

EARLY CHILDHOOD CARIES & FLUORIDE VARNISH

FLUORIDE VARNISH MINI-SYMPOSIUM

MAY 16, 2008

TOPEKA, KS

PAUL KITTLE DDS

PRIVATE PRACTICE

LEAVENWORTH, KS

913-651-9800

PEDIDENT@AOL.COM

MAKING ORAL HEALTH A PRIORITY IN KANSAS



BECAUSE IT MATTERS









THE EMPHASIS HAS TO BE ON
THE YOUNG CHILD

WHY THIS EMPHASIS ON THE YOUNG CHILD?

MOST OF US 'OLD' "PEDODONTISTS" HAVE SEEN
A RAISE IN THE CAVITY RATE. DESPITE PAST
REPORTS TO THE CONTRARY, THE CAVITY RATE
"HAS BEEN INCREASING....." THE CDC RECENTLY
AGREED

RECENT CENTER FOR DISEASE CONTROL (CDC) REPORT

- (April 2007)
 - **Oral Health Improving for Most Americans, But Tooth Decay Among Preschool Children on the Rise**
 - Americans of all ages continue to experience improvements in their oral health. However, tooth decay in primary (baby) teeth increased among children aged 2 to 5 years, according to a report released by the Centers for Disease Control and Prevention (CDC).
 - Based on data from CDC's National Center for Health Statistics, the report, "Trends in Oral Health Status-United States, 1988-1994 and 1999-2004," it represents the most comprehensive assessment of oral health data available for the U.S. population to date. (THIS IS OLD DATA)
 - Tooth decay in primary (baby) teeth of children aged 2 to 5 years increased to 28 percent between 1988-1994 and 1999-2004.

WHY THIS EMPHASIS ON THE YOUNG CHILD?

- “CARIES PREVALENCE GOES UP MOST BETWEEN 1 → 2 YEARS OF AGE”
- “HOW BIG OF A DISEASE IS DENTAL CARIES?
ANS: \$50 BILLION”

»

JOEL BERG, U WASH, 2007

SO, AGAIN...WHY THIS EMPHASIS ON...

THE YOUNG CHILD?

- ONCE YOU GOT THE DISEASE, YOU GOT THE DISEASE, SO IT'S ONLY LOGICAL THAT.....
- IT IS EASIER AND CHEAPER TO PREVENT THE DISEASE THAN TREAT THE DISEASE
- ORAL HEALTH IMPACTS WHOLE BODY HEALTH

WHY– THIS EMPHASIS ON THE YOUNG CHILD?

- IT IS THE MORAL DUTY OF A DEVELOPED SOCIETY TO TAKE CARE OF THEIR CHILDREN'S (ORAL) HEALTH CARE NEEDS. THE CHILD CANNOT DO THIS FOR THEMSELF.

CURRENT SCIENCE

- BRIEF OVERVIEW

CORRECT CURRENT TERMINOLOGY

- CARIES IN INFANTS AND TODDLERS=

- E C C (EARLY CHILDHOOD CARIES)

‘CARIES IS A BIOFILM-MEDIATED,
ACID DEMINERALIZATION OF
ENAMEL (AND DENTIN)’

AAPD

CARIES ARE PRODUCED FROM THE DYNAMIC INTERACTION OF 3 VARIABLES

- CARIES-CAUSING BACTERIA
- FERMENTABLE CARBOHYDRATES
- TEETH

...AND...

AAPD

THE SCIENCE OF CARIES

- THIS DYNAMIC PROCESS INVOLVES:
 - BACTERIAL INFECTION AND TRANSMISSION
 - SUSCEPTABILITY TO ACQUIRE THE INFECTION
 - HYGIENE HABITS
 - FLUORIDE EXPOSURE
 - DIETARY HABITS
 - FAMILY HISTORY AND DYNAMICS
 - SOCIAL, CULTURAL AND BEHAVIORAL FACTORS
 - SOCIOECONOMIC FACTOR

THE SCIENCE

CARIES IS AN **INFECTIOUS DISEASE**

CARIES IS A **MULTIFACTORIAL DISEASE**
**(RESULTING IN DEMINERALIZATION AND
REMINERALIZATION)**

CARIES IS A **PREVENTABLE DISEASE**

CARIES IS AN **INFECTIOUS** DISEASE

- A CHILD IS NOT BORN WITH CAVITY CAUSING BACTERIA IN THEIR MOUTH
- SO...
 - FROM WHAT?
 - FROM WHOM?
 - HOW?

...DO THEY GET IT?

CARIES IS AN **INFECTIOUS** DISEASE

STREP MUTANS – PRIMARY BACTERIA

STREP SALAVARIOUS – VERY POTENT. MAY BE
THE PRIMARY CULPRIT IN THE CHILD WITH
THE MOST SEVERE, RECURRING CAVITIES

LACTOBACILLUS

7/8 OTHERS- S. SOBRINUS

72% OF THE TIME, THE BACTERIA IS ACQUIRED
FROM THE MOTHER

TOOTH ENAMEL

- ENAMEL IS A PERMEABLE STRUCTURE COMPOSED OF AN ORGANIC MATRIX AND INORGANIC FILLER MATERIAL MADE OF HYDROXYAPETITE CRYSTALS
- ENAMEL'S PERMEABILITY ALLOWS FOR EXCHANGE OF CALCIUM, PHOSPHATE AND FLUORIDE IONS
- **PH** IS CRITICAL IN MAINTAINING SOUND ENAMEL
- WHEN PH IS ALTERED, DEMINERALIZATION OR REMINERALIZATION WILL OCCUR
- ACIDIC PH ALLOWS LEACHING OUT OF THE CALCIUM AND PHOSPHATE MOLECULES AND A BREAKDOWN OF THE CRYSTALS

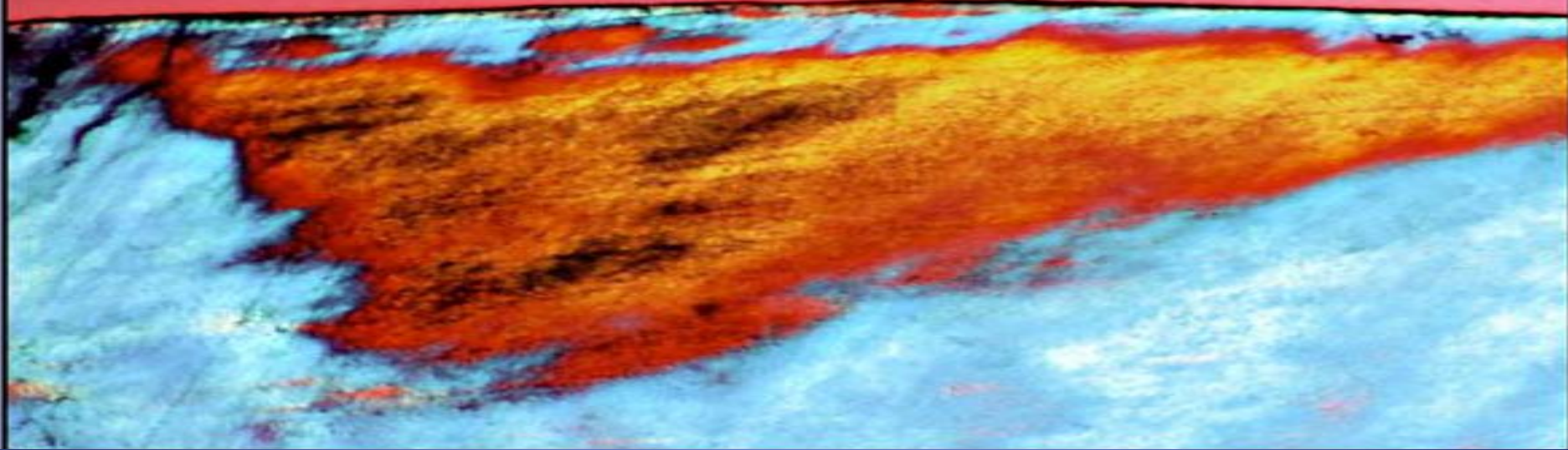
THE SCIENCE DEMINERALIZATION AND REMINERALIZATION

- COLONIZATION BY BACTERIA
- BACTERIA METABOLIZE FERMENTABLE CARBOHYDRATES VIA SALIVARY AMYLASE
- BACTERIA EXCRETE ACID AS A BY-PRODUCT OF METABOLISM
- ACID CONTACT CAUSES DEMINERALIZATION OF THE SURFACE AND SUBSURFACE ENAMEL

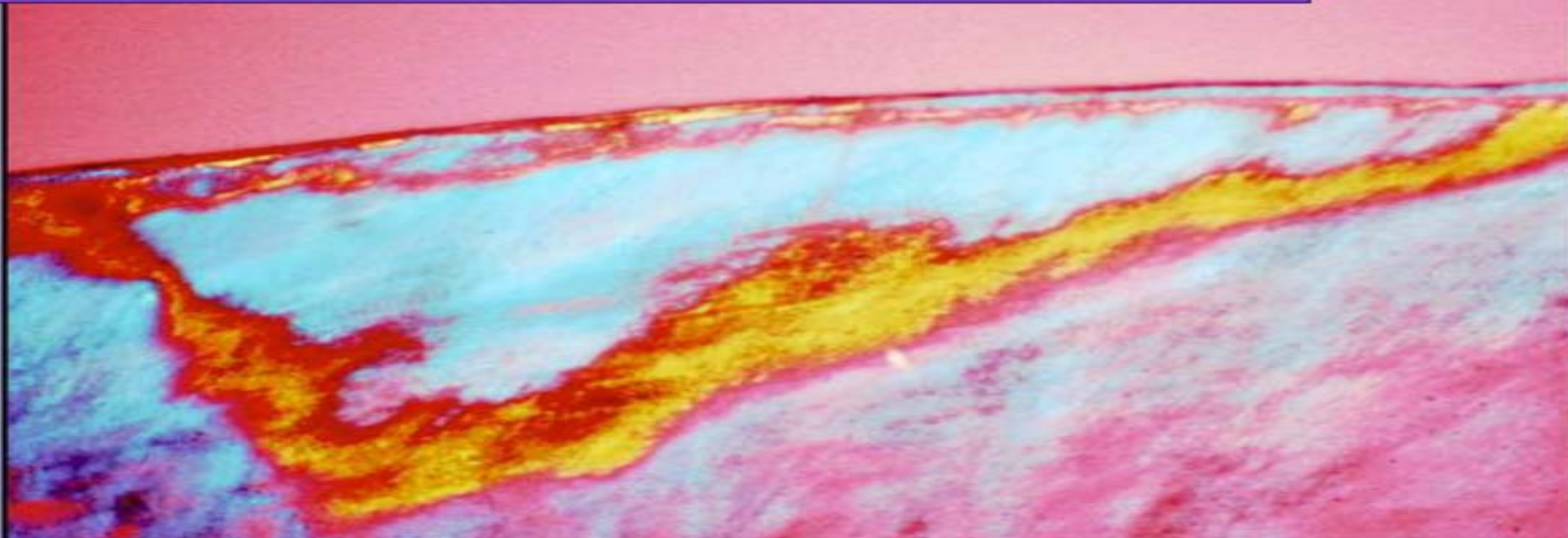
BACTERIA EXCRETE ACIDS

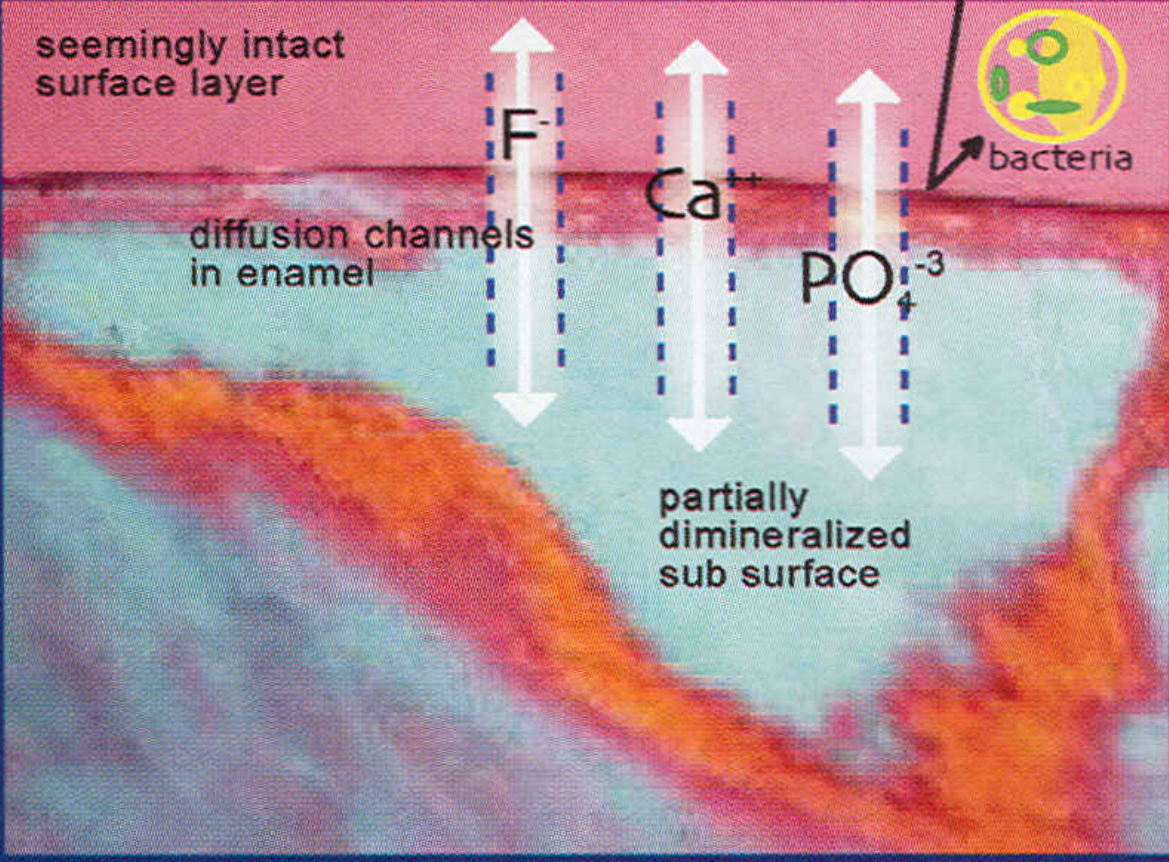
- WITHIN 5 MINUTES OF INJECTION AS THE SUGARS AND STARCHES ARE DIGESTED
- ACIDS PERSIST FOR 20-40 MINUTES
- SALIVA BUFFERS THE ACID...TO A POINT
- FLUORIDE, PHOSPHATE AND CALCIUM MOLECULES HELP REMINERALIZE EFFECTED ENAMEL

Demineralized Enamel

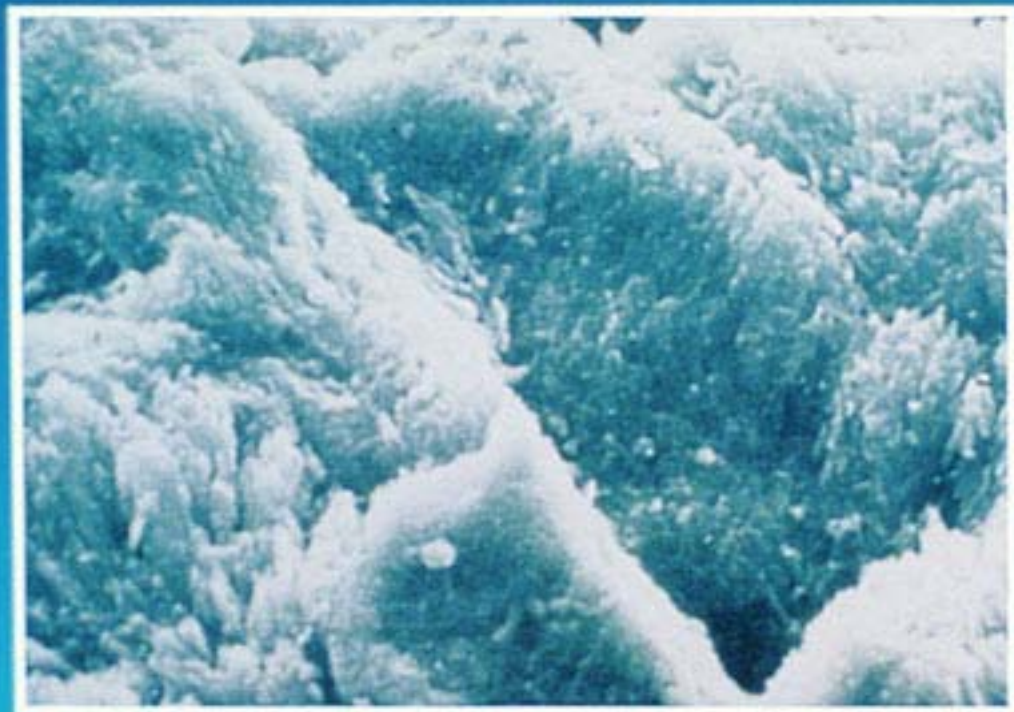


Remineralized Enamel





Partially Demineralized Enamel Crystals



- Acid diffusion through rod substance
- Calcium and phosphate dissociate



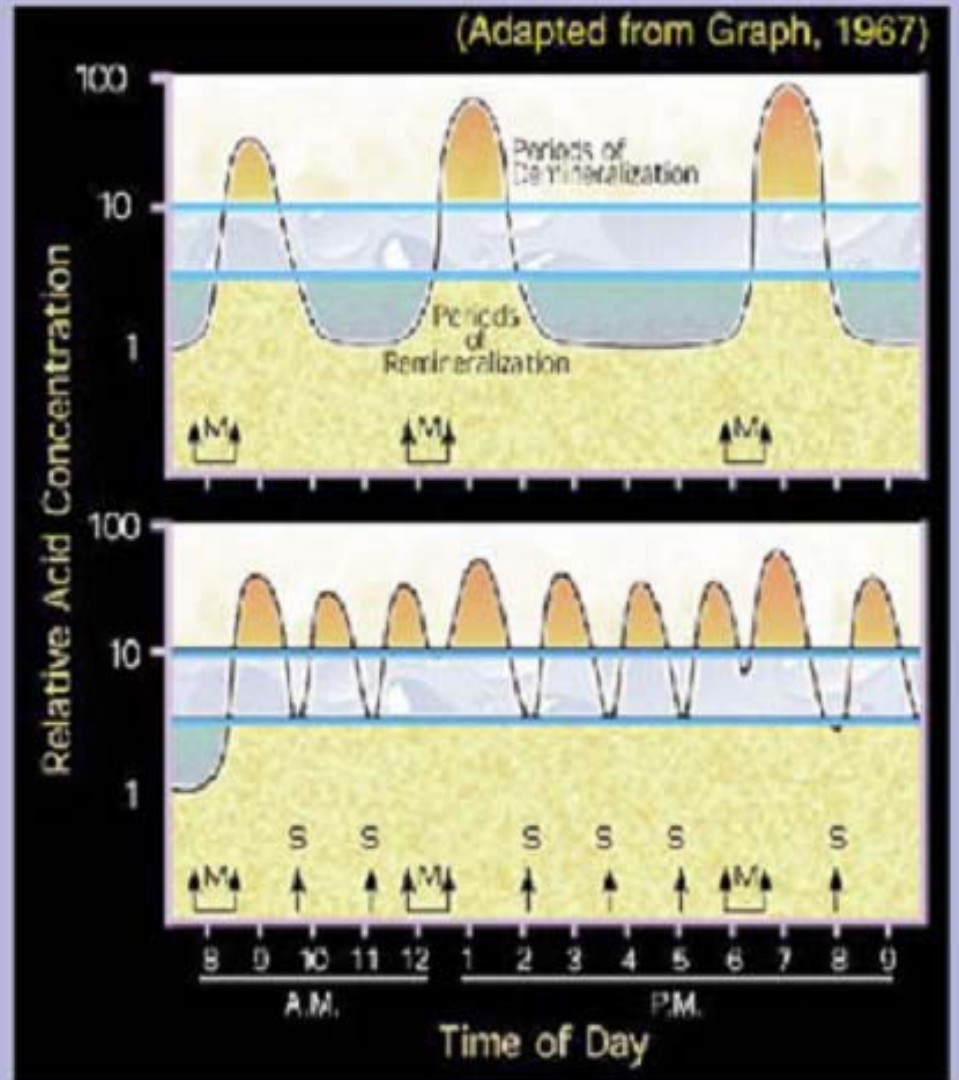
FREQUENCY

- **A KEY** – THE **FREQUENCY** OF THE ACID PRODUCTION, THEREFORE, THE FREQUENCY OF THE EXPOSURE TO FERMENTABLE CARBOHYDRATES
- ONE OF THE **MOST IMPORTANT KEYS**
- **SO, KIDS WHO SNACK OR SIP ALL DAY.....**

ACID ATTACK

Regular Meals (M)

Regular Meals (M)
plus
Sweet Snacks (S)





white spot lesions



THE SCIENCE

- CARRIES IS
PREVENTABLE...

FLUORIDE MECHANISMS

- SYSTEMIC
- TOPICAL

SYSTEMIC FLUORIDE

- FLUORIDE THAT IS INGESTED. IT IS INCORPORATED INTO THE HYDROXYAPATITE CRYSTAL AND MAKES THE ENAMEL LESS SOLUBLE TO ACID DISSOLUTION
- 1. WATER FLUORIDATION
- 2. LIQUID OR PILL SUPPLEMENTATION
(OR, FLUORIDE THAT IS NOT SUPPOSED TO BE SWALLOWED, LIKE IN TOOTHPASTE)

Systemic Fluoride Considerations

MANY MUNICIPAL WATER SYSTEMS ARE
FLUORIDATED.....WICHITA'S WATER IS **NOT**
FLUORIDATED (1 OF THE LARGEST CITIES IN THE U.S.
WITHOUT FLUORIDE)

MANY WATER FILTERS REMOVE FLUORIDE
HOW DO YOU KNOW?

BOTTLED WATER USUALLY DOES NOT HAVE FLUORIDE
(26% OF PEOPLE DRINK ONLY BOTTLED WATER)

Systemic Fluoride Considerations

**** FLUORIDE THAT IS INGESTED ALSO IS CONTINUALLY
RELEASED INTO THE SALIVA IN MINUTE AMOUNTS ****

****THIS IS A SIGNIFICANT CAVITY DETERRENT. ****

Halo Effect

BEWARE OF THE “HALO EFFECT”

- MULTIPLE SOURCES OF FLUORIDE INCREASE THE DANGER OF FLUOROSIS
- INGESTION OF TOO MUCH FLUORIDE IN TOTAL FROM:
 - WATER
 - TOOTHPASTE
 - PREPACKAGED BEVERAGES
 - SUPPLEMENTS
 - RINSES, GELS, VARNISHES
- WHEN, **AND IF**, I WRITE AN RX.....I GENERALLY USE ½ THE RECOMMENDED DOSE

ADA-Recommended Supplemental Fluoride Dosage Schedule

| Age of Child | Water Fluoride Concentration (parts per million) | | |
|---------------------|--|-------------------|------------------|
| | Less than 0.3 | Between 0.3 - 0.6 | Greater than 0.6 |
| Birth to 6 Months | 0 | 0 | 0 |
| 6 months to 3 years | 0.25 mg liquid drops | 0 | 0 |
| 3 to 6 years | 0.5 mg drops or tablet | 0.25 mg | 0 |
| 6 to 16 years | 1.00 mg | 0.5 mg | 0 |

SHOULD SYSTEMIC FLUORIDE BE PRESCRIBED ANY MORE?

- BE CAREFUL

TOPICAL FLUORIDE

- FLUORIDE THAT IS USED TOPICALLY (BRUSHED, RINSED OR PAINTED ON).
- IT IS INCORPORATED INTO THE VERY OUTER LAYERS OF THE ENAMEL AS “GLOBULAR CALCIUM FLUORIDE WHICH ACTS AS A RESERVOIR AND RELEASES FLUORIDE IONS IN RESPONSE TO **PH CHANGES** IN THE MOUTH” THUS RESISTING DISSOLUTION. THIS IS A TEMPORARY EFFECT.
- ALSO “ABSORBS ONTO THE ENAMEL SURFACE AND INHIBITS DISSOLUTION OF THE HYDROXYAPETITE CRYSTAL AND INCREASES THE RATE OF REMINERALIZATION”

TOPICAL FLUORIDE

- FOUND IN TOOTHPASTES, GELS, FOAMS, RINSES, **VARNISH**

SPELLING

- There is no flour in fluoride

WHO SHOULD BE TREATED WITH TOPICAL FLUORIDE?

- NOT EVERYONE

AAPD CARIES-RISK ASSESSMENT TOOL

WHO ARE YOU GOING TO PAINT FLUORIDE VARNISH ON?

- HOW DO YOU DECIDE?

AAPD (AMERICAN ACADEMY OF PEDIATRIC DENTISTRY) FAMILY CARIES RISK ASSESSMENT TOOL

A framework for clarifying/classifying caries risk in infants, children and adolescents based on physical, environmental and general health factors

A format that is dynamic. Changes as new evidence is obtained

3 COMPONENTS ARE LOOKED AT

- CLINICAL CONDITIONS - WHAT YOU SEE AND THE CARIES HISTORY
- ENVIRONMENTAL CHARACTERISTICS-THE FLUORIDE, THE DIET, GRAZING, PARENTAL STATUS
- GENERAL HEALTH CONDITIONS

RISK CLASSIFICATIONS

- HIGH RISK
- MODERATE RISK
- LOW RISK
- THE HIGHEST PRESENCE OF A **SINGLE RISK INDICATOR** IN ANY OF THE 3 COMPONENT AREAS, CLASSIFIES THAT CHILD IN THE **HIGHER RISK CATEGORY**

AAPD CARIES-RISK ASSESSMENT TOOL 2007/2008

• RISK FACTORS

RISK INDICATORS



HIGH

MED

LOW

– HISTORY (BY INTERVIEWING)

| | | | |
|--|-------------|--------------|---------------|
| • DECAY PRESENT | YES | - | NO |
| • PARENT/SIBLING WITH DECAY | YES(WITHIN | NOT RECENTLY | NO |
| • | LAST 3 YRS) | | |
| • DENTAL VISITS (DENTAL HOME) | NONE | IRREGULAR | YES |
| • FLUORIDE TOOTHPASTE | NO | SOMETIMES | YES |
| • FLUORIDATED WATER | NO | - | YES |
| • FLUORIDE SUPPLEMENTS (WHERE NEEDED) | NO | IRREGULAR | YES |
| • TIME SINCE LAST CAVITY | <12 Mo | 12-24 Mo | >24Mo |
| • TIMES/DAY TEETH BRUSHED | <1 | 1 | 2-3 |
| • WEARS BRACES | YES | - | NO |
| • GRAZES | YES, >3 | 1-2 | MEALTIME ONLY |
| • SOCIOECONOMIC STATUS | LOW | MID-LEVEL | HIGH |
| • SPECIAL HEALTH CARE NEEDS, ESP MOTOR | YES | - | NO |
| • MED CONDITION THAT IMPAIRS SALIVA | YES | - | NO |

AAPD CARIES-RISK ASSESSMENT TOOL 2007/2008

- RISK FACTORS

RISK INDICATORS



HIGH

MED

LOW

— CLINICAL FACTORS (BY EXAMINATION)

| | | | |
|---|-----|---|------|
| VISIBLE PLAQUE (WHITE, STICKY BUILDUP) | YES | - | NO |
| GINGIVITIS (RED, PUFFY GUMS) | YES | - | NO |
| AREAS OF ENAMEL DEMINERALIZATION | >1 | 1 | NONE |
| ENAMEL DEFECTS AND/OR DEEP PITS & FISSURES | YES | - | NO |

THE SMILE CENTRE' NEW CHILD SCREENING QUESTIONNAIRE

Please answer each of the following questions concerning your child:

CHILD'S NAME _____

DATE _____

What age did your child get their first teeth?

Before six months _____

Between 6-12 months _____

After 12 months _____

Have you or your child's other parent **had cavities** within the past 3 years?

No _____ Yes _____ Mom _____ Dad _____

Brother history of cavities? _____ Sister history of cavities _____?

Who **brushes** your child's teeth?

Mom _____ Dad _____ Child _____ No One _____

Who **flosses** your child's teeth?

Mom _____ Dad _____ Child _____ No One _____

Does your child **cooperate** for brushing/flossing?

Always _____ Sometimes _____ Never _____

- How many times a day are the child's teeth brushed?
 - None_____
 - 1_____
 - 2_____
 - 3_____
 - More_____
- What **type of toothpaste** is used for your child?
 - Non-fluoridated toothpaste_____
 - Fluoride toothpaste_____
 - Don't know_____
 - None_____
- Is your **water fluoridated?**
 - Yes_____
 - No_____
 - Don't know_____
- Do you use a **water filter?**
 - No_____
 - Yes_____
- Does your child drink **bottled water?**
 - Only bottled water___?
 - Occasional___?
 - None___?=
 - Does your child take **any medications frequently?** If so, what_____?

- What **oral habits** does your child have?
- Finger(s)_____ Thumb_____ Pacifier_____ Other_____

- When and **how often** does this habit occur?
All the time_____ Nap Time_____ Tired Time_____
Stress time_____ In bed at night_____ Occasionally_____

- Does your child **drink** from a bottle, sippy cup, regular cup? (Circle)

- **What liquid** does your child mostly drink?
Water_____ Milk_____ Juice_____ Other_____

- Does your child **eat between** meals?
– No_____ Occasionally_____ Frequently_____

- Does your child **drink between** meals?
– No_____ Occasionally_____ Frequently_____

- Is your child **breast fed**?

Currently_____ At night in bed with mother_____

- Does your child take **anything** other than a stuffed animal **to bed** with them at night?

Bottle_____Pacifier_____ Blanket_____

- Have you or your child's other parent had **braces**?

Mom_____ Dad_____

- Has your child suffered **any injuries** to their mouth?

Yes_____ No_____ What age_____

- Do you have **any special concerns**? _____

06 7 10



07 8 11









IS FLUORIDE VARNISH THE ANSWER?

WHAT IS FLUORIDE VARNISH?

- A COLOPHONY/RESIN BASED PRODUCT DEVELOPED AND USED IN EUROPE FOR MANY YEARS THAT RELEASES FLUORIDE IONS INTO THE **DENTAL ENAMEL** IN HIGH CONCENTRATIONS.
- USUALLY 5% SODIUM FLUORIDE
- CONTAIN UP TO 50,000 PPM

HOW DOES FLUORIDE VARNISH WORK?

- ADHERES TO THE ENAMEL BETTER THAN OTHER FLUORIDE PRODUCTS, FORMING A DEPOT FROM WHICH FLUORIDE IS SLOWLY RELEASED
- EXTENDS THE EXPOSURE TIME OF FLUORIDE IN THE MOUTH COMPARED TO OTHER TOPICAL FLUORIDES.

FLUORIDE VARNISH

- FLOURIDE VARNISHES ARE INTENDED TO REMAIN IN CLOSE CONTACT WITH ENAMEL FOR HOURS.
- WORKS BY INCREASING THE CONCENTRATION OF FLUORIDE IN THE OUTER LAYERS
- ESPECIALLY CONCENTRATED IN DEMINERALIZED AREAS
- DRYING IS SUFFICIENT TO “CLEAN” THE TEETH BEFORE APPLICATION

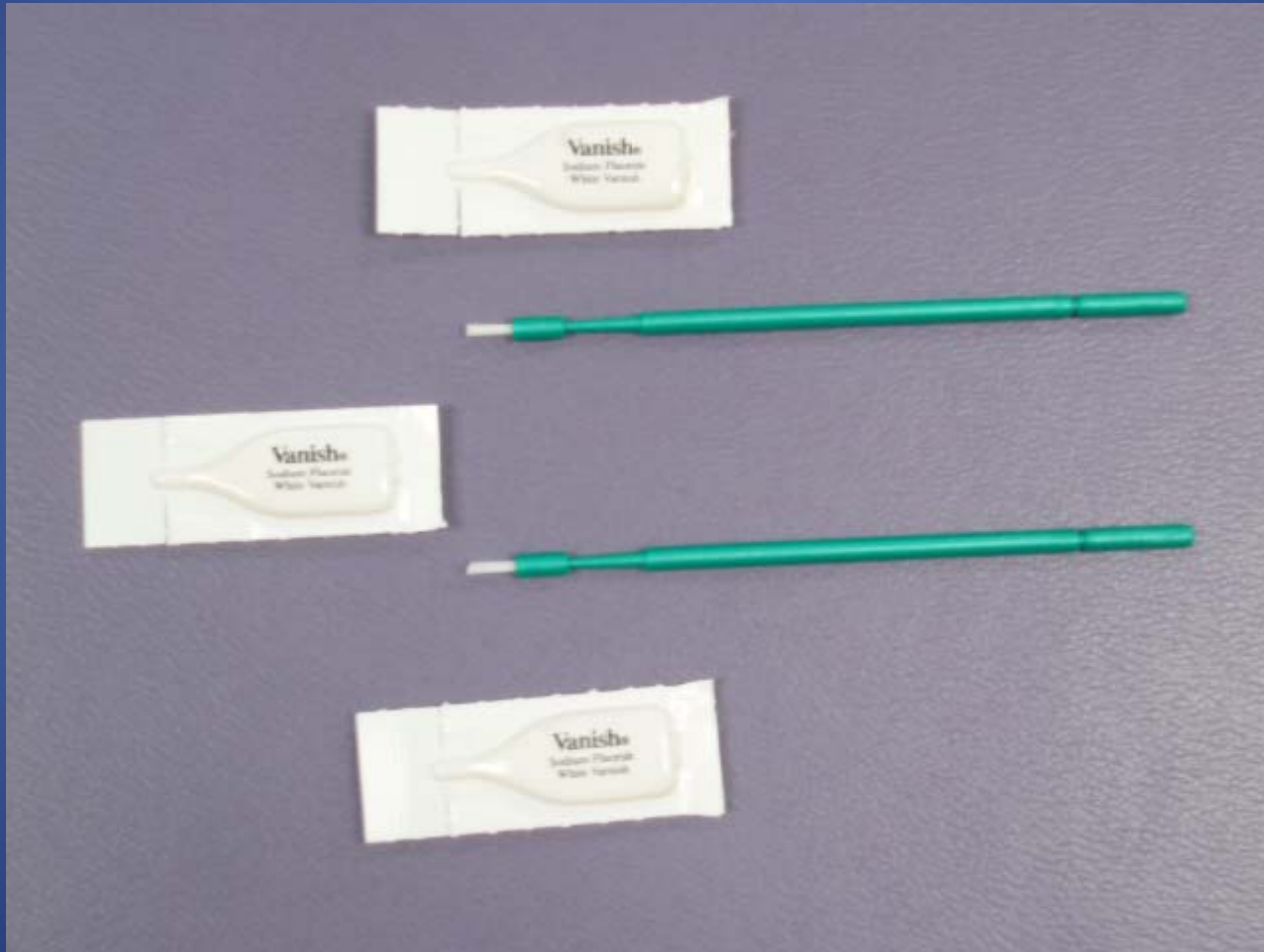
ADVANTAGES OF FLUORIDE VARNISH

- APPLY IN LESS THAN ONE MINUTE
 - DOES NOT REQUIRE SPECIAL EQUIPMENT OR THE NEED FOR A PROPHYLAXIS PRIOR TO APPLICATION
- SETS ON CONTACT WITH SALIVA
- NEUTRAL, BUBBLEGUM, MINT, CHERRY VANILLA, MELON, CHERRY
- PREVENTION OF CARIES
- DELAYS CARIES PROGRESSION

<https://decs.nhgl.med.navy.mil/1QTR07/PRODUCTEVALUATIONS/fluoridevarnishssynopsis.htm>

THIS SITE GIVES THE COSTS AND
GIVES UNBIASED EVALUATIONS

VANISH VARNISH (OMNI)









Isabella
Drs













AMOUNT TO APPLY

- BRUSH ON A 0.5 MM LAYER TO ALL SIDES OF EACH TOOTH
 - FACIAL
 - LINGUAL (BACK)
 - INTERPROXIMAL (SIDES) [WHEN TEETH NOT TOUCHING] (I TRY TO FORCE IT BETWEEN ESPECIALLY THE MAXILLARY CENTRAL INCISORS)
 - OCCLUSAL/INCISAL (BITING SURFACE)

FOLLOWUP INSTRUCTIONS

- CHILD CAN EAT OR DRINK IMMEDIATELY – A BIG +
- DON'T BRUSH OR FLOSS THE TEETH UNTIL TOMORROW
- SOFT DIET IS BETTER FOR THE REST OF THE DAY
- “STICKY TOOTHPASTE”

SAFETY

- MULTIPLE EUROPEAN STUDIES (AS EARLY AS 1966)
- MULTIPLE STUDIES SHOW TOXICOLOGIC SAFETY
- [Ekstrand J, Koch G, Petersson LG.](#) Plasma fluoride concentration and urinary fluoride excretion in children following application of the fluoride-containing varnish Duraphat. Caries Res. 1980;14(4):185-9.

SAFETY

- De Bruyn and Arends. Fluoride Varnishes; A Review. J Biol Buccale. 1987
- Seppa. Efficacy and safety of fluoride varnishes. Comp Cont Educ Dent. 1999
- Beltran-Aguilar, Goldstein, Lockwood. JADA, 2000

EFFICACY

- [Azarpazhooh A, Main PA.](#) Fluoride varnish in the prevention of dental caries in children and adolescents: a systematic review. J Can Dent Assoc. 2008
- [Ramaswami N.](#) Fluoride varnish: a primary prevention tool for dental caries. J Mich Dent Assoc. 2008
- [Weintraub JA, **Ramos-Gomez F, Jue B, Shain S, Hoover CI, Featherstone JD, Gansky SA.](#) Fluoride varnish efficacy in preventing early childhood caries. J Dent Res. 2006

AND IF IT IS EFFICACIOUS...

- HOW OFTEN SHOULD IT BE APPLIED?

HOW MANY TIMES TO APPLY PER YEAR?

- NO CURRENT CONSENSUS
 - 4 APPLICATIONS PER YEAR
 - 3 APPLICATIONS IN 1 WEEK
 - PROBABLY NOT
 - 3 WEEKLY APPLICATIONS
 - PROBABLY NOT
 - MINIMUM OF 2 PER YEAR

AND THE CURRENT ANSWER IS...?

3+ TIMES PER YEAR?

SHOULD FLUORIDE VARNISH BE PAINTED ON ALL CHILDREN AGES ...1ST TOOTH TO 5 (3?) YEARS OLD??

- **IF AT RISK, “YES”**
 - 2X
 - 3+ X
- **IF NO** VISIBLE CARIES, NO CARIES HISTORY IN FAMILY, NO POSITIVE RISK FACTORS, PARENT IS INVOLVED AND LISTENING AND YOU THINK THE CHILD WILL BE SEEN IN A DENTAL HOME, THEN

“NO”

ADVANTAGES OF FLUORIDE VARNISH

- EFFICACIOUS – IT WORKS WELL!
- EASY TO APPLY
- SAFE
- “INEXPENSIVE”

DISADVANTAGES OF FLUORIDE VARNISH

- IT CLOGS UP THE SUCTION!!!

SO.....

- USE FLUORIDE VARNISH ON HIGH RISK KIDS AFTER DOING A RISK ASSESSMENT
- GIVE PARENT SIMPLE ORAL HEALTH COUNSELING...
 - CAVITIES ARE INFECTIOUS!!!
 - PASSED FROM PARENT TO CHILD BY SPIT!!!
 - MILK AND JUICE IN A BOTTLE/SIPPY CUP WHERE THE CHILD CAN DRINK “AT-WILL” IS A MAJOR PROBLEM!!!
 - NO BOTTLE AT NIGHT OR NAP TIME!!!
- REPEAT FLUORIDE VARNISH TREATMENTS EVERY 3 OR 4 MONTHS
- ENCOURAGE A DENTAL HOME

MAKING ORAL HEALTH A PRIORITY IN KANSAS



BECAUSE IT MATTERS