

0519 Microhardness Testing to Evaluate Remineralization of Tooth Enamel

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Objective: Contact microradiography (CMR) is a time-consuming, indirect method of observing remineralization. Clinically, data on changes in tooth enamel strength may be more valuable than data on changes in mineral content when assessing remineralization. We used enamel hardness testing to evaluate remineralization, and compared this method with CMR. **Method:** (1) Artificial subsurface lesions were formed on extracted human molars using a demineralizing solution of 0.1M-lactic acid buffer, 3.0mM-Ca, 1.8mM-P, pH4.5. Half the lesion area was then masked with resin, as a control. (2) One sample each was subjected to remineralization by immersion for 72 hours below 37 degrees centigrade in (a) artificial saliva (20mM-HEPES, 3.0mM-CaCl₂, 1.8mM-KH₂PO₄, 150mM-NaCl) or (b) artificial saliva containing 250ppm fluoride (NaF). (3) A horizontal section of each sample was cut and polished for hardness testing. (4) Hardness was tested at 20mm intervals on the section surface, in the direction of the depth of the enamel, using a Microhardness tester, and knoop hardness calculated by digital image processing. (5) Remineralization was calculated by comparing the hardness of the remineralized and control layers with that of adjacent sound enamel. (6) A thin section from the same lesion area of each tooth was examined by CMR and remineralization calculated by standard method. **Results:** The hardness of sound enamel was 350Kg/mm². Remineralization for the two samples was (a) 6.21% and (b) 11.24% measured by microhardness testing and (a) 10.79% and (b) 14.74% measured by CMR. **Conclusion:** Results from both microhardness testing and CMR showed a similar tendency and both methods showed higher remineralization when fluoride was added to the saliva. We concluded that hardness testing could be a valuable method for evaluating enamel remineralization.