nanoXIM•CarePaste: The Enamel Repair Ingredient

Nano-hydroxyapatite toothpaste vs Fluoride toothpaste in reducing dental hypersensitivity

Dental hypersensitivity

Our teeth are constantly subjected to erosion caused by the action of food and drinks (1). These aggressions result in the exposure of dentinal tubules and the underlying nerves to the external environment. Consequently, external stimuli trigger the nerves causing a short and acute pain clinically defined as dental hypersensitivity (2). Individuals with this condition present tooth with open dentinal tubules that are wider and more numerous than nonsensitive teeth (2, 3). Therefore, it has been reported that the occlusion of tubules is an effective method for the management of dental hypersensitivity (2).

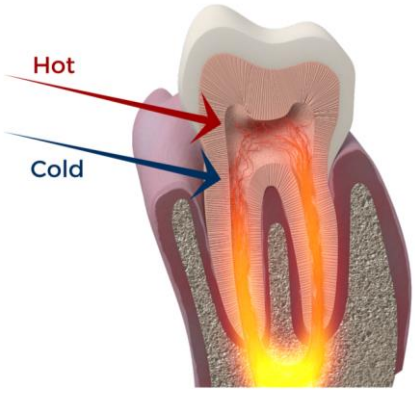

Figure 1: Dental hypersensitivity as a result of exposed dentin tubules in response to hot and cold stimuli.

Recently, **nano-hydroxyapatite (nano-HAp) has been incorporated in oral care formulations and revealed a great potential** in the treatment of dental hypersensitivity, as its nanosized particles can be incorporated inside the dentinal tubules. These become sealed and pain associated with dental hypersensitivity is reduced (4, 5).

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 developed 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.

Clinical trial

In the present clinical trial, it was evaluated the efficacy of a toothpaste containing nano-hydroxyapatite (nanoXIM•CarePaste ingredient), in reducing dental hypersensitivity, in comparison with a toothpaste containing fluoride (2). A total of 105 subjects were enrolled in this trial and they were divided in three groups:

- Experimental group: PrevDent toothpaste (15 % nanoXIM•CarePaste toothpaste);
- Positive control group: Colgate Cavity Protection Regular (1450 ppm fluoride toothpaste);
- Negative control group: Placebo toothpaste (glycerin and water).

Hypersensitivity was assessed using two frequent and validated stimuli tests: tactile test and airblast test. The patient response to each stimulus was analyzed and the related score value was recorded. For both stimuli tests, a higher score corresponds to a higher level of dental hypersensitivity. Examinations were performed at the baseline, after 2 and 4 weeks of treatment.

This clinical trial revealed a **significant reduction of dental hypersensitivity for the group treated with the toothpaste containing nanoXIM•CarePaste**, both at air blast and tactile tests (Figure 2). In addition, there was no statistical difference between the fluoride and the placebo toothpastes. Fluoride is a widely used toothpaste ingredient known to be efficient in preventing tooth decay. However, it did not show any major reduction in dental hypersensitivity.

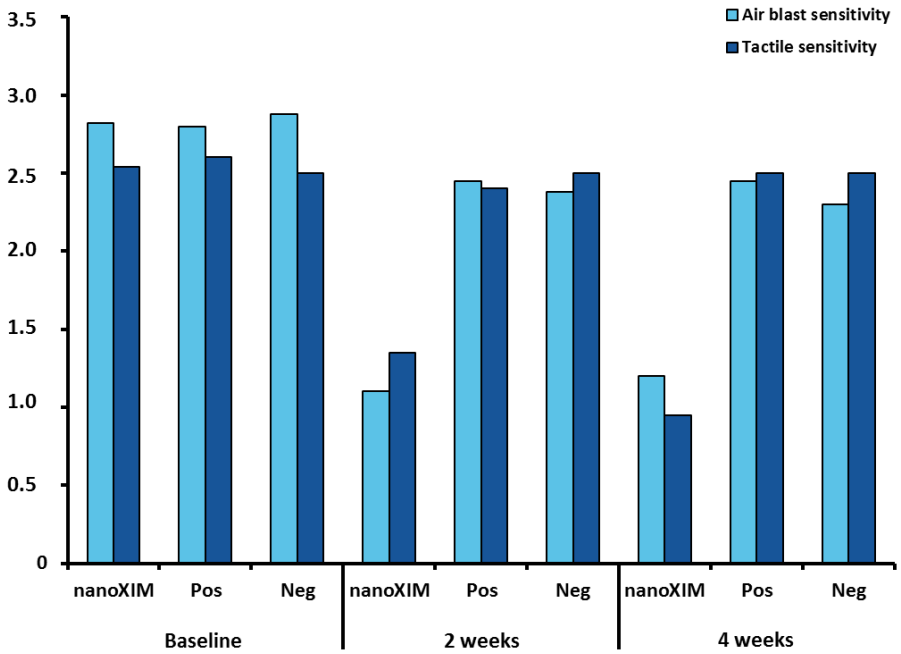

Figure 2: Hypersensitivity scores for the three different group treatments and for both stimuli tests (air blast and tactile) at baseline, 2 and 4 weeks of treatment. nanoXIM: experimental group (nanoXIM•CarePaste toothpaste). Pos: positive group (fluoride toothpaste). Neg: negative group (placebo toothpaste). This chart was created based on data from (2).

Conclusions

- PrevDent toothpaste containing **nanoXIM•CarePaste performed better** than Colgate fluoride toothpaste for both air blast and tactile sensitivity tests in a statistically significant way (P<0.001);
- For the air blast stimulus, the PrevDent toothpaste containing 15 % of nanoXIM•CarePaste was capable of **decreasing** the **dental hypersensitivity in 61 %** immediately after 2 weeks. In opposition, the Colgate toothpaste containing fluoride was only capable to reduce hypersensitivity by 13 %;
- For the tactile stimulus, it was verified a 47 % hypersensitivity reduction after 2 weeks and a final hypersensitivity reduction of 63 % after 4 weeks of treatment with a 15 % nanoXIM•CarePaste toothpaste from PrevDent;

The present study evidences that **nanoXIM•CarePaste** is a promising ingredient to **reduce dental hypersensitivity** as it provides a fast and effective **pain relief**.

References

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