

# Comparison between mechanical cleaning and an antimicrobial rinse for the treatment and prevention of interdental gingivitis

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Caton JG, Blieden TM, Lowenguth RA, Frantz BJ, Wagener CJ, Doblin JM, Stein SH and Proskin HM: Comparison between mechanical cleaning and an antimicrobial rinse for the treatment and prevention of interdental gingivitis. *J Clin Periodontol* 1993; 20: 172-178. © Munksgaard 1993.

**Abstract.** This study compared the efficacy of an antimicrobial mouthrinse (0.12% chlorhexidine gluconate) plus toothbrushing (mouthrinse group), mechanical interdental cleaning plus toothbrushing (mechanical group), and toothbrushing alone (control group), at reducing and preventing interdental gingival inflammation. 92 male subjects were examined for interdental inflammation using the Eastman interdental bleeding index at baseline, then monthly for 3 months after using one of the above oral hygiene regimens. The mechanical cleaning group had significant reductions in bleeding sites compared to baseline at 1 month (56.90% versus 13.17%) that persisted throughout the study (2 months = 6.65%, 3 months = 5.70%). The other regimens showed no significant bleeding reduction at any time point in the study. The mechanical interdental cleaning group showed improvement over baseline at 1 month with the full benefit apparent after 2 months. The effect of location in the mouth on bleeding reduction was also assessed. The % of posterior sites which bled was always higher than anterior sites. Analysis of maxillary versus mandibular, and buccal versus lingual sites showed no significant differences. Additional observations of the data demonstrated that sites which bled at baseline were more likely to stop bleeding in the mechanical cleaning group. Also, sites which did not bleed at baseline were unlikely to bleed subsequently when mechanical cleaning was used. Neither of these observations were true for the other cleaning regimens. These data show that only mechanical interdental plaque removal combined with toothbrushing is effective at reducing or preventing interdental inflammation. This underscores the importance of instituting mechanical interdental cleaning to eliminate interdental inflammation.

Key words: interdental gingivitis; gingival inflammation; gingival bleeding; chlorhexidine; interdental cleaner.

Accepted for publication 3 February 1992

Antimicrobial mouthrinses reduce supragingival plaque and gingival inflammation (Hirst 1972, Ochsenein 1973a, 1973b, 1974, Flötra et al. 1972, Lang et al. 1982, Segreto et al. 1986, Grossman et al. 1986). However, previous clinical studies focused on the facial and lingual gingiva for changes in gingival inflammation, excluding the midinterproximal area from their analysis. Early studies by Loe & Schiött (1970) demonstrated that a 0.1% or 0.2% chlorhexidine mouthrinse failed to effectively reduce plaque in the interdental areas of posterior teeth. More recent studies have reported that a

0.12% chlorhexidine mouthrinse significantly reduced gingival inflammation assessed by a reduction in visual signs (color) and gingival bleeding (Grossman et al. 1986, Siegrist et al. 1986, Segreto et al. 1986). In these investigations, gingival bleeding was assessed on the facial and lingual gingival tissues using the gingival index (Loe & Silness 1963), which uses a periodontal probe to stimulate the gingival margin. It is unclear from these clinical studies whether the antimicrobial mouthrinse was able to penetrate and reduce gingival inflammation within the midinterdental area, since this gingival index and

other sulcular bleeding indices do not effectively assess this region (Caton et al. 1988a).

Clinical signs of inflammation have been correlated with the presence of an inflammatory lesion on the facial and lingual gingival surfaces and sulcular bleeding after stimulation with a periodontal probe has been associated with the presence of inflammation in the adjacent gingival tissues (Appelgren et al. 1979, Greenstein et al. 1981, Davenport et al. 1982). Furthermore, bleeding of the interdental tissues after stimulation has been considered a clinical sign associated with gingival inflammation

(Loesche 1979, Dolles & Gjermo 1980, Abrams et al. 1984, Amato et al. 1986, Thilo et al. 1986, Caton et al. 1988a, Bouwsma et al. 1988, Caton et al. 1989). However, clinical evaluation of the interdental gingiva, which is an area of the gingiva considered to be vulnerable for the development of periodontal diseases, is compromised since access to the area is limited by anatomical factors. Bleeding following stimulation of the interdental area with wooden interdental cleaners is a clinical feature considered to be diagnostic of gingival inflammation (Loesche 1979, Dolles et al. 1980, Caton et al. 1985), and has been shown to be associated with inflammatory lesions within the connective tissue of the interproximal gingiva (Abrams et al. 1984, Amato et al. 1986, Thilo et al. 1986, Caton et al. 1988b, Bouwsma et al. 1988, Caton et al. 1989). The inability to assess the midinterproximal area using visual signs of inflammation or a sulcular bleeding index leaves a significant portion of the gingiva unexamined for the presence of inflammation.

Therapy aimed at the control of bacterial plaque will reduce or eliminate gingival bleeding (Løe et al. 1965, Tagge et al. 1975, Listgarten et al. 1978, Loesche 1979, Axelsson & Lindhe 1978, Dolles et al. 1980, Axelsson & Lindhe 1981, Badersten et al. 1981, Proye et al. 1982, Caton et al. 1982, Cercek et al. 1983, Amato et al. 1986). Specifically, mechanical plaque removal utilizing wooden interdental cleaners in the interdental region was correlated with a significant reduction of interdental gingival bleeding sites (Bouwsma et al. 1988), and a concomitant histological reduction in inflammation (Bouwsma et al. 1988, Caton et al. 1989). While the elimination of plaque and reduction of inflammation in the interdental area is well documented for mechanical therapies, little is known about the effects of antimicrobial mouthrinses on reduction of inflammation in this site.

Due to the inaccessibility of the interdental area, it is possible that antimicrobial mouthrinses, such as chlorhexidine gluconate, may not penetrate into the region at a concentration capable of exerting a therapeutic effect. Therefore, the purpose of this study was to compare the effects of a mechanical cleaning regimen and a chemical plaque control regimen on the prevention and treatment of interdental gingival inflammation, using a diagnostic method

specifically developed to assess the status of the interdental gingiva.

### Material and Methods

92 healthy male subjects, age 18–28 years (mean age 23.3) participated in the investigation. At the initial examination, the number of interproximal bleeding sites on both the buccal and lingual surfaces were assessed using the Eastman interdental bleeding index according to the method of Caton & Polson (1985). A total of 8 interproximal bleeding sites were necessary for inclusion into the study. Bleeding tendency was assessed in all interdental areas excluding the interdental area between the second and third molar. A wooden interdental cleaner was inserted between the teeth from the facial aspect, parallel to the occlusal plane, depressing the papilla 1–2 mm. The interdental cleaner was inserted and removed four times and the presence or absence of bleeding within 15 s on both the facial and lingual interproximal surfaces was recorded. After the baseline examination, subjects received oral hygiene instructions and a dental prophylaxis consisting of scaling and polishing to remove all plaque, calculus and stain. Subjects were stratified according to age and number of bleeding sites into 3 balanced groups.

The mouthrinse group ( $n=34$ ) used 0.12% chlorhexidine gluconate\* as a mouthrinse twice a day for 30 seconds in addition to toothbrushing. No form of mechanical interdental cleaning was utilized by the mouthrinse group. The mechanical cleaning group ( $n=32$ ) used soft wooden interdental cleaners\*\* twice a day in addition to toothbrushing. The control group ( $n=26$ ) continued their existing personal oral hygiene regimen. No oral hygiene instructions were given to the control group. In order to monitor and confirm compliance, all subjects were required to maintain a log indicating the times at which daily oral hygiene procedures were performed. In addition, subjects completed a compliance questionnaire at each monthly examination. Throughout the course of the investigation, compliance was further monitored and re-

inforced with phone calls to each subject between examination visits.

Subsequent to the baseline examination, subjects were reexamined monthly for 3 months. Bleeding determinations were made in 2 contralateral quadrants (randomly selected at baseline) at each time point and the percentage of bleeding sites for each subject was calculated. The mean % of bleeding sites was the average of the half-mouth means from subjects in their respective group. The remaining 2 quadrants were examined only at baseline and 3 months and those data were collapsed in an identical manner. This divided the quadrants into two groups: quadrants with four exams (baseline, 1, 2, and 3 months), and quadrants with 2 exams (baseline and 3 months). This was done to determine if the monthly scoring of sites using the EIBI had an effect on the overall bleeding scores by allowing a comparison of the differences between the four-exam and two-exam quadrants at the baseline and three month time points.

### Examiner calibration

Prior to initiating the main study, 2 examiners were trained in the use of the EIBI. To ensure that the examiners were appropriately calibrated, intra- and inter-examiner reliability data were obtained from examinations performed on a smaller population of subjects selected specifically for this purpose. The protocol for this and the methods of statistical analysis were reported in detail elsewhere (Blieden et al. 1992). Briefly, 26 subjects were examined  $2 \times 1$  h apart, by either a single examiner or 2 examiners in each half of their mouths, for the presence of bleeding using the method of stimulation for the EIBI. Scores were tabulated from individual sites and intra- and inter-examiner % agreements and  $\kappa$  coefficients calculated. Overall, intraexaminer agreement statistics were high (91.3% to 93.1% agreement; 0.79 to 0.86  $\kappa$  coefficient). Breakdowns of the intraexaminer data into facial and lingual sites by arch and location (anterior or posterior) also resulted in high levels of reliability, with no significant differences within examiners. The overall interexaminer agreement statistics were good (82.8% to 87.6% agreement; 0.62–0.75  $\kappa$  coefficient). When inter-examiner data were analyzed at facial or lingual sites by arch and location, a significant difference

\* Peridex\*, Proctor and Gamble Corp., Cincinnati, OH, USA.

\*\* Stim-U-Dent\*, Johnson and Johnson Consumer Products Inc., Skillman, NJ, USA.

existed in reliability for mandibular posterior lingual sites. In spite of this, no significant differences were found at any other sites, thus indicating good inter-examiner reliability.

#### Statistical analysis

The key parameter employed in the statistical analysis was the "whole mouth bleeding index", which was determined for each subject as simply the % of that subject's available sites which bled at that given exam. For the data obtained from four-exam and two-exam quadrants, repeated measures ANOVA and post-ANOVA multiple comparison procedures (least significant differences tests) were utilized to compare the mean percentage of bleeding sites for each group at each examination, and differences among locations (between arches, between facial and lingual sites, and between anterior and posterior sites). In addition, for each treatment group randomized block design ANOVA was used to compare the proportions of bleeding scores at the various time points. In all cases, the patient was used as the unit of measurement and a level of significance of  $p < 0.05$  was employed.

#### Results

##### % of sites which bled when probed

##### *Analysis of differences between two-exam and four-exam sites*

The data in Table 1 shows the mean %s of bleeding sites at baseline and 3 months for the two-exam and the four-exam  $\frac{1}{2}$  mouth scores. The overall mean percentage of bleeding sites was slightly higher in the two-exam  $\frac{1}{2}$  mouths. The difference between the mean %s for the 2 types of scoring was relatively constant at each time point for each of the 3 treatment groups. These observations were supported by the two-way interaction between examination time point and scoring method (indicating that the baseline to 3-month change was similar

for the 2 scoring methods across all 3 treatment groups combined). Furthermore, there was no significant three-way interaction among examination time point, scoring method, and treatment group, indicating that the consistency between scoring methods did not vary significantly between groups. Therefore, an assessment of the relative efficacy of the three treatment regimens from quadrants examined only at baseline and 3 months does not differ from assessments made using data obtained at these same time points from quadrants examined at monthly intervals.

##### *Comparison of the efficacy of the regimens*

ANOVA was also used to test for significant differences in the three month efficacy among the 3 treatment regimens. A significant two-way interaction between exam time point and treatment regimen was found, suggesting that the 3 treatment regimens differed with respect to change in percentage of bleeding sites from baseline to three months. Table 2 illustrates this difference between the treatment regimens. These data show that the mechanical cleaning regimen was far more effective than the other 2 in reducing the % of bleeding sites over the 3-month course of the study. It can also be seen that this effect was evident well before the 3-month examination was performed. Individual one-way ANOVA's were performed using the data from each exam. These indicated that while there was no difference in % bleeding scores at baseline, there were differences at 1 month that persisted throughout the remainder of the study. The post-ANOVA least significant differences tests at months 1, 2, and 3, always resulted in the same pattern; the mean % of bleeding sites for the mechanical cleaning regimen was significantly lower than either the control or mouthrinse regimens. Furthermore, the latter 2 regimens did not differ significantly among themselves at any time point in the study.

##### *Determination of the efficacy for each regimen*

Given the results of the above analyses, we were interested to know if, within each treatment group, significantly different mean percentages of bleeding sites were evident at the 4 examinations. A randomized block design ANOVA using the data from the four-exam sites indicated that for both control and mouthrinse groups, no significant differences existed. However, the mechanical cleaning group showed a different pattern and significant differences were detected between the four exams. Post-ANOVA least significant differences tests indicated significant differences between every possible adjacent pair of examinations except months 2 and 3. This indicates that mechanical cleaning was the only regimen to yield a significantly lower mean % of bleeding sites at month 1 compared to baseline. Also, in the mechanical cleaning group, a further significant reduction in mean % of bleeding sites was evident at month 2, with no significant reduction at month 3. These data indicate that in this study population, mechanical interdental cleaning shows improvement over baseline within 1 month, with the full benefit of this regimen apparent after 2 months.

##### *Differences in efficacy between arches, buccal/lingual, and anterior/posterior sites*

The anatomy of different areas of the mouth may facilitate or hinder the application of an oral hygiene technique. As an example, anterior areas may be more accessible for mechanical cleaning, or mouthrinsing may possibly be more beneficial to buccal surfaces. To establish if this type of effect occurred, an analysis of whole mouth percentages using baseline and 3 month data was performed to uncover any significant differences between maxillary versus mandibular, facial versus lingual, and anterior versus posterior sites. The results of the ANOVA testing revealed a significant overall difference between percentage change in anterior and posterior sites. In addition, a significant regimen by anterior-posterior interaction was evident. Fig. 1 graphically illustrates these findings, and shows that the overall anterior and posterior means obtained for each treatment regimen at baseline and 3 months. The % of posterior sites which bled was always higher than the corresponding % of anterior

Table 1. Mean %s of bleeding sites at baseline and 3 months for the two-exam and four-exam half-mouth scores

Regimen	Two-exam $\frac{1}{2}$ mouth		Four-exam $\frac{1}{2}$ mouth	
	Baseline	3 months	Baseline	3 months
control	51.56	44.57	47.50	40.46
mouthrinse	61.37	52.17	54.65	47.08
mechanical	60.49	7.82	56.09	5.70

Table 2. Mean % of sites that bled over the three month study

Regimen	Baseline	1 month	2 months	3 months
control	47.50	46.45	44.55	40.46
mouthrinse	54.65	48.54	50.83	47.08
mechanical	56.09	13.17	6.65	5.70

sites which bled. For control and mouthrinse regimens, the differences between the mean % for anterior and posterior sites was fairly constant at baseline and 3 months. However, in the mechanical cleaning group, the difference was markedly smaller at 3 months than at baseline. This is likely due to the tendency of the mechanical cleaning regimen to reduce bleeding to a uniformly low level. The corresponding analysis for maxillary or mandibular sites, and buccal or lingual sites showed no significant effect due to either of these factors, nor any significant interaction involving them.

#### Fate of individual sites

By tracking the fate of individual sites throughout the course of the study relative to bleeding status, it was possible to determine the effect of each regimen on the prevention and treatment of interdental gingivitis. Data from each of the treatment regimens by time point were tabulated based on their status at the baseline examination. Sites were divided into bleeding or nonbleeding, from each of the treatment regimens and their diagnosis at subsequent examinations was followed. While no inferential statistics were applied, several interesting points emerged from this compilation of data.

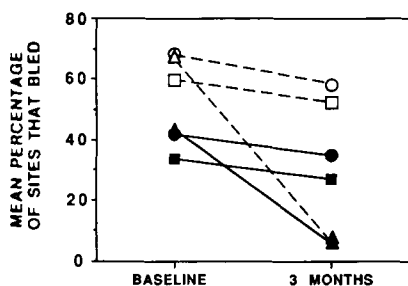


Fig. 1. Mean % of sites which bled, separately for all anterior and posterior sites, at baseline and 3 months; values for posterior sites are represented by dashed lines and open plot symbols: control (□), mouthrinse (○), mechanical (△). Values for anterior sites are represented by solid lines and closed plot symbols: control (■), mouthrinse (●), mechanical (▲).

Among those sites which were bleeding at baseline, some had stopped bleeding as of month 1; others bled at month 1, but had stopped bleeding at month 2; some bled at month 2, but had stopped bleeding at month 3. The % of sites which were bleeding at baseline and underwent each degree of bleeding cessation are shown in Table 3. The % of sites which stopped bleeding during the study was much greater in the mechanical cleaning group (89.3%) than in either the control or rinse group (36.4% and 32.9%, respectively). Of all sites which bled at baseline, 76.1% of those in the mechanical cleaning group had stopped bleeding by month 1, whereas the corresponding % for the control and mouthrinse group were 15.2% and 14.0% respectively.

A different picture emerges when examining the data compiled from the % of sites in each regimen which did not bleed at baseline, but subsequently bled during the study. These data are presented in Table 4. Only 12.3% of the sites in the mechanical cleaning group which were not bleeding at baseline bled subsequently. In the control group, 46.9% of sites and in the mouthrinse group 55.0% of sites subsequently bled after baseline. A relatively small % of sites began bleeding at one month in the mechanical cleaning group (7.2%) compared to the control and mouthrinse group (28.5% and 30.4%).

Sites which bled at baseline were more likely to stop bleeding in the mechanical cleaning group. Similarly, sites which did not bleed at baseline were unlikely to bleed subsequently when mechanical cleaning was employed. Neither of these observations appear to be true for the other 2 regimens.

#### Discussion

The purpose of this investigation was to determine the relative efficacy of a chemotherapeutic regimen and a mechanical cleaning regimen at preventing and treating interdental gingivitis. Several previous investigations have shown that chemotherapeutic agents can be

highly efficacious in the prevention and treatment of gingivitis on buccal and lingual surfaces (Løe & Schiött 1970, Løe et al. 1976, Siegrist et al. 1986, Segreto et al. 1986, Grossman et al. 1986). In the present study, the focus of the therapy, and the subsequent diagnosis of its effect was on the interdental gingiva, the area directly under the contact point that is not accessible for visual examination. As a result of this anatomical location, chemotherapeutic agents may not gain access to the site if they are not delivered there directly. Mechanical therapy, on the other hand, may be thought to be more site specific, since mechanical plaque removal can be achieved with various interdental cleaning devices in areas inaccessible to rinsing.

Significant differences were seen among the three treatment groups relative to the mean % reduction in bleeding sites over the 3-month study. The control and mouthrinse group showed no difference with regard to bleeding reduction in the interdental tissue. The inability of mouthrinsing to reduce inflammation and, therefore, bleeding indicated its inability to penetrate and exert an effect on a part of the gingiva which is overlooked in many clinical studies of anti-gingivitis agents (Siegrist et al. 1986, Segreto et al. 1986, Grossman et al. 1986, Brex et al. 1989). The interdental area is sometimes considered the same as the buccal and lingual interproximal gingiva when in fact the former can be several mm removed from the latter. Previous studies have ascribed an efficacious rôle for antimicrobial rinses at buccal or lingual interproximal sites, and this is consistent with its ability to exert an effect at other sites of the gingival margin (Brex et al. 1989). There is no question of the effectiveness of antimicrobial rinses at sites where the agent can reach, or can be delivered. In addition, interdental areas where natural recession or post-surgical recession has occurred, may also be amenable to therapy with an antimicrobial rinse. It is clear, however, from the results of this study, that in a population of subjects with gingival tissues exhibiting various degrees of interdental gingivitis, use of an antimicrobial rinse may be questioned as an effective adjunct to normal toothbrushing.

The data obtained from this study also showed that the use of wooden interdental cleaners caused a significant reduction in bleeding at the 1 month

Table 3. % of sites which were initially bleeding at baseline but subsequently ceased to bleed, for each treatment regimen by time at which bleeding ceased

Time at which bleeding ceased	% of sites Treatment regimen		
	Control	Mouthrinse	Mechanical
month 1	15.2	14.0	76.1
month 2	9.1	6.9	11.8
month 3	12.0	12.0	1.4
% which ceased to bleed during study	36.4	32.9	89.3
% bleeding at baseline	100	100	100

examination. In addition, further reductions could be seen up to 2 months, with no additional reductions seen at the 3-month examination. It is possible that increased compliance on the part of the subjects could account for the further bleeding reduction seen at 2 months. Virtually all subjects in the mechanical interdental cleaning group were, initially, unfamiliar with the use of wooden interdental cleaners. Some decrease in bleeding could be accounted for by the increased dexterity and use of the cleaners as the subjects became more familiar and proficient in their use.

The compliance surveys given to the subjects indicated that mechanical interdental cleaning was generally well received, and all subjects reported consistent use of the wooden interdental cleaners. This was also true for the mouthrinse group. Compliance was reported to be high in this group and, as a result, could not account for the lack of effect of the mouthrinse on the interdental gingiva. While there were no expectations from the control group other than to continue their normal oral hygiene, they too were contacted on a regular basis. It would appear from these data that the continuation of normal oral hygiene efforts had no adverse effect on the subjects gingiva nor did it cause significant reductions in bleeding. Any reductions in bleeding seen in either the control or mouthrinse group were likely due to the scaling at the onset of the study and/or improved oral

hygiene from increased subject awareness. These reductions were small and found to be insignificant relative to the overall data from this study.

An analysis of bleeding scores broken down by arch, facial versus lingual, and anterior versus posterior was performed to determine if an effect by any of the regimens could have been masked by pooling the percentage scores from the whole mouth. The only significant difference was found for anterior and posterior sites. In all three groups, the posterior areas had a significantly higher % of bleeding sites than anterior areas at baseline. At the end of the study, this was still true for the control and mouthrinse group. The mechanical interdental cleaning group on the other hand, showed not only a significant reduction in mean % of bleeding sites, but also reduced the mean to about the same value for anterior and posterior sites (from  $43.25\% \pm 4.98$  for anterior and  $67.65\% \pm 3.62$  for posterior to  $5.85\% \pm 1.87$  for anterior and  $7.17\% \pm 3.16$  for posterior).

Of further interest was the fact that the use of an invasive index such as the EIBI, had no effect on the overall bleeding scores. It is conceivable that using such an index at monthly intervals may have been sufficient to remove plaque to the point of reducing inflammation and hence bleeding. In order to test this, half of each subjects mouth was scored at monthly intervals and the remaining half was scored only at base-

line and 3 months. This allowed comparisons to be made between each type of examination protocol relative to its effect on bleeding scores in each group. The use of a wooden cleaner to stimulate the interdental tissue for diagnostic purposes had no significant effect on bleeding scores in any of the groups, meaning that the EIBI can be used at monthly intervals to diagnose interdental gingivitis as indicated by bleeding. However, no attempt was made to assess the effects of the examination on other parameters such as plaque or quantitative or qualitative analysis of crevicular fluid flow. Therefore, while the effect on reduction of bleeding is now well established for the EIBI, these other factors await investigation.

Another interesting aspect of these data was the result from the tracking of sites throughout the study based on their bleeding status at baseline. These data summaries clearly show the effectiveness of each of the regimens at treating and preventing interdental gingivitis. This type of analysis is interesting because it shows the pattern of effect within each regimen. When mechanical cleaning was used a site was more likely to stop bleeding if it initially bled, indicating the effectiveness of this regimen at treating interdental gingivitis. On the other hand, in the mechanical cleaning group, a site was unlikely to begin bleeding if it was initially nonbleeding indicating the effectiveness of the regimen to prevent interdental gingivitis. This was not true for the control or mouthrinse group.

Taken together, these data show that an antimicrobial mouthrinse used in conjunction with toothbrushing is not effective when compared to mechanical interdental cleaning at preventing or treating interdental gingival inflammation. This suggests that rinsing does not allow the agent to penetrate into the interdental area in a concentration high enough to be effective. This emphasizes the importance of implementing mechanical interdental cleaning with any oral hygiene regimen which is, in general, not directed at the interdental tissues.

Table 4. % of sites which did not bleed at baseline but subsequently bled, for each treatment regimen by time at which bleeding began

Time at which bleeding began	% of sites Treatment regimen		
	Control	Mouthrinse	Mechanical
month 1	28.5	30.4	7.2
month 2	10.9	14.8	4.3
month 3	7.5	9.8	0.8
% which began to bleed during study	46.9	55.0	12.3
% not bleeding at baseline	100	100	100

#### Acknowledgements

Funding for this research was provided in part by USPHS grants DE0791 & DE0159, and by Johnson and Johnson Consumer Products Inc.

## Zusammenfassung

*Vergleich zwischen mechanischer Reinigung und antimikrobieller Mundspülung bei Behandlung und Prävention der interdentalen Gingivitis*

Die Wirksamkeit einer antimikrobiellen Mundspüllösung (0,12%ige Chlorhexidindlösung) zusammen mit etwa gleichzeitigem Zähneputzen (Mundspülgruppe) und einer mechanischen interdentalen Säuberung in Kombination mit mechanischer Zahnreinigung (mechanische Gruppe), wurden in dieser Untersuchung untereinander und mit alleinigem Zähneputzen (Kontrollgruppe) verglichen, und zwar hinsichtlich der Reduktion und Vorbeugung interdental angesiedelter Zahnfleischentzündung. 92 männliche Probanden wurden eingangs und dann, nach Anwendung einer der o.a. Hygieneformen, 3 Monate lang einmal monatlich mit dem Eastman International Bleeding Index untersucht. Im Vergleich zur Eingangsuntersuchung wurde bei der mechanisch reinigenden Gruppe eine abgesicherte Verringerung des Vorkommens blutender Stellen bereits nach einem Monat erreicht (56,90% gegenüber 13,17%), die während der gesamten Studie anhielt (nach 2 Monaten 6,65% und nach 3 Monaten 5,70%). Bei den anderen Formen der Hygienebehandlung kam es während der Studie zu keinem Zeitpunkt zu einer statistisch abgesicherten Reduktion des Zahnfleischblutens. Bei der Gruppe, die ihre Interdentalspalten mechanisch reinigte, wurden gesundheitliche Verbesserungen der Gingiva im Vergleich zur Eingangsuntersuchung bereits während des 1. Versuchsmonats gesehen, die dann nach 2 Monaten in voller Stärke deutlich wurden. Die Einwirkung der Lokalisation der Zahnzwischenräume auf die Reduktion der Blutung wurde ebenfalls näher untersucht. Posterior gelegene, blutende Stellen kamen durchgehend prozentual häufiger vor als anteriore. Bei der Analyse des Vorkommens blutender Stellen im Ober- gegenüber denen im Unterkiefer und bukkal gegenüber lingual gelegenen Stellen, wurden keine signifikanten Unterschiede konstatiert. Zusätzliche Beobachtungen der Daten zeigten, daß eingangs blutende Stellen in der mechanisch reinigenden Gruppe eher sistierten. Daß eingangs nicht blutende Stellen dann später Blutungstendenzen zeigten, war bei mechanischer Reinigung unwahrscheinlich. Keine dieser Beobachtungen trafen auf die anderen Reinigungsformen zu. Diese Daten zeigen, daß nur eine mechanische Entfernung der interdentalen Plaque, in Verbindung mit dem Zähneputzen, zu einer wirkungsvollen Verringerung der interdentalen Entzündungen oder zu ihrer Vorbeugung führt. Diese Erkenntnisse unterstreichen, wie wichtig die Einführung mechanischer Interdentalreinigung in die Mundhygiene ist.

## Résumé

*Comparaison entre nettoyage mécanique et rinçage avec un antimicrobien pour le traite-*

*ment et la prévention de la gingivite interdentaire*

Cette étude compare l'efficacité d'un bain de bouche antimicrobien (gluconate de chlorhexidine 0.12%) associé au brossage dentaire (groupe rinçage), celle d'un nettoyage interdentaire mécanique (gros cure-dents triangulaires en bois) également associé au brossage dentaire (groupe mécanique), et celle du brossage dentaire seul (groupe contrôle) à réduire et prévenir l'inflammation gingivale interdentaire. 92 hommes ont été examinés pour l'inflammation interdentaire en utilisant l'indice de saignement interdentaire d'Eastman lors de la visite initiale et mensuellement durant trois mois d'utilisation d'un des régimes précités. Le groupe mécanique avait une réduction des sites avec saignement: 56.90% lors de l'examen initial, ensuite 13.17%, puis 6.65% et enfin 5.70%. Les 2 autres groupes n'ont accusé aucune réduction significative du saignement à aucun moment de l'étude. Dans le groupe mécanique, le % de sites postérieurs avec saignement était toujours plus élevé qu'en antérieur. Aucune différence significative n'a été observée entre maxillaire et mandibule, ni entre vestibulaire et lingual. Les sites avec saignement lors de la visite initiale avaient beaucoup de chance de ne plus saigner par la suite. De plus, les sites qui ne saignaient pas lors de cette première visite avaient très peu de chance de saigner par la suite. Aucune de ces observations n'était valable pour les 2 autres groupes. Ces données indiquent que seul le nettoyage interdentaire mécanique est efficace à réduire ou prévenir la gingivite interdentaire, ce qui souligne la grande importance.

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