A New Trial for Determining the Hardness of Carious Dentin

SHIMIZU Akihiko, KINOSHITA Naoto, HONDA Kousuke,
ABE Tetsuya and HASEGAWA Makoto

Department of Dentistry and Oral Surgery, Hyogo College of Medicine

Abstract: Objectives: We aimed to establish a new method for determining the hardness of human carious dentin without extraction.

Method: We produced a handy indentation device (weight: 80 g) with a conical sapphire indenter (0.5 mm φ -48° - 0.7 mil). Operating load for indentation was set at 150 g. The carious dentin of an extracted human tooth was ground with a series of emery papers. The sapphire indenter was pressed into various places of the remaining carious dentin. The diameter (μm) of each indentation was measured under a microscope attached to a hardness tester (MHT-1, Matsuzawa). Then Knoop hardness number (KHN) was determined with the hardness tester at the site of 25 μm from the margin of each indentation. The data of the diameter and the KHN were plotted on a graph, and the relation between the diameter of indentation produced by our device and the hardness determined with the hardness tester was examined.

Results: We revealed a correlation between the diameter of indentation and the KHN, enabling us to convert the diameter into the KHN. Therefore, it seems reasonable to suppose that if we indent carious dentin using the device and take an impression with a silicone impression material clinically, and then measure the diameter of indentation on the replica model, we can determine the KHN of the dentin without extraction.

Conclusion: The new method using the handy indentation device might allow us to determine the hardness (KHN) of human carious dentin under clinical conditions.

Key words: Carious dentin, Knoop hardness, Indentation device, Replica model