Clinically simulated brushing-vibrating plaque control by lamellar full-mouth devices

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Objectives:

All toothbrushing methods have advantages and disadvantages. Therefore, robot tests of alternative biophysical lamellar brushing actions are needed. The aim was to test two prototypes (BLBR, Grünwal, Germany) with a clinically validated robot program, (ii) to introduce the new occlusal PlaCore Plaque Index (pPlI) and (iii) to compare the efficacy of the full-mouth devices with Philips Sonicare powered toothbrush (Drachten, Netherlands).

Material and Methods:

After pretesting different Shore hardness A materials, vibration modes and intermediate dentifice foams (Aero - containing sodium fluoride/nitrogen, Toyoo - containing amine fluoride/hydrogen, BLBR, Grünwal) the SHA was set to 43 and the vibration to 140 Hz. Prototype RED 2 employed indirect, prototype RED 3 direct vibration transfer to 140 Hz. Prototype RED 2 employed BLBR, Grünwald) the SHA was set to 43 and the vertical movement 2.0 cm. Ten replicated human incisors, canines, premolars and molars.

Results:

Prototype RED 3 was superior to Prototype RED 2 and Philips Sonicare PTB in all buccal coronal fields at smooth surfaces (81.7–92.0 % plaque removal) and risk areas in-between teeth and next to the gum line (32.5–59.4 % plaque removal), significantly different (p<0.001 – p<0.05) from Philips Sonicare PTB. However, differences in occlusal plaque removal were non-significant after Bonferroni correction. Analysis of single teeth revealed optimal plaque control by Prototype RED 3 around all incisors, canines, premolars and molars.

Conclusions:

The unique bio-physical brushing-vibrating mechanism of action - MOA - of a powered lamellar toothbrush prototype is promising for effective plaque control.

The MOA is supported by a special fluoride containing dentifice foam.

The new Occlusal PlaCore Plaque Index (pPlI) is relevant for biofilm disclosure.

References:

T. LANG, S. KAUFER, R. BEIMEL, P. GAENGLER

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Clinical Validation of an Occlusal Plaque Index (pPlI) for the four tested toothbrushes.

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