Getting excited about fluoride again

May 1, 2005

Early detection of caries is possible due to research breakthroughs, enabling preventive specialists to promote remineralization with fluoride varnish.

by Kathryn Gilliam, RDH, BA

Let's face it, cavity prevention is passé. Fluoride treatments are not grabbing headlines these days. We've been successfully fluoridating community water and using in-office fluoride treatments for more than 60 years. Fluoride products have come a long way. We have very tasty fluoride rinses, gels, and foams that enhance patient acceptance, much more so than years ago. Most patients understand the benefits of fluoride application, and they do not question our recommendations for regular fluoride treatments.

We take for granted fluoride's effectiveness. So it's hard to imagine getting excited about another fluoride product. Yet, that's exactly what I'm suggesting we do.

I have been excited about fluoride varnish ever since it was recommended to me for use on my youngest, cavity-prone son. We had tried everything for this child, including three-month professional prophylaxis with topical fluoride gel, home fluoride tablets, and high-concentration home fluoride toothpaste. We brush his teeth with a battery-operated toothbrush and I floss for him. He had sealants placed on primary and permanent molars and premolars, yet he continued to experience cervical breakdown.

You can imagine the frustration and feelings of failure I experienced as the professional dental hygienist/mother of this poor, caries-prone child.

When I heard of the long-term benefit of fluoride varnish, I immediately ordered a sample and coated my son's teeth with it. I have continued to reapply the varnish every three months. Since we began this protocol, he has not experienced any further breakdown. We have been able to arrest

a few areas of incipient decay, as well. This experience of mine is certainly anecdotal and without scientific evidence, but it served to further my interest in fluoride varnish as a treatment option for other patients who are caries prone. If I can use a product that helps them gain control of caries activity, and possibly reverse caries and conserve tooth structure by preventing the need for physical intervention such as drilling and filling, I will feel I have done a great service. This is what being a preventive specialist is all about.

A new strategy

It's true that there has been a dramatic reduction of the incidence in caries; however, dental caries remains a significant problem, especially in less affluent populations. Nearly 20 percent of children between the ages of two and four have detectable caries. By age 17, almost 80 percent of young people have had a cavity. More than two-thirds of adults between the ages of 35 to 44 have lost at least one tooth due to dental caries.1 According to the NIH Consensus Statement, "In order to make continued progress in eliminating this common disease, new strategies will be required."

One of the most exciting new strategies, in my opinion, is the use of fluoride varnish. Studies show that fluoride prevents the formation of, slows the progression of, or even reverses newly forming cavities. Caries progression or reversal is determined by the balance between protective and pathologic factors. Fluoride works primarily via topical mechanisms: inhibition of demineralization, enhancement of remineralization, and inhibition of bacterial enzymes.2

Although fluoride varnish is relatively new to dental practice in the United States, it has been used as a caries preventive treatment for years in Europe and Canada. Along with other factors, fluoride varnish has been credited for a significant decrease in dental caries in these areas.3 To date, the Food and Drug Administration (FDA) approves fluoride varnish use as a cavity liner and desensitizer. The use of fluoride varnish for caries prevention is considered "off label," which means it is being used for a purpose not specified in the information provided with the product. The ADA has given one of the fluoride varnish products its seal of approval, but this information can't be publicized until the FDA gives its approval for use of fluoride varnish as a caries preventive product.4

Several fluoride varnishes are available in the United States:

• Duraphat, Colgate Oral Pharmaceuticals

• Duraflor, Pharmascience, Inc.

• FluorProtector, Ivoclar-Vivadent

• Fluoridex Lasting Defense, Discus Dental

• VarnishAmerica, Medical Products Laboratories

• Durashield, Sultan Dental

• CavityShield, OMNII

• Dentsply, AllSolutions

Duraphat and Duraflor, for example, contain a high fluoride concentration and are intended to be delivered by dental professionals. The varnishes contain 5 percent sodium fluoride (NaF), which forms a sticky layer on the tooth following application and hardens on contact with saliva. Fluoride is then absorbed into the enamel over time. It is recommended that fluoride varnish be allowed to remain on the enamel for 24 hours for optimum absorption, but the patient may be allowed to brush four hours following application for patient comfort.5 Fluoride varnish is not intended to adhere permanently to the tooth surface like a sealant, but to remain in close contact with enamel for several hours. The caries-reducing effect continues for some time following initial application.

Reapplication is required in order to maintain a caries preventive effect over time. Various application schedules have been proposed but a standard protocol has not yet been established.

Despite the rapid setting time and the small dosage used, the risk exists that some of the product may be ingested during placement. Additionally, as fluoride is released from the varnish after treatment, some fluoride will be ingested. Studies have shown that the risk of acute toxic reactions with varnishes is minimal.6

We are entering a new era of preventive dental care. New methods of early detection of caries are being researched, which will enable us to promote remineralization with fluoride varnish. The need for the physical intervention of drilling and filling carious lesions with restorations will be reduced, thereby preserving tooth structure. This will be a tremendous benefit to our patients. The future of preventive dentistry is now.

Kathryn Gilliam, RDH, BA, is a coach with Hygiene Mastery, as well as a speaker, author, and practicing dental hygienist. She can be reached for comment or coaching at kathryngilliam@yahoo.com.

References

1 NIH Consensus Statement, Diagnosis and Management of Dental Caries Throughout Life, vol. 18, no. 1, March 26-28, 2001, National Institutes of Health, Office of the Director.

2 Featherstone JDB. The Science and Practice of Caries Prevention. JADA, July 2000, vol. 131, No. 7, pp. 887-899.

3 Beltran-Aguilar E, Goldstein JW, Lockwood SA. Fluoride Varnish: A Review of Their Clinical Use, Cariostatic Mechanism, Efficacy and Safety. JADA, May 2000, vol. 131, No. 5, pp. 589-596.

4 Terhune Alty T. Tarheel Varnish. RDH, February 2000. http://rdh.pennet.com Accessed 6/13/02.

5 Shen, C, Aution-Gold J. Assessing Fluoride Concentration Uniformity and Fluoride Release from Three Varnishes. JADA, February 2002, Vol. 133, No. 2, pp. 176-182.

6 Beltran-Aguilar E, Goldstein JW, Lockwood SA. Fluoride Varnish: A Review of Their Clinical Use, Cariostatic Mechanism, Efficacy and Safety. JADA, May 2000, vol. 131, No. 5, pp. 589-596.

7 Fluoride Varnish Protocol, Iowa Department of Public Health, Division of Community Health, Bureau of Oral Health. http://www.idph.state.ia.us Accessed 6/13/02.

Varnish application protocol[7]

1. Clean the teeth. Toothbrushing is acceptable as fluoride varnish penetrates plaque. Professional prophylaxis is not required.

2. Dispense one drop of varnish (.3ml) into a small plastic well or dappen dish.

3. Isolate and gently dry the quadrant to be treated with gauze or air. Excessive or complete drying is not necessary.

4. Apply the varnish to all exposed surfaces of the teeth. A disposable brush is convenient and effective. Cotton-tipped applicators may also be used.

5. Repeat procedure for all quadrants to be treated.

6. Ask the patient not to brush teeth for at least four hours following application of fluoride varnish. Inform the patient and parents to expect the teeth to appear yellow until the varnish is brushed off at the appropriate time. Advise the patient to wait 30 minutes after application before drinking or eating.

Clinical notes

I have used fluoride varnish in my clinical practice for the last three years for those patients identified as being at high risk for dental caries. Patient acceptance has been good and ease of application makes it a procedure I prefer over the use of fluoride trays. I have developed and have been given application tips that make it an easy procedure to incorporate into my day.

1. Less is more. As with sealant material, it is easy to overload the brush. It is important to paint a thin film of varnish on the teeth, so dip your applicator carefully.

2. To keep the cost contained, be careful not to dispense more varnish than necessary for treatment. It’s not always easy to judge how much

liquid you will need. For that reason, the unit-dosage product may be helpful. The varnish is premeasured and a disposable brush is included.

3. Fluoride varnish is very sticky and it can be uncomfortable if accidentally touched to the patient's lips or face. It may be helpful to coat the lips with a thin film of lip balm or petroleum jelly prior to application of varnish. To remove drips and drops from the skin, use a cotton-tipped applicator or two-by-two gauze dipped in an alcohol based mouthwash.

4. Be sure to remove fluoride varnish from the mirror and instruments with a two-by-two gauze moistened with alcohol prior to autoclaving. Once it is baked on, it is very difficult to remove.

5. Always explain to the patient and parent that the teeth will appear yellow until the varnish is brushed off of the surface. It may be a shock if one isn't prepared.

Mastery points

▲ Fluoride varnish is effective, quick, and easy to apply.

▲ The concentration of fluoride is as high as standard AFP gel.

▲ Varnish is at least as effective as four-minute APF gel treatments.

▲ Varnish remains on teeth, especially in the pit and fissure, cervical, and interproximal areas, releasing fluoride for several hours.

▲ Comparatively small amounts are ingested during and after treatment; it is less likely to be swallowed by young children during treatment than gel.

▲ No intraoral trays or suction are required during application.

▲ Fluoride varnish can be applied to teeth in difficult patients where a conventional gel can't be accomplished.

▲ Fluoride varnish can penetrate plaque, so a professional prophylaxis isn't required, making in-school treatments possible and effective.

▲ Fluoride varnish causes a color change until the product is brushed away after at least four hours.

▲ Fluoride arrests and reverses the dental caries process; it also remineralizes the tooth enamel.

▲ Fluoride varnish can be a valuable service for orthodontic patients; it does not affect the bonding ability of brackets after treatment.

Kathryn Gilliam, BA, RDH, FAAOSH
Kathryn Gilliam, BA, RDH, FAAOSH, is a regular contributing author to Today's RDH and many other publications. Kathryn is a proponent of incorporating the latest scientific research on the multiple oral – systemic links into practical clinical protocols. She is a well-recognized speaker, dental practice consultant, and practicing clinician. Kathryn can be reached for comments or questions at Kathryn@PerioLinks.com.