

Effect of nonsurgical periodontal therapy

II. Severely advanced periodontitis

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Abstract. Healing events following nonsurgical periodontal therapy in patients with periodontal pockets up to 12 mm deep were investigated. Incisors, cuspids and premolars in 16 patients were treated by plaque control and supra- and subgingival debridement using hand or ultrasonic instruments in a split mouth approach. The results were evaluated by recording of plaque scores, bleeding on probing, probing pocket depths and probing attachment levels. Minimal change in gingival conditions occurred during the initial 3 months of experimentation, which were utilized for plaque control measures alone. Subsequent to instrumentation and during the following 9-month period, a gradual and marked improvement of periodontal conditions took place. During the remaining 12 months of the 24-month experimental period no further changes of the recorded parameters were noted. No differences in results could be observed when comparing hand versus ultrasonic instrumentation, or when comparing the results of 2 different operators. Initially, a total of 305 sites demonstrated probing pocket depths ≥ 7 mm. At the 24-month examination 43 such sites remained. The results indicate that there is no certain magnitude of initial probing pocket depth where nonsurgical periodontal therapy is no longer effective.

In a previous study the effect of nonsurgical periodontal therapy was investigated in patients with periodontal pockets 4-7 mm deep (Badersten et al. 1981). The study was performed to accumulate information on healing events following oral hygiene instruction, supra- and subgingival debridement with hand and ultrasonic instruments. Marked improvement of the periodontal conditions was obtained, including sites with pockets initially 6-7 mm deep. The apparently successful results of conservative treatment of these patients raised the question to what extent nonsurgical therapy is feasible also in patients with severely advanced lesions. The present study was carried out to study healing events in patients with pockets up to 12 mm deep, and to compare effects of hand and ultrasonic instrumentation.

Material and Methods

16 patients, 38-58 years of age, 11 males and 5 females with severely advanced periodontal disease, were selected for the study. Incisors, cuspids and premolars in either the maxilla or the mandible were studied. A minimum of 4 and a maximum of 10 teeth were used in each patient. The areas of the dentition under study had generalized periodontal destruction involving both sides of the jaw to a similar extent. Clinical signs of gingival inflammation and periodontal pockets ≥ 5 mm deep with calculus and bleeding upon probing were present on 2 or more aspects of each tooth.

The therapy and methods of the present investigation were similar to those in our previous study (Badersten et al. 1981). In the

EXPERIMENTAL DESIGN

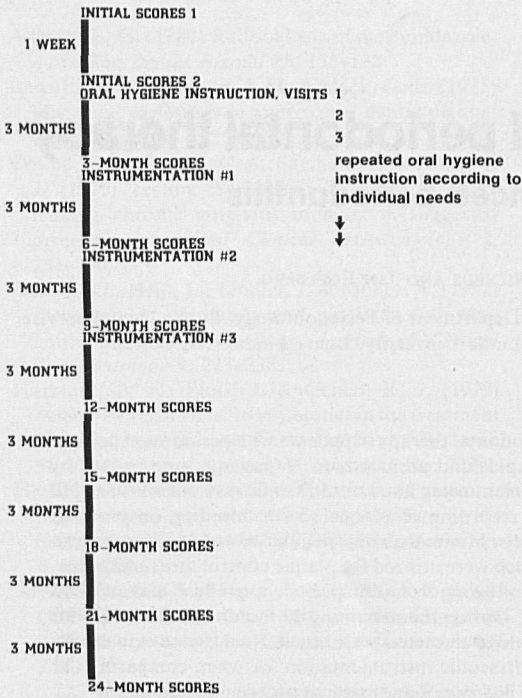


Fig. 1. Flow chart of the experimental design.

Versuchsablauf - Zeitfolge.

Organigramme du plan de l'expérience.

following only details which differed from the earlier investigation will be described.

The experimental design is shown in Fig. 1.

Oral hygiene instruction

Initial oral hygiene instruction was given in 2-3 visits during the first month of experimentation. Additional instruction and reinforcement as well as polishing of the teeth was provided according to individual needs for the entire duration of the study.

Debridement of periodontal pockets

Instrumentation (by means of hand instruments or ultrasonic instruments) was performed by 2 operators (authors J. E. and R. N.) treating 8 patients each. The first debridement was performed 3 months after start of experimenta-

tion. Repeated instrumentation was carried out at 6 and 9 months.

Methods of measurement

Measurements of dental plaque, bleeding on probing, probing pocket depth, probing attachment level and gingival recession were made every third month by one of the authors (A.B.) who was unaware of which instrumentation had been used for the different teeth. Recordings were made at 6 aspects of each tooth: mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual and distolingual. 2 initial measurements of pocket depth and attachment level were taken 1 week apart to evaluate the intraexaminer reproducibility of the recordings.

At the initial recordings and at 18 and 24 months, a second examiner (author R.N.) also measured probing pocket depth and probing attachment level for the purpose of studying interexaminer reproducibility.

The probing measurements were taken after the recording of plaque and bleeding scores.

Table 1. Distribution of surfaces by initial probing pocket depth (in mm) and method of instrumentation
Verteilung der Oberflächen auf die initiale Sondierungstiefe (in mm) und auf die instrumentale Behandlungsmethode

Répartition des surfaces suivant la profondeur initiale de poche et la méthode d'instrumentation

Initial probing pocket depth (mm)	No. of surfaces	
	Hand instruments	Ultrasonics
1.0- 1.5	10	12
2.0- 2.5	49	48
3.0- 3.5	36	39
4.0- 4.5	31	30
5.0- 5.5	70	66
6.0- 6.5	79	77
7.0- 7.5	71	69
8.0- 8.5	44	44
9.0- 9.5	23	25
10.0-10.5	9	11
11.0-11.5	4	3
12.0-12.5	—	2
Total	426	426

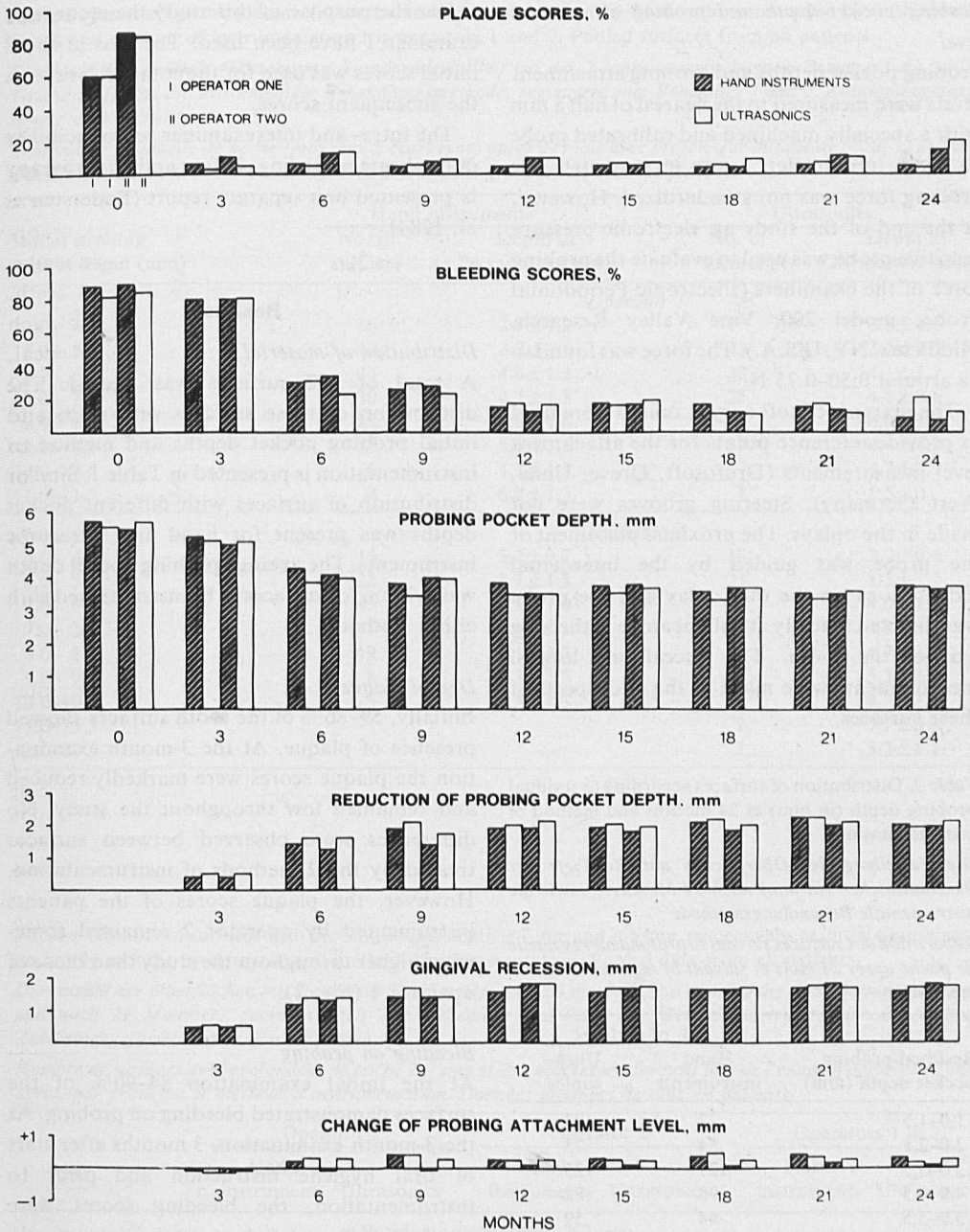


Fig. 2. Means of the recorded parameters by operator and method of instrumentation at the 3-month recording intervals throughout the 24 months of study.

Mittelwerte der vom Behandler registrierten Parameter und die instrumentale Behandlungsmethode, bei der in 3-monatlichen Anständen erfolgten Registrierungen der 24 Monate andauernden Studie.

Moyennes des paramètres enregistrés par opérateur et par méthode d'instrumentation lors des visites trimestrielles pendant les 2 années.

Probing pocket depth and probing attachment level

Probing pocket depths and probing attachment levels were measured to the nearest of half a mm with a specially machined and calibrated probe (0.5 mm in diameter, 1 mm increments). The probing force was not standardized. However, at the end of the study an electronic pressure sensitive probe was used to evaluate the probing force of the examiners (Electronic Periodontal Probe, model 200, Vine Valley Research, Middlesex, NY, U.S.A.). The force was found to be around 0.50–0.75 N.

The margins of soft acrylic onlays were used to provide reference points for the attachment level measurements (Drufosoft, Dreve, Unna, West Germany). Steering grooves were not made in the onlays. The proximal placement of the probe was guided by the interdental indentations on the thin onlay and the probe was directed apically at a slight angle to the long axis of the tooth. The buccal and lingual measurements were made at the midaspects of these surfaces.

Table 2. Distribution of surfaces according to residual probing depth (in mm) at 24 months and method of instrumentation

Die Verteilung der Oberflächen auf die Tiefe der Residualtaschen (in mm) nach 24 Monaten, sowie die instrumentale Behandlungsmethode

Répartition des surfaces suivant la profondeur résiduelle de poche après 24 mois et suivant la méthode d'instrumentation

Residual probing pocket depth (mm)	No. of surfaces	
	Hand instruments	Ultrasonics
1.0–1.5	27	37
2.0–2.5	84	75
3.0–3.5	121	125
4.0–4.5	90	82
5.0–5.5	44	59
6.0–6.5	39	26
7.0–7.5	17	12
8.0–8.5	4	7
9.0–9.5	—	1
10.0	—	2
Total	426	426

For the purpose of this study the records of examiner 1 have been used. The first of the 2 initial scores was used for the comparisons with the subsequent scores.

The intra- and interexaminer reproducibility of duplicate recordings before and after therapy is presented in a separate report (Badersten et al. 1984).

Results

Distribution of material

A total of 852 surfaces was treated. The distribution of these surfaces with respect to initial probing pocket depths and method of instrumentation is presented in Table 1. Similar distribution of surfaces with different pocket depths was present for hand and ultrasonic instruments. The average probing pocket depth was 5.7 mm for surfaces to be instrumented with either method.

Dental plaque

Initially, 59–86% of the tooth surfaces showed presence of plaque. At the 3-month examination the plaque scores were markedly reduced and remained low throughout the study. No differences were observed between surfaces treated by the 2 methods of instrumentation. However, the plaque scores of the patients instrumented by operator 2 remained somewhat higher throughout the study than those of operator 1 (Fig. 2).

Bleeding on probing

At the initial examination 84–90% of the surfaces demonstrated bleeding on probing. At the 3-month examination, 3 months after start of oral hygiene instruction and prior to instrumentation, the bleeding scores were minimally affected. Subsequent to instrumentation, a marked and gradual improvement of the bleeding scores took place until a 14–18% level was reached at 12 months. Similar reductions in bleeding scores occurred for both operators and both methods of instrumentation (Fig. 2).

Table 3. Residual probing depth (mean±standard deviation) at the 24-month examination by initial pocket depth and method of instrumentation for operators 1 and 2. Pooled surfaces from all patients

Residuale Taschentiefe (Mittelwert±Standarddeviation) bei der 2-Jahresuntersuchung in Bezug auf die initiale Taschentiefe und die instrumentale Behandlungsmethode, registriert vom Behandler 1 und 2. Zusammengefasste Werte aller Patienten

Profondeur résiduelle de poche (moyenne±écart type) après 24 mois avec profondeur initiale de poche et méthode d'instrumentation pour les praticiens 1 et 2. Surfaces groupées de tous les patients

Initial probing pocket depth (mm)	Hand instruments		Ultrasonics	
	No. of surfaces	Depth at 24 months (mm)	No. of surfaces	Depth at 24 months (mm)
<i>Operator 1</i>				
4.0- 4.5	16	2.9±1.2	17	3.3±1.1
5.0- 5.5	42	3.7±1.5	43	3.7±1.2
6.0- 6.5	34	4.6±1.5	32	4.1±1.7
7.0- 7.5	30	4.7±1.3	25	4.8±1.6
8.0- 8.5	25	4.9±1.6	22	6.0±1.8
9.0- 9.5	15	5.1±1.5	17	4.4±1.2
10.0-10.5	6	4.2±1.2	7	4.7±1.7
11.0-11.5	4	6.2±1.3	1	5.5±0
<i>Operator 2</i>				
4.0- 4.5	15	3.2±0.7	13	2.7±0.6
5.0- 5.5	28	3.7±1.5	23	3.5±1.2
6.0- 6.5	45	4.1±1.0	45	4.0±1.1
7.0- 7.5	41	4.4±1.1	44	4.1±1.2
8.0- 8.5	19	4.1±1.3	22	4.7±1.2
9.0- 9.5	8	4.3±1.5	8	5.3±1.5
10.0-10.5	3	5.5±1.3	4	4.7±1.0
11.0-11.5	—	—	2	5.7±0.3
12.0-12.5	—	—	2	5.2±1.1

Table 4. Number of surfaces with probing pocket depth ≥ 7 mm and ≥ 6 mm, respectively, at initial examination and at 24 months by operator and method of instrumentation. Pooled data from all patients

Die Anzahl der Oberflächen mit sondierter Taschentiefe von ≥ 7 mm bzw. ≥ 6 mm, bei der Ausgangsuntersuchung und nach 24 Monaten, geordnet nach dem Behandler und nach der Methode instrumentaler Behandlung. Zusammengefasste Daten aller Patienten

Nombre de surfaces avec profondeur de poche ≥ 7 mm et ≥ 6 mm respectivement lors de l'examen initial et 24 mois après, par praticien et méthode d'instrumentation. Données groupées de tous les patients

	Operator 1		Operator 2		Operators 1 & 2	
	Hand instruments	Ultrasonics	Hand instruments	Ultrasonics	Hand instruments	Ultrasonics
Probing pocket depth ≥ 7 mm						
Initial	80	72	71	82	151	154
At 24 months	17	16	4	6	21	22
Probing pocket depth ≥ 6 mm						
Initial	114	104	116	127	230	231
At 24 months	43	31	17	17	60	48

Probing pocket depth

Initially, the mean probing pocket depths were 5.5–5.8 mm. 3 months after start of oral hygiene instruction the mean depths were reduced to 5.1–5.3 mm. Following instrumentation more noticeable reductions of pocket depths occurred until the depths stabilized around 3.6–3.9 mm at 12 months. Similar reductions took place for both operators and both methods of instrumentation (Fig. 2).

The distribution of the 852 experimental surfaces according to residual probing depth at 24 months and method of instrumentation is presented in Table 2. Similar distribution of surfaces with different residual probing depths was present for hand and ultrasonic instruments.

The residual probing depth at 24 months for pooled surfaces with initial probing pocket

depth ranging from 4.0–12.5 mm is shown in Table 3. Reduction of pocket depth took place also for the deeper pockets, irrespective of operator and method of instrumentation.

The number of surfaces with probing pocket depth ≥ 6 mm and ≥ 7 mm, respectively, at the initial examination and at 24 months is presented in Table 4. Initially, a total of 305 surfaces demonstrated probing pocket depth ≥ 7 mm. At the 24-month examination only 43 such surfaces remained.

Gingival recession

Limited gingival recession occurred during the initial 3 months of the study. Following instrumentation at 3 months, more notable recession took place until a level of 1.6–1.8 mm recession was reached at the 12-month examination (Fig. 2).

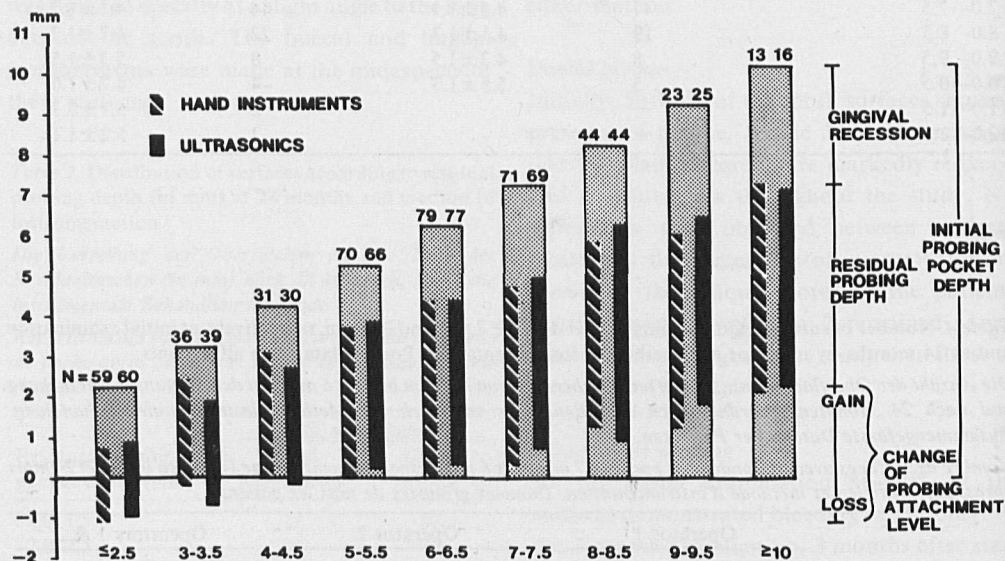


Fig. 3. Mean amounts of gingival recession, residual probing depth and gain/loss of probing attachment level at 24 months related to initial probing pocket depth. Pooled surfaces for hand and ultrasonic instruments from all patients.

Mittelwerte der gingivalen Rezession, der Residualtaschentiefe und des Gewinnes/Verlustes sondierten Attachmentniveaus nach 24 Monaten – in Bezug auf die Taschentiefe der Ausgangsuntersuchung. Zusammenfassung der durch Hand- und Ultraschall behandelten Oberflächen aller Patienten.

Quantités moyennes de récession gingivale, de profondeur résiduelle de poche et de variation de niveau d'attache après 24 mois, en relation avec la profondeur initiale de poche. Surfaces groupées pour les instruments manuels et les ultrasons pour tous les patients.

Probing attachment level

Limited changes in the mean probing attachment level occurred during the observation period. At 24 months a mean gain of probing attachment amounting to 0.1–0.3 mm was observed (Fig. 2).

Changes related to initial probing pocket depth

In Fig. 3 the data from all surfaces of all patients have been pooled and grouped according to initial probing pocket depth of the individual surfaces. Sites with initially deeper probing pocket depth showed more gingival recession, more gain of probing attachment and deeper residual probing depth at 24 months than sites with initial shallow pocket depth. Surfaces with initial probing pocket depth ≤ 3.5 mm demonstrated loss of probing attachment whilst surfaces initially ≥ 8 mm deep showed 0.9–2.3 mm average gain of probing attachment.

Similar healing events took place following both methods of instrumentation.

Computation of the data of Fig. 3 was also performed using patient means of surfaces of different initial probing pocket depths. These calculations showed average changes of the parameters similar to the pooled data of the individual surfaces.

Figs. 4, 5 and 6 present bleeding scores, probing pocket depths and changes in probing attachment levels at the 3-month recording intervals throughout the 24 months of study for surfaces with initial probing depth ≥ 7 mm. The sequential changes in these deep sites were similar irrespective of whether they were treated by operator 1 or 2, or by hand or ultrasonic instrumentation. Thus, the rate of initial healing was comparable and the results were equally well maintained once the improvements were obtained.

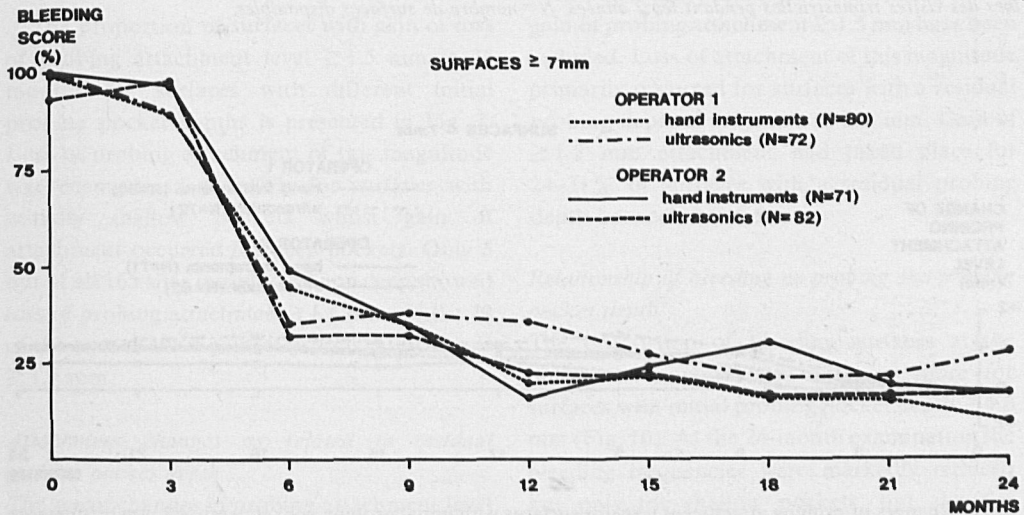


Fig. 4. Bleeding scores for surfaces with initial probing pocket depth ≥ 7 mm by operator and method of instrumentation at the 3-month recording intervals throughout the 24 months of study. N = number of available surfaces.

Blutungs Scores an Oberflächen mit einer initialen Sondierungstiefe von ≥ 7 mm, vom Behandler 1 und 2 registriert, sowie die Methode instrumentaler Behandlung während der in 3-monatlichen Abständen vorgenommenen Registrierungen, innerhalb der 24 Monate andauernden Studie. N = Anzahl zur Verfügung stehender Oberflächen.

Scores de saignement pour les surfaces avec profondeur initiale de poche ≥ 7 mm par praticien et méthode d'instrumentation lors des visites trimestrielles pendant les 2 années. N = nombre de surfaces disponibles.

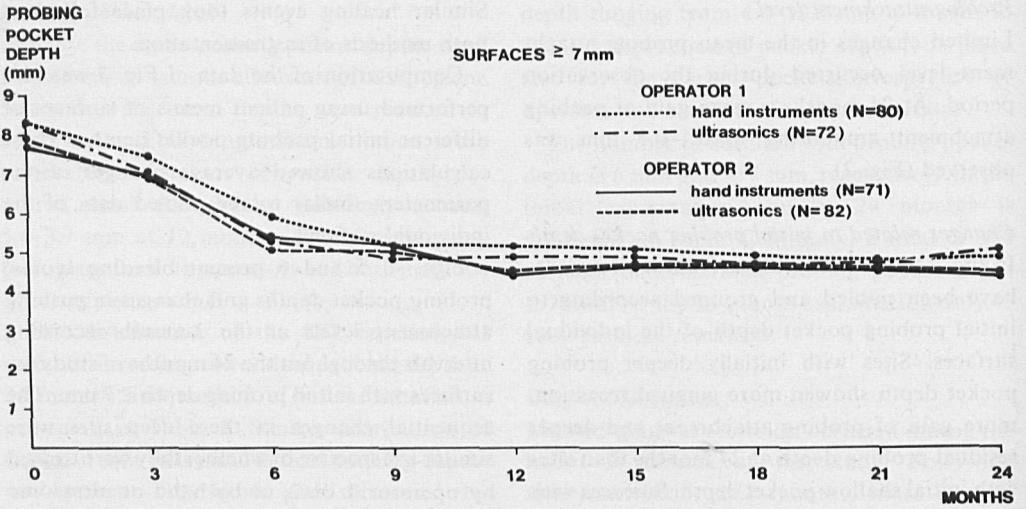


Fig. 5. Probing pocket depths for surfaces with initial probing pocket depth ≥ 7 mm by operator and method of instrumentation at the 3-month recording intervals throughout the 24 months of study. N = number of available surfaces.

Sondierede Taschentiefen an den Oberflächen einer, von jedem Behandler registrierten Taschentiefe von ≥ 7 mm, sowie die Methode instrumentaler Behandlung während der in 3-monatlichen Abständen vorgenommenen Registrierungen, innerhalb der 24 Monate andauernden Studie. N = Anzahl zur Verfügung stehender Oberflächen.

Profondeurs de poches pour les surfaces avec profondeur initiale ≥ 7 mm par praticien et méthode d'instrumentation lors des visites trimestrielles pendant les 2 années. N = nombre de surfaces disponibles.

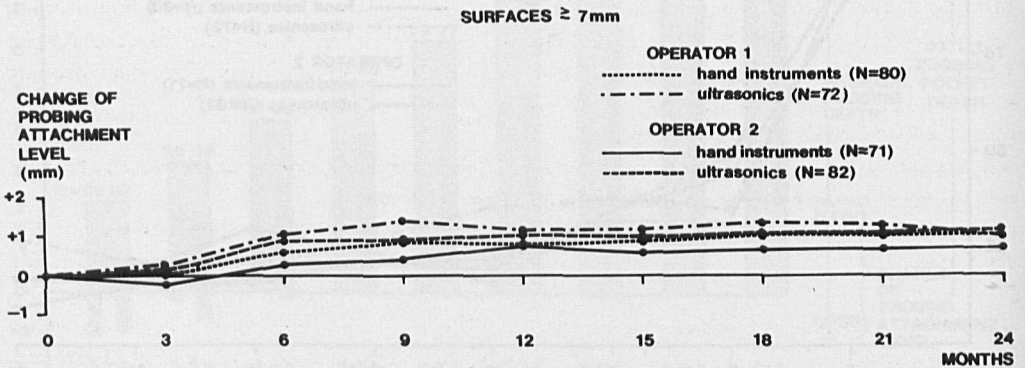


Fig. 6. Changes of probing attachment level for surfaces with initial probing pocket depth ≥ 7 mm by operator and method of instrumentation at the 3-month recording intervals throughout the 24 months of study. N = number of available surfaces.

Veränderungen des Attachementniveaus an Oberflächen mit einer, von jedem Behandler registrierten, initialen Sondierungstiefe von ≥ 7 mm, sowie die Methode instrumentaler Behandlung während der in 3-monatlichen Abständen vorgenommenen Registrierungen, innerhalb der 24 Monate andauernden Studie. N = Anzahl der zur Verfügung stehenden Oberflächen.

Variations des niveaux d'attache pour les surfaces à profondeur initiale de poche ≥ 7 mm par praticien et par méthode d'instrumentation lors des visites trimestrielles pendant les 2 années. N = nombre de surfaces disponibles.

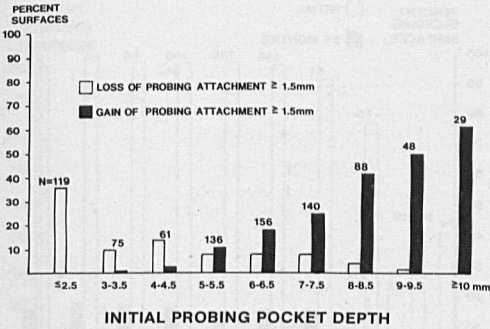


Fig. 7. Proportions (%) of surfaces with gain/loss of probing attachment level ≥ 1.5 mm at 24 months grouped by initial probing pocket depth. N= number of available surfaces.

Nach 24 Monaten - prozentualer Anteil von Oberflächen mit Gewinn/Verlust von Attachmentniveau von $\geq 1,5$ mm - gruppiert nach der initialen Sondierungstiefe. N= Anzahl der zur Verfügung stehender Oberflächen.

Pourcentages de surfaces avec gain (colonnes noires) ou perte (colonnes blanches) d'attache $\geq 1,5$ mm après 24 mois, groupés par profondeur initiale. N=nombre de surfaces disponibles.

The proportion of surfaces with gain or loss of probing attachment level ≥ 1.5 mm at 24 months for surfaces with different initial probing pocket depths is presented in Fig. 7. Loss of probing attachment of this magnitude was encountered primarily for surfaces with initially shallow pockets whilst gain of attachment occurred for deep pockets. Only 5 out of all 165 sites initially ≥ 8 mm deep showed loss of probing attachment ≥ 1.5 mm, whilst 79 of the sites showed gain of probing attachment ≥ 1.5 mm.

Attachment changes as related to residual probing pocket depth

The mean changes in probing attachment level for pooled surfaces of different residual probing depths at 24 months are presented in Fig. 8. Surfaces ≤ 2.5 mm and ≥ 6 mm seemed to have lost a slight amount of probing attachment, whilst surfaces with a residual depth of 3.0-5.5 mm seemed to have undergone a minor improvement of attachment level.

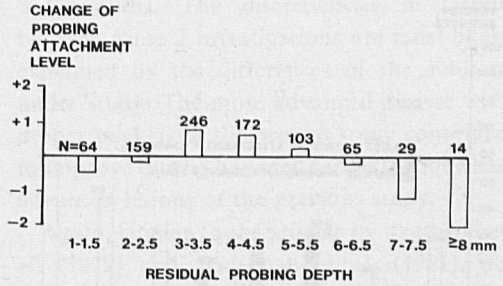


Fig. 8. Mean change of probing attachment level for surfaces with different residual probing depths at 24 months. Pooled surfaces from all patients. N= number of available surfaces.

Mittlere Veränderung des Attachmentniveaus an Oberflächen mit unterschiedlichen Tiefen residualer Taschen - nach 24 Monaten. Die Oberflächen aller Patienten sind zusammengefasst. N=Anzahl zur Verfügung stehender Oberflächen.

Variation moyenne du niveau d'attache de surfaces avec différentes profondeurs résiduelles de poche après 24 mois. Surfaces groupées de tous les patients. N=nombre de surfaces disponibles.

In Fig. 9 only surfaces demonstrating loss or gain of probing attachment ≥ 1.5 mm have been included. Loss of attachment of this magnitude primarily occurred for surfaces with a residual probing depth ≤ 2.5 mm and ≥ 6 mm. Gain of ≥ 1.5 mm attachment had taken place for 24-31% of surfaces with a residual probing depth between 3.0-4.5 mm.

Relationship of bleeding on probing and probing pocket depth

The proportion of bleeding surfaces at the initial examination was 90% or more for surfaces with initial probing pocket depth ≥ 4.0 mm (Fig. 10). At the 24-month examination the bleeding frequencies were markedly reduced not only for shallow pockets, but also for pockets of deep initial probing depth.

The bleeding frequencies at the 24-month examination according to residual probing depth are shown in Fig. 11. Bleeding upon probing was encountered more often in pockets with deeper residual probing depths than in shallow depths.

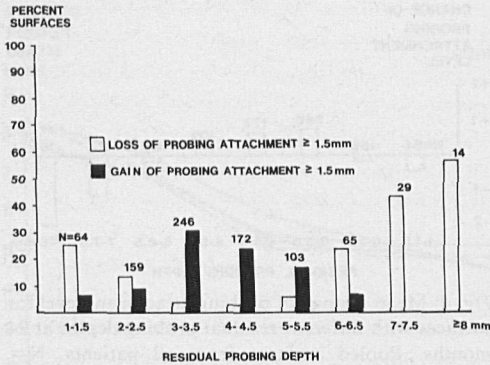


Fig. 9. Proportions (%) of surfaces with gain/loss of probing attachment level ≥ 1.5 mm at 24 months grouped by residual probing depth at 24 months. N=number of available surfaces.

Nach 24 Monaten - prozentualer Anteil der Oberflächen mit Gewinn/Verlust von Attachmentniveau $\geq 1,5$ mm, gruppiert nach der residualen Taschentiefe nach 2 Jahren. N=Anzahl zur Verfügung stehender Oberflächen.

Pourcentages de surfaces avec gain (colonnes noires) ou perte (colonnes blanches) d'attache $\geq 1,5$ mm après 24 mois, groupés par profondeur résiduelle de poche après 2 ans. N=nombre de surfaces disponibles.

Time of instrumentation

Mean time of instrumentation per tooth by operator and method of instrumentation is presented in Table 5. The total time of instrumentation varied to some degree between the 2 operators. Also, one of the operators used somewhat less time with ultrasonics than with hand instruments.

Discussion

The present study investigated the effects of oral hygiene instruction and supra- and subgingival instrumentation on severely advanced periodontitis and extended the observations made in our previous investigation performed on patients with moderately advanced periodontitis (Badersten et al. 1981). The findings demonstrated that nonsurgical therapy resulted in marked improvement of gingival conditions

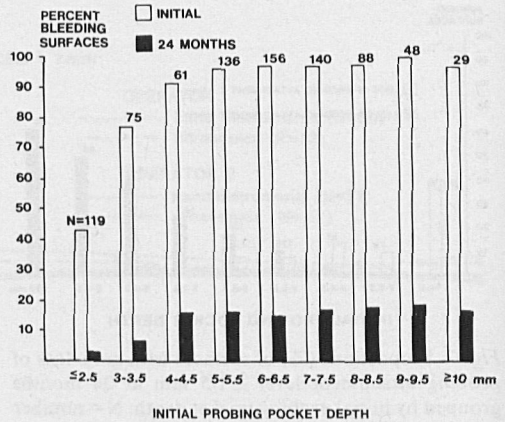


Fig. 10. Proportions (%) of surfaces showing bleeding upon probing at initial examination and at 24 months grouped by initial probing pocket depth. Pooled data from all patients. N=number of available surfaces.

Prozentualer Anteil der Oberflächen, die bei der Ausgangsuntersuchung und nach 24 Monaten beim Sondieren bluteten, gruppiert nach den initialen Taschentiefen. Zusammengefasste Daten aller Patienten. N=Anzahl zur Verfügung stehender Oberflächen.

Pourcentages de surfaces avec saignement au sondage lors de l'examen initial et après 24 mois, groupés par profondeur initiale de poche. Données groupées pour tous les patients. N=nombre de surfaces disponibles.

not only in periodontal pockets of moderate depth but also in pockets up to 12 mm deep.

Plaque control measures alone were instituted during the first 3 months of the study. Limited improvement occurred during this period in spite of the low plaque scores that were obtained. The mean probing pocket depths were reduced by 0.4–0.5 mm, primarily due to gingival recession. Minimal improvement of bleeding scores was observed. These limited changes were contrasted to the improvement that took place during the subsequent 3 months following start of instrumentation. During this period probing depths were further reduced by 0.9–1.2 mm together with marked improvement in bleeding scores. The limited improvement following plaque control alone is in agreement with the findings of Cercek et al. (1983) investigating the effect of prolonged plaque control measures.

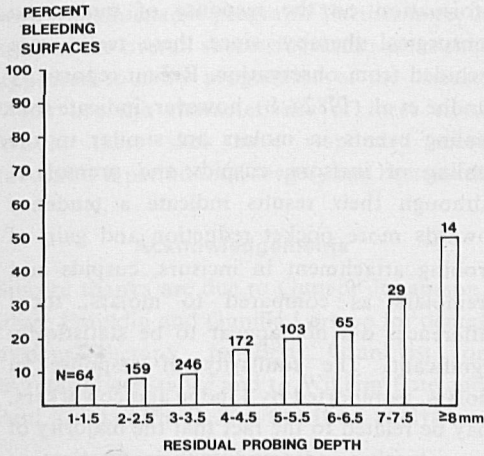


Fig. 11. Proportions (%) of surfaces showing bleeding upon probing at 24-month examination grouped by residual probing depth at 24 months. Pooled data from all patients. N=number of available surfaces.

Prozentualer Anteil der Oberflächen, die bei der Ausgangsuntersuchung und nach 24 Monaten beim Sondieren bluteten, gruppiert nach den residualen Taschentiefen. Zusammengefasste Daten aller Patienten. N=Anzahl zur Verfügung stehender Oberflächen.

Pourcentages de surfaces avec saignement au sondage lors de l'examen après 24 mois, groupés par profondeur résiduelle de poche après 24 mois. Données groupées de tous les patients. N=nombre de surfaces disponibles.

Periodontal conditions continued to improve during 6-9 months following start of instrumentation. In our previous study (Badersten et al. 1981) the improvement leveled off after

3-4 months. The discrepancies in results between these 2 investigations are most likely explained by the differences of the subjects under study. The more advanced disease with deeper pockets of the present study continued to improve during a longer period than the less advanced lesions of the previous study.

Again, similar to the studies by Torfason et al. (1979) and Badersten et al. (1981), no differences in results could be detected following hand and ultrasonic instrumentation. Debridement of the contaminated root surfaces in deep pockets can apparently be accomplished by ultrasonics as well as hand instruments. Also, as in the study by Badersten et al. (1981), the 2 participating operators obtained comparable results.

Most of the examined surfaces showed bleeding on probing at the initial examination. The therapy resulted in substantial reduction of the bleeding scores including sites with deep initial probing pocket depths. Some surfaces, however, still showed bleeding after treatment. The proportion of bleeding surfaces after therapy was higher for surfaces with deeper residual probing depths than for surfaces with shallow residual depths. At 24 months, 31% of the surfaces with 7-7.5 mm and 50% of the surfaces with ≥8.0 mm residual probing depth bled upon probing. However, 9-16% of surfaces with 3.0-4.5 mm residual probing

Table 5. Mean time of instrumentation (min per tooth) by operator and method of instrumentation
Mittlerer Zeitverbrauch des Behandlers bei der instrumentalen Behandlung (in Min pro Zahn) und die Methode der instrumentalen Behandlung
Durée moyenne d'instrumentation (en minutes par dent) par praticien et méthode d'instrumentation

	Operator 1		Operator 2	
	Hand instruments	Ultra-sonics	Hand instruments	Ultra-sonics
Instrumentation No. 1 (at 3 months)	5.7	4.9	8.0	8.8
Instrumentation No. 2 (at 6 months)	2.7	1.8	2.9	2.7
Instrumentation No. 3 (at 9 months)	1.0	0.9	1.6	1.8
Total	9.4	7.6	12.5	13.3

depth also showed bleeding on probing at this point.

The probing pocket depths of sites initially 7.0–12.5 mm deep were markedly reduced following the conservative therapeutic approach. The probing attachment levels were also improved. More mean pocket reduction and gain of attachment was obtained for these deep sites than for surfaces with 4.0–6.5 mm initial depth. Similar patterns of change in probing pocket depths and probing attachment levels following nonsurgical therapy have been reported by Hill et al. (1981), Isidor (1981), Pihlstrom et al. (1981) and Lindhe et al. (1982a, b). Thus, the fact that deep pockets show more gain of probing attachment than moderately deep pockets combined with the fact that they demonstrate similar reduction of bleeding upon probing indicate that there is no certain magnitude of initial probing pocket depth where nonsurgical periodontal therapy is no longer effective. Our observations further suggest that the decision to proceed with additional therapy should preferably be postponed until 6–9 months after start of instrumentation. Not until then has all the healing taken place that will occur following nonsurgical therapy.

Loss of probing attachment level was primarily observed for sites with initial shallow probing pocket depth. Attachment loss following nonsurgical therapy has previously been reported for shallow sites and buccal surfaces by Badersten et al. (1981), Hill et al. (1981), Isidor (1981), Pihlstrom et al. (1981) and Lindhe et al. (1982a, b). Interestingly, Cercek et al. (1983) also found some loss of probing attachment at sites with shallow probing depth following plaque control measures alone (without concomitant instrumentation). It was suggested that the attachment loss for shallow sites may be related not only to injury from instrumentation but also to some type of atrophy, possibly caused by tooth brushing trauma.

The present study does not provide any

information on the response of molars to nonsurgical therapy, since these teeth were excluded from observation. Recent reports by Lindhe et al. (1982a, b), however, indicate that healing events in molars are similar to the healing of incisors, cuspids and premolars. Although their results indicate a tendency towards more pocket reduction and gain of probing attachment in incisors, cuspids and premolars as compared to molars, these differences did not appear to be statistically significant. The similarity of response in molars, as reported by Lindhe and coworkers, may be related to the fact that the majority of the molar sites under study in their investigation were pockets adjacent to "flat" surfaces. No study seems available as yet where special attention has been focused on the response of molar sites with furcation involvement.

Instrumentations were carried out at 3, 6 and 9 months. Thereafter, plaque control and tooth polishing only were performed. Thus, during a 15-month interval between the 9- and 24-month examinations, there was no subgingival instrumentation. The means of all periodontal parameters remained unchanged during this interval. This included sites with initial probing pocket depth ≥ 7 mm. This apparently successful maintenance indicates that supra-gingival plaque control combined with polishing was sufficient to prevent subgingival recolonization by microorganisms to the extent that relapse occurred. Analyses of results, in this report limited to observations of means of the various parameters, however, do not disclose if occasional surfaces may have deteriorated.

Several other questions remain to be answered before further recommendations for clinical purposes can be given. For example, the present study utilized repeated instrumentation at 3-month intervals. Would comparable improvements occur after a single, initial instrumentation only? Also, this report is limited to a 24-month observation period. Will results continue to hold up beyond this period

with a maintenance program? Furthermore, in spite of the overall successful results some sites appeared to show progression of the disease. What are the characteristics of these sites? Would these sites have responded more favorably if periodontal surgery had been used?

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Zusammenfassung

Der Effekt nicht-chirurgischer Parodontaltherapie II. Weit fortgeschrittene Parodontitis

Bei Patienten mit parodontalen Taschen bis zu 12 mm Tiefe, wurden die Heilungsvorgänge nach nicht-chirurgischer Parodontaltherapie untersucht. Schneidezähne, Eckzähne und Prämolaren wurden bei 16 Patienten mittels Plaquekontrolle, sowie mit supra- und subgingivaler Zahnsteinbehandlung mit Hand- oder Ultraschallinstrumenten, im "splitmouth"-Versuchsansatz behandelt. Die Resultate wurden durch das Registrieren der Plaque-Scores (Beurteilungseinheiten), der Blutungstendenz nach dem Sondieren, sowie durch das Sondieren der Taschentiefen und des Attachmentniveaus ausgewertet. Während der ersten 3 Versuchsmonate wurde lediglich Plaquekontrolle vorgenommen und die Veränderungen des gingivalen Erscheinungsbildes waren minimal. Nach instrumenteller Behandlung und im Laufe der dann folgenden 9 Monate kam es zu schrittweiser und markanter Verbesserung der parodontalen Verhältnisse. Während der dann noch verbleibenden 12 Monate der 24-monatlichen Versuchsperiode wurden keine weiteren Veränderungen der erreichten Behandlungsergebnisse gesehen. Beim Vergleich zwischen den therapeutischen Resultaten der Hand- und der Ultraschallinstrumente, wie auch bei dem Vergleich der Behandlungsergebnisse 2 verschiedener Behandler, konnte kein Unterschied festgestellt werden. Anfangs wurde an 305 sondierten Zahnoberflächen eine Taschentiefe von ≥ 7 mm festgestellt. Bei der Nachuntersuchung nach 24 Monaten waren nur noch 43 Zahnoberflächen mit diesen Taschentiefen vorhanden. Die vorliegenden Resultate zeigen, dass es keine spezielle Sondierungstiefe gibt, bei der nicht-chirurgische Parodontaltherapie nicht mehr wirkungsvoll und damit sinnvoll ist.

Résumé

Effet du traitement parodontal non-chirurgical II. Parodontite très sévère

La guérison de 16 patients ayant subi un traitement parodontal non-chirurgical et dont la profondeur des poches parodontales atteignait jusqu'à 12 mm a été observée. Des incisives, canines et prémolaires ont été traitées par contrôle de plaque dentaire et détartrage sus- et sousgingival aux ultrasons pour la moitié des dents et avec des instruments manuels pour l'autre moitié. Les résultats ont été évalués en enregistrant les scores de plaque, le saignement au sondage, les profondeurs de poche et les niveaux d'attache. Durant les 3 premiers mois de l'expérience seules les mesures d'hygiène buccale ont été prises et les conditions gingivales ont peu varié. Après l'instrumentation et durant les 9 mois suivants, une nette amélioration progressive de l'état du parodonte était constatée. Durant les 12 derniers mois de cette expérience de 2 ans, aucun changement supplémentaire n'a été enregistré. Ni les résultats obtenus avec les ultrasons ou avec les instruments manuels, ni ceux enregistrés par les 2 praticiens ne présentaient de différence. Au départ, 305 sites avaient une profondeur de poche de ≥ 7 mm. Deux années plus tard, il n'en restait plus que 43. Les résultats indiquent qu'aucune profondeur initiale de poche ne limite la thérapie parodontale non chirurgicale.

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