Creating the ideal preventative dental treatment gel

1 Hour CPD Program

Dental treatment gels are often considered to be fundamentally different to conventional dentifrices. Treatment gels are often formulated with a low RDA (Relative Dentine Abrasivity) and are often adjuncts to conventional dentifrices. Historically treatment gels were used as methods of applying a particular type of technology directly to the tooth surface. Types of technology include fluoride, antigingivitis, remineralisation and desensitisation. Treatment gels by definition tend to be less viscus than tooth pastes. In addition to being brushed onto the tooth surface, some treatment gels can be used at home in a custom close fitting tray to deliver a more intensive treatment.

Dentifrices are agents used along with a toothbrush to clean and polish natural teeth. They are supplied in paste, powder, gel or liquid form. Generally, dentifrices contain ingredients under the headings: Abrasives, Fluorides, Surfactants and Other components.

Abrasives are the insoluble particles which aid in the removal of plaque from the tooth surface, in recent times there has been a significant reduction in the abrasivity of dentifrices. The Relative Dentine Abrasivity scale (RDA) is a method for measuring the abrasive effect that the components of dentifrice have on the tooth, particularly on enamel and dentin. It involves using standardized abrasives compared against the test sample. Products with an RDA of 100 or more are generally considered to be highly abrasive.

RDA	Abrasivity
0-70	Low Abrasion
70-100	Medium Abrasive
100-150	Highly Abrasive
150-250	Regarded as Harmful Limit

Fluoride in its various forms are the most popular “active ingredients” in dentifrices, Sodium Fluoride, Stannous Fluoride and Sodium Monoflurophosphate have all been popular. However, research suggests that Stannous Fluoride is the only fluoride to prevent gingivitis and treat sensitivity.

Stannous fluoride as an active ingredient in dentifrice was first introduced in the 1950’s, and only later replaced by (the soon to become more popular) sodium fluoride. Sodium fluoride became a more popular option as it was considered less expensive than stannous fluoride, and was at the time far better tasting. The first formulations of stannous dentifrice had a very gritty texture. Stannous was also thought to have an unpleasant metallic taste caused by the tin complex. Over time it was thought that stannous fluoride caused a significant amount of extrinsic staining. The literature suggests that stannous fluoride was always a more effective active ingredient in dentifrice than sodium fluoride. It is well documented that stannous fluoride strengthens enamel with a rich fluro-apatite layer which is more resistant to demineralisation. It has further been suggested that stannous fluoride has several key advantages over sodium fluoride. Importantly stannous fluoride is thought to be antimicrobial. Stannous fluoride is able to destroy bacteria by interfering with the

microbes metabolism. It makes sense that less bacteria leads to less acid production, and therefore a reduction in the number of cavities.

As we know, when plaque bacteria metabolise fermentable carbohydrates such as sugar, they produce acid. The acid production by the bacteria, lowers the pH of the oral environment. Once the critical pH is reached, tooth tissue becomes demineralised. Compared to sodium fluoride, in an oral environment treated with stannous fluoride pH tends not to drop as low and often recovers much quicker.

There is strong scientific evidence to suggest that if patients have xerostomia and other oral conditions that cause dryness, they are more susceptible to dental caries, gingivitis and sensitivity. In the western world, we have an ever aging population, many of which take some form of long term prescription medication. Various medications and other systemic disease states like Diabetes, hypertension, asthma and Attention Deficit Disorder (ADD) have a profound effect on xerostomia and dryness.

Patients with dryness are also prone to developing periodontal disease and other chronic gingival infections. In research carried out by Dr Athena Pappas at Tuffs University in the USA, stannous fluoride performed as well as products containing Triclosan in patients with medical induced xerostomia. So if stannous fluoride is the “new” wonder technology that can effectively do all of the above, then why are so many consumers and dental professionals unfamiliar with it?

For almost 20 years the dental profession forgot about stannous fluoride and all its unique properties; occasionally it was used as a last resort to treat patients with high caries rates, or those that did not respond to conventional treatments. Consumers were concerned about the taste and fear of having stained teeth.

In 2004 several manufactures created stabilised stannous fluoride complexes, these products had improved taste, and a far greater reduction in the potential to significantly stain teeth.

Surfactants are helpful in removing stains and many dentifrices contain Sodium Lauryl Sulphate (SLS) which is a popular foaming agent. Recent studies have suggested that SLS may cause both oral ulceration and allergic reactions.

Re-mineralising agents some dentifrices contain re-mineralising technology to help restore and replenish calcium, fluoride and phosphate lost from the tooth structure.

Amorphous calcium phosphate (ACP) technology and its potential were discovered in 1991 by Ming S. Tung, PhD chemist and researcher at the American Dental Association (ADA) Foundation Paffenbarger Research Centre in Gaithersburg, Maryland USA.

By definition the Amorphous Calcium Phosphate compound is irregular shaped and extremely reactive, in the oral environment ACP forms on the tooth enamel, within the dentinal tubules and provides a calcium and phosphate reservoir. 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 and protect against erosion.

The ACP-forming ingredients also strengthen teeth by acting as an enhanced fluoride delivery system to deliver more fluoride than products without ACP. The patient has the benefit of fluoride uptake without greater exposure to higher fluoride concentrations or volumes. ACP combines with fluoride to desensitise dentin. Fluoride, along with ACP, occludes tubules by depositing tooth-like

minerals to create a semi-permanent reduction in hydraulic conductance. This is a proven mechanism to reduce dentinal hypersensitivity

Fluoride reacts with tooth mineral, forming either fluoridated apatite (firmly bound fluoride) or Calcium fluoride (loosely bound fluoride). Firmly bound fluoride incorporated onto the surface of the crystals or apatite, can reduce the solubility of tooth mineral, and therefore inhibit demineralisation due to acids generated by plaque bacteria.

Loosely bound fluoride (labile F) provides a relative slow release of ionic fluoride to plaque and saliva. There has been renewed interest in loosely bound fluoride as a reaction product of fluoridation to act as a potential "reservoir" source of solution fluoride, enhancing remineralisation and hindering demineralisation.

Other ingredients desensitisers like strontium chloride and potassium nitride are often added to dentifrices and preventative treatment gels.

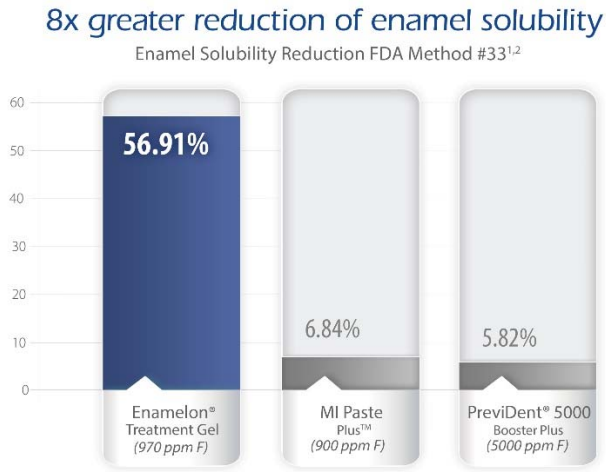
Ultramulsion is a patented composition with unique properties, providing a long lasting coating that lubricates and soothes the soft tissue of the mouth. Ultramulsion enhances substantivity. (Substantivity: Persistence of effect of a topically applied drug or cosmetic, determined by the degree of physical and chemical bonding to the surface; resistance to removal or inactivation)

Spilanthese natural herb and flavour enhancer, that offers a refreshing and vitalising finish

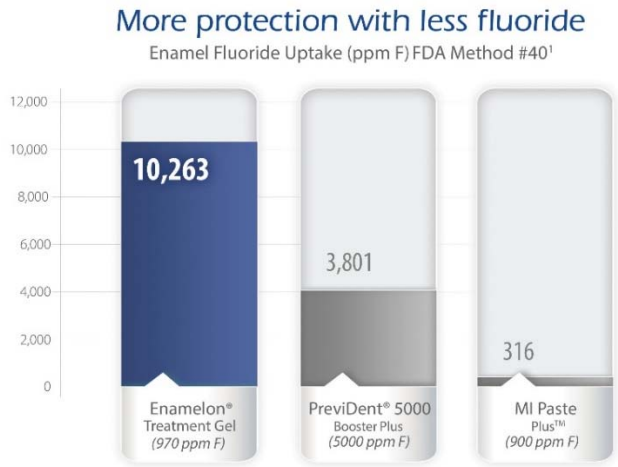
Enamelon Treatment Gel is a new product developed by Premier Dental Products company, based in Philadelphia USA. Enamelon is a stannous fluoride treatment gel with and ACP formulation. Enamelon has been scientifically proven to provide up to 8 x greater reduction in enamel solubility with twice as much uptake as 5000 ppm F toothpastes.

In the USA the FDA (Food and Drug Administration) have two standardised tests: FDA Method 33 for Enamel Solubility and FDA Method 40 for Fluoride uptake.

FDA Method 33



FDA Method 44



In the UK, Colgate offers high fluoride concentration toothpaste (5000ppm F; Sodium Fluoride 1.1 % w/w) under the brand name Duraphat, but not PreviDent.

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Delivering more fluoride but containing less

It's an interesting concept to consider that a product containing substantially less fluoride than many competitors can actually deliver more fluoride to the tooth surface. Often those patient groups that need the high fluoride levels are disadvantaged as many products are unsuitable. For example, 5000 ppm F toothpastes are contraindicated in children under 16 years of age. High fluoride toothpastes need to be used under close supervision, there is a great potential for unwanted systemic effects of fluoride if they are swallowed or overused. Enamelon treatment gel is safe for all ages and contains only 970 ppm fluoride ion, making it extremely suitable for those patient groups that need it the most.

Enamelon Overview

- Stannous fluoride 970 ppm
- ACP formulation
- Low abrasivity RDA 8
- No SLS, Gluten free, No Parabens, No Triclosan
- Contains Spilanthese and Ultramulsion
- Effective for Sensitivity
- Soothes & Moisturizes dry mouth tissues
- Safe for whole family
- EXTRA protection for patients of all ages
- Great taste for compliance
- Potential Practice builder
- 113g Tube, 6 months' supply

References

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