CASE STUDY

BY FIONA SANDOM

THE USE OF AN OSCILLATING-ROTATING POWER TOOTHBRUSH IN A HIGH-NEED NHS PAEDIATRIC DENTAL SETTING IN WALES

This feasibility study explored the use of an oscillating rotating toothbrush designed for children in one high-needs NHS paediatric dental practice in North Wales. The pilot aimed to assess baseline oral hygiene status, device compliance and short-term clinical outcomes over a four-week period. Despite recruitment challenges limiting the sample to four participants, qualitative feedback revealed promising improvements in child engagement and caregiver satisfaction. The study highlights practical considerations for future trials and offers recommendations for scaling oral health interventions in socioeconomically deprived communities.

Background

Effective plaque control in children aged 6 years and above is essential for preventing caries and gingival inflammation, not only in the deciduous dentition but also to halt the disease trajectory in the permanent dentition.[1] However, children from socioeconomically disadvantaged backgrounds often face barriers to consistent and effective oral hygiene, including limited manual dexterity, inconsistent caregiver support and competing family priorities.[2]

Health Inequalities and National Context

Despite the overall improvements in the oral health of children, the recent child dental health surveys in Wales highlight significant disparities in oral health outcomes between children from deprived and affluent areas. According to the 2022/23 Child Dental Health Survey[3], 32.4% of children aged 5–6 had experience of tooth decay, a reduction from 47.6% in 2007/08. The average number of decayed, missing or filled teeth per child dropped from 1.98 to 1.11. Among 12-year-olds, the 2023/24[4] survey showed a decline in tooth decay prevalence from 31% in 2016/17 to 25.3%. Despite these improvements, 30% of children reported that oral health issues affected their quality of life, with pain being the most common complaint.

Children living in the most deprived areas continue to experience worse oral health outcomes. In these communities, 43.4% of children had decayed, missing, or filled teeth, compared to 20.7% in the least deprived areas. The average number of diseased teeth among affected children remains at two, unchanged since 2016/17. Tooth decay remains one of the leading causes of childhood hospitalisation in Wales, contributing to pain, sleep disturbance, difficulty eating, and poor self-image. These issues can have long-term impacts on speech development, mental health, and educational outcomes.[5]

To address these inequalities, the NHS Community Dental Services delivers the 'Designed to Smile' programme,[6] which includes supervised toothbrushing in schools and nurseries, fluoride varnish applications, and oral health education for families and professionals. Public Health Wales emphasises that tooth decay is largely preventable through a low-sugar diet, twice-daily brushing with fluoride toothpaste, early dental visits and consistent oral health education.

Power toothbrushes designed specifically for children may improve brushing efficacy and motivation. The Oral-B iO Kids 6+ integrates clinically proven oscillating-rotating technology, an ergonomic design, interactive features, and simplified brushing modes to support independent oral care. This study evaluated the feasibility of implementing this device in a real-world NHS setting, where resource constraints and patient complexity often challenge preventive care delivery.

Objectives

1. Assess baseline plaque and gingival status and monitor changes after four weeks of device use.
2. Evaluate patient adherence to recommended brushing routines.
3. Generate practical Point of Health (POH) and Patient Support Resources (PSR) informed by clinician and caregiver feedback.

Goal Performance Measures

Primary Goal

Evaluate the feasibility, acceptability, and short-term clinical impact of one oscillating-rotating brush, designed for children, in a high-needs NHS paediatric population.

Performance Measures

- Recruitment: Enrolment of five eligible children.

- Retention: ≥4 participants completing four-week reassessment.
- Clinical Outcomes:
  - Change in plaque index (baseline versus four weeks).
  - Change in gingival health index (baseline versus four weeks).
- Compliance:
  - Average brushing sessions/day.
  - Mean brushing duration.
  - Proportion achieving ≥2 sessions/day.

Solution

The Oral-B iO Kids 6+ is tailored for children's oral health needs with the following features:

- Clinically proven oscillating-rotating technology.
- Sensitive Mode: Reduces brushing intensity to protect developing gums.
- Smart Pressure Sensor: Alerts users when brushing too hard.
- Built-In Timer: Encourages brushing for the recommended 2 minutes.
- Ergonomic Handle: Easy grip for small hands, promoting independence.
  - Brush head: Designed for smaller mouths and gentle cleaning.
  - Characters to drive engagement.
  - Special music to encourage time spent brushing.

These features address common challenges in paediatric oral hygiene by enhancing motivation, guiding technique, and supporting caregiver oversight.

Implementation

Recruitment

Participants were recruited from a North Wales NHS dental practice serving a high-need population. Inclusion criteria included:

- Age 6–10 years.
- No contraindications to electric toothbrush use.
- Caregiver consent and willingness to participate.

Recruitment proved more challenging than anticipated. Only four participants were enrolled due to:

- Low response rates to outreach.
- Scheduling difficulties.
- Limited caregiver availability.

Procedure

Each participant received an Oral-B iO Kids 6+ toothbrush and a brief orientation session. Caregivers were instructed on:

- Recommended brushing frequency (twice daily), last thing at night and one other time, but for simplicity this was recommended on waking and undressing.
- Monitoring brushing duration and pressure, demonstration on a mouth model, with the option to try was utilised.

Participants were asked to use the toothbrush for four weeks, with no other changes to their oral hygiene routine.

Data Collection

Plaque and Gingival Indices: Assessed by dental professionals using standardised scoring sheets and the simplified plaque index[2]

Compliance: Tracked via caregiver logs

Qualitative Feedback: Collected through structured caregiver interviews and child questionnaires.

Ethical Considerations: Ethical approval was obtained, and informed consent was secured from all caregivers.

Results and Outcomes

Quantitative Data

Due to the small sample size, statistical analysis was not feasible. However, descriptive trends were observed:

Participant	Baseline Plaque Index	4-Week Plaque Index	Baseline Gingival Index	4-Week Gingival Index
1	83.3%	18.3%	56.4%	15.8%
2	84.3%	20.2%	46.3%	13.3%
3	73.2%	22.4%	52.7%	12.8%
4	62.4%	12.5%	32.4%	8.2%
5	Not recruited			

Observation: All participants showed improvement in plaque and gingival indices after four weeks.

Compliance

Pre-trial parents reported brushing "once a day in the morning" (n2) and "twice a day mostly, but not always at night" (n2).

- Average brushing sessions/day: 1.8
- Mean brushing duration: 1.6 minutes
- Three out of four participants achieved ≥2 sessions/day consistently.

Qualitative Feedback

Feedback from caregivers and children provided valuable insights into the acceptability and perceived benefits of the toothbrush:

- Enjoyment and Engagement: Children consistently reported enjoying the brushing experience. One caregiver noted, "My child actually looked forward to brushing their teeth - it became part of their routine."
- Parental Reassurance: Caregivers expressed increased confidence in their child's oral hygiene. "I felt reassured knowing the toothbrush was doing a proper job cleaning their teeth," said one parent.
- Motivational Features: The child friendly visual rewards were highlighted as effective tools for encouraging regular brushing. "The use of an up-to-date animation character motivated her to use the brush," another caregiver shared.
- Ease of Use: The ergonomic design and gentle brushing mode were appreciated. "Quiet brush, multiple settings, a great design for children to enjoy brushing their teeth

Conclusion

This feasibility study demonstrated that the Oral-B iO Kids 6+ toothbrush is acceptable and potentially beneficial for improving oral hygiene in high-need paediatric populations. While the small sample size limits generalisability, qualitative feedback suggests strong engagement and caregiver satisfaction.

Lessons Learned:

- Recruitment in deprived communities requires flexible, community-based strategies.
- Caregiver involvement is critical to sustained compliance.

Recommendations for Future Trials:

- Expand recruitment through schools and community centres.
- Offer incentives and flexible scheduling.
- Include a control group and longer follow-up period.

Practical Point of Health (POH) and Patient Support Resources (PSR)

Based on clinician and caregiver input, the following resources were developed:

- Brushing Tracker Sheet: For daily logging.
- Caregiver Guide: Tips for integrating brushing into routines.
- Small sample size (n=4) limits statistical inference.
- No control group for comparison.
- Short follow-up period (4 weeks).

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TOP TIPS

BY **ANITA HOSTY**

IMPROVE YOUR POSTURE

Musculoskeletal problems are a common complaint in our profession. Maintaining good posture is not just important when we are working: we should also be mindful of our posture outside of work. We all know what a good and what an incorrect posture is - we just need a little reminder.

Top Tips for busy clinicians

You can remind yourself throughout the day to keep a good-neutral posture in place. Ask yourself a question before seeing a patient: " How is my posture?" By simply asking this question you will be able to correct it naturally.

Your ideal posture involves:

- A long spine
- Maintaining natural curves throughout the spine
- Keeping your chin parallel to the floor
- Eyes gazing straight ahead
- Pulling your shoulders down
- Gently squeezing your shoulder blades together
- Posture should allow you to breathe easily, allowing full capacity of lungs with every inhale and exhale
- Posture should feel natural - not forced. If it feels forced, relax a bit

The key is to stay mindful and habitually returning to a neutral posture throughout the day.

Around 20% of our work involves a patient communication. During these conversations and demonstrations, it is just as important for us to protect our own health by maintaining good posture.

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