

## All about acid

### Interarch comparison of intraoral pH and temperature: a pilot study

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Soft drinks, sports drinks, smoothies, fruit juices.... all in the news of late because of their high sugar content – a cause of both dental caries and obesity. But what about their acidity?

Dental erosion is tooth wear caused by a decrease in salivary pH. Acidic drinks, such as soft drinks and fruit juices, can lower intraoral pH levels, and with children consuming soft drinks at an increasingly younger age and in

higher volumes, levels of dental erosion are rapidly increasing. Gastroesophageal reflux disease and voluntary regurgitation, due to conditions such as bulimia nervosa, are also factors which may be responsible for erosive tooth wear.

Depending on the cause, erosion is found to develop in different sites around the teeth. For example, if people are in the habit of swishing drink around their teeth before swallowing, the wear is seen on the labial/buccal side of the teeth. This is different to those with gastro reflux as in these cases erosion is seen on the palatal aspect of the teeth. However, the main factor determining where the erosion occurs is the saliva. Saliva is the superhero which can protect teeth from erosive tooth wear by diluting and neutralising acids, and provide a film to reduce the effects of erosion. For example, sites poorly bathed in saliva are more likely to show erosion compared to those areas protected by saliva.

In this *BDJ Open* paper, the authors use a special intraoral appliance to measure pH in different parts of the mouth to find out if there is a difference between the acidity levels of saliva at the mandible and the maxilla. The specially designed device allowed the team from the University of Otago in New Zealand to record both salivary pH and temperature of 14 participants continuously over a 24-hour period, excluding meal times and showers.

The team found that there was no great difference in the pH between the mandible and the maxilla during the day. However, while the participants were asleep the pH at the mandible was much lower than the maxilla. This is in direct contrast to previous studies and the authors suggest that their special appliance, which more easily allows measurement over longer periods in particular during sleep, might be the reason behind the difference in findings.

With more and more people consuming acidic drinks, studies such as this one will provide valuable information on erosive mechanisms to help both clinicians and researchers. We must help people remember it's not just about sugar when it comes to teeth.

By Ruth Doherty



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#### Author Q&A

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24 hours, twice. The appliance was customised to fit the participants' teeth to enhance the comfort while being worn; however, wearing a device that is connected to data loggers and transmitters continuously for 24 hours made potential subjects hesitant to participate in the study. Therefore, miniaturisation of the appliance would help to overcome this challenge in the future. Another challenge in carrying out this research was interpreting a large set of data. Having intraoral pH and temperature measured every second for two lots of 24 hours resulted in a large amount of data to interpret. Analysing the data in more depth, by different categories such as by hours, age, and gender, may have revealed some interesting patterns, but this requires complex statistical modelling.

#### What would you like to do next?

To overcome the aforementioned challenges, we would like to miniaturise the equipment and investigate ways to statistically manage a large data sets. We would also like to develop an intraoral device that could measure other salivary variables over extended periods to investigate the relationship between the saliva and dental diseases. ■

#### What did you aim to learn by doing this research?

In our study we measured and compared intraoral pH and temperature from two different sites (maxilla and mandible) using an intraoral appliance that enables continuous and simultaneous measurement of pH and temperature. We aimed to learn about the fluctuation patterns of pH and temperature from a site in the maxilla and the mandible to determine whether there is an interarch difference between these two variables and whether these variables may be linked to the site specificity reported with dental erosion.

#### What was the biggest challenge in carrying out this work?

The biggest challenge for this research project was to find participants who could wear the intraoral appliance for periods of up to