

# **Clinically Controlled Study of the Effects of Ultrasound in Periodontal Maintenance Therapy**

## **Executive Summary**

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Infections of tooth sockets, sometimes coupled with gum bleeding, and in many cases accompanied by bone loss around the teeth with subsequent loosening of the teeth, is becoming more and more common. Besides the bacterial release and a significant defense action of the organism against infections based on genetic and immunological factors and mouth hygiene, using toothbrushes in combination with toothpastes or tablets that contain fluoride play an important role in maintenance therapy, in particular after dental pocket treatment of the teeth. These infections of tooth sockets are also known as periodontitis and are a lifelong disease.

Just like dental caries, periodontitis requires lifelong dental treatment, including oral hygiene regimes carried out at home. This is why a gentle, yet highly effective tooth cleaning technique is important in order to ensure low abrasions of the enamel or abrasion-less control of plaque over many years.

In 2011, it was proven that a purely ultrasound-activated tooth cleaning device, the “Emmi ® dent 6 Professional”, effectively reduced plaque biofilms and prevented gum infections without the risk of any abrasions. [S. Denda et al.; J. Dent. Res. 91 (2012) Spec. Issue B, 2209]

It is therefore the objective of this additional study, to investigate the effectiveness of the tooth cleaning device “Emmi®dent 6 Professional” in the context of periodontal maintenance therapy over a time period of three months.

To achieve this, two groups were established according to an ethically approved and randomized clinically controlled parallel study, in which one group of 16 volunteers used the ultrasound device Emmi-dent 6 Professional and the other group of 17 volunteers used the manual toothbrush Denttabs.

All volunteers suffering from moderate periodontitis and shallow gingival pockets underwent a conservative periodontitis therapy. They then had a four day training program after which they refrained from any tooth hygiene for three days. On the first day of the program, all volunteers cleaned their teeth under supervision. The plaque index was monitored according to the Plaque Index (Lang et. al. 2011), and the condition of the gums was examined according to the Gingiva Index.

Initially, the depth of the sulcus and pockets, measured in millimeters, was recorded on six points of each tooth and changes were assessed after three months. Teeth

cleaning at home by the volunteers was monitored by regular examinations after two, four and eight weeks. Depending on the distribution pattern, the collected data was statistically analyzed using the “t-Test, U-Test,  $\chi^2$ -Test.

As a result, the ultrasound group revealed a statistically significant size reduction of the mean pocket depth of 0.6 to 1.2mm in comparison to 0.5 to 0.9mm revealed by the group using manual toothbrushes. It was seen that in the ultrasound group, 50% of the shallow pockets disappeared in comparison to 39% in the group using manual toothbrushes.

The reduction of plaque, after training and supervision, was statistically higher than without training. Plaque reduction remained stable over the three month home care regime, proving the benefits of using the ultrasound cleaning device in particular on the lower jaw.

The reduction of the gingiva infections was significant in both groups when compared with the initial data, whereby in the application of ultrasound, gum bleeding in many cases disappeared.

In conclusion, conservative periodontal therapy of teeth with pocket curettage can be substantially improved by using the ultrasound tooth cleaning device twice a day for three minutes over a period of three months.

### **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 required at all.

The tested pure ultrasound-activated tooth cleaning device, Emmi®-dent 6 Professional, meets the current “gold standard” in tooth cleaning. The ultrasound tooth cleaning device contributes to gingival health by significantly reducing gum bleeding and completely avoids abrasive brushing movements. Therefore, the risk of wear lesions on teeth and gums is eliminated.

Ultrasound oral hygiene at home resulted in a significantly improved reduction of periodontal pockets compared to manual tooth brushing. Therefore, the ultrasound tooth cleaning device, Emmi®-dent 6 Professional, contributes effectively to the periodontal maintenance treatment.

