# PROMOTING ORAL HEALTH IN INFANTS

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# OUTLINE

- Background and significance of oral health and etiology of early childhood caries (ECC).
- Fechnique and findings of the physical exam.
- Prevention of ECC.
- > Critical appraisal with AGREE TOOL II.
  - American Academy of Pediatric Dentistry. (2011). Guideline on infant oral health care. Clinical Guidelines, 34(6).
- Recommendation for practice.
- PICO Presentation:
  - Methods for content validity.
  - Presentation of literature recommendations to the staff at SCO Family of Services in Jamaica, New York on February 19, 2014.
  - Consent for conduction of pre-test and post-test.
  - Analysis of pre-test and post-test results.

# SIGNIFICANCE OF ORAL HEALTH

- Quality oral health is imperative to the overall health of infants and young children.
- With the eruption of the first primary tooth, infants are susceptible to tooth decay and thus oral health should be initiated in the neonatal period.
- Childhood caries and tooth decay are the most common chronic disease in children. In fact, it is five times more common than asthma in childhood.
- Childhood caries in the pediatric patient is a preventable and transmissible infectious disease that may lead to pain and infection with progression to issues with eating, speaking, and learning.
- Health care professionals are essential in teaching children and their families oral hygiene and feeding and diet practices, in addition to making referrals to dentists for optimal oral hygiene from infancy through the adolescent period and into adulthood.

American Academy of Pediatrics. (2008). Promoting oral health. Bright futures guidelines for health supervision of infants, children, and adolescents. Retrieved from http://brightfutures.aap.org/pdfs/guidelines\_pdf/8-promoting\_oral\_health.pdf.

# WHAT ARE "ECC'S"?

Early childhood caries (ECC) are defined as the presence of one or more decayed teeth, with or without a cavity, or a missing or filled tooth due to caries, in any primary tooth in a child under the age of six.

For infants and any other child under the age of three, any sign of smooth surface dental caries is considered to be severe early childhood caries (S-ECC).

American Academy of Pediatric Dentistry. (2011). Policy on early childhood caries (ECC): classifications, consequences, and preventative strategies. *Oral Health Policies*. 2011;35(6):50-52.

# EARLY CHILDHOOD CARIES: WHITE SPOTS

Chalky, dull, white coloration may appear at the gum line. If you can remove it, it is likely that this is plaque. If you cannot, these white spots are a sign of the beginning of early childhood caries.



# EARLY CHILDHOOD CARIES: BROWN SPOTS

### Brown or black spots are signs of decayed. Infants noted to have brown or black spots should be referred to the dentist.



# EARLY CHILDHOOD CARIES: SEVERE DECAY

Multiple lesions, caries, and/or cavities place the infant and child at risk for more serious systemic infections. Severe dental caries may require correction with oral surgery.



# A TRANSMISSIBLE DISEASE

It is found that tooth-adherent specific bacteria, mutans streptococci for example, inoculates gums and teeth, which then metabolize sugars to produce acid. The acid demineralizes tooth structure, which leads to caries.

*How do children initially acquire the bacteria?* Saliva sharing is the primary route, by the following two modes of transmission:

Vertical Transmission: Transmission of microbes from caregiver to child, such as from mother to child.

Horizontal Transmission: Transmission of microbes from members of a group, such as from peers in day care.

American Academy of Pediatric Dentistry (2011). Guideline on infant oral health care. Clinical Guidelines, 35(6).

# A TRANSMISSIBLE DISEASE

- Decreasing transmission will decrease the percentage of children diagnosed with early childhood caries.
- Decreasing transmission will also prevent the necessity of having expensive, time consuming and uncomfortable procedures such as fillings, tooth extractions and root canals.
- Prevention starts in the perinatal period.

American Academy of Pediatric Dentistry (2011). Guideline on infant oral health care. Clinical Guidelines, 35(6).

# **INFANT ORAL HEALTH**

- Infants are born with their primary set of teeth formed underneath the gums.
- Primary teeth usually start to come into the mouth at the age of six to eight months old. By three, all 20 primary teeth should be formed.
- It is important to develop good oral health habits at an early age. Healthy habits can prevent or reduce tooth decay in infants and children.
- The American Academy of Pediatric Dentistry recommends that infants have their first dental exam within 6 months of first tooth development or their first birthday.

New York State Department of Health. (2011). Oral Health for Infants and Children. Retrieved from http://www.health.ny.gov/prevention/dental/infant\_oral\_health.htm.

# THE ORAL HEALTH EXAM

### Knee-to-knee examination



In the knee-to-knee position, have the child sit "face to face" with the parent or guardian and place his or her legs around the hips of the parent or guardian. Lower the child's head onto your lap (the examiner). While this is happening, observe the child's mouth and teeth as much as possible. In this position the child can see the parent and the examiner can visualize and assess the mouth.

Domoto, P. K. (1998). *Knee\_to\_Knee Examination Procedure*. Retrieved from http://abcd-dental.org/wordpress/wp-content/uploads/knee-to-knee-exam.pdf.

## NORMAL FINDINGS OF THE ORAL EXAM

### **Dental Lamina Cyst**

### **Bohn's Nodules**



## **ABNORMAL** FINDINGS OF THE ORAL EXAM

- > Mucocele
- > Tongue tied
- Eruption cyst / hematoma
- White spot lesions
- Early Childhood Caries
- Fluorosis
- Parulis
- > Natal Teeth

## **ABNORMAL** FINDINGS OF THE ORAL EXAM



## **ABNORMAL** FINDINGS OF THE ORAL EXAM



# PREVENTION OF ECC

At the inception of starting foster care, birth mothers should be screened for high levels of mutans streptococci (MS) and refer to dentistry for dental treatment and/or administration of topical antibiotics, if necessary. Higher levels of MS were attributed to a higher percentage of children being infected by vertical transmission.

### > To prevent ECC health care provides are advised to:

- Ask the birth mother about her last dental visit and whether she has any dental caries.
- Discourage utensil sharing and food sharing during visits.
- > Avoid sharing toothbrush with others.
- Teach parents that transmission can occur even before tooth eruption; a common misconception.
- > Avoid putting sugary drinks in a bottle such as "Juicy Juice" or "Pink milk."
- > Avoid putting the infant to bed with a bottle, unless it is water.
- **Brush teeth twice daily with an age appropriate measure.**
- > Transition from bottle to cup by 14 months of age.
- **Establish a dental home by 12 months of age.**
- Teach parents about the importance of fluoride varnish applications.

Berkowitz, R.J. (2003) Causes, treatment and prevention of early childhood caries: a microbiological approach. *Journal of the Canadian Dental Association*, 69(5).

Poureslami, H.R. & Van Amerongen, W.E. (2009) Early childhood caries, an infectious transmissible oral disease. *Indian Journal of Pediatrics*, 76(2).

# **BENEFITS OF FLUORIDE**

### What is Fluoride?

Fluoride is a naturally occurring substance that plays an important role in the prevention of dental caries.

### How does Fluoride Prevent Dental Caries?

- It enhances remineralization of the tooth enamel.
- > It inhibits demineralization of the tooth enamel.
- It helps to prevent cariogenic bacteria from making acid from carbohydrates.



American Academy of Pediatrics. (2012). Protecting all children's teeth (PACT): A pediatric oral health training program for physicians. Retrieved from http://www.aap.org/oralhealth/pact.

# FLUORIDE VARNISH

- Fluoride varnish is a concentrated topical fluoride that is effective in preventing and reducing caries progression that can be applied in a primary care office.
- > It can be applied as soon as the first tooth erupts.
- It can be applied two times a year. In infants who are "high risk," fluoride varnish should be applied every 3 to 4 months.





## HOW TO APPLY FLUORIDE VARNISH

### 1. Prepare supplies (gloves, gauze, varnish)



### 2. Open varnish packet and mix well



## HOW TO APPLY FLUORIDE VARNISH

### 3. Wipe child's teeth dry with a clean gauze



4. Paint child's teeth with varnish



## **INSTRUCTIONS FOR PARENTS**

- The child can eat and drink immediately.
- > Do not brush your child's teeth until the next morning.
- > The child's teeth may be slightly yellow until they are brushed.



### Birth to 6 months of age:

- > Always clean your infant's gums after feeding.
- Wrap a moistened washcloth around the index and gently massage the gum tissues.
- > Do not put your baby to bed with a bottle or prop it in their mouth.
- Teething begins between four and six months of age. Gums may be red and swollen. To ease these symptoms, give your infant a clean teething ring or cold wet washcloth.

## Dental decay is an infectious transmissible disease. Avoid sharing utensils, cleaning pacifiers or a bottle nipples by putting it in their mouth.

### 6-12 months of age:

- Start to use a child's soft bristled toothbrush, with no toothpaste, in addition to massaging the gum tissues.
- Begin to wean your baby from the bottle.
- Be familiar with the normal appearance of your child's gums and teeth and schedule the child's first dental appointment.

### 12 to 18 months of age:

- By the age of one, child should have an oral examination by a dentist.
- Brush your child's teeth twice a day with plain water.
- Continue to take steps to avoid passing decay causing germs to your child.
- If your drinking water is not fluoridated, talk to your PCP about infant fluoride supplements.

### 18 months to age 5:

- By 30 months of age, all of the primary teeth should have come into the mouth.
- At age 2, begin brushing with a pea-sized amount of fluoridated toothpaste. Teach child to spit out the toothpaste.
- Bring child to dentist for a regular checkup.

# **PICO QUESTION**

Infants 0-12 months (a recommendation may be to extend to toddler age)

Educate nurses on periodontal health during infancy

C No additional education

Increase knowledge on the application of fluoride varnish and importance of infant oral health

In infants 0-12 months old, does increased education of nurses on periodontal health versus no additional education increase their knowledge of infant oral health and fluoride varnish?

- **1.** The overall objectives(s) of the guideline is (are) specifically described.
- **4.** The guideline development group includes individuals from all the relevant professional groups.
- **9.** The criteria for selecting the evidence are clearly described.
- **11.** The health benefits, side effects, and risks have been considered in formulating the recommendations.
- **13.** The guideline has been externally reviewed by experts prior to its publication.
- **15.** The recommendations are specific and unambiguous.
- **23.** Conflicts of interest of guideline development members have been recorded.

Appraisal for Guidelines for Research & Evaluations II (AGREE II) Instrument. (2009). Retrieved from www.agreetrust.org.

The objective of the infant oral health care guideline by the American Academy of Pediatric Dentistry (2011) is to "propose recommendations for preventative strategies, oral health risk assessment, anticipatory guidance, and therapeutic interventions to be followed by dental, medical, nursing, and allied health professional programs". This is concisely written and easily located in the beginning of the paper under the purpose heading. The objective clearly lists the proposed health intentions; the expected outcome and the intended audience for the guideline, however the specific population targeted for the guideline is not very distinct and only infants are mentioned. A more specific description of the intended population should be provided. This portion of the scope and purpose domain of the AGREE tool is rated as a 4 on a scale of 1 to 7, with 7 having the most strength. Furthermore, the guideline does not clearly state who was involved in the development group. The only group mentioned in the guideline is a committee comprised of members of the American Academy of Pediatric Dentistry. There is no indication if members from the entire relevant professional groups were involved in creating the recommendations. Due to the lack of disclosure on the participants involved in creating this guideline, this portion of the stake holder domain is rated as a 1 out of 7.

American Academy of Pediatric Dentistry. (2011). Guideline on infant oral health care. Clinical Guidelines, 34(6).

The criteria for selecting the evidence used in this guideline were not clearly described. It is stated that the guideline includes "a hand search of literature" in addition to searches from the MEDLINE/PubMed electronic databases, however, there were no explicit identification of the types of evidence that were included. Articles from the literature and database search that were used in the guideline were limited by the search criteria "the last 10 years, humans, English, and clinical trials" with a mention of "Fields: all," which may indicate that every type of study design was used for the guideline based on the search terms "infant oral health," "infant oral health care," and "early childhood caries." Although the "limits," "fields," and "terms" were listed, a clear description of the inclusion and exclusion criteria, such as age, target population, the designs of the studies, what interventions were used, the comparative interventions, outcomes of the studies, and geographic location of where the studies took place would provide a concise depiction of the likelihood of producing reliable and reproducible results (AAPD, 2011). Without a rationale to accompany the reason why some of the relevant evidence were included or excluded the guideline is weakened, yielding a rating of 2 out of 7 in domain of rigor and development.

In formulating the recommendations the health benefits, side effects, and risks have been considered. Potential benefits of early risk assessment in infants and the establishment of a dental home are clearly described as the prevention of early childhood caries (ECC) and need for periodontal surgical intervention in the child's lifetime. A rationale for each recommendation and the risk associated in the absence of adopting the recommendation was stated to support their implication in the overall quality of life and health outcomes for infants in childhood and adulthood.

American Academy of Pediatric Dentistry. (2011). Guideline on infant oral health care. Clinical Guidelines, 34(6).

The application of fluoride varnish and use of fluoride containing products has been proven to be both effective and safe for teeth and oral health according to the guideline, however, its application in excess serves as a significant side effect lending to risk and harm of adequate enamel development and thus has been clearly described as a risk in its recommendation. Unfortunately, supporting data about the risks and benefits were not provided, yielding a 4 out of 7 in the rigor and development domain.

A very important component of rigor and development that is barely addressed in this guideline is external review. It is only briefly mentioned under the method section, that when the scientific data appeared to be inconclusive, recommendations were taken from expert opinion from researchers and clinicians. For this section, there should be a more specific description of the reviewer external methodology. Including a list of expert researchers and clinicians with their affiliations is necessary to avoid conflict of interest. Representative of the target population should also be included in this process. Based on the lack of information provided, a 2 out of 7 was awarded to this section.

Recommendations for parental and infant oral health are presented in a clear but at times vague matter and receive a 4 out of 7 in the clarity and presentation domain. Parental oral health guidelines recommend having comprehensive oral health examinations during pregnancy, but fail to mention a time frame, any restrictions or treatment side effects. The diet recommendations for parents do not provide the specific types of food necessary to maintain good oral health. Fortunately, the infant recommendations are more specific and mention times lines with age appropriate anticipatory guidance.

In regard to the domain of editorial independence, this guideline has many weaknesses and is rated a 1 out of 7. The guideline does not explicitly state that group members do not have competing interests. No criteria were met in discussing types of competing interest, methods which interests were sought by, description of competing interests, or how those interests may have influenced the guideline. The guideline also does not mention whether or not it received funding or if funding influenced the guideline's content.

Overall, the dental hygiene guideline is mediocre due to the many limitations noted throughout each domain of the AGREE Tool. A maximum rating of 4 out of 7 and minimum of 1 out of 7 was given to the reviewed domains, exhibiting the lack of strength numerically. It is somewhat surprising to find so many weaknesses in the document, since it has been revised multiple times. Elaboration and strengthening of various parts of the guideline will be beneficial and could give pediatric clinicians a solid base of evidence-based practice to utilize in their health promotion of the pediatric patient's oral hygiene.

## CONSENT

#### **Consent for Participation**

I volunteer to participate in a Capstone project conducted by Brittany A Charles, Codi-Ann Dyer, Joann Mercedes, Kathryn A O'Leary, Tami Schmidt from New York University School of Nursing. I understand that the project is designed to gather information about my knowledge regarding infant/child oral health. I will be one of approximately 10 people participating for this project.

- 1. My participation in this project is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty.
- 2. I understand that most participants will find the discussion interesting and great learning experience. If, however, I feel uncomfortable in any way during the pre/post-test and presentation session, I have the right to decline to answer any question or to end my participation.
- 3. Participation involves answering a pre/post-test and attending a power point presentation. The session will last approximately 30-45 minutes.
- 4. I understand that the researchers will not identify me by name in any reports using information obtained from this project and that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies, which protect the anonymity of individuals and institutions.
- Administrators from my institution will neither be present at the interview nor have access to pre/post -test information. This precaution will prevent my individual answers from having any negative repercussions.
- I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study.
- 7. I have been given a copy of this consent form.

#### My Signature Date

Signature of the Investigator

For further information, please contact: Brittany A Charles, Codi-Ann Dye, Joann Mercedes, Kathryn A O'Leary, and/or Tami Schmidt

### **ORIGINAL PRE-TEST AND POST-TEST**

### 1. By which age should a family establish a dental home for their child?

- a. 6 months
- b. 9 months
- c. 12 months
- d. 24 months

### 2. At what age should we begin the application of fluoride varnish?

- a. At birth
- b. At the time of the first primary tooth eruption if a child is at high risk for dental tooth decay
- c. 6 months after the eruption of the first primary tooth if a child is at moderate risk for dental tooth decay
- d. 12 months old when then child is at high risk for dental tooth decay

### 3. Fluoride acts in the following way(s) to prevent dental caries:

- a. Enhance remineralization of tooth enamel
- b. Inhibits demineralization of tooth enamel
- c. Decrease the ability of cariogenic bacteria to produce acid from carbohydrate breakdown
- d. All of the above

### 4. True or False. Parents should begin to wipe the gums of infants with a washcloth or soft toothbrush, prior to the first tooth eruption to establish daily oral hygiene.

- a. True
- b. False

### 5. Which statement is true in regard to teeth brushing after application of fluoride varnish?

- a. Parents should be instructed to wait 4 hours application and then brush teeth
- b. Parents should be instructed to hold nighttime brush and resume the next morning
- c. Parents should be instructed to brush teeth 30 minutes after application to avoid hardening of the varnish
- d. The teeth do not need to be brushed for 48 hour

### **ORIGINAL PRE-TEST AND POST-TEST**

#### 6. After the application of fluoride varnish, when can the child eat and drink?

- a. 1 hour after
- b. 90 minutes
- c. 2 hours
- d. Immediately

### 7. Early child hood caries is defined as

- a. A transmitted infection that affect the primary teeth of children less than 5 years old that result in severe tooth decay and destruction
- b. Dental decay that result from eating candy and foods high in carbohydrates
- c. A protective process in which children less than 5 years old experience to strengthen their enamel for their adult hood
- d. An acquired disease that affects 5 or more decayed teeth in children less than 5 years old

### 8. Literature has shown that Streptococcus mutans is the causative agent of early childhood caries. What is the most common mode of transmission of this organism to an infant?

- a. Through the use of an unsanitary pacifier
- b. From a sippy cup with juice that has no been refrigerated for 3 or more hours
- c. From a parent who "pre-taste, pre-chew" and share utensils with their infant
- d. Nutritive sucking from a bottle that is filled with water and given at nighttime

### 9. All are risk factors for developing early childhood caries (ECC) except for:

- a. Use of fluoride gel
- b. Low socioeconomic status
- c. Consumption of sugary drinks
- d. Sharing utensils

### 10. Upon the initiation of fluoride varnish application in a child with high risk dental carries, how frequent should a health care provider apply fluoride varnish in an infant?

- a. Every month
- b. Every 3-6 months
- c. Every 3-4 months
- d. Every 6 months

### CONTENT VALIDITY: ASSESSMENT AND ELIMINATION

To create our final pre and post test we asked 14 experts to rate our questions using the 5 point- Likert scale. The experts included a pediatrician, pediatric nurse practitioners, a dental hygienist and fellow PNP students. The scale, with instruction on use, was administered along with the test. Consensus among our group members dictated that questions tallying less than 50 points would be eliminated, concluding that questions 5 and 10 would be discarded.

# **CONTENT VALIDITY**

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Dental	5	3	5	5	3	5	3	4	4	1
Hygienist										
Pediatrician	5	5	5	5	4	4	4	5	5	4
NP	5	4	4	5	3	4	5	4	5	2
NP	4	4	4	5	4	4	5	5	5	4
NP	4	4	5	5	5	5	4	5	4	5
Student	5	3	5	5	3	3	5	4	5	5
Student	5	5	5	5	3	1	4	1	5	3
Student	5	5	5	5	5	5	5	5	5	5
Student	5	5	5	5	5	5	5	5	5	5
Student	5	5	5	5	5	5	5	5	5	5
Student	5	5	5	5	5	5	5	5	5	5
Student	5	5	4	4	4	4	4	5	5	4
Total	58	53	57	59	49	50	54	54	58	48

### FINAL PRE-TEST AND POST-TEST

#### 1. By which age should a family establish a dental home for their child?

- a. 6 months
- b. 9 months
- c. 12 months
- d. 24 months

#### 2. At what age should we begin the application of fluoride varnish?

- a. At birth
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- c. 6 months after the eruption of the first primary tooth if a child is at moderate risk for dental tooth decay
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#### 7. Literature has shown that Streptococcus mutans is the causative agent of early childhood

- caries. What is the most common mode of transmission of this organism to an infant? a. Through the use of an unsanitary pacifier
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  - c. From a parent who "pre-taste, pre-chew" and share utensils with their infant
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#### 8. All are risk factors for developing early childhood caries (ECC) except for:

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- b. Low socioeconomic status
- c. Consumption of sugary drinks
- d. Sharing utensils

## **RESULTS OF THE PRE-TEST**

Question	1.	2.	3.	4.	5.	6.	7.	8.	Score
Nurse 1	Α.	В.	D.	Α.	В.	D.	A.	A.	4/8
Nurse 2	D.	D.	Α.	Α.	Α.	A.	В.	В.	2/8
Nurse 3	C.	D.	В.	Α.	C.	В.	Α.	D.	2/8
Nurse 4	C.	В.	D.	Α.	C.	В.	В.	D.	4/8
Percent correct	50%	50%	50%	100%	0%	25%	0%	25%	37.5%

## **RESULTS OF THE POST-TEST**

Question	1.	2.	3.	4.	5.	6.	7.	8.	Score
Nurse 1	С.	В.	D.	A.	D.	Α.	C.	Α.	8/8
Nurse 2	C.	В.	Α.	Α.	D.	Α.	C.	Α.	7/8
Nurse 3	C.	В.	D.	Α.	D.	Α.	C.	Α.	8/8
Nurse 4	C.	В.	D.	А.	D.	А.	C.	В.	7/8
Percent correct	100%	100%	75%	100%	100%	100%	100%	75%	93.75%

# **ANALYSIS OF RESULTS**

- The statistical method to use when analyzing results of a pre and post test is a paired t test. In order for data to be statistically significant, we would need to do a power analysis and ensure that the number of subjects we were using was equal to or exceeded the N that the power analysis provided. Since we only had an N of 4, our group decided that the teaching project was deemed effective if the following results were shown:
  - Each nurse answered 2 more questions right on the post test than they had on the pre test.
  - Every post test score would be passing with a score greater than 80%.
- All of the nurses got 3 or more questions right on the post test than they had on the pre test and all of the post test scores ranged from 87.5-100%.
- Not only did our teaching project on oral health increase the nurses general knowledge of oral health in infants but it had a profound impact on topics such as transmission of cariogenic bacteria and flouride varnish. The nurses went from 0 percent to 100 percent in these two domains with an increased in total group knowledge from 37.5% to 93.75%.

# CONCLUSION

This study demonstrated the effectiveness of an educational presentation to increase the general knowledge of infant oral health for nurses working in a primary care setting. The foundation for oral health begins in the infant period and primary care providers are more likely to see new mothers and infants to provide the needed education. Educating the nurses in the primary care office can help establish good health hygiene and prevent early childhood caries. While this study showed an increase in the nurse's knowledge, more research should be done on how the education of nurses and primary care providers about infant oral health can affect the incidence of early childhood caries.

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consequences, and preventative strategies. Oral Health Policies. 2011;35(6):50-52.

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# **QUESTIONS**??

