Meta-analysis

Updated meta-analysis on the clinical efficacy of side-to-side powered toothbrushes vs. manual toothbrushes

de Jager M, Schmitt P, Jain V, Master A, Wei J, Strate J. *J Dent Res* 89 (Spec Iss B): 3694, 2010

Introduction

In 2005, The Cochrane Collaboration for evidence-based healthcare reviewed "manual versus powered toothbrushing for oral health" concluding "brushes with a rotation oscillation action removed plaque and gingivitis more effectively than manual brushes in the short term." In addition, the 2005 study concluded that "no other powered designs were as consistently superior to manual toothbrushes," including side-to-side powered toothbrushes. Since the review, additional clinical studies evaluating the efficacy of side-to-side brushes were published warranting an updated meta-analysis.

Objectives

To compare the clinical efficacy of manual and side-to-side powered toothbrushes in reducing plaque and gingivitis in everyday use by conducting an updated meta-analysis using the Cochrane methodology with additional qualifying studies published in 2004 through 2007.

Methods

Following Cochrane's methodology, a literature search in PubMed, *The Cochrane Library* and IADR abstracts was performed to find parallel or cross-over, randomized controlled trials comparing plaque or gingivitis reduction. Studies needed to include at least one manual and one powered toothbrush and be conducted with subjects without disability affecting toothbrushing. Qualifying studies were added to Cochrane's data set and the meta-analysis was updated to calculate the Standardized Mean Difference and corresponding 95% Confidence Interval, which allows comparison of plaque and gingivitis reduction of side-to-side versus manual toothbrushes across multiple studies.

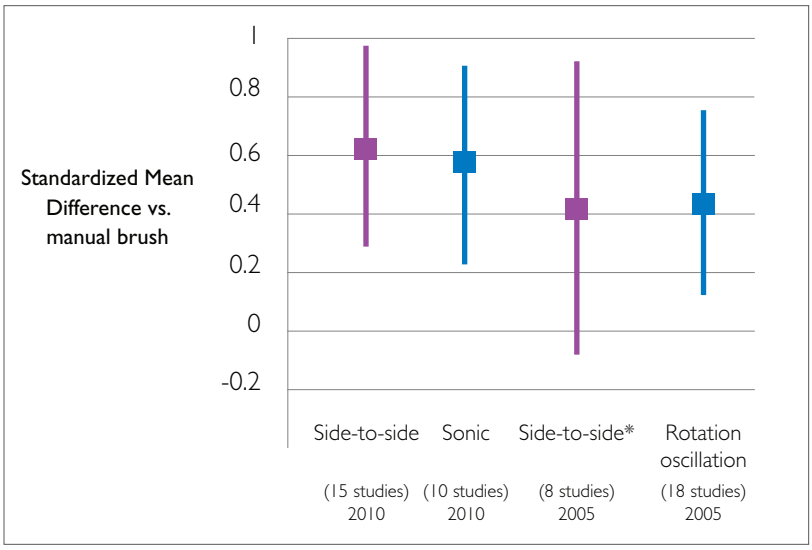
Results

Seven qualifying studies with sufficient data were added to the eight short-term studies already in the Cochrane Review. These fifteen studies together involved over 1,300 subjects and included a variety of side-to-side brushes, e.g., various Philips Sonicare models, Oral-B Pulsonic, Oral-B Sonic Complete and Ultreo. The meta-analysis revealed that side-to-side brushes had statistically significantly greater plaque and gingivitis reduction versus manual brushes. A subgroup analysis of ten high-frequency, high-amplitude "sonic" side-to-side studies, with almost 900 subjects, yielded comparable results.

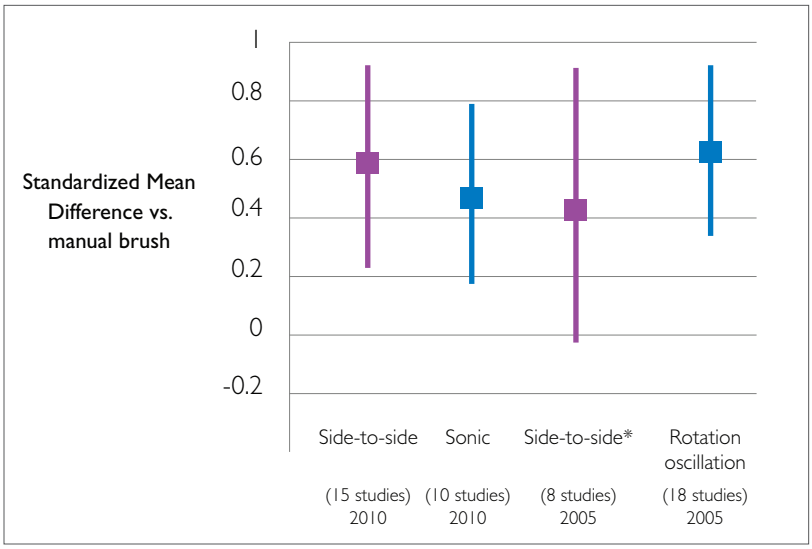
Conclusion

The updated meta-analysis on short-term clinical studies representing everyday use showed that side-to-side and sonic side-to-side powered toothbrushes resulted in significantly greater plaque and gingivitis reduction than manual toothbrushes. Thus, given this updated analysis, an evidence-based approach to optimizing home oral care includes the introduction of side-to-side and sonic brushes into the daily oral hygiene regime.

Plaque Removal Benefit Over Manual



Gingivitis Reduction Benefit Over Manual



*Difference with manual toothbrush not significant

Figures show Standardized Mean Differences with corresponding 95% Confidence Intervals for powered versus manual toothbrushes for the 2010 updated analysis and 2005 Cochrane Review.