

10 microns, in 200 ml of water. The nail was allowed to soak for a number of time intervals, each approximately 15 minutes in duration, for a total soak time of about 20 hours. Following this exposure, Fourier transform infra-red analysis (FTIR) was performed. The spectra show the formation of an HCA layer on the surface of the nail.

Scanning electron microscopy (SEM) shows the nail surface before and after treatment (200× magnification) (FIGS. 1a and 1b). The surface of the nail prior to treatment shows numerous cracks and defects on the nail surface (FIG. 1a). After treatment (FIG. 1b), the surface of the nail is much smoother, with most of the defects annealed, or covered by the calcium phosphate layer which was formed. The accompanying EDS figures (FIGS. 2a and 2b) show the elemental spectra of the nail surface before and after treatment. FIG. 2a shows the EDS (energy dispersive x-ray analysis) of the nail before treatment, and FIG. 2b shows the EDS of the nail after treatment. Before treatment, the spectra shows a small calcium peak, a large sulfur peak as well as oxygen and carbon peaks, all derived from the nail surface. After treatment, the EDS spectrum shows two new peaks, corresponding to phosphorus and silicon, both of which come from the ions released by the bioactive glass, which formed deposits on the nail surface. In addition, the intensity of the calcium peak increased, indicating the formation of a calcium phosphate layer. This layer largely prevents x-rays from escaping the nail surface because the calcium phosphate absorbs most of the x-rays.

The data shows that, after exposure to the Bioglass® solution, an extensive protective HCA layer formed on the surface of the nail. The layer smoothed the nail surface, filled in gaps in the surface, and covered many irregularities and surface imperfections. The HCA layer protects and strengthens the nail.

Example 3

Treatment of Nails with a Solution Made from Bioglass® Extracts.

An extract solution was made by adding 90 g of <20 μm Bioglass® particulate to 510 ml of a tris buffer solution (tris-hydroxymethyl aminomethane, buffered with HCl to make a 0.1 N solution). The mixture was mixed for 2 hours at room temperature using a magnetic stirrer. The solution was then filtered through a 0.44 μm filter, and the resulting solution contained 15.0 wt. % Bioglass) extract. A set of nails was then exposed to this solution for a total soak time of 20 hours. Following exposure, FTIR was performed. The spectra clearly show the formation of a calcium phosphate layer tightly bound to the nail surface. After treatment the nail surface is smooth, and the number of defects is greatly reduced, when compared to the untreated nail surface.

We claim:

1. A method for treating nails comprising applying a composition comprising an effective, nail-enhancing amount of non-interlinked particles of bioactive glass to the nails for a sufficient amount of time to provide that a layer of hydroxyapatite or other calcium phosphate crystals is formed on the nail and ions from the bioactive glass penetrate layers of the nails to form hydroxyapatite crystals within the layers of the nails.

2. The method of claim 1, wherein the average particle size of the bioactive glass particles is less than about 90 microns.

3. The method of claim 1, wherein the average particle size of the bioactive glass particles is less than about 20 microns.

4. The method of claim 1, wherein the average particle size of the bioactive glass particles is less than about 5 microns.

5. The method of claim 1, wherein the nails are coated with a layer of hydroxyapatite or other calcium phosphate mineral that is at least 0.2 microns thick.

6. The method of claim 1, wherein the composition further includes an aqueous solvent.

7. The method of claim 1, wherein the composition further includes a hydrophilic polymer.

8. The method of claim 1, wherein the composition further includes one or more components selected from the group consisting of antibiotics, antivirals, antifungal agents, biotin, collagen, amino acids, proteins, vitamins, penetration enhancers, permeation/binding agents, dyes, and fragrances.

9. The method of claim 1, further comprising removing the bioactive glass from the nail surface.

10. The method of claim 9, further comprising applying a protective lacquer coating on the nails following removal of the bioactive glass from the nail surface.

11. A medicating device for application to the nails comprising a viscoelastic gel pad which conforms to the shape of the nail, wherein the pad is impregnated with non-interlinked particles of bioactive glass and an aqueous solution.

12. The device of claim 11, further comprising one or more components selected from the group consisting of antibiotics, antivirals, antifungal agents, biotin, collagen, amino acids, proteins, vitamins, penetration enhancers, permeation/binding agents, dyes, and fragrances.

13. A method of treating nails comprising applying the medicating device of claim 11 to the nails for a sufficient amount of time to form a layer of hydroxyapatite or other calcium phosphate minerals that is at least about 0.2 microns in thickness.

14. A method for treating nails in mammals other than humans comprising applying a composition comprising an effective, nail-enhancing amount of non-interlinked particles of bioactive glass to the nails for a sufficient amount of time to provide that a layer of hydroxyapatite or other calcium phosphate crystals is formed on the nails and ions from the bioactive glass penetrate layers of the nails to form hydroxyapatite crystals within the layers of the nails.

15. The method of claim 14 wherein said mammals are dogs or cats.

16. A method for treating nails comprising applying a composition comprising an effective, nail-enhancing amount of bioactive extract to the nails for a sufficient amount of time to provide that a layer of hydroxyapatite or other calcium phosphate crystals is formed on the nails and ions from the bioactive extract penetrate layers of the nails to form hydroxyapatite crystals within the layers of the nails.