VARIATION IN EROSION SUSCEPTIBILITY BETWEEN BUCCAL AND MESIAL SURFACES OF HUMAN PREMOLAR ENAMEL

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Abstract

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The increased consumption of carbonated soft drinks is becoming more important because of the concern for dental erosion. Erosive enamel lesions most commonly affect the cervical part of facial surfaces of teeth. The largest segment of the soft drink industry is the colas.
Aim: The present research aimed to compare the erosive effect of Coca-ColaÈ beverage between the buccal and mesial cervical enamel of human premolars.
Material and methods: Twenty extracted sound human maxillary first premolars were used in the present study. Ten premolars served as Reference group (group I): Teeth of this group were utilized to provide ground sections of normal enamel to serve as reference for the control group (Group II). The other ten premolars were utilized as Control group (group II): Teeth of this group were examined and chemically analyzed to determine surface calcium (Ca), phosphorus (P) and carbon (C) weight percentage (wt%) using environmental scanning electron microscope attached with energy dispersive x-ray analyzer (SEM-EDXA). Coca- ColaÈ experimental group (group III): in which the teeth of (Group II) were immersed in Coca-ColaÈ and re-examined using SEM-EDXA then ground sectioned for light microscopic examination. Morphometric study: was performed for assessment of the surface affection band thickness. Statistical analysis: was performed to assess the effect of surface difference and application of ColaÈ on Ca, P and C wt%.
Results: The light microscopic results revealed that the control mesial cervical enamel was relatively thinner and more rapidly tapering cervically than buccal cervical enamel. In subsurface enamel, the mesial side presented varying diameter enamel rods with apparently thicker inter-rod regions. After exposure to ColaÈ, both buccal and mesial cervical thirds of group (III) showed an apparent decrease in the enamel thickness with apperance of thick dark band at enamel surface. In the subsurface enamel, both enamel rods and the interrod regions appeared more accentuated. These changes were more obvious mesially than buccaly.
Morphometric results: for group III revealed that the mesial cervical enamel showed greater mean measures of the surface affection band than the buccal one. SEM examination of enamel in the buccal cervical third of group (II), revealed plenty of perikymata grooves presenting shallow enamel rod ends & ridges of rodless enamel. Mesial cervical third of group (II), revealed more frequent perikymata grooves with more numerous rod ends & ridges, with narrower areas of rodless enamel. Scanning electron micrographs of enamel in the buccal cervical third of group (III), showed an evident generalized poorly defined surface structure. The mesial cervical enamel of group (III) showed noticeably irregular surface with variable sized small depressions. Statistical analysis: for EDXA data of groups II and III revealed statistically significant higher mean Ca and P wt % and a lower C wt % in the buccal cervical third than those of the mesial one. Moreover, both buccal and mesial cervical parts of group III showed significantly reduced mean Ca and P wt % and elevated C wt % than their correspondents of group II. Comparing the ColaÈ induced changes in wt% of the studied elements between buccal and mesial surfaces showed that the changes were significantly higher in the mesial one.
Conclusions: 1- Mesial cervical enamel normally differs from its buccal counterpart in terms of surface and subsurface structure as well as its elemental composition. 2- ColaÈ beverage obviously affected the tested parameters in both buccal as well as mesial cervical thirds. 3- The mesial cervical enamel presented greater affection than its buccal counterpart.

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