Remineralization confusion... runs rampant in my mind. Where do I begin?

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I don't know about you, but I have been confused about all of the remineralization products. What are they, are they safe, do they work, how much do they cost, where and when do I use or recommend them? Phew, that's a lot to learn and keep straight.

This article will tell you what these products are and what they are made of. Next month, a follow–up article tells you where and when to use and recommend them.

Enamel demineralization takes place at pH below 5.5. Calcium and phosphate ions are dissolved out of the tooth and eventually cause decay with the help of Streptococcus mutans and lactobacillus bacteria. Calcium, phosphate, and fluoride remineralize the tooth under the right conditions. Saliva contains calcium, phosphate, and bicarbonate. Healthy saliva has a pH of 6.8 to 7.4.

Remineralization takes place at a higher pH of 7.5 to 8.5 in the presence of calcium and phosphate. In simple terms, there is a balance of minerals going in and out of our teeth. If we have a proper balance, no cavities! If we have too many minerals leached out of our teeth and not enough going back in, we will have demineralization leading to decay. Good quality saliva has minerals that go back

we should all be using and dispensing for our patients who need them. Many of our patients have high caries risk, sensitivity, xerostomia, poor quality saliva lacking in buffering ions (calcium and phosphate), poor oral hygiene, high carbohydrate diet, use medications that promote demineralization, have systemic diseases like Sjogren's disease, have orthodontic and prosthetic appliances, just to name a few.

Reversing early tooth breakdown/demineralization is quite exciting. Not all remineralization products are created equal or designed to treat the same demineralization problem. Knowing your products is key to making proper treatment choices for your patients.

For the past 60 years, fluoride has been the gold standard treatment for remineralizing teeth. So ingrained into dentistry is fluoride that sometimes it is prescribed as if enamel breakdown is caused by a fluoride deficiency. Newer products support fluoride by reconstituting the elements in the saliva. Some of these new generation remineralization products include fluoride, increasing effectiveness. Fluoride has antimicrobial properties that fight the caries bacteria. Low–dose fluoride, as found in toothpaste, does not have substantivity. Fluoride varnishes give a sustained release of fluoride for better uptake into the tooth. Recently calcium and phosphate have been added to fluoride toothpastes to enhance the remineralization properties of these individual products.

Amorphous calcium phosphate (ACP) is an inorganic amorphous calcium phosphate technology made by combining soluble salts of calcium and phosphorous. ACP is a reactive and soluble calcium phosphate compound. ACP rapidly releases calcium and phosphate ions to convert to apatite and remineralize tooth structure. ACP has been shown in studies to decrease dentin permeability by 78%, thereby reducing sensitivity. Also, ACP has been shown to restore enamel luster and enhance fluoride delivery. ACP is found in Age Defying Toothpaste by

and potassium nitrate. The fluoride–added formulas precipitate hydroxyapitite, occluding dentinal tubules.

Casein phosphopeptide, CPP, is a milk protein that, when added to ACP, has stabilizing qualities. This combined product, casein phosphopeptide and amorphous calcium phosphate (CCP–ACP) is known as Recaldent. The combination of CPP and ACP gives the product a longer exposure time (substantivity) on the teeth compared to ACP alone. CCP–ACP needs an acid challenge to release the calcium and phosphate ions that will buffer the saliva pH to neutral (6.5 to 7.4) to remineralize teeth. CCP–ACP is released during acid challenges raising the oral pH to 7. CCP–ACP is found in MI Paste (GC America) and Trident Extra Care gum. MI Paste Plus includes the addition of 900–ppm fluoride forming calcium phosphate fluoride, CCP–ACFP. The addition of fluoride to Recaldent has shown improved remineralizing properties over CCP–ACP alone.

A useful feature of MI Paste is its slippery quality that xerostomia patients may find soothing and can be used throughout the day and night. The non–fluoride version is perfectly safe for all age groups. MI Paste Plus has 900 ppm fluoride so it should not be used in children under age six due to the risk of fluoride ingestion. Recaldent should not be used by those allergic to milk proteins or benzoate preservatives.

The second generation of calcium phosphate technology is made by NovaMin Technology Inc. This remineralization product has substantial independent controlled studies to prove its worthiness in this new remineralization market. NovaMin is a combination of calcium, sodium, phosphorous, and silica, which binds to the tooth. This product elevates oral pH to the 7.5 to 8.5 ranges, which is ideal for remineralization, allowing the calcium and phosphorous ions to enter the demineralized tooth surface. When calcium sodium phosphosilicate is contacted

in products with 5,000–ppm fluoride.

In addition, NovaMin has antibacterial properties that reduce gingivitis and kill cariogenic bacteria. NovaMin is found in many products including Sultan Healthcare's Topex ReNew toothpaste, Dentsply's NuPro NuSolutions prophy paste and Nupro NUSolutions remineralizing and desensitizing toothpaste, OMNI's SootheRx Therapy, Oravive Tooth Revitalizing Paste (which has no fluoride content) and OSspray's Sylc air polish powder, which is 100% NovaMin. Sylc does not contain aluminum — an alternative for clinicians who are concerned about breathing many of the air polisher powders on the market.

A 3M ESPE product, Clinpro 5000 toothpaste, contains a proprietary tricalcium phosphate ingredient in addition to sodium fluoride. The company reports that Clinpro 5000 forms a harder, deeper layer than fluoride alone and some other remineralizing products.

Xylitol, a sugar alcohol, is derived from plants, is sweet, and has been used in Scandinavia since the 1940s, but has become popular here in the United States more recently. Xylitol inhibits the growth of Streptococcus mutans and reduces the quantity of plaque by making it less sticky and easier to remove. Xylitol is not an actual remineralization product, but prevents demineralization by the bacterial inhibition, which keeps the pH from dropping. It is found in many sugar–free gums and mints that stimulate saliva, bringing salivary minerals in contact with the teeth, allowing remineralization.

Plenty of variables direct clinicians to recommend the correct products to patients. Knowing the "what it is" will help clinicians make informed decisions regarding remineralization products. Next month, join me to read more on the "when and how to use" each product.

passion is teaching ultrasonic scaling, laser use and ergonomics using both lecture and hands–on workshop formats. She has written articles for numerous dental hygiene publications. She has lectured to dental and dental hygiene groups and served on dental manufacturer's advisory boards. Renée can be contacted at reneeturnerrdh@yahoo.com or on her Web site at www.handsonhygiene.com.

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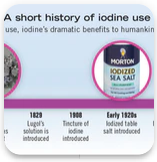

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