The relative effects of therapy and periodontal disease on loss of probing attachment after root debridement


Abstract. This study investigated the immediate effects, and the effects during 12 months, of a single episode of root debridement in 1248 sites in 9 periodontitis patients. Single recordings for probing depths and probing attachment levels were made at baseline, and at 3, 6, 9 and 12 months. In addition, triplicate recordings of attachment levels were made for all sites by 3 independent examiners immediately prior to debridement, immediately post debridement, and at 3 and 12 months. It was found that a mean loss of probing attachment of 0.5 to 0.6 mm occurred as a result of instrumentation, irrespective of initial probing depth. Individual sites were identified as having lost probing attachment using a site-specific standard deviation for measurement variability and a ≥1.0 mm change. 5% of all sites lost probing attachment from pre-instrumentation to 12 months. Approximately half of these had probing attachment loss inflicted during instrumentation. 23 sites (2% of all sites) were identified as having lost probing attachment from the post-instrumentation time point to 12 months. The majority of these sites seemed to undergo this probing attachment loss as a result of a remodelling process during the healing phase. Over the observation period used in this study, the majority of the attachment loss identified seems to be either directly attributable to instrumentation or to a remodelling process as a result of the therapy rather than to progressive periodontitis.

Longitudinal monitoring of periodontal sites using probing attachment level measurements registered from a fixed reference point has been used in studies on the effects of periodontal therapy. These studies have reported mean improvements of probing attachment levels following various types of periodontal therapy, including a basic therapy of plaque control and root debridement. Individual sites, however, may demonstrate loss of probing attachment. Sites with shallow probing depth seem to be more susceptible to such attachment loss than deeper sites (Badersten et al. 1981, 1984a, 1984b, 1985a, Hill et al. 1981, Lindhe et al. 1982b, 1982c, Pihlstrom et al. 1983, Isidor et al. 1984, Lindhe & Nyman 1985, Westfelt et al. 1985, Loos et al. 1987, Nordland et al. 1987).

Probing attachment loss observed following therapy may be caused by a progressive periodontal disease process in spite of treatment. The loss may also be caused by the therapy itself. Animal experimentation has shown that during root planing, junctional epithelium and connective tissue fibers attached to the root may be inadvertently severed (Lindhe et al. 1982a).

The present study was designed to investigate to what extent loss of probing attachment may occur during a single episode of root debridement in adult periodontitis patients. Also, this study investigated to what extent attachment loss recorded after 12 months is associated with loss inflicted during initial instrumentation.

Material and Methods

Subjects

9 patients, ranging in age from 36 to 62 years and presenting with severe periodontitis, were selected for study. The patients showed generalized bleeding on probing, generalized subgingival calculus, and at least 10 sites with probing pocket depths ≥7.0 mm. They all had 14 or more teeth, at least 2 of which were molars. All patients were free of systemic disease, and had not received periodontal treatment for at least 5 years prior to the study.

Therapy

Oral hygiene instruction

Prior to debridement the patients were instructed in an intrasulcular brushing technique with a soft multitufted toothbrush. Interdental aids, consisting of dental floss and interdental brushes, were recommended according to individual needs.
Debridement
Crown and root debridement was performed under local anesthesia in 2 sessions within 1 week; 1 session for the maxillary and 1 for the mandibular teeth. The debridement was performed using an ultrasonic instrument at maximum power setting (Cavitron-Dentsply with TFI-10 tip, Cavitron Ultrasounds, Inc., Long Island City, NY, USA). The instrumentation was carried out until the operator (JE) felt confident that the root surfaces were adequately debrided. The average time for debridement per non-molar tooth was 3.8 min and 6.5 min per molar tooth.

Measurements
Scores of probing depths and probing attachment levels were obtained by the same examiner (NC) at baseline (1 week prior to debridement), and at 3, 6, 9, and 12 months (longitudinal measurements). In addition, 3 independent examiners (NC, BG, and MM) measured probing attachment levels immediately pre-debridement, immediately post-debridement, and at 3 and 12 months (triplicate probing attachment level measurements) (Table 1).

Recordings were obtained from 6 sites around the non-molar teeth: mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual, and distolingual. For maxillary molars 8 sites were measured: mesiobuccal, mid-aspect of mesiobuccal root, buccal furcation, mid-aspect of distobuccal root, distobuccal, mesiolingual furcation, mid-aspect of palatal root, and distolingual furcation. For mandibular molars 10 sites were recorded: mesiobuccal, midbuccal of mesial root, buccal furcation, midbuccal of distal root, distobuccal, mesiolingual, midlingual of mesial root, lingual furcation, midlingual of distal root, and distolingual.

Longitudinal measurements
Measurements of probing depth and probing attachment level were made using an electronic, pressure sensitive probe (Electronic Periodontal Probe, Model 200A, Vine Valley Research, Middlesex, NY, USA) with a probing force of 0.50 N. A probe tip having 1 mm increments and 0.4 mm diameter was used. Measurements were made to the nearest 0.5 mm. A vacuum adapted, 1.0 mm thick, soft acrylic onlay (Scheurl Dental, Iserlohn, West Germany) was used to provide reference points for the probing attachment measurements. For proximal surfaces, the placement of the probe was guided by the interdental indentations of the onlay, and the probe was directed apically in the projected direction of the root apex. Midbuccal and midlingual sites were measured by placing the probe at these locations and directing it longitudinally along the root surface. For furcation sites, the probe tip was guided by the furcal groove, and the measurement at the deepest point was recorded.

Triplicate probing attachment level measurements
The triplicate measurements were recorded by the 3 independent examiners in the same order at each of the 4 examination time points. The same teeth and surfaces were examined as for longitudinal measurements.

The measurements were entered directly into a personal computer using the PerioVoice (Ford/Medina Software, Redlands, CA, USA). A deviation of 1.5 mm or more from the preceding recording for the same site was made known to the examiner by an audible beep from the computer. The examiner, alerted to a possible error, then re-probed the site and the second reading was entered and used.

Analysis of data
Longitudinal measurements
Mean probing depths and changes in probing attachment levels were calculated for each patient and for all time points during the 12 months of study using subgroups of sites (initial probing depths of ≤3.5 mm, 4.0–6.5 mm, and ≥7.0 mm). Patient means were used to calculate overall means for these subgroups. Changes compared to baseline were evaluated using the Student paired t-test.

Triplicate probing attachment level measurements
Mean probing attachment levels were calculated from the triplicate measurements for subgroups of pooled sites from all patients to express changes between time points at which these recordings were made.

Identification of individual sites with probing attachment loss was made from the triplicate recordings as follows: a site specific standard deviation for measurement variability was calculated from the 4 available sets of triplicate recordings for each site using a 2-way analysis of variance model. Examiner and time point were the classification variables. It was assumed that no interaction existed between these variables. The significance of the change of the triplicate mean from one time point to another was considered in view of the site specific standard deviation. The following formula was used to calculate t values for these changes.

\[
t = \frac{\bar{x}_1 - \bar{x}_2}{S \sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}
\]

S is the standard deviation calculated by 2-way analysis of variance model. \(\bar{x}_1\) and \(\bar{x}_2\) are means of triplicate recordings from each of any 2 time points. \(N_1\) and \(N_2\) are number of observations for the same time points from which the means were calculated. This number was 3 for all time points.

If the t value corresponded to a probability less than 0.05, the site was taken as having undergone statistically significant change.

This method resulted in identification of sites showing a significant change from immediately pre-instrumentation measurement to immediately post-instrumentation measurement as shown in Table 2. Because of good probing reproducibility for many sites, this method identified sites that had undergone a limited magnitude of probing attachment loss. For example, the top row of data in the table demonstrates that a total of 149 sites (83+47+19) showed statistically significant probing attachment loss but with a magnitude of change of only 0.9 mm or less. It was therefore decided to add another requirement apart from the statistical
Table 2. Numbers of sites of different initial probing depths displaying statistically significant probing attachment loss immediately post-debridement compared to pre-debridement, grouped by magnitude of loss.

<table>
<thead>
<tr>
<th>Magnitude of probing Attachment Loss (mm)</th>
<th>Initial probing depth (mm)</th>
<th>( N )</th>
<th>( % )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \leq 0.9 )</td>
<td>( \leq 3.5 )</td>
<td>83</td>
<td>33</td>
</tr>
<tr>
<td>1.0-1.9</td>
<td>4.0-6.5</td>
<td>47</td>
<td>19</td>
</tr>
<tr>
<td>2.0-2.9</td>
<td>( \geq 7.0 )</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>( \geq 3.0 )</td>
<td>(N = 473)</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>total</td>
<td>(N = 567)</td>
<td>158 (33%)</td>
<td>64 (31%)</td>
</tr>
</tbody>
</table>

Pooled sites from all patients. \( N \) = number of available sites.

criterion, namely that sites should demonstrate a minimum magnitude of change to be considered to have lost probing attachment. 2 categories of sites were identified; those with a minimum change of 1.0 mm (group 1), and those with a change of 1.5 mm and greater (group 2).

Using the above procedure, sites were identified as having undergone probing attachment loss between the following time points:

**Pre- to post-instrumentation:** sites identified as having lost probing attachment due to instrumentation.

**Pre-instrumentation to 12 months:** sites with probing attachment loss from the pre-instrumentation recording to the 12-month time point.

**Pre- to post-instrumentation and pre-to 12 months:** sites having lost probing attachment due to instrumentation which did not rebound during the subsequent 12 months.

**Post-instrumentation to 12 months:** sites with probing attachment loss subsequent to instrumentation.

Results

Longitudinal measurements

Probing depths did not change during the 12-month observation interval for sites initially \( \leq 3.5 \) mm, whilst a mean decrease in probing depth of 1.3 mm was observed for sites initially 4.0-6.5 mm, and 2.2 mm for sites initially \( \geq 7.0 \) mm. Sites initially \( \leq 3.5 \) mm were found to have undergone a mean loss of 0.6 mm in probing attachment, whereas there was a 0.4 mm gain for sites 4.0-6.5 mm, and 0.8 mm gain for sites \( \geq 7.0 \) mm (Figs. 1, 2).

Tripletace probing attachment level recordings

The mean probing attachment levels for each of the 3 sequential examiners for the pre-instrumentation time point are presented separately in Table 3. A consistent 0.1 mm increase in mean measurements was observed from the first to the second, and from the second to the third examiner for all 3 subgroups of initial probing depths.

The changes in triplicate means from one time point to another are presented in Fig. 3. The change from pre- to post-instrumentation averaged 0.5-0.6 mm loss of probing attachment for the 3 subgroups of initial probing depths. At 3 months, rebound of probing attachment levels was observed for all 3 subgroups. This rebound was more apparent for deep sites than for shallow sites. At 12 months there was a mean loss of probing attachment of 0.2 mm for shallow sites, in contrast to a 0.8 mm mean gain for moderately deep sites, and 1.0 mm mean gain for deep sites.

Analysis with respect to tooth surface location revealed slightly more probing attachment loss during instrumentation and more rebound for proximal sites than for buccal and lingual surfaces (Fig. 4). Little difference was observed between sites of non-molar teeth, sites from flat molar surfaces, and molar furcation sites (Fig. 5).

The % of sites with probing attachment loss 1.0 mm or more (group 1) for each of the participating subjects is presented in Table 4. Although some variation can be observed among the subjects, all subjects demonstrated attachment loss between all of the time intervals studied.
Fig. 4. Means of changes in triplicate probing attachment levels for buccal, lingual, and proximal sites. Pre = immediately pre-instrumentation. Post = immediately post-instrumentation.

Fig. 5. Means of changes in triplicate probing attachment levels for non-molar, molar flat, and molar furca sites. Pre = immediately pre-instrumentation. Post = immediately post-instrumentation.

Table 4. Frequencies of sites (%) of all initial probing depths with a statistically significant probing attachment loss together with a minimum change of 1.0 mm (group 1) between various time intervals for each subject under study.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Pre-post instrumentation</th>
<th>Pre-12 months</th>
<th>Pre-post and pre-12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>32</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>29</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>22</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>19</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

Pre-post instrumentation = sites which lost attachment due to instrumentation; pre-12 months = sites with attachment loss from the pre-instrumentation recording to the 12-month time point; pre-post and pre-12 months = sites having lost attachment due to instrumentation which did not rebound during the subsequent 12 months.

The numbers of individual sites with probing attachment loss during various time intervals using minimum requirements of 1.0 mm (group 1) and 1.5 mm (group 2) are shown in Tables 5a, b (pooled sites from all subjects). In group 2, the numbers were reduced by approximately half as compared to group 1. However, the relative distribution of sites with loss during various time intervals was similar.

22% of all sites lost probing attachment ≥1.0 mm during instrumentation. A limited proportion of sites, (5%) showed probing attachment loss over the entire pre-instrumentation to 12-month time period. Half of these sites were also demonstrated as having undergone probing attachment loss due to instrumentation (Table 5a).

Few sites (2%) lost probing attachment ≥1.0 mm subsequent to instrumentation. These were primarily shallow sites located on buccal and lingual tooth surfaces (Table 6). Separate analyses demonstrated that only 2 of the available 23 sites displayed residual probing depths ≥7.0 mm and repeated bleeding upon probing during the 12 months of observation. Of the 15 buccal and lingual sites losing probing attachment subsequent to instrumentation, 7 had immediately neighboring sites which showed significant loss of probing attachment due to instrumentation, while 7 more were neighbors to sites displaying recession from baseline to 12 months, ranging from 2.0 mm to 4.0 mm.

**Table 5a.** Number of sites of different initial probing depths with a statistically significant probing attachment loss together with a minimum change of 1.0 mm (group 1) between various time intervals.

<table>
<thead>
<tr>
<th>Initial probing depth (mm)</th>
<th>Pre-post instrumentation (N=473)</th>
<th>Pre-12 months (N=567)</th>
<th>Pre-post and pre-12 months (N=208)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤3.5</td>
<td>75</td>
<td>47</td>
<td>19</td>
</tr>
<tr>
<td>4.0-6.5</td>
<td>149</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>≥7.0</td>
<td>45</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>all sites</td>
<td>269</td>
<td>68</td>
<td>34</td>
</tr>
</tbody>
</table>

Pre-post instrumentation = sites which lost attachment due to instrumentation; pre-12 months = sites with attachment loss from the pre-instrumentation recording to the 12-months time point; pre-post and pre-12 months = sites having lost attachment due to instrumentation which did not rebound during the subsequent 12 months. Calculations from pooled sites from all subjects.

**Table 5b.** Number of sites of different initial probing depths with statistically significant probing attachment loss together with a minimum change of 1.5 mm (group 2) between various time intervals.

<table>
<thead>
<tr>
<th>Initial probing depth (mm)</th>
<th>Pre-post instrumentation (N=1248)</th>
<th>Pre-12 months (N=208)</th>
<th>Pre-post and pre-12 months (N=208)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤3.5</td>
<td>31</td>
<td>19</td>
<td>6</td>
</tr>
<tr>
<td>4.0-6.5</td>
<td>67</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>≥7.0</td>
<td>26</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>all sites</td>
<td>124</td>
<td>29</td>
<td>12</td>
</tr>
</tbody>
</table>

Pre-post instrumentation = sites which lost attachment due to instrumentation; pre-12 months = sites with attachment loss from the pre-instrumentation recording to the 12-months time point; pre-post and pre-12 months = sites having lost attachment due to instrumentation which did not rebound during the subsequent 12 months. Calculations from pooled sites from all subjects.

**Table 6.** Distribution of 23 sites with statistically significant probing attachment loss ≥1.0 mm post-instrumentation to 12 months (sites having lost attachment subsequent to instrumentation) by initial probing depth and surface location.

<table>
<thead>
<tr>
<th>Initial probing depth (mm)</th>
<th>Surface location</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤3.5</td>
<td>buccal (N=473)</td>
</tr>
<tr>
<td></td>
<td>lingual (N=704)</td>
</tr>
<tr>
<td></td>
<td>proximal furcation (N=107)</td>
</tr>
<tr>
<td>3.5-4.0</td>
<td>13</td>
</tr>
<tr>
<td>4.0-6.5</td>
<td>2</td>
</tr>
<tr>
<td>≥7.0</td>
<td>0</td>
</tr>
</tbody>
</table>

Calculations from pooled sites from all subjects.

Discussion

This study was designed to investigate the effects of root debridement on probing attachment levels. The results demonstrated a mean loss of probing attachment amounting to about 0.5 mm which was inflicted during the therapeutic procedure. Identification of individual sites with attachment loss occurring during instrumentation resulted in an overall
incidence of loss of 22% when a minimum change of 1.0 mm was applied and 10% when a change of 1.5 mm or more was applied.

Periodontal probing is commonly used in the monitoring of periodontal patients. This method, when used to ascribe attachment level differences in individual sites, has limitations in both validity and reproducibility. In this study the reproducibility problem was mitigated by the use of triplicate measurements, and the establishment of a site specific variance factor using 4 sets of triplicate recordings for each site. This variance factor was used for the statistical identification of sites with probing attachment loss.

The validity problem in probing relates to the fact that the probe tip may not disclose the level of the connective tissue attachment, particularly in areas relatively free of inflammation (Armitage et al. 1977, Listgarten 1980, Magnusson & Listgarten 1980, Caton et al. 1981, Van der Velden 1982, Fowler et al. 1982). Thus, a loss of probing attachment may not necessarily reflect connective tissue loss and may instead be due to a lateral displacement of epithelium from the tooth allowing more apical positioning of the probe tip. A threshold of minimum change required for sites shown statistically to have lost probing attachment helps to overcome this problem. Minimum changes of 1.0 mm and 1.5 mm were chosen as threshold values in order to increase the likelihood of connective tissue loss being responsible for the probing attachment loss seen. The use of a safety threshold of 1.5 mm reduced the number of sites with attachment loss by about half as compared to 1.0 mm threshold. However, the use of the larger safety threshold did not produce any different trends than those observed with 1.0 mm threshold.

The use of triplicate sets of attachment level measurements could conceivably introduce an error due to tissue trauma from the repeated measurements. The observed gradual 0.1 mm mean deepening of probing attachment levels from the first, to the second, to the third of the 3 sequential examiners demonstrates that the prohings, in fact, do cause some trauma. However, the limited trauma caused by the repeated prohings compared to that of instrumentation did not seem to jeopardize the ability to detect instrumentation damage in this study.

Probing attachment loss due to instrumentation also occurred in shallow sites, in spite of the fact that the operator was careful not to needlessly instrument shallow sites. However, presumably not all shallow sites were free of subgingival deposits. Furthermore, shallow sites may have been damaged during instrumentation of deep sites immediately adjacent to the shallow sites. The root debridement in this study was carried out by 1 operator using ultrasonic instruments. The longitudinal changes of the probing depth and probing attachment level measurements compared well with other studies utilizing this same operator, either employing hand, sonic, or ultrasonic instruments (Badersten et al. 1981, 1984a, 1985b, Loos et al. 1987, Nordland et al. 1987).

Also, the changes corresponded to those observed following debridement by other clinicians (Hill et al. 1981, Lindhe et al. 1982b, 1982c, Pihlstrom et al. 1983, Badersten et al. 1981, 1984a, 1985c, Isidor et al. 1984, Lindhe & Nyman 1985, Westfelt et al. 1985, Nordland et al. 1987). A similar pattern of probing attachment loss may have occurred in all of the above studies during instrumentation. However, this loss may have been disguised by a rebound already established 3 months postoperatively. Further studies need to be carried out to investigate if immediate soft tissue damage varies following use of a different types of instruments for debridement, and to find out to what extent this damage could be reduced.

The nature of the rebound of probing attachment levels following instrumentation loss could be attributed to 3 phenomena: (1) readaptation of epithelium detached at instrumentation; (2) reattachment of severed connective tissue fibers; (3) a combination of these events. The possibility that some degree of irreversible connective tissue attachment loss accompanies the probing attachment loss following instrumentation cannot be discounted. Experimentation in monkeys has demonstrated an apical displacement of junctional epithelium following subgingival instrumentation (Lindhe et al. 1982a).

It was observed that 5% of all sites demonstrated probing attachment loss during the entire 12-month observation interval using a minimum threshold of change of ≥1.0 mm. This incidence is comparable with results of previous studies observing probing attachment loss following root debridement during 12–24 months of monitoring (Badersten et al. 1985a, Loos et al. 1987, Nordland et al. 1987). In the present study, it was noted, however, that 50% of these sites with probing attachment loss at 12 months compared to the pre-instrumentation time point had undergone attachment loss during instrumentation. In other words, half of the pool of sites with probing attachment loss over the entire 12-month time span consisted of sites that did not rebound following instrumentation damage. This needs to be kept in mind during interpretation of studies using incidence of probing attachment loss to evaluate the effect of periodontal therapy. It seems desirable for future studies to obtain a baseline of probing attachment levels immediately subsequent to the therapy in order to properly evaluate the long-term outcome of any mechanical treatment.

A small proportion of sites (2%) was found to have lost ≥1.0 mm of probing attachment from the post-instrumentation time point to 12 months. Although few sites (23) were available, these sites were individually analyzed in an attempt to reveal the cause of the post-instrumentation loss for these sites. Only 2 sites displayed probing depths and bleeding frequencies suggesting a progressive periodontal disease process as the cause of the probing attachment loss. 17 of the sites, 15 of which were located buccally or lingually, had adjacent sites which either underwent probing attachment loss during instrumentation or had undergone gingival recession of 2.0 mm or more. This seems to suggest that “healthy” buccal or lingual sites may lose some attachment due to a remodelling phenomenon instigated by significant changes in adjacent proximal sites. For the remaining 3 sites, the attachment loss did not seem to be explained using either of above hypotheses.

It appears from the results of this study that probing attachment loss following root debridement identified by pretreatment baseline recordings and during a subsequent 12-month period to a large extent is caused by the treatment itself, either by instrumentation damage or possibly by some type of remodelling. In previous studies, sites with probing attachment loss have been identified after 24 months and the relationships of longitudinal scores of plaque, bleeding, suppurative, and probing depth to attachment loss at these sites have been studied (Badersten et al. 1985b, 1987, ...
Vanooteghem et al. 1987). The findings have generally demonstrated limited re-
demonstrate probing attachment loss during short-
during the initial instrumentation. This finding confirms the re-
achieved with sondierte Initialtiefe, ein Höhen-
der Untersuchung 12 Monate danach, sondierbare At-
Gebisstellen identifiziert werden, bei denen sondierbares Attachmentniveau verloren ge-
verlust des sondierten Attachmentniveaus von 0.5 bis 0.6 mm als die Folge der instru-
des Remodellie-
stitution, Remodelling may more often be
be the cause of this loss than a periodontal
disease process. Therefore, probing at-
ach der instrumentellen Behandlung einstellte. Durch An-
 rung einer seitenspezifischen Standard-
die Effekte einer einzigen Wurzelsca-
allerdings anläßlich der Ausgangsun-
enregistrements uniques de la profondeur et

Zusammenfassung
Die relativen Folgen der Therapie und der Pa-
rodontalkrankheit bei dem Verlust des sondier-
ben Attachmentniveau, nach 12 Monaten un-
ach der instrumentellen Behandlung. Dureh An-

In conclusion, the results of this study suggest the following.
(1) A significant number of sites of all initial probing depths may undergo probing attachment loss during root de-

(2) The attachment levels for the ma-
ajority of these sites seem to rebound and the initial instrumentation damage may therefore be disguised at later obser-

(3) Of those relatively few sites that demonstrate probing attachment loss over an entire 12-month observation in-
tervals, 50% may have lost attachment during the initial instrumentation.

(4) For those few sites that demon-
strate probing attachment loss during 12 months subsequent to instrumen-
tation, remodelling may more often be
the cause of this loss than a periodontal disease process. Therefore, probing at-

In dieser Studie wurden die Sofort-Folgen und die Effekte einer einzigen Wurzelsca-

References
Les niveaux d’attache au sondage ont été effectués lors de l’examen initial et après 3, 6, 9 et 12 mois. De plus, des enregistrements triplés des niveaux d’attache ont été réalisés au niveau de tous les sites par trois examinateurs indépendants juste avant le lissage, juste après, et après 3 et 12 mois. Une perte moyenne de 0.5 à 0.6 mm d’attache résultait de l’usage des instruments, quelle que soit la profondeur initiale. La perte d’attache des sites individuels a été mesurée en utilisant une déviation standard spécifique du site pour la variation de mesure et un changement ≥ 1.0 mm. 5% de tous les sites ont perdu de l’attache entre la mesure précédant le lissage et douze mois après. Environ la moitié d’entre eux ont perdu de l’attache à cause des instruments. Vingt-trois sites (2% de tous les sites) avaient perdu de l’attache entre le traitement et douze mois après. La majorité de ces sites semblaient subir cette perte d’attache lors du processus de remodelage ayant cours durant la phase de guérison. Pendant la période étudiée, la majeure partie de la perte d’attache enregistrée semble être due soit directement à l’action des instruments soit au processus de remodelage résultant du traitement, plus qu’à la parodontite progressive elle-même.


Address:
Noel Ciaffey
Department of Periodontics
School of Dentistry
Loma Linda University
Loma Linda, CA 92350
USA
This document is a scanned copy of a printed document. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material.