Clinical Effects of Ultrasonic Toothbrush for Patients with Chronic Periodontitis

OTSUKA Hideharu, ICHIMURA Koh, ISHII Makiko,
MATSUDA Atsushi, MIKAMI Koichiro, YATARE Kazuhiro,
OHASHI Toshio, HAYASHI Joichiro, TATSUMI Junichi
and SHI Kitetsu

Division of Periodontology, Department of Oral Biology and Tissue Engineering, Meikai University School of Dentistry

Abstract: In the last decade, new toothbrushes that generate acoustical energy have been developed, and ultrasonic toothbrushes are now used widely. Although there have been reports on the clinical usefulness of ultrasonic toothbrushes, there has been almost no research on the influence on periodontal-pathogenic bacteria in periodontal pockets.

The tested ultrasonic toothbrush (DENT.EX systema ultrasonic®, Lion Dentistry Material) is characterized by ultrasonic oscillation of 1.6 MHz and extremely tapered end bristles. It was designed using the Bass method to remove plaque in periodontal pockets.

The purpose of this research was to consider the influence of an ultrasonic toothbrush on bacteria on chronic periodontitis.

The subjects were 14 chronic periodontal patients (5 males and 9 females, average age 48.6±12.4, age range 35 to 69) who visited the Department of Periodontics, Meikai University Hospital.

As for the examine tooth, one or more of 56 premolars and molars were chosen for pockets of 4 mm or more by Probing Pocket Depth (PPD); the ultrasonic toothbrush was used on the experiment side, and a manual brush (DENT.EX 44M® Lion Dentistry Material) was used on the control side. Subjects were instructed to perform brushing 2 to 3 times per day using the Bass method.

1) Plaque Index (PII: Silness & Löe), 2) Bleeding on Probing (BOP), 3) Gingival Index (GI: Löe & Silness), 4) PPD and 5) the amount of Gingival Crevicular Fluids (GCF) were used as clinical parameters, and 1) the number of microorganism copies by the real-time PCR method and 2) the total number of periodontal-pathogenic bacteria (Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia, and Tannerella forsythia) copies were used as clinical parameters.

As for BOP and GI, there was an improvement in the two groups with time. However, there was no significant difference among both groups.

According to a comparison restricted to PII (Mesiodistal) of 4w of the experiment group, improvement was shown (p<0.05).

The number of periodontal-pathogenic bacteria in the gums of the experiment group showed a decreasing tendency with time. GCF decreased significantly in the experiment group of 4w (p<0.05). It is suggested that the 1.6 MHz ultrasonic toothbrush affects the bacteria in periodontal pockets of chronic periodontitis patients.

Key words: Ultrasonic toothbrush, Chronic periodontitis, Polymerase chain reaction, Periodontal-pathogenic bacteria