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学位論文内容の要約

学位論文題目

Antibacterial coating of human dentin surface with
surface pre-reacted glassionomer (S-PRG)
nanofillers

(surface pre-reacted glassionomer (S-PRG) ナノ
フィラーによるヒト象牙質表面の抗菌コーティング)

Surface pre-reacted glass ionomer (S-PRG) filler shows tooth remineralization and antibacterial effects via ion-releasing. In this study, we fabricated the nano- and micro-sized S-PRG fillers and assessed the adhesive properties of S-PRG fillers to the human dentin surface. In addition, the antibacterial effects of dentin coated with S-PRG fillers were examined.

The stock of S-PRG filler (average particle size; 5 μm) was fractionated to obtain the two types of dispersion; nano and micro scale particle types, and then labeled with nano- and micro-S-PRG, respectively. S-PRG fillers were characterized by scanning electron microscope (SEM), energy dispersive X-ray spectrometry (EDX), ion-releasing test and provided to antibacterial and cytotoxic assessments. Subsequently, we assessed the adhesion test of stock, nano- and micro-S-PRG to human dentin blocks. In addition, antibacterial effects of nano-S-PRG coated dentin was examined using *Streptococcus mutans* and *Actinomyces naeslundii*.

The results showed that the nano- and micro-S-PRG showed including of elements of F, Na, Al, Si and Sr, ion releasing ability comparable with the stock, antimicrobial activity and low cytotoxicity. SEM and EDX examinations revealed that S-PRG fillers uniformly covered the dentin surface after application of filler to dentin. After ultrasonically cleaning, nano-S-PRG predominantly remained on the dentin surface compared to stock and micro-S-PRG, suggesting that the nano-S-PRG could adhered to dentin. Nano-S-PRG treated dentin showed the sterilization effect and bacterial growth inhibition.

In conclusion, nano-S-PRG exhibited great adhesive and antimicrobial properties to human dentin. S-PRG application to tooth would be beneficial for dental antibacterial treatment.