

DENTAL PRODUCTS USED IN ENAMEL REMINERALIZATION THERAPY

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Introduction

Dental remineralization is defined as the process whereby calcium and phosphate ions are supplied from a source external to the tooth such as saliva or biofilm into partially demineralized tooth structures. Remineralization can replace minerals in partially demineralized enamel and dentin or create amorphous mineral precipitates in the intercrystal and interdental spaces. This process can occur naturally or be induced by therapies.

Purpose

Evaluation of remineralizing therapies in the light of its composition and mechanism of action.

Material and methods

The study of different remedies with remineralizing properties depending on the manufacturer, mechanism of action, chemical composition. Study of scientific literature, researches and publications.

Enamel remineralization therapy

1. In the past were used solutions containing fluorine, calcium or phosphorus such as sodium fluoride (0.2%, 1-2%), tin fluoride (8-10%), aminofluorides, calcium gluconate (sol. 10%), calcium glycerophosphate (2.5%), calcium chloride (10%)

2. Complex remineralization solutions such as Profocar containing calcium, phosphorus, fluorine, magnesium, iron, zinc, potassium, sodium, chlorine, copper, lead, and the Remodent solution besides all also contains fluoride.

3. It turned out that the remineralization solutions do not have a prolonged effect on the enamel surface, therefore, special compositions containing minerals have been developed, which can be fixed on the tooth surface for a relatively long period of time.

4. Thus, fluorinated varnishes have become widespread, the disadvantages being the temporary yellowing of dental tissues, unpleasant sensation in contact with gingival tissue, requires more manual dexterity when is applied compared to other methods.

	<p>R.O.C.S. Medical Minerals</p> <p>Remineralizing gel For strengthening the teeth, with active components like Calcium, phosphorus, magnesium and xylitol</p>	<p>-Active ions are formed from calcium glycerophosphate by saliva and penetrate into the dental tissues. -Bioavailable compounds of calcium, phosphorus and magnesium strengthen the enamel. A thin invisible layer of the gel remains on the teeth for a long time. -Xylitol increases the remineralizing potential of the complex.</p>
<p>CURODONT REPAIR FLUORIDE PLUS (Credentis)</p> <p>It is a remineralizing solution containing 0.05% sodium fluoride based on the unique CUROLOX® formulation</p>		<p>-CUROLOX® TECHNOLOGY stands for these intelligent matrix-forming protein molecules. Self-Assembling P11-4 Peptides has a high plasticity and affinity to hydroxyapatite: It can form its three-dimensional biomatrix in specific locations and as a matrix exhibits a high affinity for hydroxyapatite.</p>
<p>Remin Pro forte (VOCO)</p> <p>water-based cream that contains hydroxyapatite, sodium fluoride (1,450 ppm fluoride), xylitol, extracts of ginger (Zingiber officinale) and curcuma (Curcuma xanthorrhiza).</p>	<ul style="list-style-type: none"> - restoration of the mineral balance - neutralisation of plaque acids - antibacterial and anti-inflammatory effect - prevention and control of hypersensitivities - promotes healing and regeneration of inflamed mucosa 	
	<p>Remin Pro (VOCO)</p> <p>Contains fluoride (1,450 ppm), hydroxyapatite and xylitol Available in three aromatic flavours (melon, mint and strawberry)</p>	<ul style="list-style-type: none"> -Provides a balanced oral flora and thus protects the teeth against harmful acid attacks -Strengthens the teeth after whitening and professional cleaning -Cariostatic properties from the contained xylitol
<p>Curodont Protect Remineralizing Tooth Gel (Credentis)</p> <p>is a remineralizing tooth gel with the award-winning Curolox Technology biomatrix.</p>		<p>-Curolox is a modern technology that in combination with calcium phosphate and fluoride, it forms a stable protective layer on the tooth. Therefore, this mineral-rich layer protects dentine and enamel from acid attacks. Thanks to the high affinity of calcium phosphate, the gel adheres very well to the tooth surface.</p>
<p>MI Paste and MI Paste Plus (GC)</p> <p>are not toothpastes; they are topical tooth crèmes containing the active ingredient RECALDENT™ (CPP-ACP)</p>		<p>-Casein Phosphopeptide (CPP) are natural occurring molecules which are able to release calcium and phosphate ions and stabilize Amorphous Calcium Phosphate (ACP), which is also the source of calcium and phosphate.</p>
	<p>Tooth mousse (GC)</p> <p>the first product for professional use to contain this complex of CPP-ACP (Recaldent™), is the ideal delivery system for bio-available calcium and phosphate ions.</p>	<p>-Recaldent™ is derived from the milk protein, casein. For many years it has been known that milk and its derivatives have a tooth protective effect. Research has shown that this activity is due to a part of the casein protein called Casein Phosphopeptide (or CPP), which carries calcium and phosphate ions in the form of Amorphous Calcium Phosphate (ACP).</p>

Table 1. Dental varnish alternatives.

Results

According to this research, was found that remineralizing strategies have significantly progressed in recent years. The classical treatment with different fluorides in remineralizing therapy is still proving to be effective and used in modern practice, but also there are various new effective technologies that can't be neglected. The most relevant being calcium and phosphate-based systems, such as Self-assembling Peptides P11-4 from Curolox technology, the CPP-ACP: Casein Phosphopeptide–Amorphous Calcium Phosphate from Recaldent technology, nanohydroxyapatite, xylitol and others, which represent the future of what we know about the formation of a biomimetic enamel matrix.

Conclusions

Remineralizing strategies have significantly progressed. Most of these therapies prolong the supersaturation periods by creating stable systems capable of supplying bioavailable calcium, phosphate directly to the lesion, due to which the concept of remineralizing therapy may be expanded

Keywords

Remineralisation therapies, fluorides, calcium and phosphate systems.

Bibliography

- Nastase.C. Terehov.A. Terapia Remineralizantă. Recomandări Metodice. Chişinău.CEP Medicina, USMF "Nicolae Testemitanu", 2016. 56p
- Dafina Doberdoli, Claudine Bommer, Agim Begzati, Fehim Haliti, Monika Heinzl. Randomized Clinical Trial investigating Self-Assembling Peptide P11-4 for Treatment of Early Occlusal Caries. Gutenbrunner4 & Hrvoje Juric2 (2020) 10:4195 | <https://doi.org/10.1038/s41598-020-60815-8>
- Alkilzy, M., Santamaria, R.M. et al., «Treatment of Carious Lesions Using Self-Assembling Peptides» Adv Dent Res (2018), Vol. 29(1) 42-47
- OLIVEIRA, Patrícia Regina Almeida de, BARBOZA, Carolyn Mello, BARRETO, Luísa Schubach da Costa, & TOSTES, Mônica Almeida. Effect of CPP-ACP on remineralization of artificial caries-like lesion: an in situ study. *Brazilian Oral Research*, 34, e061. Epub June 24, 2020. <https://doi.org/10.1590/1807-3107bor-2020.vol34.0061>
- www.credentis.com/en/credentis-secures-global-distribution-partner-for-curodont-repair/
- www.europe.gc.dental/sites/europe.gc.dental/files/products/downloads/toothmousse/leaflet/LFL_Tooth_Mousse_Portfolio_bg.pdf
- www.rocsinfo.com/catalog/medical/medical-gel/
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