

Effect of Ultrasonic Toothbrushing in Periodontal Maintenance Treatment

Executive Summary

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Inflammation of the tooth attachment with bone loss and often gum bleeding are widespread and increasing among the population, finally resulting in tooth loss. Bacterial etiology of dysbiotic biofilms and usually powerful host responses, modulated by genetic and immunologic factors, play a major role. However, oral hygiene with toothbrushing and oral hygiene tablets or dentifrices containing fluoride represents an important part of periodontal maintenance treatment during home care.

Periodontitis is, like dental caries, a life-long disease. Therefore, a life-long dental follow-up including oral hygiene home care is needed. Consequently, a very soft but nevertheless highly effective toothbrushing technique with polishing or non-abrasive effects is important to avoid tooth wear.

In 2011 it was demonstrated that an exclusively ultrasound-activated toothbrush Emmi®dent Professional effectively reduced plaque biofilms and prevented gum bleeding with no wear risk (S. Denda et al.; J. Dent. Res. 91 (2012) Spec. Issue B, 2209)

It was, therefore, the aim of a clinical randomized parallel-design follow-up study to assess the efficacy of ultrasonic toothbrushing (Emmi dent Professional, EMAG AG, Mörfelden-Walldorf, Germany), compared to manual toothbrushing (Denttabs, Innovative Zahnpflegegesellschaft mbh, Berlin, Germany) in periodontal maintenance treatment over 3 months.

After scaling and root planing of periodontitis teeth with shallow pockets 16 subjects aged 45 – 54 yrs were included in the test group and 17 subjects in the control group, undergoing a 4-day training period. Baseline and follow-up data after 2, 4, 8 and 12 weeks comprised six-point pocket depth, planimetric plaque index (Lang et al. 2011) at 9 fields per vestibular and oral sites of teeth and Gingiva Index. The ultrasonic toothbrushing, used 2 times per day for 3 min., was exclusively ultrasound activated. Data underwent statistical analysis (t-test, U-test, Wilcoxon-test, χ^2 -test).

The ultrasonic toothbrush group exhibited statistically significant higher reduction in mean probing depth (range 0.6 - 1.2 mm) compared to the manual toothbrush group (range 0.5 – 0.9 mm). In the ultrasound group 50 % of shallow pockets vs. 39 % in the manual toothbrush group were transferred to pocket depth less than 3 mm. The percentage of plaque-free planimetric fields after the training period increased significantly, and after 3 months the plaque reduction on vestibular sites was stable, with better performance of ultrasonic toothbrushing on mandibular teeth. The reduction of the Gingival Index is for both groups significant. Bleeding on probing is more reduced in ultrasonic toothbrushing group.

It was concluded that the outcome of scaling and root planning is markedly improved by ultrasonic toothbrushing, up to 3 months after treatment.

Clinical conclusion

The direct application of ultrasound within the oral cavity is a completely new biophysical dimension of effective tooth cleaning and control of the bacterial biofilms with no brushing action at all.

The tested exclusively ultrasound-activated toothbrush Emmi®-dent Professional is as effective in plaque reduction as a manual toothbrush being the gold standard in tooth cleaning. The ultrasonic toothbrush contributes to gingival health by significantly reducing gum bleeding and avoids completely abrasive brush movements. Therefore, the risk of wear lesions on teeth and gums is excluded.

The ultrasound oral hygiene home care resulted in a markedly improved reduction of periodontal pockets compared to manual toothbrushing. Therefore, the ultrasonic toothbrush Emmi®-dent Professional contributes effectively to the periodontal maintenance treatment.