

POSTER #19

Effects of Sterilisation and Storage on Dentine mechanical properties

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Objective : Extracted teeth are used for pre-clinical teaching, dental materials researches, and transplantation. They are considered to pose a biological hazard, and a potential cause of cross infection. Therefore, proper sterilisation and storage are important. However, these procedures might alter the dentine mechanical properties, which can greatly affect the research outcomes. The objective of this work is to investigate influence of different sterilisation and storage methods on the dentine microhardness, root susceptibility to vertical fracture, and push-out bond strength to biodentine cement.

Methods: Eighty-four extracted mandibular premolars collected under NHS ethical approval (15/LO/1545), were randomly allocated to seven groups: (i) one cycle autoclaving, (ii) two cycle autoclaving, (iii) formalin, (iv) chloramine, (v) distilled water, (vi) frozen, (vii) control (freshly extracted teeth). After the assigned treatment, dentine discs of 2mm thickness were prepared from crown of each premolar and prepared for microhardness measurement. The pulp space of each disc was prepared to be filled with biodentine for pushout bond strength analysis. Each remaining root was then subjected to vertical loading, and maximum force at fracture (F-max) was recorded.

Results: In comparison to the hardness of control samples (61.8), independent sample t test ($P > 0.05$) reveals significant reduction in the autoclaved (53.3), water stored (56.2) and frozen samples (58.5). However, no significant effect for sterilisation and storage on the pushout bond strength which is 11.3 in the control group, and F-max of vertical root fracture (526.1) except for two cycle autoclaving (8.5 and 413.21 respectively).

Conclusions: Autoclaving, water storage and freezing significantly decreased the dentine microhardness. However, two cycle autoclaving affected the root susceptibility to fracture, and push-out bond strength.