

Lecture P113 (*Shishu*)

[3002]

Effects of Ion-toothbrushes in periodontitis patients

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[Objective]

Plaque control is an important element in the prevention and treatment of periodontal diseases and is the most effective method that can be practiced by patients. However, it is difficult to maintain good plaque control over time because it depends not only on patients' skills but other factors such as their motivation as well. For this reason, various toothbrushes with additional functions have been developed. At the 56th Autumn Meeting of the Japanese Society of Periodontology, we reported the effects of an anion-releasing ion toothbrush in healthy volunteers. This ion toothbrush has a built-in lithium cell and releases anions as a result of the formation of a circuit

between fingers that hold the handle and the head that comes into contact with teeth in the oral cavity. In the process of plaque formation, plaques are adsorbed onto the tooth surface (by cross-linking) taking advantage of cations in the saliva. This ion toothbrush is believed to prevent bacteria from being adsorbed on pellicles by releasing anions via saliva and thereby interfering with the binding of bacteria and pellicles mediated by Ca cross-linking on the tooth surface. This ion toothbrush is also reported to enhance patients' feeling of satisfaction by smoothing the tooth surface. This double-blind study was conducted to evaluate its clinical and bacteriological efficacy in patients with periodontal diseases.

[Materials and methods]

A randomized, double-blind clinical study was conducted in 20 patients who met the dental indication criteria and gave informed consent at the outpatients' unit of the Department of Periodontics of the Tokyo Medical and Dental University Dental Hospital. Informed consent was obtained in writing. Ten patients were assigned to an ion toothbrush that allows electric current to flow (Ion Power Kiss You: Fukuba Dental Co., Ltd.) and the other 10 to an ion toothbrush that did not allow electric current to flow as a result of circuit interruption (control group). The ion toothbrush was used in an ordinary way for 3 weeks without using dentifrice and examined before and after

surgery. Examinations were conducted with respect to 1) bacteria, 2) plaque index (PII), 3) gingival index (GI), 4) probing pocket depth (PPD), and 5) bleeding on probing (BOP). Wilcoxon's rank sum test was used for statistical analysis. Bacteriological tests were conducted by the real time PCR method after sampling non-stimulated saliva and extracting bacterial DNA. Total bacteria were determined by the SYBR Green method, while *Prophyromonas gingivalis* (*P.g.*), *Treponema denticola* (*T.d.*), and *Tannerella forsythia* (*T.f.*) were determined by the Taqman probe method. A questionnaire survey was conducted after surgery asking patients how they felt using the toothbrush.

[Results and discussions]

Bacteriological tests showed no significant inter-group differences in changes in *P.g.*, *T.d.*, or *T.f.* counts with their counts decreasing in 5/10 and 4/10 patients, 6/10 and 4/10 patients, and 5/10 and 3/10 patients, respectively, in the test and control groups. PII, GI, PPD and BOP showed no marked changes. Of the 10 patients, 5 in the test group answered "Yes" when they were asked whether they "felt efficacy of the toothbrush" and whether "their teeth became smoother" compared to only 1 in the control group in response to both questions. These findings suggest that the ion toothbrush offers an additional value of making the tooth surface smoother in addition to its ordinary function. In conclusion, findings

obtained in the present study suggest that the anion-releasing ion toothbrush gives great satisfaction to patients and helps maintain their motivation to control plaques.

The ion toothbrushes used in the test group and control group in the present study were supplied by Fukuba Dental Co., Ltd.