ (TABLE 6). Providers ask caregivers to choose just one or two items they might feel comfortable trying at home. Follow-up calls in between visits have been shown to help with compliance.⁵⁹

A small, soft-bristled toothbrush can be introduced to a baby even before teeth erupt. This helps the child become desensitized to a caregiver cleaning his or her mouth. Making oral hygiene efforts fun can enhance acceptance by an infant or toddler. Singing while brushing and consistently doing something positive immediately after may encourage the child to look forward to cleanings. Directing the toothbrush bristles at a 45-degree angle, with half on the gum and half on the tooth, is the most effective technique for caregivers to use. Moving the brush in four or five little "jiggles" or circles before moving to the next area helps ensure that all of the teeth are thoroughly cleaned. As mentioned previously, just a smear of fluoride toothpaste is necessary (FIGURE 5). Young children swallow whatever is introduced into the mouth and excessive toothpaste should be avoided (FIGURE 8). Flavored toothpastes may promote excessive ingestion.

Typically, personal hygiene activities like toothbrushing are performed in the bathroom, but this is the most likely room for dental trauma to occur. Children's teeth can be brushed and flossed in any location where lighting is adequate. The child can be held in the caregiver's lap. If behavior challenges arise, caregivers do well to focus on areas prone to decay such as the previously mentioned highly susceptible cervical areas of incisors and the occlusal surfaces of primary molars. The best times to brush are immediately after breakfast and just before bed. Morning brushing is important to disrupt the biofilm that has formed in the mouth overnight. Cleaning the teeth before nighttime sleep, when the mouth's self-cleansing activity (salivary flow and oral movement) is at the lowest point of the day, helps prevent tooth damage during this susceptible time. If brushing is not possible, at least caregivers can be sure that a few sips of water are swallowed immediately following any drinks, snacks, or meals. Ideally, mouths are always kept clear of any fermentable carbohydrates, including milk or formula residue, as well as any naturally or artificially sweetened foods.

A high carbohydrate diet actually promotes the growth of acid-tolerant bacteria and inhibits the growth of alkali-generating, healthy bacteria. In addition, it fuels acid and polysaccharides/glucan production that is known to promote plaque formation and can result in enhanced carious destruction of the teeth.⁶⁰ Proper diet is key to maintaining a healthy oral environment.⁷ Caregivers should be advised to focus especially on limiting exposure to sugars in all forms and never leaving the bottle or breast in the baby's mouth past a limited feeding time. Because of the difficulty that



FIGURE 8. A baby eating flavored toothpaste.

many families experience minimizing sugar intake, it is a message providers need to repeat frequently. Data revealed that between 1960 and 2000, total sugar consumption among American families increased by 33 percent. The ingestion of high fructose corn syrup increased 10.6 fold between 1970 and 2000.⁶¹

The frequency of sugar intake could be just as important as the amount of sugar.⁶¹ Ingestion of fermentable carbohydrates ultimately leads to a decrease of oral pH or "acid attack," which harms enamel surfaces. Caregivers benefit from being taught how to minimize the number of daily acid attacks that occur in their child's mouth. For instance, drinking a cup of juice during a meal would be better than taking small sips throughout the morning. For toddlers, eating a box of raisins in one sitting is much healthier than nibbling on one raisin every 10 or 15 minutes during an afternoon of play.

Long-term regular doses of medications containing glucose, fructose, or sucrose for palatability may also contribute to caries risk.⁶² Lists of the sucrose content of liquid pediatric preparations are available.⁶³ Consumption of juice and sugar-sweetened beverages has been linked to childhood obesity as well as caries development. Promoting healthy eating behaviors can decrease both.¹⁰

Xylitol is the only sugar substitute with antibacterial properties. It has 40 percent fewer calories and a sweetness rivaling sugar. Currently, xylitol is available in many forms, such as gum, mints, chewable tablets, lozenges,

TABLE 7

Dental Home Provisions¹⁰

1. Accurate risk assessment for oral diseases and conditions
2. Individualized preventive dental health program based on risk assessment
3. Anticipatory guidance about growth and development issues
4. A plan for emergency dental trauma management
5. Information regarding care of teeth and oral soft tissues
6. Nutrition and dietary counseling
7. Comprehensive oral health care in accordance with accepted guidelines and periodicity schedules for pediatric oral health
8. Referrals to dental specialists, such as endodontists, oral surgeons, orthodontists, and periodontists when care cannot be provided directly within the dental home

**FIGURE 9.** Newly erupted teeth.

toothpastes, mouthwashes, cough mixtures, and other products. However, only chewing gum has been proven to be an effective preventive agent.⁶⁴ Using xylitol gum in expectant and new mothers has been attributed to the prevention of transmission of *Streptococcus mutans* from mother to child.²⁷

With childhood obesity on the rise, many health providers are understandably concerned about promoting sweet-tasting xylitol products that may inadvertently promote the use of nonxylitol gum, mints, etc. In addition, excessive jaw movement may be detrimental to the temporal mandibular joints and something to consider when discussing gum. The best selection for caregivers who allow their children to chew gum would be products labeling xylitol as the first ingredient. For children, gum and mints may not be a good choice. They are definitely not recommended for children under the age of 4.

Dental Home

The first steps in oral disease prevention are early OHRA, oral evaluation, and anticipatory guidance. Establishment and maintenance of a dental home is equally important for long-term success. The “home” concept has long been applied to pediatric medicine but until recently overlooked in relation to children’s oral health.

Modeled after the medical concept, a dental home is defined by the AAPD as “the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivery in a comprehensive, continuously accessible, coordinated, and family-centered way.”⁶⁵ The AAP states several provisions that a dental home should offer¹⁰ (TABLE 7).

A timely establishment of a dental home is critical. Ideally, it should be arranged before the child’s first birthday. As previously mentioned, this places a child into care while still in the early stages of the erupting dentition (FIGURE 9) and prior to carious involvement that requires dental surgery. Preventive methods have the greatest chance of being effective and minimize the chance of experiencing dental pain when implemented prior to 12 months of age. Early preventive visits increase the probability of the continuation of preventive visits and decrease costs.¹¹ Early timing also establishes a child in a dental practice prior to any unfortunate oral/dental trauma.

Where to Refer?

Having dental homes readily available facilitates the referral process and helps physicians comply with the AAP recommendations¹⁰ (TABLE 1). In 2002, the executive directors of the California Dental Association’s local dental societies compiled a list of dental clinics in California.⁶⁶ In

addition to listing clinics, it might be prudent to generate a statewide database of potential dental homes that would include private dental offices, dental clinics, hospitals, community health centers, mobile vans, dental schools, and other possible sources whose doors are open for infants. Specific data collection details might include willingness to see patients under the age of 1, how many patients the facilities are capable of seeing per month, and what third-party reimbursements are accepted.

Setting up local community referral network infrastructures modeled after Michigan’s Point of Light program might increase early dental home access. Physician and dentist contact letters, referral policy, infant oral health care handouts, and PowerPoint presentations can be found free online.⁶⁷ The dentists’ willingness to collaborate with primary care providers to establish referral bases for at-risk infants and toddlers is an important key to success.⁶⁸ Because of a paucity of pediatric dentists, general dentists involvement is particularly crucial.⁶⁹

Sharing with Medical Providers

As evidenced by AAP’s 2008 policy statement, pediatric medical providers are interested and many desire additional training in providing oral health for their patients. Physicians have questions about the new AAP recommendations (TABLE 1) and are looking for answers. Every California dentist is a natural resource for this information.¹⁰

Obstetricians also can play a significant role in oral health counseling. They have contact with first-time mothers at a time



FIGURE 10. Prenatal is the best time to start education on oral health.

when these women are very receptive to infant care information. The prenatal period is the ideal time to begin the conversation (**FIGURE 10**). Prenatal discussions of infant oral health can be effective in preventing oral disease and resultant pain.⁷⁰

Dentists who have become familiar with early preventive interventions may wish to help educate physicians and other nondental health providers on how to integrate oral health into primary medical care. It is not necessary to use an elaborate presentation to share this information. Often, a simple discussion is less intimidating and helps establish a rapport for future questions and guidance. All that may be required is a basic outline to serve as a reminder of key points (**TABLE 8**). Physicians interested in learning more about infant and toddler oral health can be directed to online resources.^{71,72}

Formally or informally, all dentists can promote early oral health care by recruiting our medical colleagues. Simply asking a physician out to lunch and inquiring about their thoughts on infant oral care might initiate an important conversation. Personal contacts may open doors to presenting at medical study clubs and other small health care groups. Typically, hospitals have a one-hour continuing medical education, CME, presented monthly for staff physicians. An opportunity to speak to such a group can quickly disseminate

TABLE 8

Outline of Key Early Oral Health Prevention Discussion Topics

Objective: Facilitate integration of AAP's Policy Statement on Preventive Oral Health Intervention into pediatric, family, and OB/GYN medical practices

- A. Introduction (current crisis condition, consequences of caries, before first birthday model)
- B. Basic cariology
- C. Risk factors
- D. Five key early prevention strategies
 - 1. Fluoride (systemic and topical)
 - How it works
 - Fluoride varnish
 - 2. Oral health risk assessment = caries risk assessment
 - Identify risk factors early
 - Oral evaluation – lift the lip
 - 3. Anticipatory guidance/oral health education
 - Motivational dental care counseling
 - Oral hygiene instructions
 - Caregiver compliance
 - Dietary intake and feeding habits
 - Xylitol
 - 4. Establishing a dental home before age 1
 - Where to refer?
 - 5. Sharing with medical providers
- F. Conclusion (Call to action and questions)

the important early prevention message throughout an entire health care facility. Contacting a hospital's CME coordinator and offering to present usually will be met with an appreciative invitation. With a larger cadre of health providers trained to intervene in early childhood oral disease, ultimately, the need for dental pain management can be substantially diminished.

Conclusion

Optimal dental pain management protocol eliminates etiological factors early in life. Controlling caries with education and medicinal therapy may be as close to rendering true atraumatic dentistry as possible. Evidence-based strategies that prevent or decrease the likelihood of gross dental decay and ensuing pain and infections are available. These timely preventive strategies decrease the chance of

California children requiring operative/dental surgery, local anesthesia, sedation, and/or general anesthesia in a hospital setting. Conceptually, the minimally invasive methods presented can be applied to patients of all ages, including those with special health care needs and geriatric issues.

On average, it takes 17 years before new, proven medical guidelines become integrated into mainstream practice.⁷³ The pitiful state of oral health in California children can be addressed much more quickly if early prevention is disseminated widely. Dental pain and suffering can be avoided now. Not only do dental health care providers need to take an active role in early prevention, but our medical colleagues, who have earlier opportunities with patients and patient families, must be actively involved in helping patients steer clear of

caries. Working together, we can promote and provide prevention strategies for children before their first birthday.

Early prevention is the key to helping all of California's children enjoy a lifetime of pain-free oral health. Promoting the new paradigm of very early prevention in nontraditional settings promises to be worthy of our efforts. Every dentist can invite a pediatrician, family practitioner, or obstetrician out to discuss the AAP's new policy and recommendations.¹⁰ Better yet, please consider picking up the phone today and arranging to speak to a group of physicians at a local hospital, clinic, or medical school to share early preventive oral health strategies. ■■■■■

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