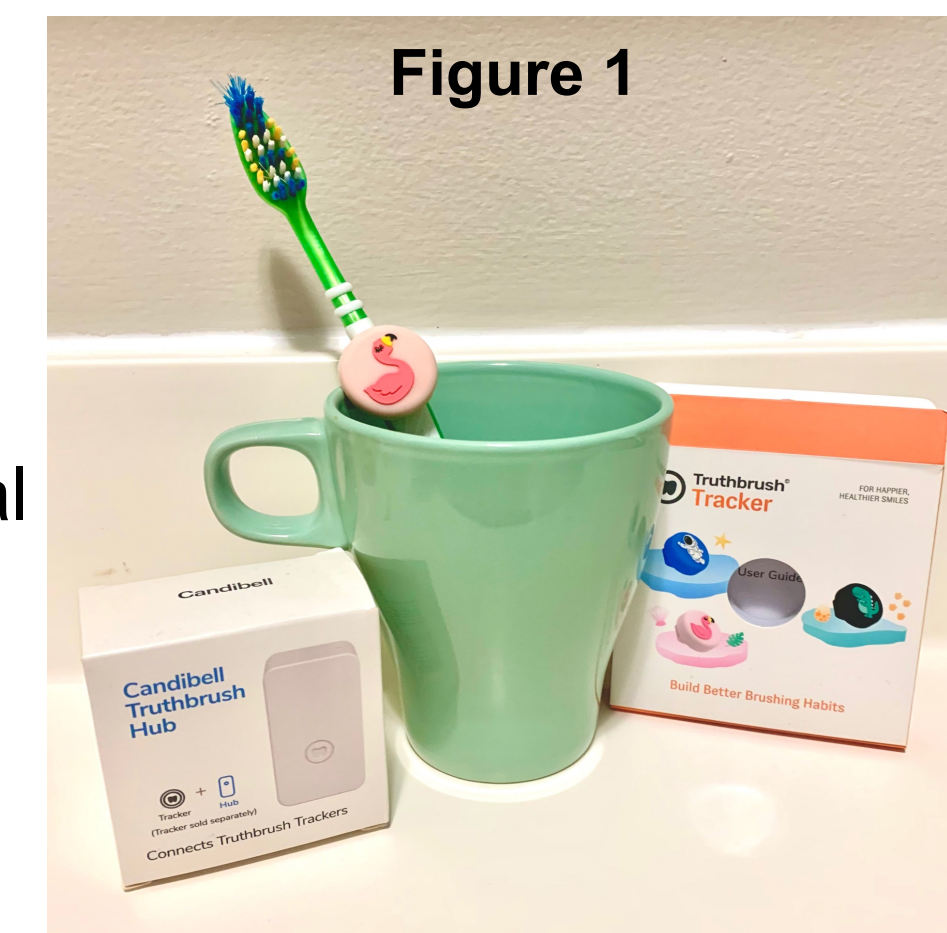


Can Truthbrush-Tracking Device Improve Brushing Efficacy in Children with Autism?

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Background

- According to the Center of Disease Control, Autism Spectrum of Disorders (ASD) is a multifaceted developmental disorder that affects social behavior and the ability to communicate.
- Children with ASD have a higher risk of caries and periodontal disease.
- Fifty nine percent of children with ASD versus 14.8% of children without ASD have poor oral hygiene. This can account, at least partly, for the increased numbers of decayed, missing or filled teeth of children with ASD compared to healthy patients.
- Oral homecare is often challenging for individuals with ASD and/or their parents/caregivers.
- Although parents/caregivers of children with ASD report brushing of their child's teeth, the extent, duration and efficacy of brushing are difficult to assess.



- Oral hygiene tracking devices such as the Truthbrush (Figure 1) can inform patients, their parents/caregivers and their dentists where brushing frequency, duration, coverage, and efficiency are lacking and thus they could contribute to the improvement of the oral hygiene of these patients.

Hypothesis

- Through the use of the Truthbrush tracking device, caregivers of children with ASD, will be better able to provide them with good oral hygiene, that is customized to each child's specific needs.

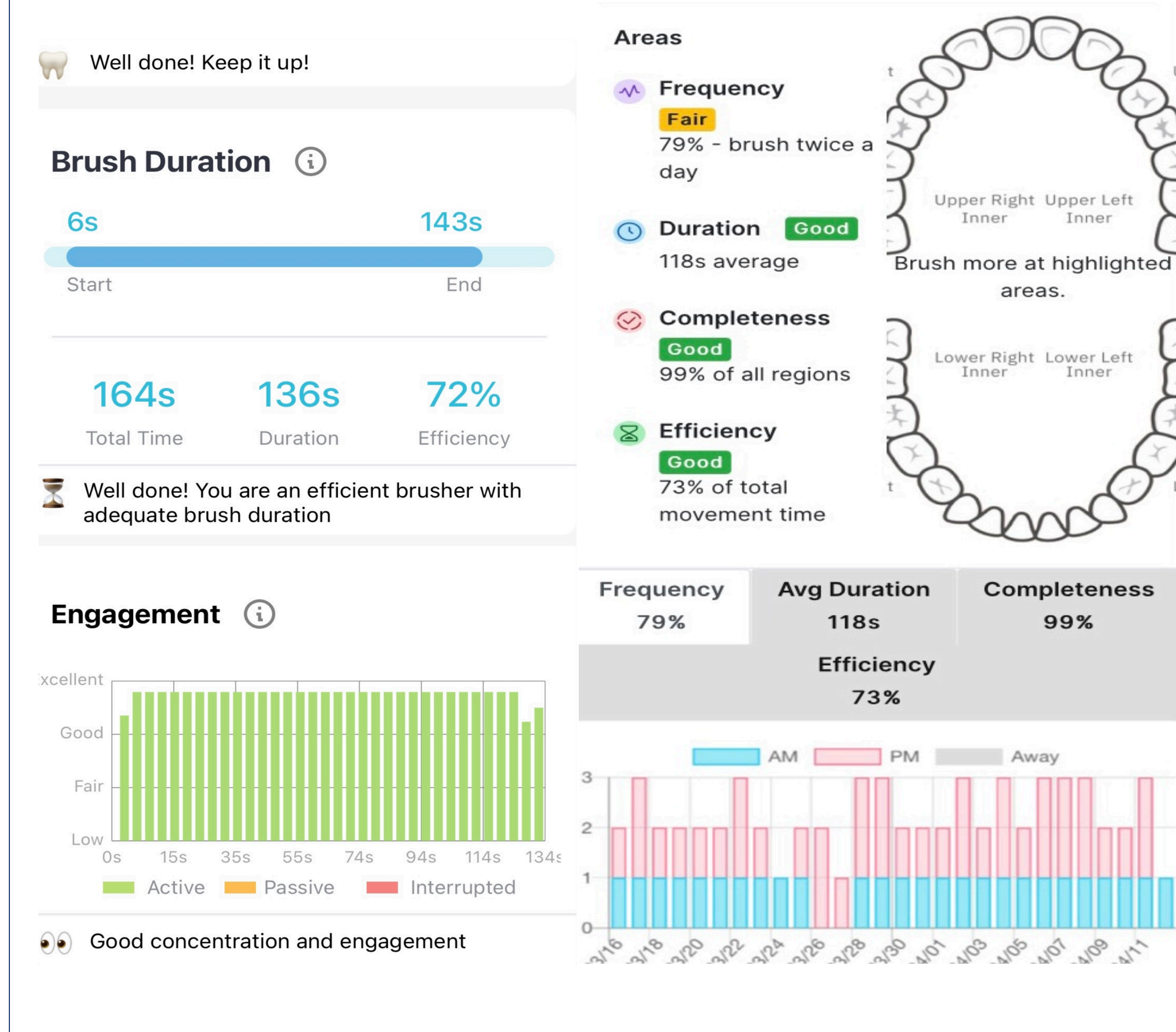
Methods

- Under review by IRB of the University of Pennsylvania.
- Inclusion criteria for this pilot study:
 - 15 children between the ages of **8-18 years**, with **Autism Spectrum Disorder**, and no other co-morbidities, who present to the Pediatric Dental Clinic at the University of Pennsylvania, School of Dental Medicine, for dental care.
 - Participants must use a **manual toothbrush**, have Wi-Fi to set up the Truthbrush Hub, and have a smart device in order to utilize the application.
- Subjects will be given the Truthbrush (Figure 1) tracking device and instructed on how to use it.
- Investigators will have access to the collected data via the "share with dentist" option on the Truthbrush website.

Methods (cont.)

- Each participant will serve as their **own control** in this study, which will last a total of **four weeks** and will be broken down into **two phases**.
 - **Phase I:** In the first two weeks, participants will be instructed to resume normal brushing habits and not access the Truthbrush Application analytics (Figure 2).
 - **Phase II:** In the second two weeks of the study participants will have access to view the Truthbrush Application Analytics and **adjust their brushing accordingly**. This data will be collected and analyzed after the four weeks for each participant and will include the following brushing parameters (Figure 2):
 - **Frequency:** number of brushing times per day.
 - **Duration:** time spent brushing, measured in seconds.
 - **Coverage:** extent to which each quadrant of the mouth has been brushed.
 - **Efficiency:** percentage of time the user spent actually brushing (applying strokes) divided by total movements.

Figure 2



Methods (cont.)

Figure 2

Movement ⓘ

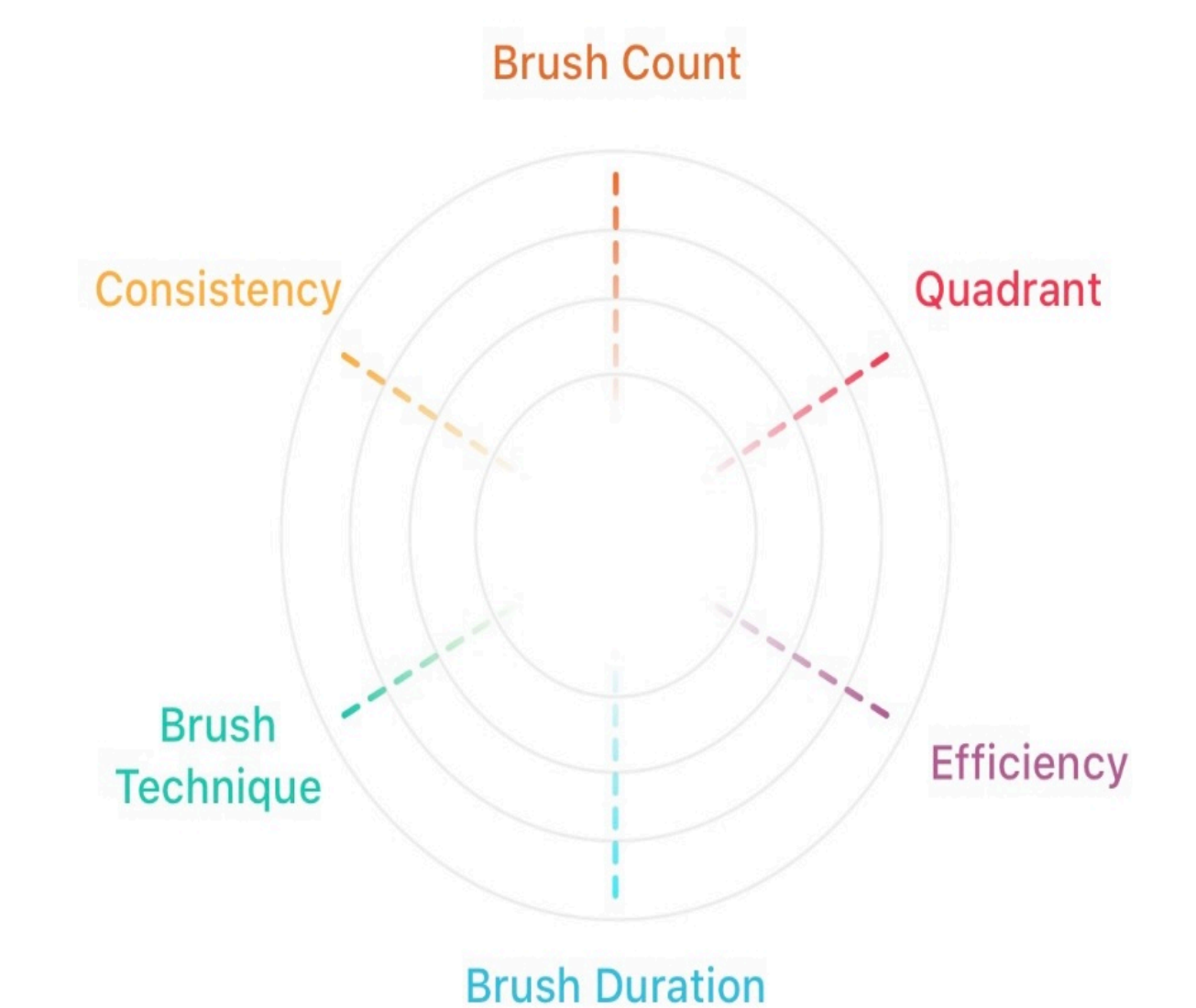


Tip: Avoid left-to-right movement and apply more circular or up-down technique

Bottom 50%

Age Group Ranking

Your brushing performance is below 50% of others in your age group. Improvement is needed.



Discussion

- Technological advances and the use of digital devices offer opportunities to guide patient behavior and connect remotely with the patient at a personal level.
- Remote oral monitoring systems have been shown to improve plaque control.
- Oral hygiene information provided to the patients with ASD, their parents/caregivers, and dentists by the Truthbrush application is expected to motivate and improve the oral hygiene efficacy of children with ASD.

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