Electric vs Manual toothbrushes effectiveness at plaque removal in children

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Introduction

Early dental caries is the most common chronic childhood disease in the United States (AAPD, 2020). The prevalence for childhood caries is (52%) amongst Hispanics youth, (44.3%) African American, (42.6%) Asian, and (39.0%) White (AAPD, 2020). While the prevalence is high, many dental caries are preventable with proper oral hygiene practices. Various research theories support the use of tooth brushing to reduce and effectively remove plaque biofilm from primary dentition. Younger children may face challenges with dexterity; research identified good handwriting, ability to write full address, or cut complex shapes as behavioral characteristics that might predict children's ability to brush teeth effectively. (1)

Purpose

Both electric and manual toothbrushes have been considered equally effective at removing plaque in children. Most dentists recommend whichever works best in parents' and patients' hands. More recently, a meta-analysis made advancements towards identifying electric toothbrushes as a superior toothbrush type in pediatric populations. In light of new research, the aim of this study is to evaluate plaque reduction effectiveness with manual and electric toothbrushes during a one-minute brushing session of 3–6-year-old children.

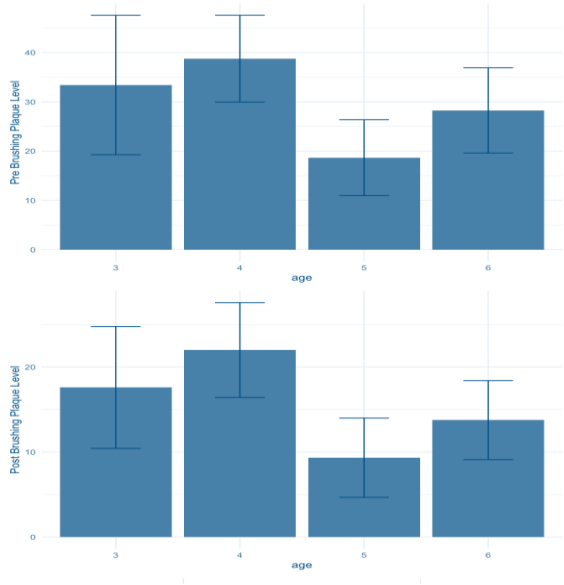
Methods

Research visit (Single visit no follow up needed)
-Participants did not receive any coaching regarding how to brush their teeth prior to the trial, they were asked to brush their teeth as they do at home.
-Participants received a number that was preassigned to electronic or manual toothbrush, numbers were randomized and assigned using Excel.
-Participants chewed plaque disclosing tablets for 30 seconds, revealing tooth plaque.
-Examiner record pre-plaque index using data collection sheet.
-Participants brushed for 1 minute while supervised.
-Examiner recorded post-plaque index using data collection sheet.
-Examiner revealed remaining plaque to parent and participants using hand mirror, and participants received professional prophy.

Results

One-way ANOVA was performed on the change in plaque as described by the age of the participant. A one-way ANOVA revealed that there was not a statistically significant difference in change in plaque between at least two groups ($F(3, 16) = 1.10$, $p = 0.379$.). Results were verified using a permutation ANOVA test with 1000 replications ($p = 0.38$).

A Welch *t*-test was performed to determine if there was a statistically significant difference in change in plaque between types of toothbrush. There were 9 electric toothbrushes and 11 manual toothbrushes. A Welch t-test revealed that there was not a statistically significant difference in reduction in plaque (t = 2.0633,p = 0.05483) between the two groups.



Conclusion

Both electric and manual toothbrushes are effective at plaque removal in school aged children.

References

Kerr R, Claman D, Amini H, Alexy E, Kumar A, & Casamassimo PS. (2018.) Evaluation of the Ability of Five- to 11-Year-Olds to Brush Their Teeth Effectively with Manual and Electric Toothbrushing. *Pediatric Dentistry, 41(1),* 20-24.