KALIDENT-Calcium Hydroxyapatite

GENERAL DESCRIPTION

KALIDENT-Calcium Hydroxyapatite is based on a formulation designed to significantly enhance the natural salivary remineralisation of dental enamel.

Each day dental enamel is demineralised by acids present in the mouth and remineralised by the calcium and phosphate ions carried in saliva. Under normal circumstances the dynamic balance between demineralisation and remineralisation is stable. This equilibrium results in healthy teeth which are not affected by caries, and are not eroded, decalcified or hyper-sensitive.

Poor oral hygiene, wrong dietary habits, excess consumption of carbonated beverages, occupational hazards can all increase the rate of demineralisation. The dynamic balance ions-salt can also be adversely affected by reductions in the salivary flow resulting from the normal ageing process, the use of many common drugs, the fitting of orthodontic appliances, dehydration through occupational or recreational activities and the radiotherapy and surgical interventions connected to some diseases.

Saliva is normally super-saturated in calcium and phosphate ions (i.e. saliva carries the maximum possible amount of them) hence it was not possible to increase its ions concentration in order to compensate for the loss of tooth enamel caused by any of the above circumstances. The problem of carrying high concentrations of calcium and phosphate ions directly to the tooth surface could not be solved in this way.

The regular use of KALIDENT-Calcium Hydroxyapatite over an extended period can do much to alleviate problems caused by excessive demineralisation of dental enamel. The use of KALIDENT-Calcium Hydroxyapatite helps preventing caries or to stabilise rampant caries, counteracting the consequences of poor oral hygiene, acid foods and carbonated drinks. It can help prevent the dental consequences of xerostomia or Sjogren’s syndrome. It can even assist in the reversal of dental erosion and its adverse consequences.

KALIDENT-Calcium Hydroxyapatite is a good alternative to those patients unwilling to use fluorides as part of their dental care regime.
CLINICAL PROPERTIES

Laboratory tests indicate that the fully nanoparticle hydroxyapatite is twice as effective in restoring demineralised tooth enamel as its larger-particle parent structure.

Over half the dry weight of human bone, 97% of dental enamel and 70% of dentine is comprised of hydroxyapatite. Human saliva, rich in calcium and phosphate ions, is a saturated solution of hydroxyapatite. Natural and synthetic hydroxyapatite have a strong affinity with the human body, and are used widely in orthopedic and dental applications (such as bone augmentation, dental cement, coatings for implants, etc.), as well as in foods, as a readily absorbed dietary calcium phosphate supplement.

A joint study carried out by the Tokyo Medical and Dental University and Gifu Dental University shows a significant reduction in new caries formation in children who brushed their teeth daily with an hydroxypatite-based toothpaste compared with a non-hydroxyapatite control.

KALIDENT-Calcium Hydroxyapatite repairs microscopic defects in surface and subsurface tooth enamel, restoring the enamel to its original mineral density and reversing incipient caries, the beginning of tooth decay. This restoration also returns the enamel to its original optical characteristics.
MODE OF ACTION

Demineralisation and remineralisation of tooth enamel occur naturally and constantly in the oral environment. The surface of the teeth is covered by a salivary pellicle, which can be colonized by bacteria to form dental plaque.

Minute cracks and scratches in the enamel surface and spaces between the teeth that are inaccessible to a toothbrush especially harbour plaque.

The enamel itself is comprised of closely packed rods of hydroxypatite, separated by minute channels, around 50 nanometers in size. Plaque bacteria digest carbohydrates and produce acids which seep into the minute channels between the enamel rods, causing the enamel to dissolve and become microscopically demineralised.

Saliva however, has a restorative function, acting not only as a buffer, to reduce the acidity caused by plaque bacteria, but also as a constant source of calcium and phosphate ions. Upon neutralization of plaque acids, calcium phosphate complexes from the saliva diffuse back into the channels between the depleted enamel rods, replenishing the supply of hydroxyapatite. So that the enamel gets remineralised.
Under optimum physiological conditions, demineralisation and remineralisation are balanced in the oral cavity, so that no net loss of mineral from the teeth occurs. But conditions such as excess plaque, inadequate saliva flow, frequent intake of acidic foods or carbohydrates can upset the balance, driving the equation overwhelmingly in the direction of demineralisation, so that cavity formation eventually occurs. It is now known, however, that early-stage demineralisation (incipient caries or “white spot lesions”) can be reversed by replenishing or reinforcing the enamel, before decay requiring medical treatment sets in.

1. Adhesion to and Reduction of Plaque

KALIDENT-Calcium Hydroxyapatite has a strong propensity to bind with protein, and adheres to plaque bacteria and glycoproteins in the oral cavity, facilitating their removal on rinsing the mouth after brushing. This feature of hydroxyapatite has been enhanced by reduction of its particle size through nanotechnology, so enormously increasing the surface area to which bacterial proteins attach.

2. Repair of Microscopic Surface Damage

KALIDENT-Calcium Hydroxyapatite also acts as a filler, restoring minute cracks and scratches in surface tooth enamel. Reduction of its size to nanometre level has enhanced this ability of hydroxyapatite to enter and rebuild the crystalline network at the surface defects in the enamel. By filling minute surface lesions and restoring smoothness to the enamel, KALIDENT-Calcium Hydroxyapatite also reduces the number of sites on the tooth surface to which plaque is likely to adhere. Results of research in this area were presented at the IADR in early 2004.
3. Remineralisation of Subsurface

KALIDENT-Calcium Hydroxyapatite, having almost the same composition as our teeth, directly provides mineral to demineralised subsurface areas of the tooth (incipient caries), restoring the enamel to its near-natural state, without changing the composition of the enamel. This is in contrast to fluorides, which are not true remineralising substances by themselves, but promote teeth remineralisation by salivary calcium phosphate, by creating a new substance, fluorapatite, on the tooth surface. Fluorides tend to form a coating on the surface of the enamel, in contrast to hydroxyapatite, which tends to restore subsurface lesions from the deeper part of the lesion first. This deep restorative effect has been enhanced by the reduction of the hydroxyapatite particle size to two-figure nanometer size, facilitating their deeper penetration into the enamel.

FUNCTIONAL CLAIMS

Features
- Dental sensitivity
- Remineralization and filling of surface lesions
- Plaque clinical-physical removal
- Acid antierosion
- Bio-available calcium and phosphate ions
- Boosts natural ability of saliva to remineralise tooth structure

Alleviates:
- Teeth Erosion
- Dental White lesions
- Rampant caries
- Dental effects of acidic mouth
- Enamel problems in newly-erupted teeth

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