The Effect of Tubule Orientation and Location on the Hardness of Root Dentin *Nakarat E., Worakanchana T., and Lertchirakarn V. Department of Operative Dentistry

Dentin is a composite material that consists of several structures. These structures and orientation may affect the mechanical properties of dentin. The purpose of this study is to determine the effect of tubule orientation and location on hardness of human root dentin. All specimens were prepared from extracted human maxillary incisors or canines in the middle-third area of the root. The specimen was cut into 2 sections. The first section, the cut surface was perpendicular to the long axis, whereas the cut surface was parallel to he long axis in the second section. All examined surfaces were polished with sandpaper and alumina powder. The hardness of each sample was measured by a microhardness tester in Vicker unit and calculated to GPa unit. The tested areas in both sections were 1 mm from the root canal wall and 0.5 mm from the root surface. The hardness that force was applied perpendicular and parallel to tubule orientation at 1 mm from the root canal wall were 0.28±0.005 and 0.31±0.004 GPa, while perpendicular and parallel force to tubule orientation at 0.5 mm from the root surface were 0.33±0.006 and 0.35±0.005 GPa respectively. The data analysis based on a two-way ANOVA and scheffe's test indicated that there was a statistical difference (p < 0.05). Both tubule orientation and location affect on hardness of root dentin.

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