Remineralisation and Enhanced Fluoride Delivery with ACP:

Remineralisation technologies are now playing an important role in preventive care. Creating excitement is amorphous calcium phosphate (ACP). ACP is more than a cosmetic benefit for patients- it’s the first non-fluoride therapy to remineralize enamel and dentin. The most reactive and soluble calcium phosphate compound, ACP forms on the tooth enamel within the dentinal tubules and provides a reservoir in the saliva. ACP rapidly releases calcium and phosphate ions to convert to apatite and remineralise. The potential of ACP was discovered by ADA Foundation Paffenbarger Research Center chemist and researcher, Ming S. Tung, Ph. D. in 1991. Research shows that available ACP on the enamel can prevent damaging erosion by stimulating remineralisation of tooth structure. Introducing calcium and phosphate back into the surface of the tooth with products containing ACP technology is an ideal strategy to reverse the demineralisation process.

The ACP-forming ingredients also strengthen teeth by acting as an enhanced fluoride delivery system to deliver more fluoride than products without ACP. As a part of the prophylaxis procedure, prophylactic paste is intended to polish the enamel. While polishing, the fluoride-enriched layer of enamel is removed. Premier’s Enamel Pro® prophylactic paste delivers 31% more fluoride uptake into the enamel than prophylactic paste without ACP. In addition to the increased fluoride uptake, Enamel Pro prophylactic paste improves enamel lustre as the ACP fills in the enamel crevices for an intense polish and shine. In other procedures involving ACP formulated products, ACP also works together with fluoride to desensitise dentin. Fluoride along with the ACP occludes tubules by depositing tooth-like minerals to create a semi-permanent reduction in hydraulic conductance, thereby minimising sensitivity. Whether it arrests early stages of caries for patients, produces a delivery system for fluoride, providing a more lustrous enamel surface, or desensitising teeth, the potential of ACP technology will continue to provide to professionals new tools to remineralise and great strides in eradicating the caries process.

In a 2012 study evaluating incubation conditions on fluoride release in vitro, Enamel Pro Varnish displayed greater fluoride release than 3M Varnish and Colgate Duraphat. Independent studies show Enamel Pro® Varnish delivers more enamel fluoride uptake and greater fluoride release than 3M Varnish with TCP.

Distinguished:
- First advanced fluoride varnish optimised to provide valuable tooth-building ions of calcium and phosphate
- Designed to create substantive forms of CaF2 and ACP

Indications for use:
- Enamel Pro Varnish is a fluoride containing preparation for the treatment of dentinal hypersensitivity, and for the reduction of post operative sensitivity.
- Enamel Pro Varnish offers a nice aesthetic appearance, is patient pleasing and has studies which support fluoride uptake, fluoride release and diminished hydraulic conductance.
The Leading 10:  
10 questions regarding  
Enamel Pro® Varnish by Premier®

1. What are the latest technologies in strengthening enamel?
Products containing calcium and phosphate, which are naturally found in healthy saliva.

2. How do the additions of such salts contribute to a successful treatment plan?
Calcium and phosphate technologies are not all alike, the intention of these formulas is to reinstate lost minerals as a result of acidic or erosive challenges that occur daily and affect both enamel and dentinal structures.

3. What are the differences that health professionals need to look at in these technologies?
The differences exist in the mechanism of action of each technology and how it sets up the delivery of calcium and phosphate ions. For instance, products which create amorphous calcium phosphate (ACP) are derived from a combination of specialised salts of calcium and phosphate.

4. Once the mechanism of action is determined, what sets them apart in providing the best solution?
Solubility/bioavailability addresses how quickly these formulas break down to make calcium and phosphate ions readily available in the oral environment. ACP provides for rapid delivery, in fact, its high solubility is its best attribute. It is immediately bio-available and improves fluoride uptake.

5. How does the addition of ACP formula in products contribute to greater fluoride uptake?
As the specialised salts become soluble in the oral environment, calcium and phosphate ions are free to attach to the fluoride ions. Fluoride reacts with tooth mineral, forming either fluoridated apatite (firmly-bound) or calcium fluoride (loosely-bound). ACP forms on the tooth enamel within the dentinal tubules and when met with fluoride, provides a beneficial calcium fluoride ion reservoir on teeth in plaque and in the saliva.

6. Explain loosely-bound fluoride.
Calcium fluoride, or loosely-bound fluoride provides a relatively slow-release form of ionic fluoride to plaque, saliva or soft tissue. A potential reservoir source of solution fluoride enhances remineralisation and slows down the demineralisation processes.

7. Firmly-bound?
Firmly-bound fluoride, or fluorapatite, incorporated onto the surface of the crystals of apatite can reduce the solubility of tooth mineral and, hence, inhibit demineralisation due to acids generated by plaque bacteria.

8. Is there a comparison of calcium/phosphate technologies on fluoride uptake?
In fact, a recent study with NaF varnish indicates Premier Enamel Pro Varnish with ACP formulation delivers statistically significantly more fluoride both to intact and demineralised enamel than varnish with tri-calcium phosphate (TCP). It is likely that this outcome results from the greater availability of the calcium and phosphate ions in the ACP formulation.

9. NaF Varnishes are indicated as a desensitiser. Can you elaborate on how ACP technology contributes?
Enamel Pro Varnish with ACP formula is proven to diminish hydraulic conductance by 73%. ACP works together with fluoride to desensitise dentin; ACP crystallizes with fluoride and forms fluorapatite - tooth-like mineral. ACP and fluoride provide semi-permanent occlusion with fluorapatite.

10. So, fluoride varnishes are not all alike?
No; while all varnishes provide fluoride, Enamel Pro Varnish has studies supporting fluoride uptake, fluoride release and diminished hydraulic conductance. Enamel Pro Varnish is the perfect solution for patients of all ages who need a fluoride treatment; takes seconds to apply, sets on contact with saliva and provides relief from hypersensitivity.


Random Facts

# Enamel is comprised of approximately 96% inorganic material and 4% organic material and water.
# Normal flow of saliva, whether it is resting or stimulated, is essential to keeping the oral cavity maintained in a healthier state.
# Minerals will start to leach out of Hydroxyapatite when the pH is below 5.5.
# Minerals will start to leach out of Fluorapatite when the pH is below 4.5.
# ACP (Amorphous Calcium Phosphate) technology was discovered through funding by the American Dental Association (ADA) Foundation and developed in collaboration with the Paffenbarger Research Center, ADAHF and NIST, Maryland, USA.