Original Article

EVALUATION OF THE EFFECT OF TRICLOSAN CONTAINING, CONVENTIONAL FLUORIDE AND TWO HERBAL TOOTH PASTES ON PLAQUE AND GINGIVAL STATUS OF SCHOOL GOING CHILDREN AGED 14-15 YEARS IN DAVANGERE CITY- A RANDOMIZED CONTROLLED TRIAL.

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Abstract

Aim: The aim of the present study was to compare the effect of Triclosan containing tooth paste, Conventional fluoride tooth paste and two herbal tooth pastes on plaque and gingival status in selected sample.

Material and Methods: Study was conducted among 160 school going children aged 14-15 years as measured by Turesky's modification of Quigley Hein index for plaque status and Loe and Silness index for gingival health at base line and at the end of 1st, 2nd, 3rd months. Results: At the end of third month the reduction in plaque scores between the individual groups was not statistically significant except between Triclosan containing dentifrice group and Neem containing dentifrice group with the p value of 0.00. At the end of third month there was no statistically significant difference between the individual groups in gingival scores. Conclusions: All dentifrices used in this study have shown significant effect on plaque and gingival status at the end of the study. Triclosan containing dentifrice has shown better in reduction of plaque scores when compared to the Neem containing dentifrices.

Key words: Triclosan, Fluoride, Neem Multi herbal, plaque status, gingival health, dentifrice.

Introduction

The role of plaque accumulated at the gingival margin in the initiation and progression of gingivitis and periodontitis has been well documented. The prevention and control of dental caries and as well the periodontal disease is dependent on optimal plaque control. The mechanical removal of such deposits on a regular basis is one of the principal methods advocated by the researchers and clinicians. However, mechanical plaque removal is not always performed to an adequate standard as many surfaces on the teeth and gingiva are relatively inaccessible for mechanical cleansing and added to this fact, it also depends on the manual dexterity of the performer. In order to increase the antiplaque action during tooth brushing, it has been suggested that chemical control be utilized.

Among all chemical agents, Triclosan and Fluoride have been incorporated in tooth pastes and mouth rinses since long time to prevent the plaque accumulation on the tooth surface. Comparative studies among these two have shown that the Triclosan containing tooth paste is more efficient in plaque control and improvement of gingival health than conventional fluoride tooth paste.

Interest in alternative tooth paste based on the plant extracts has increased recently. Among these, herbal products namely parodontox has received...
greater attention in foreign countries. Certain herbes like neem, meswak, babhul, manjistha, and vajjradanti are extensively used in the form of tooth pastes or as chewing sticks in India and perhaps in the Indian subcontinent including Arabian peninsula and parts of Africa. A few herbal dentifrices are very popular in India and used by a significant segment of population (Smyle, Vicco vajjradanti).

As studies related to these herbal dentifrices are lacking, research in this area to generate the necessary evidence is required. Thus, aims of this study were to evaluate the efficacy of Triclosan containing dentifrice (Colgate strong teeth), Conventional fluoride dentifrice (Colgate-Cibaca) Neem containing dentifrice (Smyle) and Multi herbal dentifrice (Vicco vajjradanti) on plaque and gingival status individually and to compare the effectiveness of these dentifrices on the plaque and gingival status by conducting a randomized controlled trial among school going children in Davangere city.

Materials and Methods

The present study is an experimental study, it was conducted to evaluate the effect of Triclosan containing tooth paste (Colgate strong teeth), conventional fluoride tooth paste (Colgatem - cibacca) and two herbal tooth pastes (Smyle – Neem containing paste and Vicco vajjrandati - Multi herbal paste) on plaque and gingival status of school going children aged 14-15 years in Davangere city as measured by Turesky’s modification of Quigley Hein index for plaque status and Loe and Silness index for gingival health at base line and at the end of 1st, 2nd, 3rd months.

Ethical clearance and permission to conduct the study were obtained with concerned departments. Among all the schools at Davagere city four schools were selected randomly, one from each zone (north, south, east, west). List of all the students of 14-15 year age group in each of the selected school was made from school records. Those children who met the exclusion criteria as set were deleted and from the group of remaining children, a total of 40 children were selected randomly by employing lottery method from each school. The sample size was determined after the pilot study was conducted. This resulted in a total sum of 160 children from four schools.

Exclusion criteria

- History of antibiotic or Chlorehexidine usage within 7 days prior to the start of the study.
- Mentally ill subjects.
- Students who didn’t have the habit of using toothbrush for their oral hygiene practices.
- Students who were wearing intra oral appliances or prosthesis.

A specially prepared and pretested closed ended questionnaire was used after the written informed consent was obtained from both selected subjects and their parents. The prepared 30g of placebo tooth paste was packed in the air tight container and distributed to all the study subjects. They were instructed not to use the regular tooth paste which they have been using and to use placebo tooth paste for a week to reduce the carry over effects.

The selected 4 schools were randomly allocated to one of the four dentifrice groups not the subjects were individually allocated by considering each school as a block. The technique of randomization employed in the study can be well designated as “Block randomization”. This method was employed in order to blind the subjects with respect to the different dentifrices used. Dentifrice groups were as follows:

- Group I - Neem and clove containing tooth paste (Smyle)
- Group II - Triclosan containing tooth paste (Colgate strong teeth)
- Group III – Fluoride containing tooth paste (Cibaca - Colgate)
- Group IV - Multiherbal tooth paste (Vicco)
After the children used placebo dentifrice for week, the baseline clinical examination was done. The examination was conducted in the classroom under natural light by applying gingival index first followed by plaque index. In order to record plaque score two tone disclosing agent was applied to all the surfaces of the teeth using cotton pellet and tweezers.

The children were instructed not to rinse their mouth till the examination got over. The clinical examination was similarly repeated at the end of 1st, 2nd and 3rd months. Statistical analysis was done with SPSS (version 11) USA. Statistical tests employed for the obtained data in this study were paired ‘t’ test to test the significance of difference between group means, one way ANOVA test to find out the statistical significance between and within groups, and Newman-Keul test for pair wise comparison between the groups after the application of one way ANOVA test.

Results

Table: 1 Pair wise comparison of mean dental plaque scores between four groups by Newman-Keuls test procedure

<table>
<thead>
<tr>
<th>Follow ups</th>
<th>Groups</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>Means</td>
<td>1.57</td>
<td>1.65</td>
<td>1.45</td>
<td>1.60</td>
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<tr>
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<td>I</td>
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<tr>
<td></td>
<td>II</td>
<td>0.83</td>
<td>-</td>
<td></td>
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<tr>
<td></td>
<td>III</td>
<td>0.31</td>
<td>0.39</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>0.86</td>
<td>0.68</td>
<td>0.47</td>
<td>-</td>
</tr>
<tr>
<td>2 months</td>
<td>Means</td>
<td>1.51</td>
<td>1.42</td>
<td>1.37</td>
<td>1.43</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>0.67</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>II</td>
<td>0.55</td>
<td>0.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>0.45</td>
<td>0.93</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>3 months</td>
<td>Means</td>
<td>1.51</td>
<td>1.20</td>
<td>1.31</td>
<td>1.37</td>
</tr>
<tr>
<td></td>
<td>I</td>
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<td>II</td>
<td>0.00*</td>
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<tr>
<td></td>
<td>III</td>
<td>0.11</td>
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<tr>
<td></td>
<td>IV</td>
<td>0.16</td>
<td>0.19</td>
<td>0.54</td>
<td>-</td>
</tr>
</tbody>
</table>

* Significant at 0.05% level of significance (p<0.05)
Table 2: Pair wise comparison of mean gingival scores between four groups by Newman-Keuls test procedure

<table>
<thead>
<tr>
<th>Follow ups</th>
<th>Groups</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>Means</td>
<td>0.28</td>
<td>0.44</td>
<td>0.38</td>
<td>0.52</td>
</tr>
<tr>
<td></td>
<td>I</td>
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<td>-</td>
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<tr>
<td></td>
<td>II</td>
<td>0.13</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>0.22</td>
<td>0.49</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>0.02*</td>
<td>0.33</td>
<td>0.22</td>
<td>-</td>
</tr>
<tr>
<td>2 months</td>
<td>Means</td>
<td>0.20</td>
<td>0.35</td>
<td>0.28</td>
<td>0.31</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>0.09</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>0.19</td>
<td>0.56</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>0.21</td>
<td>0.52</td>
<td>0.70</td>
<td>-</td>
</tr>
<tr>
<td>3 months</td>
<td>Means</td>
<td>0.20</td>
<td>0.19</td>
<td>0.26</td>
<td>0.29</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>0.86</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>0.31</td>
<td>0.46</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>0.28</td>
<td>0.33</td>
<td>0.61</td>
<td>-</td>
</tr>
</tbody>
</table>

* Significant at 0.05% level of significance (p<0.05)

The present study showed that there was a significant difference in plaque and gingival scores from baseline to third month in all the four dentifrices groups.

In pair wise comparison there was statistically significant difference in mean plaque scores only between group I and group II (p=0.00), at the end of 3rd month but between group II and group III, group III and group IV, and group I and group IV, there were no statistically significant differences in mean plaque scores.

Pair wise comparison for mean gingival scores showed that at the end of 1st month, there was statistically significant difference in mean gingival scores between group I and group IV (p=0.02). There were no significant statistical differences in the mean gingival scores between the four groups at the end of 2nd month and at the end of 3rd month.

DISCUSSION

A thorough exploration of available literature revealed a very few studies in which different herbal dentifrices were compared with fluoride containing dentifrice and Triclosan dentifrice. The sample size, the design, the study period, the indices and the techniques used in those studies highly varied from one study to another study. The present study is not an exact duplication of any of those studies. Although an accurate comparison of the present
study with other studies may not be possible, an attempt is made to compare selected results wherever possible maintaining the validity of comparisons to the possible extent.

Statistical analysis showed that there was significant reduction of mean plaque and gingival score from baseline to third month in all the four groups. Similar findings were observed by Subraya Bhat et al (comparison between Neem containing toothpaste and conventional fluoride tooth paste), Ozaki et al, Mullaly et al, J.Moran et al (comparison between parodontax toothpaste and conventional fluoride tooth paste.) Lindhe et al, Muller et al, Schacken et al, Ellwood et al, Rosling et al and Cullinan et al. This shows that all the toothpastes have property of reducing plaque and gingival inflammation.

The reduction in the plaque should naturally reduce gingivitis. The positive correlation between dental plaque and gingivitis is well established finding of many other studies the current study adds to this evidence base and further strengthens it.

The results are presented in table no 1 which indicates a statistically significant difference of plaque scores between first group (Neem group) and second group (Triclosan group). It exemplifies that the Triclosan dentifrice was exceedingly better when compared to the neem dentifrice in reducing dental plaque. The other two dentifrices namely Vicco vajjradanti and Colgate – Cibaca, although reduced dental plaque they were moderately effective and their efficacy lies in between triclosan containing dentifrice (Colgate strong teeth) which was highly effective and Neem containing dentifrice (Smyle) which was least effective. These results are not in conformity with other study which has shown that there is no comparable plaque inhibiting effect of Triclosan containing dentifrice against fluoride and herbal containing dentifrice. This contradiction may be attributed to short duration of the study by Ozakie et al.

Gingival scores (table 2) revealed that statistically significant difference between group I and group IV. Neem was found to be superior when compared to Vicco vajjradanti dentifrice. Although numerically lowest mean gingival scores were observed for group II at the end of three months, in the pair wise comparison with gingival scores of other groups it was not statistically significant. The results of current study are in contrary to some study results. Among these, most of the studies were conducted for six month period. In the present study three months period may not be sufficient to produce the significant difference on gingival health.

There are few studies reported in the literature which do support the findings of our study which reveal statistically not a significant difference in gingival scores between different dentifrice groups at the end of the study.

These contradictions may be possibly due to differences in the research design, dentifrice used, difference in the concentration of active ingredients, the different indices being used for gingival assessment and variations in the individual population being studied.

Further exploration is required in order to clarify certain issues which arise out of these contradictions. A systematic review with meta-analysis if conducted may provide solutions for many questions. As there are very few studies of similar kind with similar objectives as that of current study being reported on literature a meta-analysis at this stage may not be fruitful. More studies are required to contribute to the evidence base for a meta-analysis to be done.

CONCLUSIONS

- Triclosan containing dentifrice was found to be better antiplaque agent on comparison with Neem containing dentifrice.
- At the end of one month there was significant reduction of gingival scores in subjects belonging to Neem containing dentifrice group (Smyle) when compared to multi herbal dentifrice group (Vicco vajjradanti).
- At the end of three months all the dentifrices have found to exhibit significant reduction in gingival
scores when compared to baseline. None of the
dentifrices were found to be superior to others in
their anti gingival effect.

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