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In Vivo Study of Erosive Activity

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Objectives Dental erosion is a multifactorial condition of growing concerns.

Understanding its speed and progression rate is crucial to determine the need for adequate preventive measurements at proper treatment stage, and guide decisions on restoring eroded teeth. The purpose of this research was to examine the onset, progression and wear rates of dental erosion in an established mouse model.

Methods Dental erosion in mice was experimentally induced and the acidic effects of cola drink on their teeth were closely analyzed. Sixty mice were randomly distributed into two equal groups: provided with *ad libitum* cola drink (experimental group) and distilled water (control group). An experimental and a control subgroup of ten animals were analyzed at two, four and six- week time point, respectively. Molars were dissected out and observed by scanning electron microscopy (SEM). Mandibular first molars were subsequently embedded in Epon, ground transversely, observed again by SEM, and the tooth height and enamel/dentin loss were calculated.

Results The dental erosion on the molars showed clear progression from two to six weeks. Notably, by the two-week mark, a significant portion of enamel was already eroded, revealing the dentin on the lingual cusps. In the control group, minimal attritional changes on the lingual cusps were observed. When adjusted for attritional wear, molars exposed to cola for two weeks showed a significant 35% drop in lingual tooth height compared to controls (533 μ m vs. 818 μ m). At four and six weeks, the cola-exposed group continued significantly to display decreased lingual tooth heights by 40% (476 μ m vs. 799 μ m) and 43% (440 μ m vs. 767 μ m), respectively.

Conclusions Significant erosive activity in mouse molars as early as two weeks, with erosion, not attrition, causing tissue loss was revealed. Hence, early identification by clinicians and preventive treatment is essential to prohibit further escalation.