nanoXIM•CarePaste: The Enamel Repair Ingredient

Clinical efficacy of a dentifrice containing nanoXIM•CarePaste

About dental hypersensitivity

Dental hypersensitivity is considered a relevant clinical problem. It is characterized by a short and sharp pain arising from exposed dentin in response to chemical, thermal, tactile or osmotic stimuli (1, 2). Essentially, dentin may become exposed by the removal of enamel or cementum as a result of friction, abrasion or erosion. Consequently, dentinal tubules are unprotected providing a direct connection between the internal pulp of the tooth and the external environment (2). The contact of pulp with the external stimuli triggers the nerves causing an intense pain which is a considerable concern for patients (2).

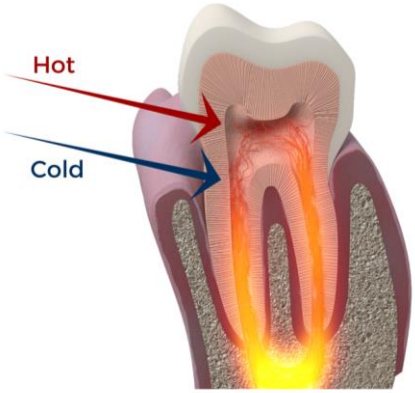

Figure 1: Dental hypersensitivity as a result of exposed dentin tubules in response to hot and cold stimuli.

Presently, the most recent home procedures to treat dental hypersensitivity aim at obstructing the dentinal tubules, providing a relief (1). The use of dentifrices is a common treatment option due to its low cost and possibility to be done at home.

nanoXIM – The Enamel Repair Ingredient

The **nanoXIM•CarePaste is** a paste of nanocrystalline hydroxyapatite produced and marketed by FLUIDINOVA. This **synthetic nano-hydroxyapatite** aqueous paste has been specifically **made for oral care applications**, such as mouthwashes, toothpastes and chewing gums. Nano-hydroxyapatite is a calcium phosphate material widely accepted in dentistry and medicine due to its exceptional **biocompatibility** and **bioactivity**. Its excellent performance is related with its nanometer size, being very similar with natural teeth and bone. nanoXIM•CarePaste contains high purity **nanoparticles** under 50 nm in size, being much smaller than the dentinal tubules. Therefore, they **can be easily integrated inside the tubules**, blocking them and **reducing the pain** associated with dental hypersensitivity. In addition, nanoXIM•CarePaste is able bind to the dentin apatite and tooth enamel. Consequently, a new apatite layer is formed, remineralizing the enamel and protecting the surface of the tooth.

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Clinical trial

In this study, it was compared the effectiveness of different dentifrices in reducing dental hypersensitivity. For that purpose, three toothpastes were tested containing the following active ingredients:

- Nano-hydroxyapatite (nanoXIM•CarePaste) (Aclaim, Group Pharmaceuticals, India);
- Calcium Sodium Phosphosilicate (NovaMin) (SHY-NM, Group Pharmaceuticals, India);
- Casein Phosphopeptide (CPP) – Amorphous Calcium Phosphate (ACP) (G. C. Tooth Mousse, Recaldent, Australia).

Tooth sensitivity was assessed using two different methodologies, the VAS score and the Schiff test, which evaluate the pain response to a certain stimulus. Two stimuli were performed for each methodology, one with controlled air and the other with cold water. For this trial, a total of 80 teeth from people of both sexes were selected for each group, with an age between 18 and 50 years. The study was performed during 3 months and sensitivity was measured at baseline, 2 weeks, 1, 2 and 3 months.

In 3 out of 4 tests performed, the Aclaim toothpaste containing **nanoXIM•CarePaste was the most effective in reducing dental hypersensitivity.** After the 3 months of treatment, it was observed a higher pain reduction in the patients that used Aclaim toothpaste, which is expressed by a greater variation in VAS and Schiff values. Another interesting aspect is that Aclaim **provided a faster pain relief** when compared with the other toothpastes. Immediately after 2 weeks of treatment, the patients treated with Aclaim felt a higher decrease in dental hypersensitivity.

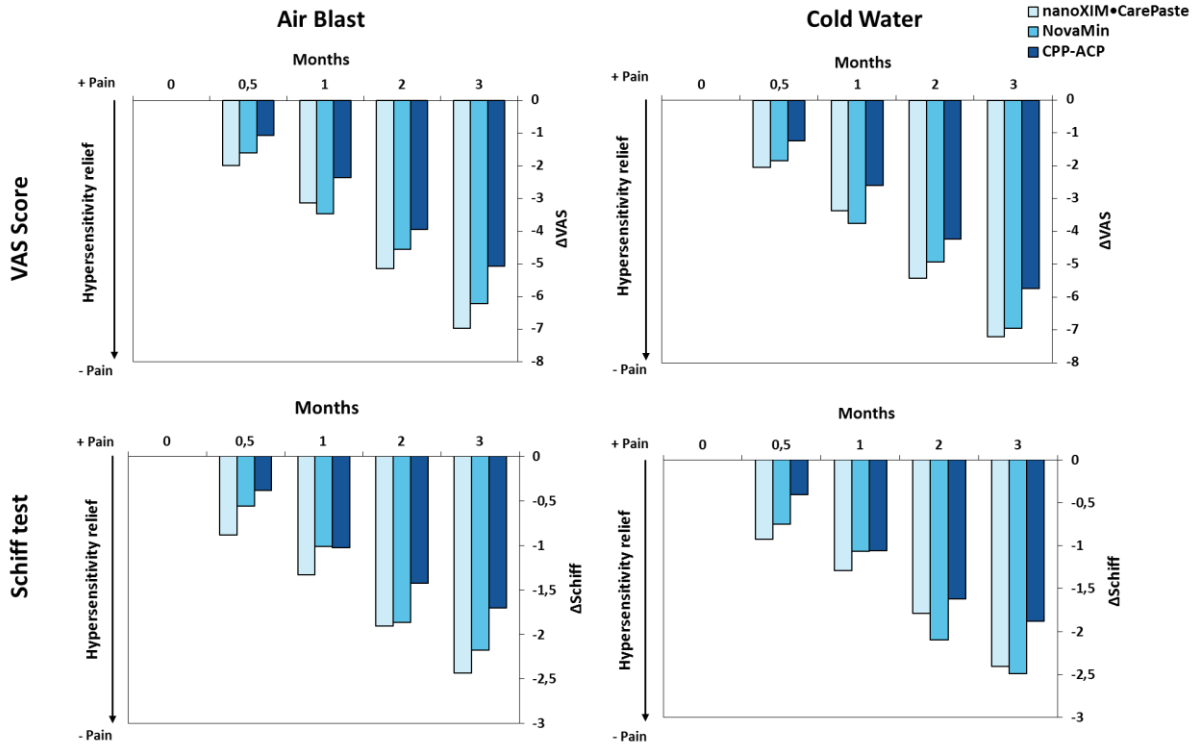

Figure 2: Hypersensitivity reduction for the three toothpastes with different ingredients tested using VAS score and Schiff test. For each time point, it was calculated the difference from the baseline.

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Conclusions

- In 100 % of the cases, the toothpaste containing nanoXIM•CarePaste performed better that the CPP-ACP toothpaste;
- In 75 % of the cases, nanoXIM•CarePaste toothpaste performed better than the NovaMin toothpaste;
- Immediately after 2 weeks of treatment, the **nanoXIM•CarePaste toothpaste** systematically **provided a superior pain relief** when compared with NovaMin and CPP-ACP toothpastes;

  This clinical trial revealed that **Aclaim containing nanoXIM•CarePaste was the most efficient toothpaste in reducing dental hypersensitivity**. Moreover, Aclaim provided a greater and immediate relief only after two weeks of treatment.

References

1. Shetty PA, Shetty D, Shetty S. A Comparison of Clinical Efficacy of Dentifrices Containing Calcium Sodium Phosphosilicate, Nanoparticle Hydroxyapatite and a Dentifrice Containing Casein Phosphopeptide Amorphous Calcium Phosphate on Dentinal Hypersensitivity - A Comparative Triple Blind Randomized Study. Advances in Human Biology. 2014;4(2):57-63.

2. Bartold PM. Dentinal hypersensitivity: a review. Australian Dental Journal. 2006;51(3):212-8.

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