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Title	Does gradual dehydration affect the mechanical properties and bonding outcome of adhesives to dentin? [an abstract of entire text]
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Description	この博士論文全文の閲覧方法については、以下のサイトをご参照ください。 https://www.lib.hokudai.ac.jp/dissertations/copy-guides/
Degree Grantor	北海道大学
Degree Name	博士(歯学)
Dissertation Number	甲第13049号
Issue Date	2018-03-22
Doc URL	https://hdl.handle.net/2115/70710
Type	doctoral thesis
File Information	Chowdhury_AFMA_summary.pdf



学位論文内容の要約

学位論文題目

Does gradual dehydration affect the mechanical properties and bonding outcome of adhesives to dentin?
(乾燥処理時間は象牙質の物性と接着性能に影響を与えるか?)

博士 (歯学)

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Summary:

In this study, we evaluated the effects of gradual dehydration on the mechanical properties of mild two-step self-etch adhesives and dentin, and also on the micro-tensile bond Strength (μ TBS) of the adhesives to dentin. For μ TBS, mid-coronal dentin surfaces of twenty sound human third molars were exposed and polished with # 600-grit SiC paper under running water. The teeth were then randomly treated with Clearfil Mega Bond (MB) or Clearfil SE Bond 2 (SE2) and built-up with composite resin. After water-storage at 37° C for 24 h, μ TBS of wet (SE2W and MBW; tested at 5 min after removal from the storage) and dry (SE2D and MBD; tested at 10 min) specimens were obtained by subjecting composite resin/dentin beams (1 mm²) to a universal tester at a crosshead speed of 1 mm/min. Failure modes were determined by scanning electron microscope. The changes in the mechanical properties and weight of dehydrating dentin beams and adhesive discs were monitored over time. The μ TBS data were analyzed by two-way ANOVA to demonstrate the effects of adhesive and condition followed by Tukey's test. The H, E and weight-loss data were analyzed by one-way repeated measures ANOVA and Bonferroni's test at 5% level of significance. Significant differences in bond strength were observed for adhesives ($p < 0.05$) and for conditions (dry vs. wet, $p < 0.001$). Dehydration caused significant gradual changes ($p < 0.05$) in the H, E and weight-loss of adhesives and dentin. However, the changes in dentin's E were not significant ($p > 0.05$). Gradual dehydration of μ TBS testing specimens can cause significant changes in the test outcomes and should be avoided as a significant source of test variation.