

Fluoride Use in Primary Care

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Disclosure Statement

- I have no relevant financial relationships with the manufacturers(s) of any commercial products(s) and/or provider of commercial services discussed in this CME activity
- I do not intend to discuss an unapproved/ investigative use of a commercial product/device in my presentation.

Objectives

- Understand indications for topical fluorides in children
- Learn the types of fluoride products and the appropriate dosage

Background

- Dental caries remains the most common chronic disease of childhood.
- Caries is mostly preventable
- Dental health vs disease is a balance between protective and destructive factors
- Fluoride has proven effectiveness in the prevention of caries



Proposed Mechanisms of Action

- **Systemic** – incorporation into developing tooth enamel (pre-eruptive)
- **Topical** – anti-bacterial
- **Topical** – remineralization of existing tooth enamel (post-eruptive)

Systemic Fluoride

- Community water fluoridation has been recognized as 1 of the top 10 public health achievements of the 20th century by the CDC
- When children born and raised in fluoridated areas move to non-fluoridated areas, the decay-preventive effects largely disappear
- Drinking fluoridated water provides a topical benefit as well as systemic
- MMWR Morb Mortal Wkly Rep. 1999;48(12):241–243

The Role of Systemic Fluoride

- Prior to writing a prescription you must assess the child's fluoride intake from all sources
 - Water at home, formula, beverages, water at school or day care facility
 - Is child supervised during tooth brushing?
 - Is child getting a fluoride supplement at school?

Dietary Fluoride Supplements

- Should be considered for children living in a non-fluoridated community or who drink well water
- Status of water fluoridation may be available at: My Water's Fluoride
- (https://nccd.cdc.gov/DOH_MWF/Default/Default.aspx).
- Well water should be tested for fluoride content
 - Usually available through state's public health laboratory

My Water's Fluoride

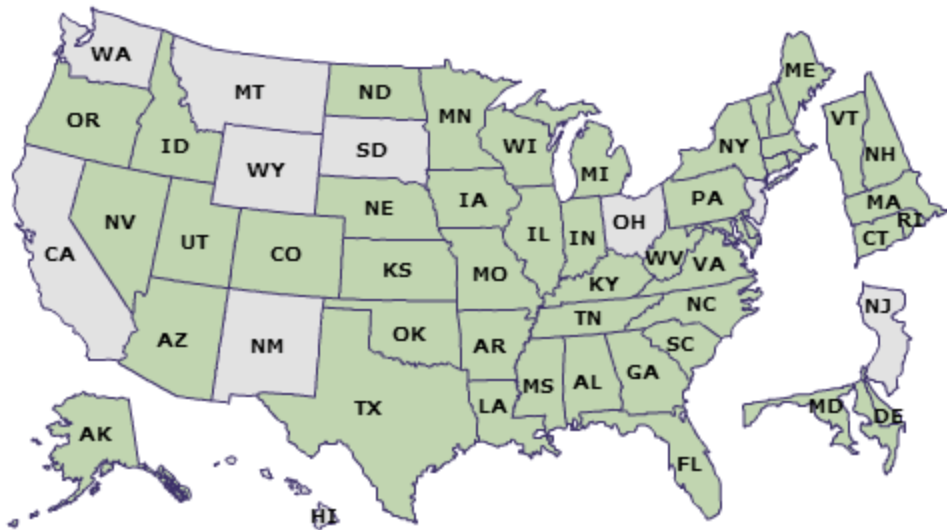
View Water System Information

Search by State

Search by County or Water System

If you do not see your state, then the state is currently not participating in My Water's Fluoride. [States participating in MWF](#)

Select State/Territory:



■ Participating ■ Not Participating

My Water's Fluoride



Florida - List of Counties

Select a county from this list to display the community water systems.

67 Counties

Alachua	Hamilton	Okeechobee
Baker	Hardee	Orange
Bay	Hendry	Osceola
Bradford	Hernando	Palm Beach
Brevard	Highlands	Pasco
Broward	Hillsborough	Pinellas
Calhoun	Holmes	Polk
Charlotte	Indian River	Putnam
Citrus	Jackson	Santa Rosa
Clay	Jefferson	Sarasota
Collier	Lafayette	Seminole
Columbia	Lake	St. Johns
Dade	Lee	St. Lucie
DeSoto	Leon	Sumter
Dixie	Levy	Suwannee

Orange County Public Water Systems

50 Water Systems Found

Results Per Page:

1 - 20 of 50 next >>

<u>PWS Name</u>	<u>PWS ID</u>	<u>Fluoridated</u>
APOPKA, CITY OF	FL-3480200	No
BARTON LAKE MHP	FL-3480061	No
BIG OAKS MOBILE HOME PARK	FL-3481571	No
BRIGHTWOOD MANOR MHP	FL-3480114	No
CLARCONA RESORTS	FL-3481501	No
COLLEGE MOBILE HOME PARK	FL-3480226	No
CONESTOGA MOBILE HOME PARK	FL-3481551	No
CRESCENT HEIGHTS S/D(CONSEC)	FL-3480255	Yes
DAVIS SHORES (CONSEC)	FL-3480272	Yes
DE NEEF VILLAGE	FL-3480289	No
EATONVILLE WATER DEPARTMENT	FL-3480327	Yes

Supplement Dosage

Age	Fluoride Ion Level in Drinking Water (ppm)*		
	<0.3	0.3-0.6	>0.6
Birth–6 months	None	None	None
6 months–3 years	0.25 mg/day**	None	None
3–6 years	0.50 mg/day	0.25 mg/day	None
6–16 years	1.0 mg/day	0.50 mg/day	None

**1.0 part per million (ppm) = 1 milligram per liter (mg/l)*
*** 2.2 mg sodium fluoride contains 1 mg fluoride ion.*

<http://www.ada.org/en/member-center/oral-health-topics/fluoride-supplements>

Fluoride Supplements

Lozenges

Rx: Sodium fluoride lozenges (0.25 or 0.50 mg F-
/lozenge)

Disp: 120 lozenges

Sig: Dissolve one lozenge in mouth daily

Refill: 1

Is there an anti-bacterial benefit

- Evidence suggests that fluoride may inhibit energy and biosynthetic metabolism of oral bacteria
- However, the fluoride concentrations necessary for anti-microbial effects are higher than would be present in the mouth
- Bottom Line: Likely only minor effect

Topical Fluoride Modalities

- Over-the-counter
 - Fluoride toothpaste (1000 ppm)
 - Fluoride rinse
- Professionally applied or prescribed
 - Fluoride varnish
 - High concentration fluoride toothpaste (5000 ppm)
 - Fluoride gel for home use
- Optimally fluoridated drinking water
 - Provides both a topical and systemic benefit

Topical Fluoride

- Strong evidence to suggest that fluoride shifts the equilibrium in the local oral environment towards greater mineralization of tooth structure
 - Enhances remineralization and inhibits demineralization
- Fluoride provides effective caries prevention for all ages

Bottom Line: Main effect of fluoride

Fluoride as a Therapeutic Agent for Dental Caries Prevention

- Given that the main effect of fluoride is topical, localized and direct on erupted (or erupting) teeth, the ideal fluoride regimen is one that provides fluoride exposure on a continuous or high frequency basis.

The Role of Topical Fluorides in Prevention

- Topical fluoride gel, foam and varnish is effective in the remineralization of early carious lesions and in the prevention of new cavities
- Fluoride varnish is well suited to young children because there is less risk of ingestion and it does not require the use of trays

Available Fluoride Therapies

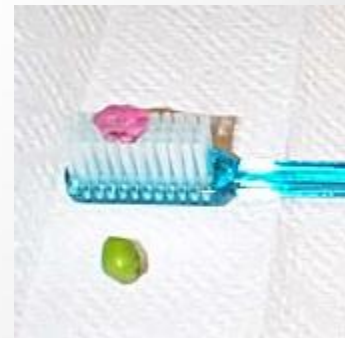
Fluoridated Water:

- Provides low-dose (0.7-1.0 ppm) fluoride topically on a nearly continuous or high frequency basis for those consuming it alone, or in foods or beverages made with water
 - 1 ppm = 1 mg/liter (~ 0.24 mg/cup)
- Very effective and low-cost
- Many people do not receive fluoridated tap water
- Bottled water is generally low in fluoride

Available Fluoride Therapies

Fluoride Toothpastes:

- Provides moderate-dose (1000 ppm) fluoride topically on a 2-3 times per day basis for those using it (1 inch on toothbrush is ~ 1mg fluoride/pea size is 0.25mg)
- Very effective, readily available and low cost
- Requires active use (people must brush their teeth to receive benefit)
- Ingestion a concern in younger children
 - Recommend parental supervision



When to use tooth paste?

- Begin to use tooth paste when first tooth erupts
 - Children under 3 years of age – use a smear of toothpaste
 - Children 3 years and older – use a pea-sized amount



**UNDER 3 YEARS
= SMEAR**



**OVER 3 YEARS
= PEA-SIZED**

- Recommended by AAP, ADA and AAPD
- Tooth brushing & dispensing of tooth paste should be done by parents or with close parental supervision.

The Role of Fluoride Toothpaste in Prevention

- Tooth brushing with fluoridated toothpaste prevents caries
- Decay reducing benefits of fluoride have been extensively documented in the scientific literature
- Most effective time of day to brush is before bed time

Fluoride in Tooth Paste

- Most tooth paste has 1000 ppm fluoride (some has 1500 ppm)
- In U.S. there are no children's tooth pastes with decreased concentrations of fluoride
- Preident is a prescription tooth paste with 5000 ppm
 - Recommended for adolescents at increased risk for caries

Available Fluoride Therapies

Fluoride Mouth Rinses:

- Provides moderate-dose (226 ppm) fluoride topically on a daily basis for those using it.
- Effective and available OTC
- Requires active use (people must remember to rinse daily)
- Younger children incapable of rinsing & expectorating

Fluoride Rinse

- Available over-the-counter 0.05% NaF
- Not recommended for children under 6 years of age
 - Must be able to swish and spit
- Recommend rinsing daily after brushing and before bed, then NPO
- Can be brushed on a child's teeth that doesn't like foaming action of tooth paste

Topical Fluoride Gel

- Requires prescription
- 1.1% NaF (5000 ppm) gel
- Recommended for children over 6 years of age who are at high risk for dental caries
- Brush 1 drop of gel on teeth before bedtime; NPO at least 30 min.



Recommendations

- Avoid fluoride mouth rinses and professionally applied gels in infants and young children due to risk of ingestion.
- Prescribe dietary fluoride supplements for those with deficient water fluoride.
 - Assess caries risk and other fluoride exposures prior to prescribing
- Educate parents about dangers of excess fluoride ingestion.

Available Fluoride Therapies

Professionally Applied Fluoride Varnishes:

- Provides high-dose (22,600 ppm) fluoride topically several times per year
- Effective, under providers' control and locally retained for several hours
- Small amount used, so less ingestion concern
- Requires professional visit
- More frequent use somewhat impractical and expensive

Fluoride Varnish

- First introduced in Germany in 1964 under the trade name Duraphat
- Over 30 years of clinical study
- Majority of studies have exhibited a 25-45 percent reduction in dental caries
- Reduction in occlusal as well as smooth surface caries

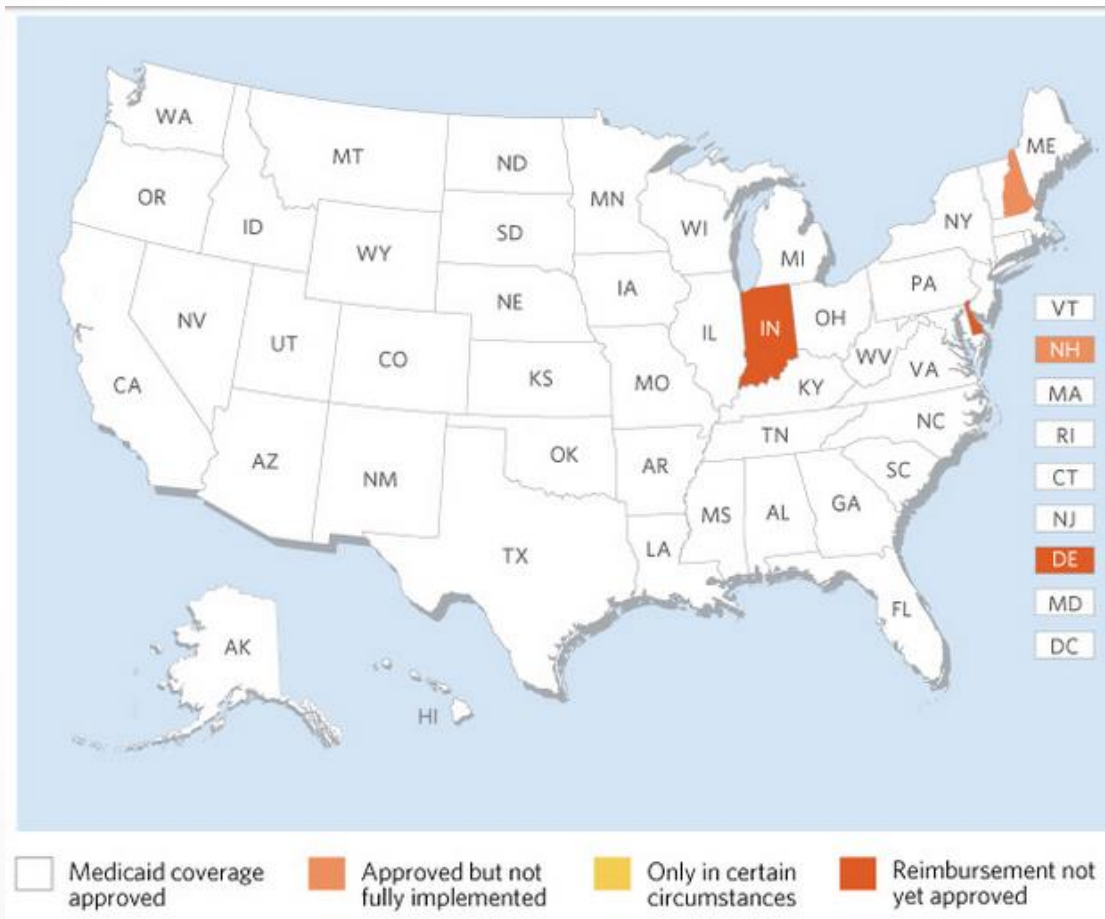
Fluoride Varnish

- Introduced to United States in 1991
- FDA approval as a “cavity liner” and a “desensitizing agent”
- 5% NaF (2.26% F ion)
- Fluoride ingestion lower than with gels

Fluoride Varnish Efficacy

- Average 33% caries reduction with biannual application*
- 43% reduction in decayed, missing, filled teeth compared to placebo**
- Systematic review of topical fluoride studies concluded that there is good evidence to support the use of 5% sodium fluoride varnish in children of all ages.***
- *Helfenstein and Steiner, Community Dent Oral Epidemiol, 1994
- **Marinho et al, Cochrane database syst rev, 2013
- ***Weyant et al, JADA, 2014

States with Medicaid funding for physician oral health screening and fluoride varnish



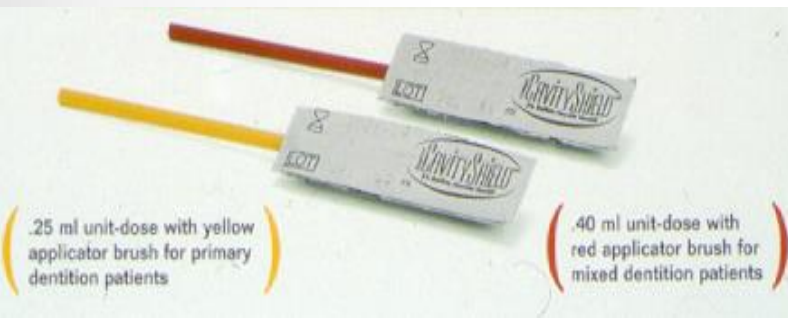
<http://www.pewtrusts.org/en/research-and-analysis/analysis/2011/08/29/reimbursing-physicians-for-fluoride-varnish>

Services Reimbursed in Florida

- Fluoride varnish and Anticipatory Guidance
- Provided by MD, PA or ARNP
 - Can delegate to CAN, LPN, RNA, RN
- Reimbursement: \$27
- Code: 99499 with modifier SC (medically necessary)
- Eligible ages: 6-42 months
- Frequency – 4 applications per year

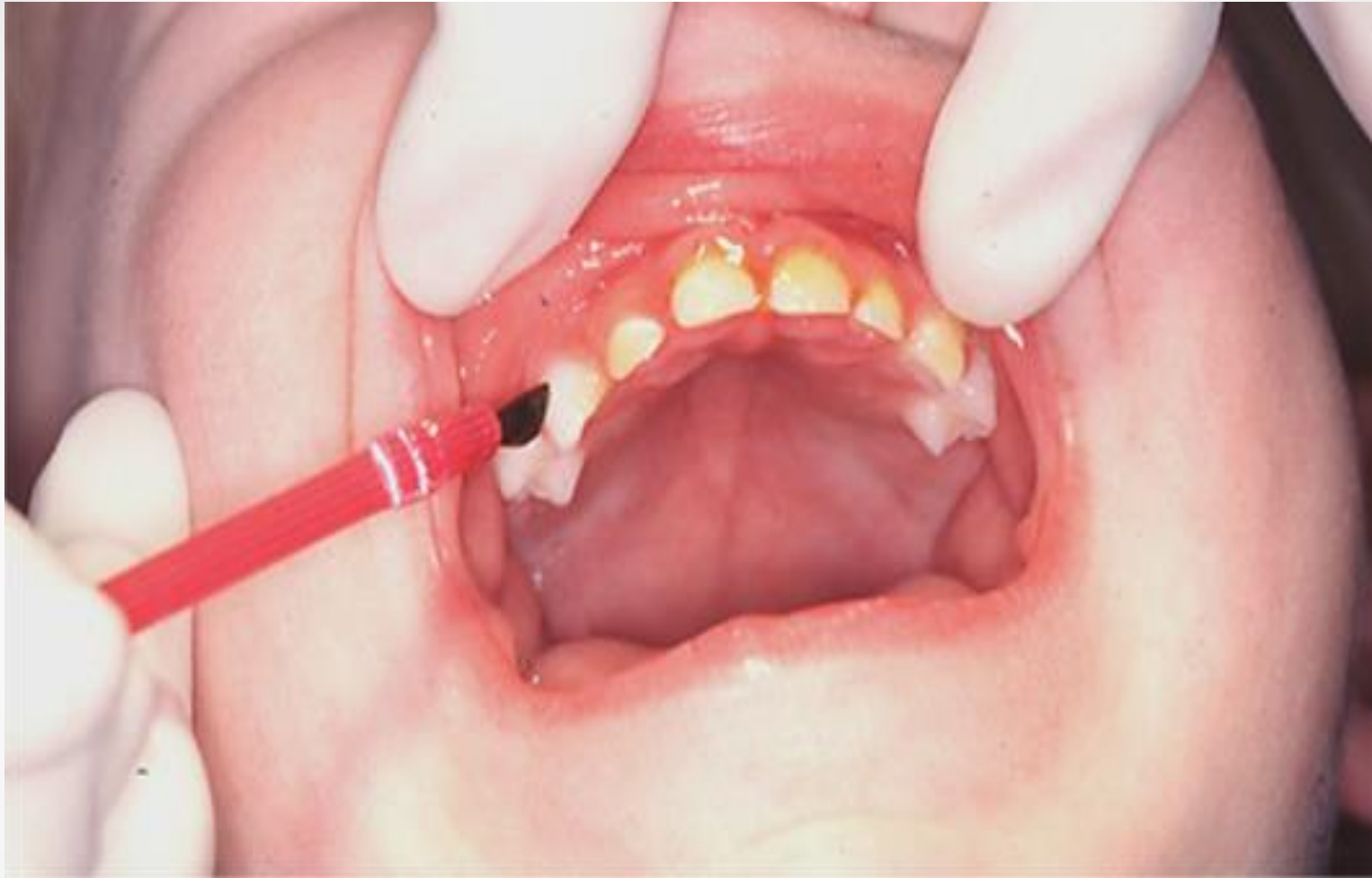
- <http://www2.aap.org/commpeds/doch/oralhealth/State.html>

Over 17 different brands available





Dry teeth with 2x2 gauze square



Apply varnish to all tooth surfaces



Varnishes vary in color from clear to white or yellowish

Dental Fluorosis

- A permanent, intrinsic stain caused by excessive fluoride ingestion during tooth development
- Staining is usually white, but can be dark brown or orange
- In severe cases, tooth enamel can be damaged
- Can occur in primary or permanent teeth

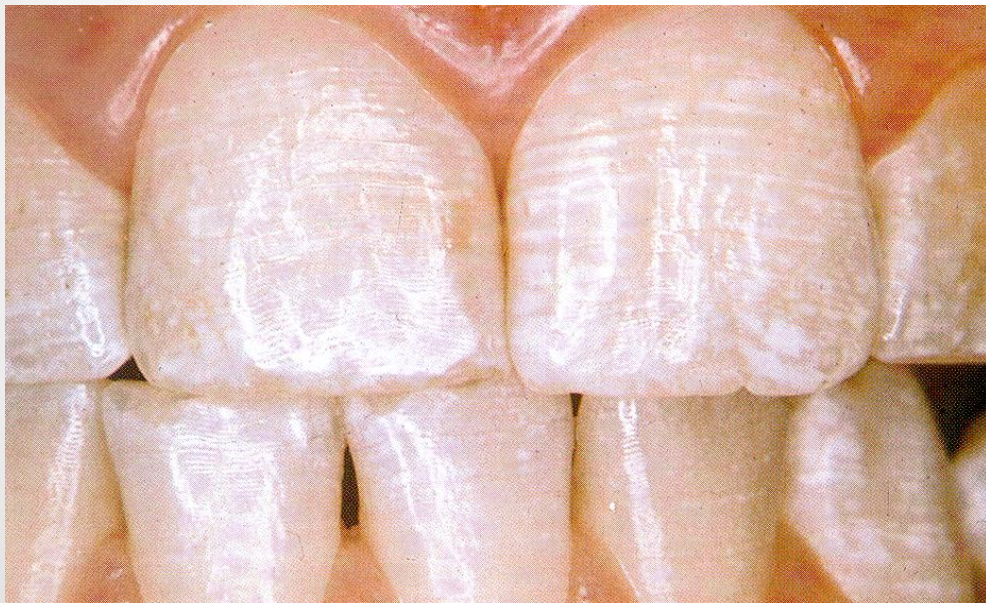
Fluorosis Risk

- Risk is increased by ingestion of greater than optimal levels of fluoride during tooth development
 - Unsupervised tooth brushing
 - Fluoride supplementation when child drinks fluoridated water
 - Reconstitution of infant formula with fluoridated water
- Methods to decrease risk
 - Parents apply toothpaste to the brush (smear or pea-sized)
 - Toothpaste stored where children cannot easily access it
 - Consider reconstituting formula with bottled water
 - Only prescribe fluoride supplements if no other exposure to fluoride

Dental Fluorosis - Primary Teeth



Dental Fluorosis – Permanent Teeth



Timing of Tooth Development

Primary Dentition

	Calcification begins at	Formation [*] complete at	Eruption		Exfoliation	
			Maxillary	Mandibular	Maxillary	Mandibular
Central incisors	4 th fetal mo	18-24 mo	6-10 mo	5-8 mo	7-8 y	6-7 y
Lateral incisors	4 th fetal mo	18-24 mo	8-12 mo	7-10 mo	8-9 y	7-8 y
Canines	4 th fetal mo	30-39 mo	16-20 mo	16-20 mo	11-12 y	9-11 y
First molars	4 th fetal mo	24-30 mo	11-18 mo	11-18 mo	9-11 y	10-12 y
Second molars	4 th fetal mo	36 mo	20-30 mo	20-30 mo	9-12 y	11-13 y

* In utero

http://www.aapd.org/media/policies_guidelines/rs_dentgrowthanddev.pdf

Timing of Tooth Development

Permanent Dentition

	Calcification begins at	Crown (enamel) complete at	Roots complete at	Eruption*	
				Maxillary	Mandibular
Central incisors	3-4 mo	4-5 y	9-10 y	7-8 y (3)	6-7 y (2)
Lateral incisors	Maxilla: 10-12 mo Mandible: 3-4 mo	4-5 y 4-5 y	11 y 10 y	8-9 y (5)	7-8 y (4)
Canines	4-5 mo	6-7 y	12-15 y	11-12 y (11)	9-11 y (6)
First premolars	18-24 mo	5-6 y	12-13 y	10-11 y (7)	10-12 y (8)
Second premolars	24-30 mo	6-7 y	12-14 y	10-12 y (9)	11-13 y (10)
First molars	Birth	30-36 mo	9-10 y	5.5-7 y (1)	5.5-7 y (1a)
Second molars	30-36 mo	7-8 y	14-16 y	12-14 y (12)	12-14 y (12a)
Third molars	Maxilla: 7-9 y Mandible: 8-10 y			17-30 y (13)	17-30 y (13a)

Acute Toxicity

- Toxic effects at 5 mg F/kg body weight
 - For a 10 kg child, toxicity (nausea & vomiting) can result with ingestion of about 1-2 oz. of toothpaste, or 6-8 oz. of fluoride mouth rinse.
- Lethal dose may be as low as 15mg F/kg body weight in children
 - For a 10 kg child, a lethal dose corresponds to < 0.5 oz. of professionally-applied fluoride gel, or about 5 ounces of toothpaste.

Fluoride in Filtered Water

- All fluoride removed by
 - Reverse osmosis
 - Distillation
- Negligible amount of fluoride removed by:
 - Activated charcoal filters
 - Brita[®] – pitcher-type or faucet mounted
 - Pur[®] – pitcher-type or faucet mounted

Fluoride in Bottled Water

- Calistoga[®] mineral water – 0.9 ppm fluoride
- Most bottled waters have minimal to no fluoride
- 20 of 900 brands add fluoride to their water
- Some mineral waters have low levels of fluoride but not usually evident on the label

Resources

- AAP Section on Oral Health
<http://www2.aap.org/commpeds/doch/oralhealth/index.html>
- Tools for providers:
<http://www2.aap.org/commpeds/doch/oralhealth/PracticeTools.html>


Oral Health Practice Tools

Incorporate oral health into your practice with these easy-to-use tools and resources. Learn how to perform an oral health risk assessment, nutrition and oral hygiene counseling, and to apply fluoride varnish when needed as a vital part of the well child exam.

● How Should I Set Up My Practice To Include Oral Health?

- Oral Health Practice Models
- Infant Oral Health Model in a Federally Funded Family Health Center Setting  (72 KB)
- Electronic Health Record Template To Include Oral Health  (58 MKB)

● What Do I Need To Apply Fluoride Varnish in My Office?

- Where To Get Varnish Materials, Dental Mirrors, and Head Lamps  (41 MB)
- Oral Health Supplies for the Exam Room  (25 KB)
- After Varnish Instructions for Families in English and Other Languages (Spanish, Russian, Cambodian, Somali, Oromo, Vietnamese, Hmong)  (851 KB)

Resources

- Oral Health Reimbursement Chart
 - Listing of public and private payers for fluoride varnish for CPT code 99188
- <http://www2.aap.org/commpeds/doch/oralhealth/docs/OralHealthReimbursementChart.xlsx>
- FAQ on coding
 - www.aap.org/coding/ICD10

Coding at the **AAP**

- Tools for Payment
- Resources to Educate
- Solutions for Coding Challenges

CAMPAIGN FOR
DENTAL HEALTH
life is better **WITH TEETH**

- Campaign for Dental Health
 - <http://ilikemyteeth.org>
 - Tips and fact sheets regarding fluoride –
 - <http://ilikemyteeth.org/health-professionals/>

References

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