Sheet # : 10

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**Professionally Applied Topical Fluoride**

We talked about fluoridated water , fluoridated food , supplements , topical fluoride , … \*

\* we won't talk about fluoride in dental material because we talked about it in dental material as glass ionomer .

\* systemic effect of fluoride >>> we don’t really care about .

\*topical effect of fluoride >>> this which we focus on .

\* Fluoride incorporated during tooth development is insufficient to play a significant role in caries prevention.

\* The topical effect of fluoride surrounding the enamel is most important.

\*\* first use of fluoride in 1940 since they use different compound , different modalities.

\*\* The caries-preventive impact of a certain modality depends on :

1- Type of fluoride compound: e.g : APF ,NaF , stannous fluoride

2- Concentration of fluoride : depend on modality that is used .

3- Rate of clearance from plaque solution : depend on salivary flow and any mechanical clearance for the plaque .

4- Frequency of application

## fluoride solution , gel and foams ##

Now we use fluoride varnish as modality of choice to apply fluoride .

## fluoride solutions :

\* Simply its NaF solution . it is the earliest form of professionally applied 1940 . at the same time that studies of water fluoridation start .

\* first compound they used is NaF: it was applied 4 times at weekly intervals at ages 3 , 7 ,10 ,13 .>> pt recall was an issue .

\* second preparation was 8 % stannous fluoride (SnF) : it was applied every 6 months . the solution was unstable >> so if I prepared on the morning , its only active for 5 to 8 hours . the other problem that Sn >>> give poor taste and cause staining and gingival irritation >> so it was not predictive .

\*third preparation was : 1.23 % **acidulated phosphate fluoride (APF).**

**Applied every six month as well .**

**But it needs to be kept in plastic containers**

**Acidic taste which is a problem .**

**\*\*these days no longer recommended fluoride solution because we have other modalities which are better , also by using fluoride solution >> the amount that will stick on the teeth is not that much and might be systemic ingestion .**

Fluoride gel :##

\*developed in 1960 .usually its 1.23 % fluoride ( 12300 ppm ) .

((( next lecture we will talk about how to calculate fluoride percentage in every modalities )))

\* they add methyl cellulose and hydroxy-ethyl used as a gelling agents.

\*the problem in this is (acidity) >> so acidity will cause irritation , if it touch the gingival and lead to discoloration of hydroxy apatite and (formation of Fluorapatite>> this is a good thing )

\* Rapid uptake of fluoride happens in the first four minutes.

\* the problem with acidity is ( if I have a composite restoration >> it will cause etching of the composite ,, so we can use an alternative method which is natural Naf 2% ((9200ppm)) ).

\*it allow application to all surfaces of teeth at once . (+ve thing ) not as solution which I need to use a cotton then aplly it on each tooth .

\* systemic ingestion is not uncommon :

1- High concentration of fluoride.

2- Large amount of fluoride can be retained in mouth following application

3- 78% of the dose swallowed if saliva ejector is not used.

4- Reports of nausea and gastric irritation (but not strong evidence).

**\*\*permanent teeth:**

Good evidence that gels can help prevent caries in children (DMFS prevented fraction= 28%)

Primary teeth :\*\*

Low quality evidence that gels can help prevent caries in (dmfs prevented fraction= 20%)

Number of studies in permanent teeth is much higher than primary teeth )) ))

Adverse effects : there is irritation , acute toxicity , risk of fluorosis . \*\*

How to apply fluoride gel in our clinic ??##

1-pt selection : modrate or high risk

7 years or older

2-prepration :

Prophylaxis >>> No evidence it is necessary

Select appropriate disposable plastic tray.

Sit patient upright.

Apply saliva ejector to reduce ingestion >> this is important .

Wipe teeth with gauze and air-dry.

\*\* we have a tray for primary teeth , mixed dentition ,permanent teeth .

Application :\*\*

Apply no more than 2–2.5 grams of gel per tray (40% of the tray's volume)

Upper and lower trays could be inserted separately or together .

Keep the gel applied for 4 minute >> because most of the absorption of fluoride release occur in 4 min .

Ask the patient to spit the gel out for 1-2 minutes afterwards.

Instruct the patient to not rinse, eat, or drink for at least 30 minutes.

## fluoride foams :

\*Requires only one fifth of amount by weight (mass is small ) >> so potentially reducing amount ingested

\*Similar compound to that used in gels (APF).

Similar application procedure.\*

\*The problem here that is almost new .

Permenant teeth : \*\*\*

Enamel F uptake Equivalent to that of gels.

Bi-annual application reduced the incidence of caries in smooth surfaces of 6s.

Application during orthodontic treatment reduced the development of white spot lesions.

**Primary teeth :\*\*\***

Bi-annual application was effective in reducing caries increment.

\*\*Fluoride always works better on smooth surfaces ( proximal , buccal ,palatal )than occlusal surface.

\*\*regular application during orthodontics treatment for 6 month reduce risk of caries .

(( number of studies in fluoride gel is much higher than foams ))

Fluoride varnish :##

Developed in 1960.\*

We can use it in elderly in case of root caries and reduce sensitivity in exposed dentin.\*

\*Basic component are:

Fluoride (active component ) 1-

Colophon ( which allow varnish to stick to the teeth)2-

Alchohol ( it’s a solution when we put it on the tooth , it will evaporate )3 -

\*\*Different brands available with different flavours and color:

* + 5% NaF - 2.26% F (22,600) Duraphat (( most common ))
  + 1% Difluorosilane - 0.1% F Fluor Protector
  + 5% NaF - Cavity Shield

10 ml tube\*

\*3 years shelf life, but if tube open >> you should use with 3 months .

\*Costs **0.5 dinar** per application>> so its cheep .

\*\***Fluoride varnish – Evidence :**

**\*\*permenat teeth :**

**Moderate evidence that varnish can help prevent caries (DMFS prevented fraction= 48%)**

Prevented fraction : it’s the cases with new decay , missing and filling surfaces on the tooth that we prevented by using this modality .

For primary teeth the prevented fraction is about 33% .

\*\*There is no significant association with caries ,severity ,exposure to fluoride ,prior prophylaxis ,concentration or frequency of application >> , all this factors when they research, they found its not affect the effectiveness of fluoride varnish .

\*\*One study reported that varnish is more acceptable than foams , especially among 3-6 years old , so we recommended it for young children ,, but there is insufficient evidence that says ( varnish is more effective than gel )>> its only that its easy to apply .

\*\*One study evidence that fissure sealant remain better that fluoride varnish for preventing occlusal caries ,,, by logic because fluoride prevent caries on proximal surface ; e.g :- if l have pt with high with high risk of caries and l want to prevent caries l will not use fluoride varnish ,l put fissure sealant at first .. and l use fluoride varnish to prevent caries proximally >> so usually l use them together .

\*\*Varnish applying is more easer than gel , l just need a dappen dish ,fluoride and brush to apply it ..

# Method of application for fluoride varnish :

- First u have to dry the tooth ( but this is not ideally , u should clean the tooth before ).

- Use small amount as we said its 22500 ppm so u have to be very careful about the amount.

- U can use floss to deliver the varnish intra dentally .

- Tell the pt to avoid eating and drinking for up to 4 hours and should not brush his teeth for the rest of the day because one he brush the layer of varnish will remove .

- Alarm the pt , the color of teeth will be yellow in the first 48 hours and gradually it will be more whiting .

Dose : very minimum\*\*

Primary dentition: up to 0.25 mls-

Mixed dentition: up to 0.40 mls -

Permanent dentition: up to 0.75ml-

**## Contraindications (as per manufacturer): its is in the manufacture instruction only but in the we have no study on proven so there is no research that say there is absolute contraindication .**

- Hypersensitivity to colophony and/or any other constituents, pt who have sever asthma or echsima because they are more sensitive rather other people so as precaution don’t try to apply fluoride varnish unless they are in hospital .

- Ulcerative gingivitis: and stomatitis , if u have an ulcer and uptake a fluoride varnish ,u get more risk of ingestion fluoride .

Bronchial asthma-

-Don’t use in combination with any other fluoride application (i.e don’t use varnish and gel at the same time )

Risk of toxic effect :#

Acute fluoride poising (5 years old , 20 kg )-

Only .9 ml needed ( u need only .5 ml ) .

* + - Lethal dose (5 year old, 20 kg)

13 ml needed ( u finish one tube and start with second tube ,its unlikely ).

We will talk about toxicity in details next lecture .\*\*

Be careful and look at how smallest and toxicity .\*\*

\*\*The toxicity happen if ingestion not just applying .

Two of fluoride rinses :#

They are newer development and still under research but Dr think its not a good idea ,,, its :

1-marked in north Amrica

2-APF and stannous fluoride mix

3-flouride concentration are low compare to gel or varnish 1500-3000 ppm ; ( they afraid if they put high concentration the ingestion will be high )

4- they add metallic taste and increase risk of ingestion

It look like mouth wash that we prescribe it and use it in home but its high concentration .

\*\* Until now there is No evidence for effectiveness and we don’t think it will be better modality than fluoride varnish because two fluoride rises resemble fluoride solution so we don’t recommended for use for use because other established modality are already available .

The last option is slow release fluoride devices .#

- in the beginning at 2000 the people were happy with it because its new ,, but after research ,they think its not great as they thought ;

- it’s a device attached to bucall surface of one or more tooth and release fluoride over several years in the oral environment ..

- there are many types and shapes but we have to now only two type :

1-**Co-polymer membrane:**

- contains NaF in co-polymer matrix. .. the membrane it salve dose not stick on the tooth , but we need to stake the device on the tooth so we use band ( look like band in ortho ss ) .

* kept in a SS retainer attached to orthodontic band-
* - Depending on the amount of F, these devices can release between 0.02 and 1.0 mg F/day for up to 180 days.

As we know 1 mg F /day is what we look for >> so this device are design to give similar amount .

**2-glass device: they stick directly on the tooth (don’t need band):**

-Bead, kidney shaped ( to give better retention), or replaceable disk some time (when the retention of disk become less we change it ) .-

- Attached to the buccal surface of the first permanent molar using adhesive resins like composite restoration .

Contain 13.3% to 21.9% F -

-Releases F for up to two years so the duration of time is satisfy.

No complains but the problem are :-

1-only one good RCT to assess them

2-good caries preventive impact in children that retained the device only over the course of the study so the problem in retention not in device .

3- Almost 50% of the participants lost their devices – retention is an issue.

- u can image if l put some thing in bucall surface of sixes it will lose easily with mastication , so it’s a good idea in theory but not in practically it dosnt work as well.

## sources :

there are 4 sources of reverence , the Dr prefer public **Health England (PHE)>> more easier .**

**\* Recommendations for practice :**

**1- varnish and gel are the method supported by the strongest evidence so no one of u think to use slow releasing device or two fluoride rinses .**

**2-before l start applying fluoride , l should think about pt age , other source of fluoride ( tooth brushing ,water ,floriatd milk ) , caries risk e.g :**

**Patients at high risk for caries on smooth tooth surfaces. -a**

**Patients at high risk for caries on root surfaces.-b**

**Orthodontic patients. -c**

**d- Patients undergoing head and neck irradiation because xirostomia**

**e- Patients with decreased salivary flow.**

**f- Children whose permanent molars should, but cannot, be sealed e.g : partially erupted teeth ( we use glass ionomer on it ) .**

**\*if the pt 3-6 months with low risk ; we don’t need to apply fluoride , if the risk is high we apply fluoride varnish to teeth for two or more times a year ( may be 4 times a year maximum ).**

**\*if pt 3-12 years : every one need to apply fluoride varnish two times a year,if pt is in high risk apply two or more times per year and if low risk apply two times a year .**

**\* if pt higher than 16 years or more >> no need to apply fluoride for low risk pt but for high risk we apply it two times a year .**

**\* Dr show us picture for 4 years old children …**

**To do prevention plan for him we should look at :-**

**1- age =4 years**

**2-caries risk >> high risk ( the presence of caries is the strongest predictor of fissure caries )**

**- So prevention plan is :**

**1-OH ; brsh two times a day using fluoride tooth paste 1450 ppm ( adult tooth paste ).**

**2- we should conseder amount of tooth paste ( pea size) , time of brush (2 min) , floss , and the most important one is supervision .**

**3-diet advice .**

**4-fissure sealant .**

**5- varnish or gel fluoride application two or more times a year ..**

**Best of luck ,,,**

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