

What is the clinical efficacy and accuracy of a newly developed Bluetooth-enabled retainer when worn by orthodontic residents?

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A Commentary on

Castle E, Chung P, Behfar M H et al.

Compliance monitoring via a Bluetooth-enabled retainer:
A prospective clinical pilot study. *Orthod Craniofac Res* 2019;
22 Suppl 1: 149-153.

Abstract

Design A prospective pilot study.

Study population Five orthodontic residents in a university setting were asked to wear Bluetooth-enabled Hawley retainers for 12 hours per day except for eating and brushing. The subjects used an iPod to record the exact times that the retainer was inserted and removed.

Data analysis The Bluetooth-enabled device within the Hawley retainer takes a temperature reading every ten minutes. The median difference in retainer wear was reported across a five-day study period, measured in minutes either by the device or self-reported by each subject. As the device only takes a temperature reading every ten minutes, the potential for under-reporting retainer wear was considered using a calculation to adjust for the number of times the retainers were inserted and removed. The median difference between the adjusted and unadjusted wear times were reported. A Wilcoxon matched-pairs signed rank test was used to test clinical accuracy, defined as an overall median margin of error of 5% or less for the device.

Results One device malfunctioned and was replaced. Two subjects failed to synchronise their device with their iPod within 24 hours and were reminded to do so by text. The median difference between the self- and device-reported wear times (percent error) was 35 minutes or 5.1 % (range 3.3%-7.5%) using unadjusted data and 13 minutes or 1.9% (range 0.5%-3.4%) using adjusted data.

Conclusions The Bluetooth-enabled device showed a clinically acceptable level of accuracy compared to self-reported retainer wear, once the data was adjusted to account for the ten-minute time interval between measurements.

Practice points

- The Bluetooth-enabled device appears to have potential for measuring and recording compliance in the wearing of retainers
- Further research is needed to assess the acceptability of this technology to general practice patients

Commentary

This innovative development of a Bluetooth-enabled device embedded in a Hawley retainer was tested for clinical accuracy and acceptability in a small trial. It was unclear whether the five trial subjects had previously worn retainers but the subjects were currently orthodontic registrars. The photograph of the device was shown as part of a maxillary appliance but it was not clear whether the subjects were asked to wear a mandibular retainer at the same time. The paper refers to trial data over a five-day period but also mentions that data was collected in seven-day increments; the total timescale of retainer wear and the process of selecting the five-day period for the trial were not reported by the authors.

The limitations of the device, particularly the ten-minute intervals between temperature measurements, were described in detail and the calculation to account for the possible resulting discrepancy between self-reported wear and measured wear appears to be a sensible approach to this limitation. One device required replacement due to malfunctioning.

It would be fair to say that this was planned as a small trial with a particularly compliant group of subjects who wore their retainers as directed during the five-day data collection period. Two subjects had to be reminded to synchronise their device with their iPods.

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