

4th Asia Pacific Congress & Expo on Dental and Oral Health

July 27-29, 2015 Brisbane, Australia

In vitro study showed, despite their acidic nature sports drinks are safe on tooth enamel

Fathilah Abdul Razak
University of Malaya, Malaysia

Background: The apatite crystals of the enamel receive continuous challenges on its integrity as it is exposed to the fluctuating environment in the oral cavity. The ebb and flow phases of demineralisation and remineralisation of the hard tissue is under the influence of pH and physicochemical factors. Sports drinks that are often carbonated and acidic may incur detrimental effect on the structure of the enamel.

Objective: The study evaluated the erosive effect of sports drinks (SD) on the enamel tissue. Properties of SD which included pH, titratable acidity and calcium content were also determined.

Methods: Non-carious extracted teeth were collected and sterilised. Each tooth was then covered with a layer of nail varnish, leaving a window of exposed enamel with surface area of 30 mm². The tooth specimens were then distributed amongst six test groups, each with three exposed enamel windows. Each test group were tested against each of five sports drinks; ReviveTM, ExcelTM, 100PlusTM, Isotonic H₂OTM and GatoradeTM for assessment of calcium released upon exposures. Mineral water served as control in the study. The weight of tooth specimens over 7-day periodic exposures to SD was monitored. Demineralisation rate and weight loss were determined to indicate the erosive effect of SD.

Results: pH of all SD was recorded very acidic within the range of pH 3.02-3.45. GatoradeTM exhibited the lowest titratable acidity ($p < 0.05$). Calcium content in IsotonicTM and 100PlusTM was 3-fold higher than in GatoradeTM and ReviveTM. The release of calcium ions from the enamel surface was fastest following exposure to 100PlusTM (2.00 µg/min) and lowest when exposed to GatoradeTM (0.33 µg/min). Weight loss was observed after a 7-day periodic exposure to ExcelTM, IsotonicTM and GatoradeTM. Interestingly, this effect was not observed with ReviveTM and 100PlusTM.

Conclusion: There is no doubt that acidic nature of sports drinks has potential in causing dental erosion with *in vitro* studies supporting this notion. However, despite the low acidity, added ions such as calcium into SD formulation tend to reduce the erosiveness of SD and encourage remineralisation of the enamel tissue instead of demineralisation. Since SD are widely used by the public in preference to carbonated beverages, oral health educators should reinforce important practices to SD users such as to decrease the time that the drinks remain in the mouth, use drinking straws and encourage drinking plain mineral water instead, to avoid dehydration during sports activities.

Biography

Fathilah Abdul Razak is currently attached to the Department of Oral Biology and Biomedical Sciences in the Faculty of Dentistry, involved in teaching oral sciences to preclinical dental students. She is also involved in the supervision of Post graduate students in Master and Doctorate programs. Her main research interests include oral biology, biofilm studies, antiplaque agents and mechanisms and tissue culture techniques for research in antitumour and wound healing activities.

fathilah@um.edu.my

Notes: