

Shear strength of root dentin : Effect of location and tubule orientation

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The objective of this study was to determine the effect of dentinal tubule orientation and location from pulp cavity on ultimate shear strength (USS). The specimens were prepared from extracted human maxillary central incisor and canine. The samples were prepared from cervical third area of root dentin. The size of the sample was 1x1x3.5 mm. The specimens were divided into 6 groups by orientation (τ_{xz} , τ_{xy} and τ_{zx}) of dentinal tubule and location of dentin as 1 mm from the root canal wall and 0.5 mm from the cemento-dentinal junction. Then the sample was embedded in composite resin and clear resin in PVC tube. Data analysis, using Univariate Analysis of Variance and Sheffe' test, indicated that there was a significant effect of location and tubule orientation on USS ($p < 0.05$). USS was lowest when shear force was parallel to tubule orientation (τ_{xz}) and applied to the 1 mm from the root canal wall (33.71 ± 1.26 MPa, mean \pm SD) and greatest when shear force was perpendicular to tubule orientation (τ_{zx}) and applied to the 0.5 mm from the cemento-dentinal junction (48.30 ± 1.20 MPa, mean \pm SD). The results indicate that USS of root dentin is dependent on location and dentinal tubule orientation.

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