Clinical Guideline 5 - Version 4

Valid to: October 2016

dental health services victoria
oral health for better health

Use and Applications of topical Remineralizing Agents

Purpose

The aim of this Clinical Guideline is to provide advice to public oral health clinicians regarding the mode and procedure for application of topical fluorides to patients of different caries risk status. Treatment recommendations should be determined for each patient by the oral health clinician involved, and patient preferences should be considered in all treatment plans.

Oral health clinicians apply fluoride products for the primary prevention of dental caries, and may also apply fluoride products to prevent early carious lesions from progressing.. Evidence-based clinical guidelines are intended to provide guidance, and are not a standard of care, requirement, or regulation. However, the application of clinical guidelines in publicly-provided oral health services allows for consistency to occur across large patient cohorts with a variety of oral health clinicians.

This Clinical Guideline is to be read in conjunction with the DHSV Water Fluoridation Policy. Water fluoridation remains a safe, effective, efficient, and equitable method of fluoride delivery to promote the oral health of the dentate population.

DHSV recognizes and supports appropriate professional topical applications of fluoride (F^-) gels and varnishes in the prevention of dental caries for at-risk individuals.

Guideline

Case Selection

The selective use of professionally applied topical fluorides is encouraged by DHSV. The decision to apply topical fluorides should be based on the assessment of the caries-risk of patients. Topical fluoride therapy is but one part of an appropriate preventive dental treatment, and can be planned after identification of caries-risk status. In the absence of a caries-risk assessment tool for use throughout public oral health in Victoria[1], clinical options will be limited to individuals recognised as either at high or low risk to developing caries.

Professionally applied fluoride should be targeted at high caries-risk individuals and not provided on a routine basis. This applies for both fluoridated and non-fluoridated communities. Research has shown that annual application of professionally applied topical fluoride results in reduction of DMFT (decayed, missing and filled permanent teeth) by over 20% in fluoridated communities (Ripa 1989), and that fluoride gel is effective in preventing caries in school-aged children (ADA CSA 2006).

Clinical Options

There are two types of professionally applied topical fluorides in common usage, a gel or foam of either acidulated or neutral fluoride, and a fluoride varnish. In addition, there are self-use fluoride products that may be purchased over the counter, including fluoride mouthrinses, fluoride supplements, and fluoridated toothpastes.

Topical Fluoride Gel or Foam

Professionally applied topical fluoride gel is an effective way of preventing dental decay in patients at high-risk of developing caries. However, high concentration fluoride gels and foams (>1.5mg/g F^- ion) **are contra-indicated for use in children under 10 years of age** due to the potential for ingestion. Furthermore, fluoride gels appear more efficacious on the permanent dentition.

[1] Under review, 2009

There are two types in common usage: 1.23% Acidulated Phosphate Fluoride (APF) and 2.0% Neutral Sodium Fluoride (NaF) (9,000 parts per million (ppm) F^-). Due to its neutral pH, NaF is now more widely used. It is particularly indicated for use in patients with the following:

- Composite resin, glass ionomer or porcelain restorations, as the acidity of the APF gels, if used 2-3 monthly, can cause damage to these restorations
- Enamel erosion
- Very porous enamel structure such as carious or hypoplastic enamel
- Exposed or carious dentine and root surfaces

Fluoride foams for topical application are also available however, there are few clinical studies of the effectiveness of fluoride foams.

Topical fluoride Gels and foams used to be applied in dental trays, but this practice is obsolete, with the advent of fluoride varnishes.

Spot Application

Spot application of fluoride gels may be appropriate for patients with limited co-operation. APF is used for spot fluoride application (unless NaF is indicated) and applied for **four** minutes. The patient is given the same instructions as they receive after a full mouth application.

Fluoride Varnish

Duraphat™, a 5% NaF varnish (22,600 ppm F^-), is used for spot applications on enamel caries diagnosed visually or by radiograph, rather than for whole mouth application. It must be used with care in minute quantities (deciduous dentition 0.25 ml, mixed dentition 0.40 ml, permanent dentition 0.75 ml) due to its high fluoride concentration. Duraphat's™ effect is similar to that obtained with other topical fluoride preparations but is less efficient due to its high cost. An indication for its use is when treating patients who have elevated risk of developing caries, e.g. limited co-operation due to disabilities, and including children less than ten years of age.

Patients with an allergy to Colophony should not use Fluoride Varnishes.

Procedure

- Dispense the appropriate amount of varnish to be used on to a pad.
- Remove any gross plaque from the teeth that are to be treated.
- If possible, isolate the teeth using cotton rolls.
- Dry the enamel surfaces with cotton swabs, gauze, or oil-free compressed air.
- Apply the varnish in a thin film to the tooth surface with a suitable instrument. Floss may be used to ensure approximal surfaces are treated.
- Dry the varnish for 30 seconds if possible, using a gentle flow of compressed air.
- Instruct the patient not to rinse, eat or drink for a minimum of 30 minutes, preferably up to 4 hours after the fluoride application.

Recaldent/Toothmousse/Toothmousse Plus

Toothmousse is recommended for Children under 6 years of age.

Toothmousse plus contains 900ppm fluoride and is suitable for older children and adults.

Background.

CCP-ACP (casein phosphopeptide – amorphous calcium phosphate) milk-derived product that strengthens and remineralizes teeth and helps prevent dental caries.

A group of peptides, known as CPP, have been shown to stabilize calcium and phosphate preserving them in an amorphous or soluble form known as amorphous calcium phosphate (ACP). Calcium and phosphate are essential components of enamel and dentine and form highly insoluble complexes, but in the presence of CPP they remain soluble and biologically available. This CPP-ACP complex applied to teeth by means of chewing-gum, toothpaste, lozenges, mouth rinses, or sprays is able to adhere to the dental biofilm and enamel hydroxyapatite providing bioavailable calcium and phosphate ions.

Remineralization of white spot lesions has been achieved clinically by applying pastes based on these compounds, and a similar effect to self-applied fluorides has been observed in reducing the appearance of new caries lesions in patients with xerostomia.

Directions for topical application.
Use a small pea sized amount only.
Apply on finger, cottonbud, or microbrush to the teeth.

The patient can apply the paste in the same manner at home.

Fluoride Mouthrinses (for home use)

Fluoride mouthrinses offer an additional fluoride vehicle for individuals with elevated risk of caries. Likely concentrations contain between 200 – 900 mg/L F^- ion.

Children under the age of 6 should not use a fluoride mouthrinse, due to the risk of ingestion and dental fluorosis.

This can be a useful alternative for the occasional patient who insists on rinsing after brushing. It can be an alternative to Neutrafluor 5000 Plus toothpaste.

Low Caries-Risk

Additional benefits may not be received by patients within this caries risk classification (ADA CSA).

Moderate Caries-Risk

Prescribe 0.05% neutral NaF mouthrinse (220 ppm F^-) daily, OR 0.2% NaF mouthrinse (900 ppm F^-) weekly

High Caries-Risk

People aged six years or more, who have an increased risk of developing caries, should use a mouthrinse at a time of day when toothpaste is not used, although it should not be a substitute for brushing. After rinsing, the mouthwash should be spat out, not swallowed.

Prescribe 0.2% NaF mouthrinse (900 ppm F^-) daily

Silver Fluoride.

There is now a Silver Fluoride product on the market, which can be applied for spot applications to carious lesions, and also as a treatment to assist remineralizing of dentine at the base of a restoration in a carious tooth.

It is important to make sure that the silver fluoride doesn't contact the patients mucosa, and rubber dam is recommended when used in restorations.

Fluoride Supplements

Fluoride supplements have long been advocated as an alternative source of fluoride in non-fluoridated areas. However, studies that rely on compliance by parents and children at home have shown little benefit due to varied effectiveness. Also, the younger the child, the greater the risk of dental fluorosis.

Fluoride supplements in the form of drops or tablets which are consumed or chewed are no longer recommended.

Fluoride Toothpastes

The twice daily use of a toothpaste containing fluoride will prevent new caries development in approximately 80% of children. Commencement of teeth cleaning prior to the first birthday is associated with reduced caries prevalence later in childhood, but the use of fluoridated toothpaste before 18 – 24 months of age does not confer any further benefit in preventing caries. Indeed, the risk of dental fluorosis is elevated.

Recommendations for home use fluoride therapies for individuals of varying risk for caries, or do not consume fluoridated water should be as follows:

Low Caries-Risk

From the time that teeth first erupt (about six months of age) to the age of 17 months, children's teeth should be cleaned by a responsible adult, but not with toothpaste.

Children aged between 18 months – 5 years inclusive, brushing regimes should include use of a pea-sized low fluoride toothpaste (0.4 – 0.55mg/g = 400 – 550 ppm F^-) applied to a child-sized soft toothbrush, twice a day, under the supervision of an adult. The child should be encouraged to spit and rinse, not swallow, at the end of brushing.

From the age of 6, teeth should be cleaned at least twice a day, with standard fluoride toothpaste (containing 1mg/g = 1,000 ppm F^-). People aged six years or more should be encouraged to spit, not rinse or swallow at the end of brushing.

High Caries-Risk

Children who are deemed of high caries-risk or who do not consume fluoridated water need guidelines that are adapted to their individual requirements. Alternative strategies may include starting the use of toothpaste at a younger age, more frequent use of fluoridated toothpaste, or beginning to use the standard 1mg/g toothpaste at a younger age.

Use of fluoride in special needs patients

For older adults with decay present or who are at higher risk of developing tooth decay (for example, people with specific medical conditions such as dementia, or who are taking medications that dry the mouth), additional therapeutic fluoride sources are needed. These therapeutic fluoride products can be purchased from a pharmacy and used at a frequency as discussed with a dental professional. Therapeutic fluorides are of several types – APF, Stannous Fluoride (e.g. Gel-Kam™ (1,000 ppm F^-)), and neutral NaF.

Generally, for patients with special needs including older adults, neutral NaF is the product of choice, as the other fluorides may be damaging to tooth-coloured fillings and crown and bridgework, and may be too harsh for people with a dry mouth. The Colgate NeutraFluor™ neutral NaF range provides a variety of therapeutic products, with a neutral pH. The frequency and combination of use of NeutraFluor™ products is determined by decay severity, caries-risk status, and other factors such as a person's self-care ability, behavioural problems, medical conditions, swallowing problems, dietary intake, and the like. One of the easiest and most convenient to use is NeutraFluor 5000 Plus™ (5,000 ppm F^-) toothpaste, which can be used at daily or weekly frequency, and supplemented with a standard 1mg/g toothpaste if necessary.

A small pea-size amount of toothpaste or less, is all that is needed, and less in people with fewer natural teeth remaining.

Assess the need for supervision with dispensing the toothpaste.

If it is difficult to use toothpaste, consider using Mouthwash as an alternative.

NeutraFluor 900™ (900 ppm F^-) (weekly) or NeutraFluor 220™ (220 ppm F^-) (daily) mouthrinse can be rinsed, swabbed or sprayed around the mouth, (or NeutraFluor Gel™ (5,000 ppm F-) can be brushed or swabbed onto the teeth (daily or weekly).

Patients with swallowing problems need to use products of a consistency and application appropriate to their situation.

Infant formula

Infant formula powder is now manufactured with very low amounts of fluoride. Infant formula nowadays is safe for consumption by infants when reconstituted using fluoridated or non-fluoridated water.

Toxicity

Extreme care must be used with professionally applied topical fluorides. Due to the high fluoride content there is a danger of over-dosage if used too frequently or if the patient swallows large quantities. For this reason, topical fluoride gels in trays should not be used on children under 10 years of age, or where suction is unavailable. Patients must always remain under supervision.

The symptoms of acute fluoride poisoning are similar to many kinds of acute poisoning and usually involve excessive salivation, nausea, abdominal cramps, vomiting and paraesthesias (numbness or tingling of the face or extremities). In the early stages of acute fluoride poisoning, highly corrosive hydrofluoric acid may be produced in the stomach and this may damage the gastric mucosa resulting in ulceration and haemorrhage. Such damage may lead to the presence of blood in the vomitus. Diarrhoea may occur several hours after the ingestion of fluoride compounds.

The following table gives an indication for the amount of toothpaste ingested to receive a probable toxic dose.

			Amount 1000 ppm toothpaste (90g tube = 90mg F^-)		Amount 400 ppm toothpaste (45g tube=18mg F^-)	
Age of child	Average weight	Probable toxic dose	Weight	% tube	Weight	No. tubes
2 years	12 kg	60 mg	60 g	66%	150 g	3
4 years	15 kg	75 mg	75 g	85%	188 g	4
6 years	20 kg	100 mg	100 g	> 1 tube	250 g	5.5

Cameron and Widmer 2003

If acute fluoride poisoning is suspected, the patient should be immediately referred to a medical hospital Accident and Emergency Department for treatment. In the interim, first-aid action should include encouraging the person to drink a large amount of milk (which will help precipitate the fluoride as calcium fluoride). Vomiting should not be induced.

Special needs adult patients

The fluoride products described in this section are safe to use in special needs patients, including older adults, at the frequency indicated using the methods described. More than the contents of one entire tube of NeutraFluor 5000 Plus™ toothpaste would have to be ingested at one point in time to cause toxicity. More than the contents of one entire bottle of either NeutraFluor 220™ mouthrinse or NeutraFluor 900™ mouthrinse would have to be

ingested at one point in time to cause toxicity.

Summary

DHSV's recommendations for the use of fluoride products can be summarized as follows:

	Low Caries-Risk				High Caries-Risk			
	0. – 1.5 years	1.5 – 5 years	6 – 9 years	10+ years	0. – 1.5 years	1.5 – 5 years	6 – 9 years	10+ years
Toothpaste	None	400 ppm	1000 ppm	1000 ppm	Consider alternative strategies in addition to Low Caries-Risk recommendations			
Topical Gel	None	None	None	None	None	None	None	Use
Varnish	None	None	None	None	None	Use	Use	Use
Mouthrinse	None	None	None	None	None	None	0.2% daily	0.2% daily

Definitions

Nil

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Policy owner

Clinical Leadership Council

Approved by

Director of Clinical Leadership, Education and Research

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References and related documents

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