Objectives: Biophysical lamellar brushing actions demonstrated effective plaque control in clinically validated robot testing at coronal and occlusal planimetric fields/tooth (PPI, cPPI; Gaengler et al. 2021). Aim was to test (i) individual full-mouth lamellar pieces, compare (ii) with Philips Sonicare and assess (iii) different brushing time with same robot programme using clinically validated plaque simulation.

Material and Methods: Serial oral hygiene lamellar toothbrush Uniqe (BLBR 202001, Grünwald, Germany) is offered with 3 mouthpieces S, M, L. Robot brushed replicated human KaVo teeth in anatomic position coated with plaque simulation (Pepin et al. 2020), occlusal force 7.5 N, vibration 120Hz, manual movements transversally, sagitally, 60s foam Nanosaar BLBR031-34 (BLBR, Grünwald, Germany) - 7 cycles per mouthpiece. Control PhilipsSonicare DiamondClean (SensitiveHead, Drachten, Netherlands) brushed with special robot programme, 120s according to recommendations. Uniqe mouthpiece M brushed teeth with foam for 30s, 45s, 60s and 120s. Computer-assisted plaque assessment at coronal fields - 4 sites/tooth with 4 risk areas (next to gumline, in-between) - revealed plaque removal in percentage per field/area. Data underwent statistical analysis (independent two-sample t-test).

Results: Foam-filled mouthpieces executed combined brushing-vibrating plaque removal action with chewing motions and manual motions in consecutive transversal, vertical and sagittal directions. UniqeM as best fitting device brushes, consequently, at hidden areas highly significantly better (p<0.01) than Uniqe. Uniqe MOA demonstrates equality in total plaque removal in comparison to Philips, with highly significantly better results (p<0.001) at lingual areas and - in contrast - harmonic means around 4 sites of all single teeth. Optimal plaque removal was achieved with 60s (95% smooth surfaces, 67% next to gumline, 50% in-between) with 30s results not acceptable, 45s results sub-optimal.

Conclusions: Best fitting mouthpiece, optimal brushing time and novel foam are crucial to elicit the unique brushing-vibrating lamellar Mechanism of Action MOA. Optimal plaque control in clinically validated robot testing constitutes clinical testing in RCTs.

References: