Clinical Periodontal Status of Regularly Attending Patients in General Dental Practices

Walter T. McFall, Jr.,* James D. Bader,* R. Gary Rozier,† Dianne Ramsey,* Richard Graves,* Darlene Sams,* and Beryl Sloame*

PERIODONTAL STATUS OF REGULAR PATIENTS of general practitioners in the United States is unknown. A project assessing the effectiveness of continuing professional education in altering provider behavior and patient periodontal health provided the opportunity to clinically examine 1092 patients in the offices of 36 general practitioners. These regularly attending patients were selected by a random start systematic sample of patient records. The examination included recording missing teeth and assessing plaque, gingivitis, calculus, probing depth, and attachment loss on the facial and facial-mesial surfaces of the Ramfjord teeth (PDI). The mean patient age was 48 years, and 63% were female. The mean number of missing teeth, not including third molars, was 3.9. Almost 78% of the patients had no sites with a PII score greater than 1, but 52% of the patients had at least one site with bleeding. Calculus was present in 62% of the patients. Deepest pocket depth was 4 mm or greater in 9% of patients and 3.8% had sites with 4 mm or greater attachment loss. Mean attachment loss was 1.6 mm across all sites. Although the majority of these regular patients had plaque, calculus, and gingivitis, only a minority exhibited periodontitis at the index sites.

Although epidemiological studies1–3 have provided data on the periodontal status of population samples in the United States, the periodontal status of regularly attending patients in general dental practices in this nation is unknown. Some information concerning periodontal status of U.S. patients with dental insurance coverage showed that even frequent utilizers displayed evidence of gingivitis and periodontal pockets.4 In another study almost half of persons reporting a dental visit within 6 months had calculus deposits and gingival bleeding, and one fourth of them had pockets in the 4 to 5 mm range.5 Somewhat higher percentages of moderate pocket depths have been reported in a study of insured regular utilizers in the Netherlands.6 A report from Australia of patients reporting regular professional visits indicated that the majority had pockets of moderate depth.7 Because these reports used different methods in defining and measuring periodontal conditions and utilization status, direct comparisons are difficult.

A project assessing the effectiveness of a county based continuing education program in changing provider behavior and patient periodontal health was initiated in North Carolina in 1986. Data obtained from record audits of patients in general practices in this project indicated that the majority of records lacked sufficient diagnostic information to describe the patient’s periodontal status or permit the practitioner to evaluate change in periodontal status over time.8 The present report represents another facet of that project, the baseline clinical findings from examinations of a sample of regularly attending patients in general practices.

METHOD

Two North Carolina counties, each with a population of approximately 100,000, were chosen for the study. These counties presented similar sociodemographic features characteristic of mean values for the state. General dentists in the two counties were invited to participate in the project and a total of 36 practitioners (62%) volunteered. State licensure data from 1985 indicated that practice characteristics of dentist’s age, hours worked, and number of employees were similar in the two counties and to dentists in the state. Participating dentists were slightly younger (42.3 years) than nonparticipating dentists (48.9 years), but hours worked per week (36.6 vs. 36.3 hours) were similar.

Patient Sample

Patient records of healthy, dentate adults with a history of regular visits were selected for audit using a random start, systematic sampling procedure previ-
ously described. This resulted in an 80-record sample per practice or 2880 total records.

Patients with records in this initial sample were invited to participate in clinical examinations performed in their dentist's office. The patient sample for each office was divided on the basis of utilization with more frequent utilizers being patients on 6 month recall and less frequent utilizers those that met the criterion of a visit in 4 of the past 5 years. Practices were instructed to invite patients from the more frequent utilizer list before contacting those who were less frequent utilizers. Practitioners were also provided the opportunity to delete patients based on knowledge of patient's history of compliance with appointments or availability.

A target of 32 subjects per practice was established with a minimum of 28 per practice. To meet these single-day examination goals, practices were allowed to substitute patients who met the established criteria but were not in the record audit sample. Prospective subjects were informed both verbally and in writing that they would complete a brief health questionnaire and a survey of their knowledge concerning periodontal disease prior to a brief, painless clinical examination by a project investigator. Patients participated voluntarily and no compensation was offered.

Clinical Indices

The facial and mesial aspects of the Ramfjord teeth (#s 3, 9, 12, 19, 25, 28) were selected for clinical examination. The following indices were used on these teeth: the Plaque Index (PII), the Gingival Index (GI), a calculus index, probing depths and attachment loss. The PII was scored with the aid of a #17 explorer. A UNC #15 probe* was used in scoring the GI, the calculus index, and probing depths and attachment loss. This rounded probe is marked in 1 mm increments and the tip is .5 mm in diameter.

The calculus index used in this study is scored as 0 = absence of calculus, 1 = supragingival calculus, 2 = supragingival and subgingival calculus, or sup gingival calculus only.

All missing teeth were noted. In all indices in which a tooth was missing or could not be assessed a “Y” score was assigned. When an index tooth was missing the acceptable substitute defined in the PDI was used.

An assessment for periodontal destruction was made for each of the six index teeth on the facial and facial-mesial surface. Facial measurements were made at the middle of facial surfaces. For upper and lower molars the facial assessments were made at the midpoint of the mesial root. Mesial measurements were made at the buccal aspect of the interproximal contact area with the probe pointing in the long axis of the tooth. Measurements with the probe were made from the cemen-
the date of the record audit more recently than those not examined, 5.8 (6.9) versus 9.8 (11.1) months.

The group of substitute patients for clinical exams, who had not been included in the record audit, totaled 180 or 16% of the total patients examined. At least one substitute patient was seen in 33 of the practices. The substitute patients were younger, 45.2 years (15.3) versus 48.1 years (15.1) for audited patients, and they were more likely to be female (68% versus 60%). Substitutes were also slightly more recent utilizers, 5.5 (5.5) versus 5.9 (7.1) months. In approximately one-half of all practices, two visits were needed to reach the minimum number of patients.

The mean number of missing teeth per patient, excluding third molars, was 3.9. Percent distribution of missing teeth, by tooth space, is presented in Table 1. The proportion of patients with no index tooth or acceptable substitute ranged from 2.3% for #25 to 18.5% for #19.

Table 2 presents the distributions of worst plaque scores and mean plaque score for patients overall, and grouped by sex, age range, and race. Nearly 80% of patients have no scores greater than 1. Males and non-white (predominately black) patients more frequently had worst scores of 2 or 3.

Worst score distributions for calculus are shown in Table 3. Almost two-thirds of all patients had calculus, with female, younger, and white patients more likely to be calculus-free. Similarly, about one-half of all patients had at least one bleeding site, with bleeding exhibited more frequently in male, older, and non-white patients (Table 4).

Pocket depths of 4 mm or more were present in 9% of all patients (Table 5). Mean pocket depth was significantly greater for males and non-whites, but did not vary significantly by age group. Attachment loss of more than 2 mm occurred in about three-fifths of all subjects. Mean attachment loss was significantly greater for male, and non-white patients and was also significantly different among age groups (Table 6).

**DISCUSSION**

The principal threat to external validity in this study would appear to be in the direction of underestimating the prevalence of periodontal disease in North Carolina practices. Patients in this study participated voluntarily, and the majority were frequent utilizers, being seen at least annually. These patients may be unusually cooperative, with good health care attitudes and high ap-
Table 4
Patients' Gingival Scores by Sex, Age Group, and Race; Percentage Distributions of Worst Gingival Index Scores

<table>
<thead>
<tr>
<th>Subject’s worst score</th>
<th>Overall distribution (1092)</th>
<th>Distribution by sex</th>
<th>Distribution by age group</th>
<th>Distribution by race</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>male (405)</td>
<td>female (676)</td>
<td>21-34</td>
</tr>
<tr>
<td>0</td>
<td>12.8</td>
<td>9.6</td>
<td>14.6</td>
<td>13.8</td>
</tr>
<tr>
<td>1</td>
<td>35.7</td>
<td>33.1</td>
<td>37.3</td>
<td>34.4</td>
</tr>
<tr>
<td>2</td>
<td>50.8</td>
<td>56.3</td>
<td>47.6</td>
<td>51.8</td>
</tr>
<tr>
<td>3</td>
<td>0.6</td>
<td>1.0</td>
<td>0.4</td>
<td>0.0</td>
</tr>
</tbody>
</table>

100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

Table 5
Patients' Worst Probing Depth by Sex, Age Group, and Race; Percentage Distributions of Worst Probing Depth

<table>
<thead>
<tr>
<th>Subject’s worst pocket</th>
<th>Overall distribution (1092)</th>
<th>Distribution by sex</th>
<th>Distribution by age group</th>
<th>Distribution by race</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>male (405)</td>
<td>female (676)</td>
<td>21-34</td>
</tr>
<tr>
<td>1 mm</td>
<td>2.0</td>
<td>1.2</td>
<td>2.5</td>
<td>0.4</td>
</tr>
<tr>
<td>2 mm</td>
<td>40.8</td>
<td>42.0</td>
<td>39.9</td>
<td>45.1</td>
</tr>
<tr>
<td>3 mm</td>
<td>48.3</td>
<td>46.4</td>
<td>49.8</td>
<td>48.6</td>
</tr>
<tr>
<td>4 mm</td>
<td>5.1</td>
<td>7.2</td>
<td>3.9</td>
<td>2.8</td>
</tr>
<tr>
<td>5 mm</td>
<td>2.6</td>
<td>2.2</td>
<td>2.7</td>
<td>3.2</td>
</tr>
<tr>
<td>6+ mm</td>
<td>1.2</td>
<td>1.0</td>
<td>0.9</td>
<td>0.0</td>
</tr>
</tbody>
</table>

100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

Mean Probing Depths

<table>
<thead>
<tr>
<th>Overall</th>
<th>Male (405)</th>
<th>Female (676)</th>
<th>21-34</th>
<th>35-54</th>
<th>55+</th>
<th>White (965)</th>
<th>Non-white (110)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean depth (s.d.)</td>
<td>1.63</td>
<td>1.67</td>
<td>1.60*</td>
<td>1.61</td>
<td>1.64</td>
<td>1.62</td>
<td>1.60</td>
</tr>
</tbody>
</table>

* Means significantly different, P < 0.01.

Appointment compliance. Compared to the random sample of patient records, the subjects who appeared for examination were older, more likely to be female, and visited the dentist more frequently. Also, substitute patients might have represented a possible source of bias since practice staff might have known them to be in good periodontal health. The voluntary participation of the dentists in this project might also introduce bias. The dentists choosing to participate were slightly younger than nonparticipating dentists in the two counties. On the basis of licensure data, the population of dentists in these two counties are representative of those in the state as a whole.

Findings presented here, if they can be generalized, may then provide new information concerning the periodontal status of patients in general dental practices. The findings indicate that patients who regularly attend the practices of general dentists do demonstrate risk factors associated with periodontal disease. Over 80% of these patients had plaque present on the index teeth. Although the majority of these scores were in the lower plaque range, the distribution of plaque in various areas of the mouth suggests a lack of conscientious patient plaque control. It was anticipated that these patients, knowing in advance of the clinical examination, would have made an effort to improve oral hygiene prior to the exam.

Calculation, another risk factor, was prevalent in these patients with 62% exhibiting the presence of supragingival or subgingival calculus. No analysis has been made to determine the interval between the clinical examination and last oral prophylaxis, but most of these patients had annual dental visits. Subgingival calculus was more prevalent in non-white patients. This finding may indicate poorer oral hygiene, faster calculus accumulations, or less frequent or effective scaling.

Presence of the risk factors tends to be reflected in the gingival status of these patients. Alteration from
normality by changes in gingival color, texture, form, and gingival bleeding occurred in 86% of the patients on the index teeth. Gingival bleeding occurred in 50% of all patients and in 74% of non-white patients. Ginglyval bleeding has been reported as the earliest clinical sign of gingival inflammation preceding changes in color and form.\textsuperscript{12} Data from the employed adult survey, based on 28 facial and mesial sites in two random quadrants, indicated that 44% of working adults demonstrated gingival bleeding.\textsuperscript{3}

Probing depths on the index teeth did not exceed 4 mm in 91% of the patients in this study. Although a tendency toward increased pocket depth with aging is evident in most in epidemiological studies,\textsuperscript{3} no such association was noted among these patients. Regular attendance for professional care may be a factor in reducing prevalence of deeper pockets in older age groups. Attachment loss of 2 mm or greater at one or more sites occurred in 95% of all patients. The proportion of relatively greater attachment loss as compared with pocket depths suggests that much of the attachment loss is due to gingival recession.

These data suggest that the vast majority of patients examined in this study did not exhibit a high or even moderate level of destructive periodontal disease on the index teeth. Of course, the use of six index teeth in this study may lead to an underestimation of periodontitis.\textsuperscript{13} These findings have implications with regard to periodontal health, tooth loss, and periodontal referral. Most of these patients did present with risk factors contributory to periodontal disease, and indeed there was clear evidence that the majority of these regular attenders exhibit clinical evidence of gingival disease that requires professional care.

Although gingivitis does not necessarily progress to periodontitis, it can and does precede periodontitis. There is no way to predict whether an individual possesses resistance factors that will preclude this advancement. It is wise, therefore, to treat all patients with inflammation of the gingiva in a manner that will prevent progression. Patients in this study, with regular professional care, did not have their gingival condition acceptably controlled.

ACKNOWLEDGMENT

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REFERENCES


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