Effect of Toothbrushing Education Practice on Periodontal Health Conditions

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Introduction

We previously reported, using the CPITN, that the prevalence of periodontal disease in college students from 1st-year to 5th-year was as high as that in a similar age group unrelated to the dental field, but that the prevalence in the 6th-year students was lower. In our previous report the important role of a 5th-year class in brushing drill practice in decreasing the prevalence was discussed. The 5th-year students were taught Rolling, Scrubbing, Bass', Modified Stillman's, Fones', and Charters' methods. In the present study the effect of toothbrushing education and practice in the 5th-year class was assessed, using criteria to evaluate the students' periodontal condition.

Materials and Methods

The subjects were 55 5th-year students at the Kyushu Dental College, aged from 22 to 35 years (mean age: 24.1 years) (42 males and 13 females), who had gingivitis scores of more than 5 on the Anterior PMA index (PMA index). Students who had resin- or metal-fillings in the proximal surface or the cervical area in the anterior region, orthodontic appliances, or other mucosal diseases, besides gingivitis and periodontitis, were excluded. The tooth brush used was Dr. Bee Soft (Beebrand Medico Dental Co., Ltd.). The subjects were instructed to brush twice a day (just after rising or after breakfast, and before going to bed) using toothpaste. They were told to brush by any brushing method which they had mastered in the education class, mainly by the Scrubbing method. The area of the anterior teeth was inspected in regard to the PMA index, occult blood reaction, and CPITN. The PMA index was measured on the first day of the experiment, and at 1, 2, and 4 weeks after the start of experiment, by an experienced tester. At the same time, the occult blood reaction was investigated using a Salivaster (Showa Yakuhin Kako Co., Ltd.) on a scale from 0 to 4 (in 5 grades).
CPITN for 6 maxillomandibular anterior teeth was scored on the first day of the experiment and at 4 weeks using a WHO Prove (Yamaura Seisakusho Co., Ltd.) and a 4-point investigation method. To study the effect of dental calculus on the progress of periodontal disease, scaling was performed only once, 3 weeks after the start of the experiment.

**Results**

Table 1 shows the PMA index, the occult blood reaction score, and the CPITN score on the first day of the experiment, and at 1, 2, and 4 weeks after the start of experiment.

The PMA index decreased significantly from 16.2 (the first time) to 12.9 (at 4 weeks) \( (P < 0.01) \), and the value at 4 weeks was significantly lower than that at 1 week (15.6) \( (P < 0.05) \). But, no significant difference was observed between values at 2 and 4 weeks.

Change in the occult blood reaction score was similar to the pattern of change of the PMA index. Namely, the value significantly decreased from 1.7 (the first time) to 1.2 (at 4 weeks) \( (P < 0.01) \), and the value at 4 weeks was also significantly lower than that at 1 week (1.7) \( (P < 0.01) \).

**Table 1** Change of periodontal status in students after toothbrushing education and practice

<table>
<thead>
<tr>
<th></th>
<th>0 week</th>
<th>1 week</th>
<th>2 weeks</th>
<th>4 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PMA Index</strong></td>
<td>16.18±5.38(55)</td>
<td>15.58±6.21(55)</td>
<td>14.02±6.78(55)</td>
<td>12.89±6.89(54)</td>
</tr>
<tr>
<td><strong>Bleeding</strong></td>
<td>4.22±3.22(55)</td>
<td></td>
<td></td>
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<tr>
<td><strong>Occult blood reaction</strong></td>
<td>1.69±0.92(55)</td>
<td>1.71±1.14(55)</td>
<td>1.51±1.14(55)</td>
<td>1.17±0.99(54)</td>
</tr>
<tr>
<td><strong>Pocket depth 4 mm or deeper</strong></td>
<td>0.33±1.11(55)</td>
<td></td>
<td></td>
<td>0.26±1.03(54)</td>
</tr>
<tr>
<td><strong>Calculus</strong></td>
<td>5.42±3.00(55)</td>
<td></td>
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</table>

*\( p < 0.01 \), **\( p < 0.05 \)

\( X \pm s.d. (N) \)

*Mean number of sites with bleeding, pocket depth 4mm or deeper, and supra- and/or subgingival calculus.*

![Relative values of inspection items](image-url)
but no significant difference was observed between values at 2 and 4 weeks.

In regard to CPITN, the value for dental calculus significantly decreased from 5.4 (the first time) to 1.9 (at 4 weeks) \(P<0.01\) but no significant differences were observed in the values for gingival bleeding and pathologic pockets. Fig. 1 shows the changes in periodontal condition, relative to initial values, over the course of the study.

**Discussion**

Toothbrushing, as a daily dental care behavior, has been suggested by many people as a method of preventing periodontal disease. However, toothbrushing is not always helpful for the prevention of periodontal disease because mastery of the best brushing methods is too difficult for most individuals. Even dental students are no exception. As previously reported, oral hygienic conditions in dental students are not always good.

In the present study, the students continued brushing for 4 weeks without any special brushing method instruction, and their gingival condition was inspected over time. All the indices of gingival inflammation decreased, suggesting improvement in gingival health condition (Table 1, Fig. 1).

Among these indices there were significant differences in PMA index and occult blood reaction score between the first test and that at 4 weeks. These significant decreases are supposed to be due to scaling performed at 3 weeks. However, there were no significant differences between 2 weeks and 4 weeks, therefore, the effect of scaling can not be determined specifically. Consequently, it should be concluded that our results support the view that toothbrushing improves gingival inflammation more than scaling, as reported by other researchers.

As described above, students appear to become aware of the importance of their duty as a dentist-to-be in the 5th-year and in the early stage of 6th-year. This suggests the importance of oral hygienic practical education in the prevention of periodontal disease.

**Summary**

In 5th-year students at Kyushu Dental College, the effects of assessment of periodontal disease and of practical education in toothbrushing methods, on oral hygienic conditions were examined. After the practical education their gingival inflammation was improved. The results suggest the importance of oral hygienic practical education for the prevention of periodontal disease.

**References**


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ブラッシング法習得実習と歯周組織の健康管理について

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九州歯科大学学部3年時に行われている、歯周組織の各種診査やブラッシング法習得実習が、学生の口腔衛生状態に与える影響について調べた。その結果、歯肉の炎症症状は、実習後次第に改善されていた。このことは、歯周組織に関連した口腔衛生実習の重要性を示唆している。