Effect of Whitening Agent on Elastic Modulus and Knoop Hardness of Bovine Dentin

KUROKAWA Hiroyasu¹, OSHIRO Maki¹, IKEDA Masahiko¹, SUNADA Noriatsu¹, ENDO Yuko¹, KATO Aki¹, TSUBOTA Keishi¹, MIYAZAKI Masashi¹, KANAMARU Toshio¹,² and WAKAMATSU Hideki¹,³

¹Department of Operative Dentistry, Nihon University School of Dentistry
(Chief: Prof. MIYAZAKI Masashi)
²Kanamaru Dental Clinic
³Wakamatsu Dental Clinic

Abstract: This study investigated the effect of 10% carbamide peroxide whitening agent on the elastic modulus, surface hardness, and surface texture of bovine dentin. Dentin specimens were trimmed to a size of 4×4×1 mm. Whitening agent was splashed on to the specimens which were then stored at 37°C, 80% RH for 1 h, followed by rinsing with tap water. The procedure was done for a period of 56 days. Elastic modulus and Knoop hardness measurements were done immediately after the whitening, and at 7, 14, 21, 28 and 56 days after the start of treatment. For specific specimens, they were treated for observation with scanning electron microscopy.

The results were as follows:
1. No changes in elastic modulus of dentin treated by the whitening agent were observed.
2. No changes in Knoop hardness of dentin treated by the whitening agent were observed.
3. Gradual increases in pH of dentin treated by the whitening agent were observed.
4. After the whitening procedure the smear layer was removed but no structural change was observed.

Key words: Dentin, Whitening agent, Elastic modulus, Knoop hardness