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[\[PDF \(688K\)\]](#) [\[References\]](#)**A Newly Designed Automatic pH-cycling System to Simulate Daily pH Fluctuations**[Yasuhiro MATSUDA](#)<sup>1)</sup>, [Hisanori KOMATSU](#)<sup>1)</sup>, [Yukie MURATA](#)<sup>1)</sup>, [Toru TANAKA](#)<sup>1)</sup>  
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**Abstract:**

The aim of this study was to develop and evaluate an automatic pH-cycling system, which was intended for performing time-lapse analyses of dental caries. Two single-section specimens prepared from each of the five extracted human incisors were studied under a condition of 3- or 9-cycles/ day for seven weeks. Increase of mineral loss ( $\Delta\Delta Z$ ) and increase of Ld ( $\Delta Ld$ ) were examined and compared at the end of every week during the study. In the 3-cycles/ day condition,  $\Delta\Delta Z$  and  $\Delta Ld$  significantly increased only at Week 7. In the 9-cycles/ day condition,  $\Delta\Delta Z$  increased significantly from Week 5.  $\Delta Ld$  increased from Week 2, and then there were no further increases for the subsequent five weeks. Based on the results of this study, progression pattern was found to be significantly different between the two conditions. We therefore concluded that the automatic pH-cycling system which we have developed qualified as a model system that simulated the human oral cavity. As such, it could be beneficially employed to clarify the roles of many factors that cause or prevent caries development in human teeth.

**Key words:**[Automatic pH-cycle](#), [Demineralization and remineralization](#), [Time-lapse analysis](#)

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