CHANGES IN INFLAMMATION IN PERSONS PRACTICING THE TRANSCENDENTAL MEDITATION TECHNIQUE

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A decrease in periodontal inflammation was found among people attending a four-week residence course, an optional part of the Transcendental Meditation program. — EDITORS

Inflammation of the gingiva (margins of the gums) is altered by local and systemic stress factors. It precedes resorption of underlying bone (periodontal disease), which occurs in a vast majority of the population, ultimately resulting in loss of teeth and nutritional imbalance. Forty-six people practicing the Transcendental Meditation technique and 26 controls were examined clinically and repeatedly for degree of gingival inflammation. Improvement was seen in 74 percent of the meditators versus 15 percent of a control group. Since improvement in this study was apparently brought about by a systemic rather than a local procedure, it would seem likely that the Transcendental Meditation program increases resistance to disease through a general strengthening process. Further study of the effects of Transcendental Meditation on this and other inflammatory diseases would seem highly desirable.

INTRODUCTION

The mouth has often been referred to as a “mirror of the body.” Symptoms of hundreds of systemic and local diseases may be observed by oral examination. Oral symptoms of vitamin C deficiency have been reported (3, 10, 26). Similarly, oral symptoms of hypervitaminosis A (23, 28), calcium deficiency (14, 18), nicotinic acid deficiency (9), ulcerative colitis (24), intestinal polyps (12), leukemia and lymphocytic diseases (13), Letterer-Siwe disease (1, 22), diabetes (6), pregnancy (15, 16), and thyroid dysfunction (13) have been reported, to name just a few.

Periodontitis is an inflammatory disease of the tooth-supporting structures, including gingiva, alveolar bone, and ligamentous attachments. In its early stages, it is characterized by gingivitis. Diagnostic signs and symptoms include changes in gingival color, form, position, and surface appearance. Enlargement, recession, loss of stippling, glossy appearance, clefts, and heavy festooning may be seen. In addition, the following may be noted: retraction of gingival tissues; pocket formation; sulcular bleeding, presence of exudate; remodeling of the alveolar process; and mobility, migration, and alterations in occlusion (8, pp. 75–109). Histologically, gingivitis in its earliest stage is characterized by tissue infiltration by polymorphonuclear leukocytes. This early form is later altered to a chronic form characterized by plasma cell and small lymphocyte infiltration and “progressive destruction of the connective tissue and bony structures supporting teeth. Ultimately this process progresses to atrophy of the soft tissues and alveolar bone and results in loss of teeth” (21).

Periodontitis is well known to be the most common cause of tooth loss. Massler (19), Nizel (5, pp. 223–232), and others have pointed out that loss of teeth often results in the patient’s changing to a more limited diet, typically high in carbohydrates and low in protein. Thus, nutritional imbalance with all of its consequences may result. The deepened facial folds and protruding chin typical of the appearance of the aged result from loss of teeth (19). In addition, resorption of alveolar bone and subsequent positioning of the mental foramen on the superior aspect of the mandibular alveolar ridge often preclude the possibility of construction of a stable, comfortable prosthesis. Alveolar resorption may also result in thinning of the maxillary bone until the maxillary sinuses are separated from the oral mucosa by only a thin shell of bone (4, pp. 49–64).

Thus, gingivitis may be said to be preliminary to and reflective of a great deal of local and systemic pathosis. Perhaps most interesting of all is the contention of Mergenhagen and Snyderman (21) that periodontal disease is remarkably similar to many other inflammatory diseases including "rheumatoid arthritis, acute and
chronic glomerulonephritis, lupus erythematosus, periarteritis nodosa, and sarcoidosis." They suggest further that knowledge gained about periodontal disease can enlarge our understanding of other systemic inflammatory conditions such as those mentioned previously. They conclude, "The fact that periodontal tissues are far more accessible for study than joints, kidneys, or the heart should lead more investigators to study the pathogenesis of periodontal disease as a model of infectious and inflammatory disease" (21, pp. 676–677).

The causes of periodontal disease are not fully understood. However, many hypotheses have been suggested. Löe and his co-workers (17) found that the accumulation of bacterial plaque adjacent to the marginal gingiva correlates with development of gingivitis in human subjects. However, direct bacterial invasion of nontraumatized gingival tissue does not occur (2, 7, 32). Instead, the vascular permeability and dilatation, as well as the collection of polymorphonuclear leukocytes, which are later replaced by small lymphocytes and mononuclear leukocytes characteristic of inflammatory gingivitis, appear to be a reaction by the host to endotoxin (20).

It is probably the host’s individual condition, however, that determines the extent of the inflammatory response. This may be illustrated, for example, in guinea pigs injected with tuberculoprotein. If the animal has not previously come in contact with this antigen, no pathosis is noted following injection. If the animal has been previously sensitized, however, erythema and induration are seen clinically, while lymphocytes and mononuclear leukocytes may be noted histologically. The resulting "tissue damage is secondary to the inflammation and is mediated by the host’s response" (21). In humans, many systemic conditions are known to alter the individual’s immune response. Many of the disorders mentioned at the beginning of this article are known to have this effect. Pregnancy, for example, has been shown by Löe and Silness (16) to significantly alter the body’s immune response. Using Russell’s Periodontal Index (PI) and their own Gingival Index (GI), they found that 100 percent of the women in their study exhibited an increase in gingivitis, which reached a maximum during the eighth month of pregnancy. It was their conclusion (15) that pregnancy acts as a modifying influence on the gingival response to local irritants, since the quantity and character of plaque (local factors) do not appear to differ in pregnant and postpartum women.

It might well be possible, therefore, to alter the host’s immunological system and thus alter the system’s reaction to endotoxin or, perhaps, any other stressor. Selye (27) has noted that frequently the "Local Adaptation Syndrome" is characterized by an inflammatory response to stimuli of many types. The extent of the destruction may be altered, however, by many factors, including rest.

The Transcendental Meditation (TM) technique is purported to give the body "deep rest." As a tool for scientific investigation it appears to have a number of advantages. It is easy to learn and practice, requires no philosophic or religious belief, and does not necessitate changes in diet or lifestyle. Of particular significance is the fact that all teachers are personally trained by Maharishi Mahesh Yogi and are therefore expected to be essentially uniform in their teaching procedure. Previous studies have shown significant physiological changes during TM with respect to reduced oxygen consumption (30), reduced cardiac output (29), reduced blood lactate (30, 31), and increased skin resistance (31), among others.

At the commencement of this study, the effect of TM on inflammation had not previously been investigated. It seemed likely, however, that the body’s physiologic response to stressful stimuli might be altered by the practice of TM, and that this change might, in turn, be reflected in the mouth. The easy accessibility of the mouth and its demonstrated relationship to the condition of other parts of the body make it an ideal subject for a pilot study of the immune system. Thus, the effect of the practice of TM on gingivitis was examined on the assumption that such a pilot study would demonstrate whether or not TM had a positive effect on the gingiva and possibly the immune system.

METHOD OF STUDY

Two groups were chosen for this study. Members of the control group, 26 undergraduate students at The Pennsylvania State University, were given two examinations of the gingiva 25 days apart. No advice on flossing, tooth brushing, or other measures of plaque control were given. All oral examinations were performed by the author early in the school day, using fluorescent lighting in a university classroom. The subjects were not told the purpose of the study or specifically which structures were being examined. The gingival condition of these subjects was observed, employing a method described below, in the middle of an academic quarter in order to minimize anxiety due to academic examinations.

The experimental group was composed of people practicing the Transcendental Meditation (TM) technique who were attending a four-week course in residence on the Science of Creative Intelligence at Queen’s University in Kingston, Ontario. This group was studied at a similar time of day, in a similar classroom setting, and with a plan of evaluation of the gingiva comparable to that used with the control group. Again, no advice on bacterial plaque removal was given. The experimental group was originally composed of 50 subjects, of whom 46 were available for re-examination at the end of the experimental
period. The data are for these 46 individuals. The experimental subjects, who were mostly college students in the age range 17 to 25, had been practicing Transcendental Meditation twice daily for one to 24 months prior to the study and were meditating four to six times daily (20 minutes each meditation) during the experimental period. Throughout the study they were also performing asanas, a set of moderate physical exercises in the Yoga tradition, for approximately five minutes prior to each meditation. They were also attending lectures for approximately four hours and discussion groups for two hours each day six days a week. A final examination was given at the end of the course.

The gingival condition of each subject was scored according to the Gingival Index (GI) of Löe and Silness (16); however, fewer gingival areas were examined. This index was chosen because it is "based on the clinical characteristics of the different grades of gingival inflammation" (16, p. 536). The criteria for the Gingival Index System are reproduced below (16, p. 536):

0 = Absence of inflammation.
1 = Mild inflammation—slight change in color and little change in texture.
2 = Moderate inflammation—moderate glazing, redness, edema, and hypertrophy. Bleeding on pressure.
3 = Severe inflammation—marked redness and hypertrophy. Tendency to spontaneous bleeding. Ulceration.

Examinations were made of the buccal and lingual gingivae of the maxillary right central incisor and mandibular left canine (Löe and Silness used six teeth). Each gingival area (buccal and lingual of #8 and buccal and lingual of #22) was given a score of from 0 to 3, and the scores from the four areas were then added to obtain a Gingival Index. Comparisons were made between the Gingival Index of each subject at the time of the first examination and the second evaluation 25 days later.

In this pilot study it has been assumed that the gingival areas evaluated are representative of the rest of the gingivae. A comprehensive study should be made in the future, however, correlating larger numbers of areas or determining the coefficient of correlation of these areas to the rest of the mouth.

RESULTS

Of the 26 controls, improvement in gingival inflammation was noted in four subjects (15.4%), worsening was noted in 12 (46.1%), and no change was seen in ten (38.5%). Of the 46 experimental subjects, 34 (73.9%) showed improvement, three (6.5%) showed worsening, and nine (19.6%) remained unchanged during the 25-day period. The chi-square test revealed that improvement was seen in a significantly greater number of meditating subjects than control subjects ($p < 0.001$). These findings are shown in table 1 and illustrated in fig. 1.

<table>
<thead>
<tr>
<th>GINGIVAL CONDITION*</th>
<th>Worse</th>
<th>No Change</th>
<th>Better</th>
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<tbody>
<tr>
<td>Controls</td>
<td>N</td>
<td>%</td>
<td>N</td>
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<tr>
<td>12</td>
<td>46.1</td>
<td>10</td>
<td>38.5</td>
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<tr>
<td>Meditators</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>3</td>
<td>6.5</td>
<td>9</td>
<td>19.6</td>
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*$Chi-square test ($\chi^2 = 25.5$): meditators showing significant improvement ($p < 0.001$).

DISCUSSION

The data shown in table 1 indicate that gingival inflammation improved in a majority of the meditators examined and that the control subjects showed virtually no improvement in gingival condition over a comparable period of time. This result demonstrates that the four-week program in which the meditators were enrolled, a major feature of which was frequent periods of meditation (four to six periods daily), was effective in reducing gingival inflammation. A second experiment should examine changes in gingival condition in subjects practicing meditation twice daily, the usual schedule, to determine the range of application of this finding.

The exercises that many of the subjects were performing at the course might have had an effect on gingival condition as well; however, since many subjects had also been using these exercises prior to the time of this study (but less frequently), the exercises probably do not account for the results. Nutritional quality and regularity of eating may also have been influential, since meals were provided by the university during the course. However, many of the control subjects also lived in dormitories where meals were provided; so a change in diet for the meditators probably does not account for the results either.

Changes in the grade of inflammation can be brought about by many factors. Within the mouth, for example, relevant events might include an increase in production of saliva, an increase in its immunoglobulin content, a reduction in the rate of plaque formation in the gingival sulcus, or a lower rate of proliferation of the oral flora. Beyond the oral cavity itself, the meditators may have been experiencing relatively low levels of stress and anxi-
The gingival condition of 46 people practicing Transcendental Meditation was determined before and after a four-week course in residence and compared to the gingival condition of 26 control subjects examined twice 25 days apart. Double-blind studies of the many variables involved are clearly indicated.

Since the performance of this study, increased resistance to stress (25) and improvement in bronchial asthma (11) have been noted in people who practice the Transcendental Meditation technique. These and many other studies correlate well with the findings here and combine to suggest that the practice of TM is accompanied by a range of improvements in health.

SUMMARY

The mouth has been shown to reflect many pathological conditions of the body. Gingivitis, for example, is a precursor to alveolar bone resorption, tooth loss, nutritional imbalance, and many of the characteristics of aging. Gingivitis may have many features similar to other inflammatory diseases such as rheumatoid arthritis and rheumatic heart disease, and thus a study examining the effects of Transcendental Meditation on gingivitis might be used as a convenient means of learning more about the effects of the Transcendental Meditation program on the immune system.

In a study using participants in a residence course on the Science of Creative Intelligence and Transcendental Meditation, improvements in gingival health occurred in a significant proportion of the subjects. No such improvements were seen in a parallel examination of college students. Further clinical studies concerning the inflammatory response in people who practice the Transcendental Meditation technique would appear to be highly desirable.

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REFERENCES


