Objectives:
Plaque retention around orthodontic brackets increases the short term gingivitis risk and the long term caries risk in susceptible patients. It was, therefore, the aim of a randomized clinically-controlled study to compare the improvement (i) of plaque control and (ii) gingivitis control by ultrasonic vs. manual toothbrushing.

Material and Methods:
80 adolescents wearing fixed orthodontic appliances 6 month before removal and exhibiting ≥ 4 gingivitis teeth were randomly divided in 2 groups. The test group US (n=42) used the Emmi-dental ultrasonic toothbrush with emmi-dent ultrasound toothpaste (EMAG, Mörfelden-Walldorf, Germany). The control group CT (n=38) used the manual toothbrush with oral hygiene tablets (Denttabs, Berlin, Germany). The Gingiva-Index GI (Silness and Löe, 1964) with 4 codes was used at 6 points/tooth at baseline, after 3-day-plaque-regrowth at start of study, after 2 and 12 weeks. The number of gingivitis teeth according to the G (Gingivitis) (Periodontitis) M (Missing) T (Teeth) index is clinically more relevant concerning the severity and extend of gingivitis than the GI values. The Planimetrical-Plaque-Index PPI (Lang et al., 2011) was used at 8 index teeth from 6 planimetical fields buccally and 6 planimetical fields orally. Blinded PPI coding by an independent researcher on intra-oral photographs was PPI=0 (no plaque), PPI=1 (less than 50 % covered with plaque), PPI=2 (more than 50 % covered with plaque), PPI=3 (total plaque).

Results:
Highly significant reduction of gingivitis was documented for both groups, and the number of Gingivitis Teeth declined from mean 13 teeth to 4 teeth in the Emmi-dental test group US (Denda, 2011 and May, 2013). The study confirms earlier results of plaque reduction and contribution to gingival health from ultrasonic toothbrushing before supervised toothbrushing and exhibiting chronic gingivitis is clinically effective in significant plaque reduction and highly significantly decreasing the number of gingivitis teeth. The improvement of oral hygiene is matching significantly the number of gingivitis teeth according to the Gingivitis Index GI and PPI.

Conclusions:
The study confirms earlier results of plaque reduction and contribution to gingival health from ultrasonic toothbrushing (Denda, 2011 and May, 2013). The Emmi-dental Professional ultrasonic toothbrush used in a high risk cohort of subjects under orthodontic treatment and exhibiting chronic gingivitis is clinically effective in significant plaque reduction and highly significantly decreasing the number of gingivitis teeth. The improvement of oral hygiene is matching that of the control group. The advantage of ultrasonic brushing is the wear-free action. Supported by EMAG AG, Mörfelden-Walldorf, Germany.

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