

# Comparison of results following three modalities of periodontal therapy related to tooth type and initial pocket depth

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**Abstract.** Results following three modalities of periodontal therapy (subgingival curettage, modified Widman flap surgery, and pocket elimination or reduction surgery) in 78 patients over 8 years were compared for variations in pocket depth and clinical attachment level related to tooth types (maxillary molars, mandibular molars, maxillary bicuspid, mandibular bicuspid, maxillary anterior teeth, mandibular anterior teeth). The analysis was based on a classification of three severity groups according to initial crevice or pocket depth (Class I, 1-3 mm; Class II, 4-6 mm; and Class III, 7-12 mm) and with patient's means of measurements being the experimental units for the statistical analysis.

Reduction in pocket depth and gain of clinical attachment for pockets 4 mm or deeper occurred following all three methods of treatment, and was well sustained over 8 years. No one modality of treatment was consistently superior to any of the other two with regards to sustained reduction of pocket depth and gain of clinical attachment.

Surgical pocket elimination or reduction did not enhance the prognosis for maintenance of periodontal support in either moderate or advanced periodontal lesions anywhere in the mouth compared with more conservative modalities of treatment.

In spite of prophylaxis and instruction in home care every 3 months, there was a slight progressive loss of attachment over time in areas of shallow crevices (1-3 mm).

Whether the results of various modalities of periodontal therapy are related to tooth type is open to conjecture except for a few reports on questionable prognosis related to extensive furcation involvement (Hamp et al. 1975, Nyman & Lindhe 1976, Hirschfeld & Wasserman 1978). In a recent paper we reported that the combined results following three modalities of periodontal surgery were dependent on tooth type and

pocket depth to some very limited extent (Ramfjord et al. 1979). However, this pooled material did not indicate specifically any preference of treatment modalities related to separate areas in the mouth and initial pocket depth.

The present study isolates two variables: tooth type and severity of periodontal disease in terms of pocket depth, and proceeds to evaluate the interaction between

these two variables and three different modalities of periodontal therapy during 8 years of postoperative care.

### Material and Methods

Data from the same 78 patients that formed the basis for two previous papers (Ramfjord et al. 1978, Knowles et al. 1979) were used for the present study.

The experimental methodology has been described in previous publications (Ramfjord et al. 1975). In brief: pocket depth and attachment level related to the cemento-enamel junction were recorded for the mesial, buccal, distal and lingual surfaces of all teeth. Following initial periodontal treatment of scaling, root planing, instruction in oral hygiene and occlusal adjustment, all periodontal pockets  $> 3$  mm were treated surgically and frequently shallow crevices adjacent to pockets were included in the surgical procedures in order to treat the pockets. Curettage, pocket elimination surgery or modified Widman flap surgery were assigned on a random basis to each half dentition divided by the mid-sagittal plane. Then the patients were placed on recall for prophylaxis every 3 months and were rescored annually.

Since we have found that pockets of equal initial depth responded similarly to treatment regardless of what tooth surface had the pocket (Knowles et al. 1979), data from pockets of equal depth for all tooth surfaces were grouped together.

The data from various pocket depths were grouped on the basis of initial pocket depth: Class I (1-3 mm) - essentially gingival crevices rather than pockets. Class II (4-6 mm) - moderately deep pockets and Class III (7-12 mm) - deep pockets. The total dentition was divided into six tooth types: (1) maxillary molars, (2) mandibular molars, (3) maxillary bicuspid, (4) mandibular bicuspid, (5) maxillary anterior

teeth, and (6) mandibular anterior teeth. All measurements within each severity classification, and for each tooth type were averaged for each patient to form patient means which were used for the subsequent data analysis. Within each of these groups, the specific effect of treatment modality was evaluated over 8 years.

The hypothesis of equal treatment effects for the six groups of teeth was tested by an analysis of variance. The F-test of the equality of mean changes between surgical treatments in three levels of severity of depth of pocket was carried out at each year following treatment. If the hypothesis of equal treatment effects was rejected at the 0.05 level of significance for a specific tooth type, Scheffe's procedure for multiple comparisons was used to determine which of the pairs of surgical treatments differed.

### Results

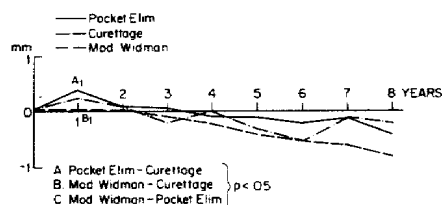
The results are reported separately for each of the six types of teeth and with regards to pocket depth, attachment level and treatment modality.

#### *Maxillary Molars*

For maxillary molars with initial pocket or crevice depth 1-3 mm (Class I) (Fig. 1A), only the first year postoperatively showed any significant difference in results regarding pocket depth (pocket elimination and modified Widman surgery both reduced pocket depth more than curettage). However, there were no sustained significant differences, and for none of the methods was the initial reduction maintained over time.

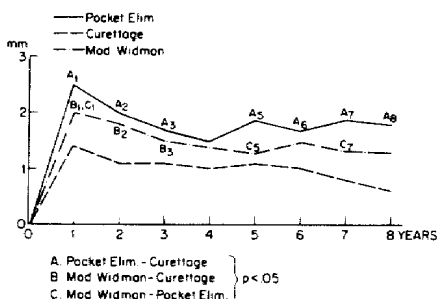
For moderately deep (4-6 mm pockets (Class II) (Fig. 1B), pocket reduction was significantly greater following pocket elimination for 7 of 8 years than following curettage, and significantly greater following modified Widman surgery than curet-

POCKET REDUCTION (Patient Means) FOR INITIAL POCKETS  
(Maxillary Molars) 1-3 mm BY TREATMENT METHOD



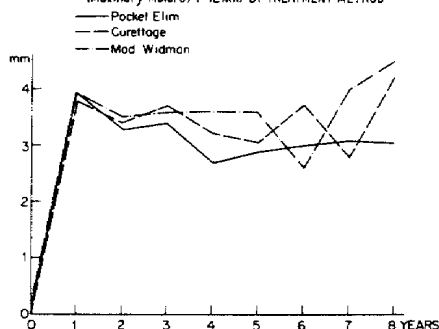
A

POCKET REDUCTION (Patient Means) FOR INITIAL POCKETS  
(Maxillary Molars) 4-6 mm BY TREATMENT METHOD



B

POCKET REDUCTION (Patient Means) FOR INITIAL POCKETS  
(Maxillary Molars) 7-12 mm BY TREATMENT METHOD



C

tage for the first 3 years. In a few instances the pocket reduction also was significantly greater following pocket elimination than following modified Widman surgery.

For the deep pockets (7-12 mm Class III) (Fig. 1C), there were no significant differences in pocket reduction following the three methods. They all were fairly effective and the effect was sustained well over the 8 years.

When attachment levels were considered (Fig. 2A, 2B, and 2C), there were practically no differences between the methods. The

Fig. 1A. Pocket reduction for initial pockets 1-3 mm.

Taschenreduktion (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Oberkiefermolaren).

Réduction des culs-de-sac (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (molaires supérieures).

Fig. 1B. Pocket reduction for initial pockets 4-6 mm.

Taschenreduktion bei initialen Taschentiefen von 4-6 mm.

Réduction des culs-de-sac pour les culs-de-sac initiaux de 4-6 mm.

Fig. 1C. Pocket reduction for initial pockets 7-12 mm.

Taschenreduktion bei initialen Taschentiefen von 7-12 mm.

Réduction des culs-de-sac pour les culs-de-sac initiaux de 7-12 mm.

erratic behavior of the curves for deep pockets after 7 and 8 years may be associated with the small numbers of such pockets in each group. There was no clear superiority of any one method with regards to loss or gain of attachment for the maxillary molars.

#### Mandibular Molars

In the mandibular molars with shallow crevices 1-3 mm (Class I) (Fig. 3A), there was a trend toward more reduction and less return of depth following pocket elim-

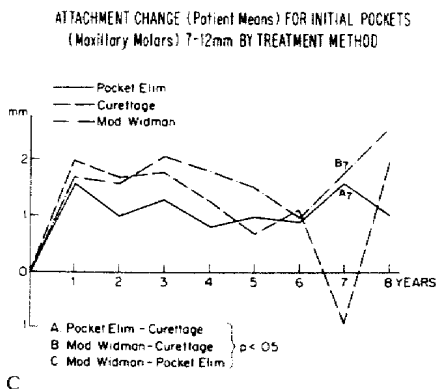
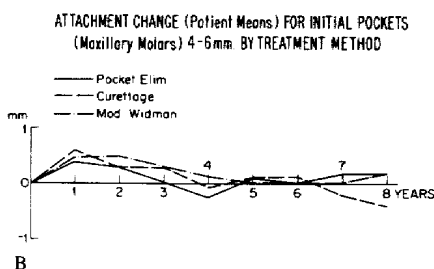
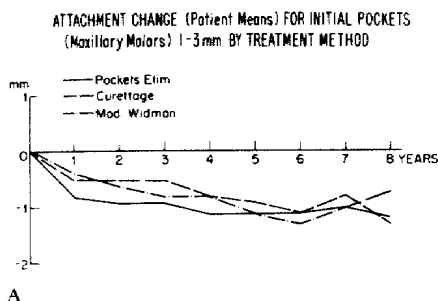


Fig. 2A. Attachment charge for initial pockets 1-3 mm.

*Veränderung des parodontalen Attachment (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Oberkiefermolaren). Modification de l'attachement (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (molaires supérieures).*

Fig. 2B. Attachment charge for initial pockets 4-6 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 4-6 mm. Modification de l'attachement pour les culs-de-sac initiaux de 4-6 mm.*

Fig. 2C. Attachment charge for initial pockets 7-12 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 7-12 mm. Modification de l'attachement pour les culs-de-sac initiaux de 7-12 mm.*

ination surgery than curettage (significant for years 1, 2 and 5). However, reduction in depth of such shallow crevices is of questionable clinical significance.

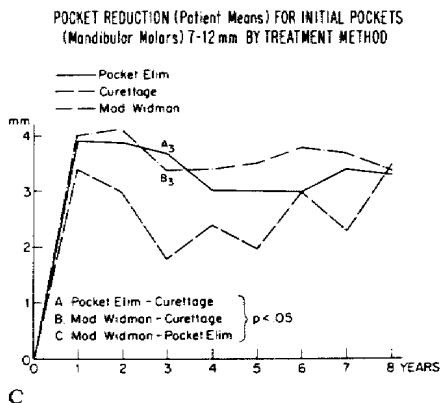
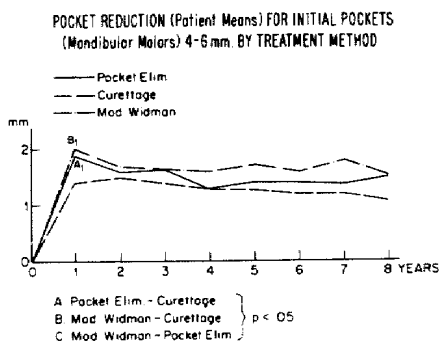
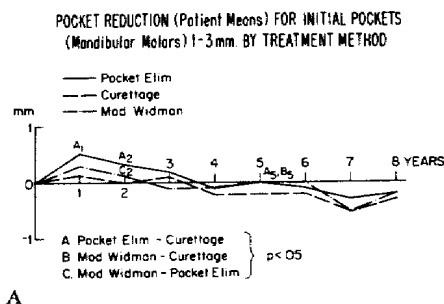
The differences for the moderately deep (Class II) (Fig. 3B) and the deep (Class III) mandibular molar pockets (Fig. 3C) were in most instances not significant, although the trend was for the greatest reduction to occur following modified Widman procedures and the least reduction following curettage.

Also with regards to changes in attachment levels (Fig. 4A, B and C) there were very few significant differences among results from the three methods of treatment, although there was a trend (signif-

icant in a few instances) to lose more attachment in shallow pockets following pocket elimination surgery than following curettage, and to gain more attachment following modified Widman surgery than following pocket elimination both in moderately deep, and deep pockets.

#### Maxillary Bicuspid

In maxillary bicuspid with shallow crevices 1-3 mm (Class I) (Fig. 5A) pocket elimination reduced the depth significantly more than curettage for most of the postoperative intervals. A return to a deeper crevice depth than pretreatment was observed only after curettage from 5 to 8 years post-operatively. For the 4-6 mm deep pockets



(Class II) (Fig. 5B) the depth was reduced significantly more for the first 3 years following pocket elimination than following curettage and this trend continued without being significant for the following 5 years. However, after the 2 to 3 first years, the pocket reduction was as great following modified Widman surgery as following pocket elimination. From a clinical standpoint it is important that the initial reduction was maintained almost unchanged after all three methods. The deep pockets 7-12 mm (Class III) (Fig. 5C) initially were

Fig. 3A. Pocket reduction for initial pockets 1-3 mm.

Taschenreduktion (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Unterkiefermolaren).

Réduction des culs-de-sac (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (molaires inférieures).

Fig. 3B. Pocket reduction for initial pockets 4-6 mm.

Taschenreduktion bei initialen Taschentiefen von 4-6 mm.

Réduction des culs-de-sac pour les culs-de-sac initiaux de 4-6 mm.

Fig. 3C. Pocket reduction for initial pockets 7-12 mm.

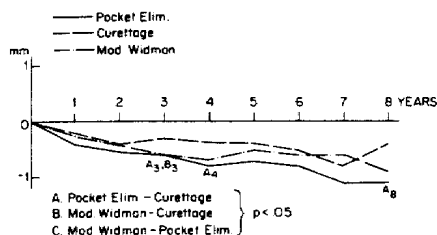
Taschenreduktion bei initialen Taschentiefen von 7-12 mm.

Réduction des culs-de-sac pour les culs-de-sac initiaux de 7-12 mm.

reduced significantly more after pocket elimination than after modified Widman surgery, but later there were no significant differences or distinctive trends among the three methods.

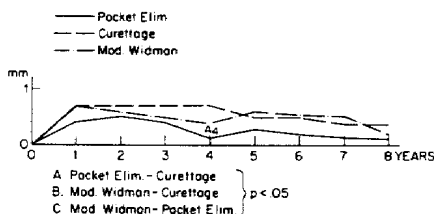
Changes in attachment level in shallow pockets 1-3 mm (Class I) (Fig. 6A) did not vary significantly among the three methods of treatment, but pocket elimination consistently led to more loss of attachment than the other two methods. For the moderately deep pockets 4-6 mm (Class II) (Fig. 6B) there also consistently appeared

ATTACHMENT CHANGE (Patient Means) FOR INITIAL POCKETS (Mandibular Molars) 1-3 mm BY TREATMENT METHOD



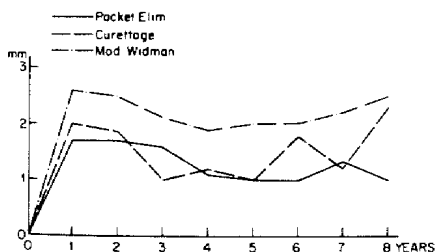
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ATTACHMENT CHANGE (Patient Means) FOR INITIAL POCKETS (Mandibular Molars) 4-6 mm BY TREATMENT METHOD



B

ATTACHMENT CHANGE (Patient Means) FOR INITIAL POCKETS (Mandibular Molars) 7-12 mm BY TREATMENT METHOD



C

Fig. 4A. Attachment change for initial pockets 1-3 mm.

*Veränderung des parodontalen Attachment (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Unterkiefermolaren). Modification de l'attachement (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (molaïres inférieures).*

Fig. 4B. Attachment change for initial pockets 4-6 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 4-6 mm. Modification de l'attachement pour les culs-de-sac initiaux de 4-6 mm.*

Fig. 4C. Attachment change for initial pockets 7-12 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 7-12 mm. Modification de l'attachement pour les culs-de-sac initiaux de 7-12 mm.*

a less favorable attachment response after pocket elimination surgery than following curettage, although these differences were significant for only three of the eight annual intervals. A similar, but not significant trend was apparent for the deep pockets 7-12 mm (Class III) (Fig. 6C), and here the modified Widman flap surgery did as well as the subgingival curettage.

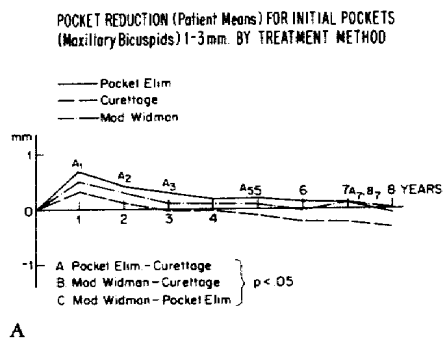
*Mandibular Bicuspid*

The shallow pockets 1-3 mm (Class I) in the mandibular bicuspid region (Fig. 7A) followed the same pattern as the maxillary bicuspid (See Fig. 5A), with a sometimes significant trend toward slightly greater

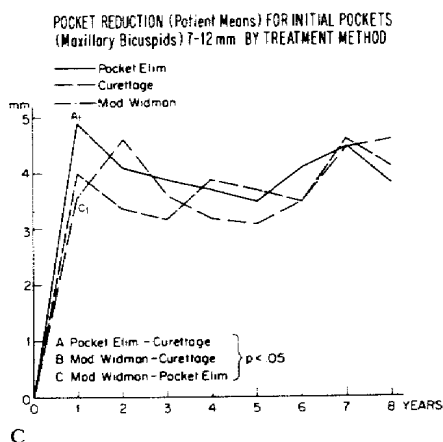
pocket reduction following pocket elimination and modified Widman operation than following curettage, and with fairly stable results after year 3.

Pocket reduction for the moderately deep pockets 4-6 mm (Class II) (Fig. 7B) also was very similar to the results for the maxillary bicuspid (See Fig. 5B), showing significantly less reduction in pocket depth after curettage than after the two other methods. However, in all instances the results were fairly stable after 3 to 4 years.

For the deep pockets, 7-12 mm (Class III) (Fig. 7C), significantly more pocket reduction occurred after modified Widman and pocket elimination surgery than follow-



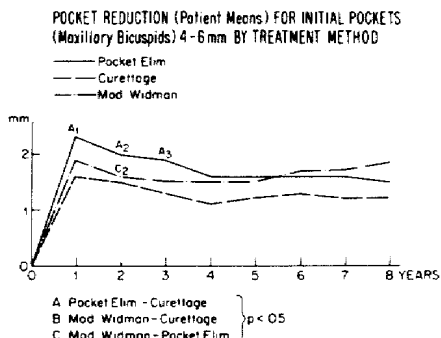
A



C

ing curettage, and while the pocket reduction was well sustained after the former two methods, the pockets gradually regained depth after curettage. This result was in contrast to the maxillary bicuspid (See Fig. 5C), and cannot be explained readily although it should be considered that very few individuals with at least 20 remaining teeth have pockets 7 mm or deeper in the mandibular bicuspid region, so these curves are based on relatively few pockets.

The changes in attachment levels for the shallow pockets 1-3 mm (Class I) (Fig. 8A), were similar to the comparative data from



B

Fig. 5A. Pocket reduction for initial pockets 1-3 mm.

*Taschenreduktion (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Oberkieferprämolaren).*

*Réduction des culs-de-sac (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (prémolaires supérieures).*

Fig. 5B. Pocket reduction for initial pockets 4-6 mm.

*Taschenreduktion bei initialen Taschentiefen von 4-6 mm.*

*Réduction des culs-de-sac pour les culs-de-sac initiaux de 4-6 mm.*

Fig. 5C. Pocket reduction for initial pockets 7-12 mm.

*Taschenreduktion bei initialen Taschentiefen von 7-12 mm.*

*Réduction des culs-de-sac pour les culs-de-sac initiaux de 7-12 mm.*

the maxillary bicuspid (See Fig. 6A). There was initially a significant trend to lose more attachment following pocket elimination than following the two other methods, but with no significant differences after year 4.

There were no significant differences in gain of attachment among the surgical methods in the moderately deep pockets, 4-6 mm (Class II) (Fig. 8B), except for year 8 when the modified Widman operation showed a greater gain of attachment than the two other methods. The attachment levels for the deep pockets 7-12 mm

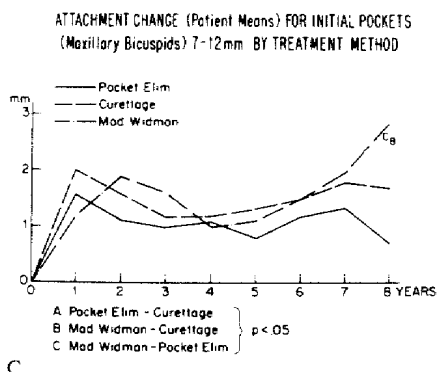
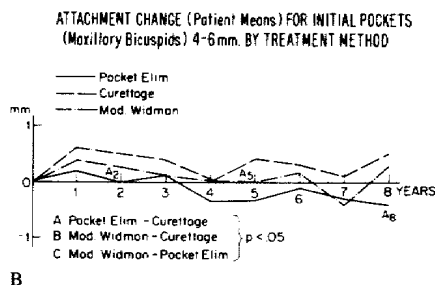
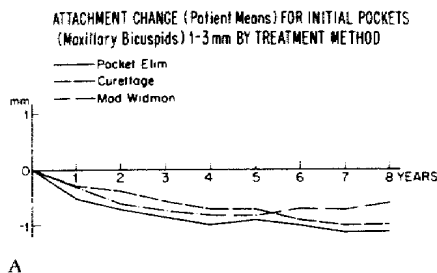


Fig. 6A. Attachment change for initial pockets 1-3 mm.

*Veränderung des parodontalen Attachment (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Oberkieferprämolaren).*

*Modification de l'attachement (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (prémolaires supérieures).*

Fig. 6B. Attachment change for initial pockets 4-6 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 4-6 mm.*

*Modification de l'attachement pour les culs-de-sac initiaux de 4-6 mm.*

Fig. 6C. Attachment change for initial pockets 7-12 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 7-12 mm.*

*Modification de l'attachement pour les culs-de-sac initiaux de 7-12 mm.*

(Class II) (Fig. 8C) showed erratic behavior and no significant differences in spite of apparently great variations in means due to the low number of such pockets. In some instances these curves represent means from as few as three to four patients due to the scarcity of deep pockets in the mandibular bicuspid regions.

### Maxillary Anterior Teeth

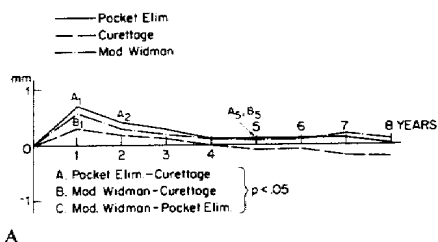
Following an initial slight reduction in depth of the shallow crevices or pockets 1-3 mm (Class I), they essentially remained at the pretreatment depth during the 8 years (Fig. 9A).

The moderate deep pockets 4-6 mm

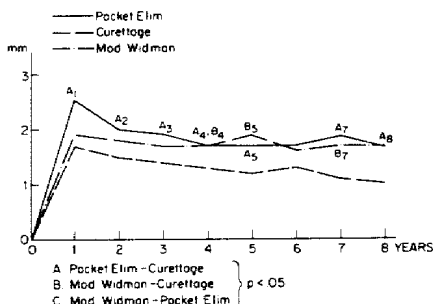
Class II) (Fig. 9B) were reduced slightly more in depth following pocket elimination surgery than following the other two methods (significant only for years 1 and 2, and only when compared to curettage). A sustained separation between the means indicate that one may expect slight but statistically insignificant differences in degrees of pocket reduction for moderately deep pockets in the maxillary anterior region depending on surgical methodology. The deep pockets, 7-12 mm (Class III) (Fig. 9C), were reduced significantly less in depth by curettage 1 year postoperatively, but thereafter there were no significant differences.



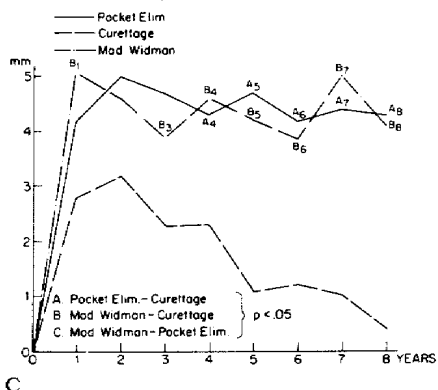
POCKET REDUCTION (Patient Means) FOR INITIAL POCKETS  
(Mandibular Bicuspsids) 1-3 mm. BY TREATMENT METHOD



POCKET REDUCTION (Patient Means) FOR INITIAL POCKETS  
(Mandibular Bicuspsids) 4-6 mm. BY TREATMENT METHOD



POCKET REDUCTION (Patient Means) FOR INITIAL POCKETS  
(Mandibular Bicuspsids) 7-12 mm. BY TREATMENT METHOD



B

Fig. 7A. Pocket reduction for initial pockets 1-3 mm.

Taschenreduktion (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Unterkieferprämolaren).

Réduction des culs-de-sac (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (prémolaires inférieures).

Fig. 7B. Pocket reduction for initial pockets 4-6 mm.

Taschenreduktion bei initialen Taschentiefen von 4-6 mm.

Réduction des culs-de-sac pour les culs-de-sac initiaux de 4-6 mm.

Fig. 7C. Pocket reduction for initial pockets 7-12 mm.

Taschenreduktion bei initialen Taschentiefen von 7-12 mm.

Réduction des culs-de-sac pour les culs-de-sac initiaux de 7-12 mm.

As for all of the other tooth groups, there was a tendency to lose more attachment in the shallow pockets 1-3 mm (Class I) (Fig. 10A), following pocket elimination surgery than following the other two methods (significant only for the first 2 years). However, the loss progressed only slightly after 2 to 3 years, and did not exceed 1 mm.

The attachment response in the moderately deep pockets, 4-6 mm (Class II) (Fig. 10B) was very similar following all three methods, and the gains in attachment

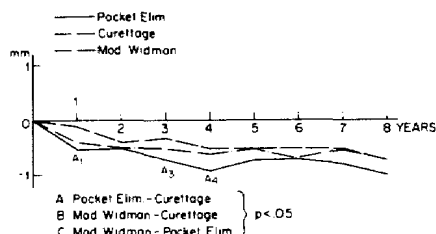
were sustained equally well after all three methods.

In deep pockets 7-12 mm (Class III) (Fig. 10C) there was a trend to gain less new attachment following pocket elimination surgery than following the other two methods, but only in two instances were the differences significant statistically.

#### Mandibular Anterior Teeth

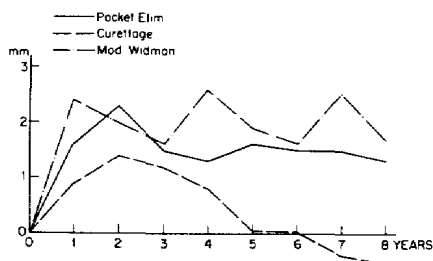
For shallow pockets or crevices, 1-3 mm (Class I) (Fig. 11A), there were no significant differences in reduction of crevice of

ATTACHMENT CHANGE (Patient Means) FOR INITIAL POCKETS (Mandibular Bicuspsids) 1-3 mm BY TREATMENT METHOD



A

ATTACHMENT CHANGE (Patient Means) FOR INITIAL POCKETS (Mandibular Bicuspsids) 7-12 mm BY TREATMENT METHOD

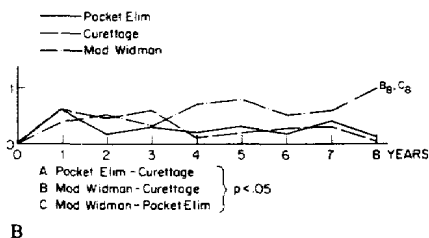


C

pocket depth among any of the three methods during the 8 years, and the pretreatment depth was maintained. Furthermore, there were practically no differences in reduction of pocket depth related to method of treatment for the moderately deep, 4-6 mm (Class II) and the deep pockets, 7-12 mm (Class III) (Figs. 11B and 11C). The initial pocket reduction was equally well sustained for all three methods of surgery.

Similar to the other tooth types, there was a tendency for the mandibular anteriors to lose some attachment in the shallow pockets, 1-3 mm (Class I) (Fig. 12A), and the trend was to lose less attachment following curettage than following the other

ATTACHMENT CHANGE (Patient Means) FOR INITIAL POCKETS (Mandibular Bicuspsids) 4-6 mm BY TREATMENT METHOD



B

Fig. 8A. Attachment change for initial pockets 1-3 mm.

*Veränderung des parodontalen Attachment (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Unterkieferprämolaren).*

*Modification de l'attachement (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (prémolaires inférieures).*

Fig. 8B. Attachment change for initial pockets 4-6 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 4-6 mm.*

*Modification de l'attachement pour les culs-de-sac initiaux de 4-6 mm.*

Fig. 8C. Attachment change for initial pockets 7-12 mm.

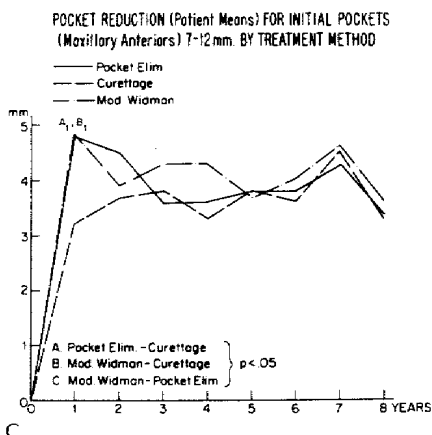
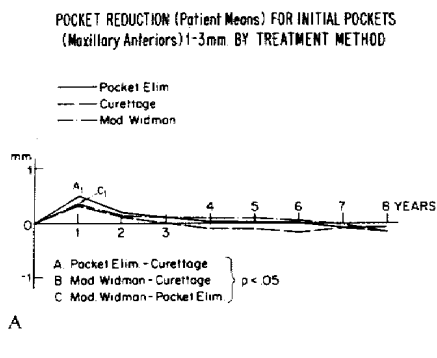
*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 7-12 mm.*

*Modification de l'attachement pour les culs-de-sac initiaux de 7-12 mm.*

two methods. However, this trend was significant statistically only for year 3. The mean loss of attachment never reached 1 mm following any of the methods.

A similar gain of attachment occurred following all three methods in moderately deep pockets, 4-6 mm (Class II) (Fig. 12B), and the gain in attachment was sustained equally well following all three methods over the 8 years.

In the deep pockets, 7-12 mm (Class III) (Fig. 12C), there was a distinct trend toward a greater gain of attachment to occur following curettage and modified Widman flap surgery than following pocket elimination surgery. However, these differences are



statistically significant for only three of the eight time intervals.

### Significance

Based on data from clinical probing, the results following the three modalities of periodontal treatment in general were very similar with small deviations which sometimes were significant statistically but without obvious clinical importance. The loss of teeth within each group will be reported in a subsequent paper.

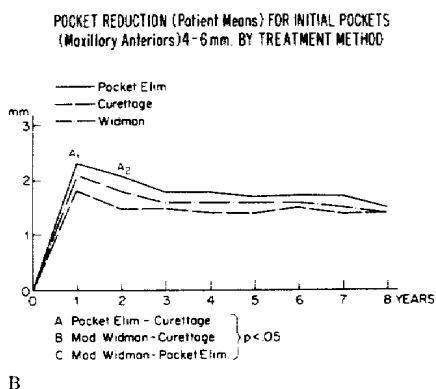


Fig. 9A. Pocket reduction for initial pockets 1-3 mm.

Taschenreduktion (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Oberkieferfrontzähne).

Réduction des culs-de-sac (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (dents antérieures du haut).

Fig. 9B. Pocket reduction for initial pockets 4-6 mm.

Taschenreduktion bei initialen Taschentiefen von 4-6 mm.

Réduction des culs-de-sac pour les culs-de-sac initiaux de 4-6 mm.

Fig. 9C. Pocket reduction for initial pockets 7-12 mm.

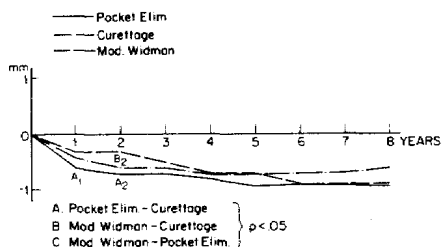
Taschenreduktion bei initialen Taschentiefen von 7-12 mm.

Réduction des culs-de-sac pour les culs-de-sac initiaux de 7-12 mm.

There was an initial trend (sometimes significant) for more pocket reduction to occur a few years after attempts on surgical pocket elimination than following modified Widman and subgingival curettage surgery, but 5 to 8 years postoperatively this trend was changed in favor of more pocket reduction following modified Widman flap surgery. The impact on crevice depth in Class I cases (1-3 mm depth), beyond the first couple of years was very similar following all of the methods.

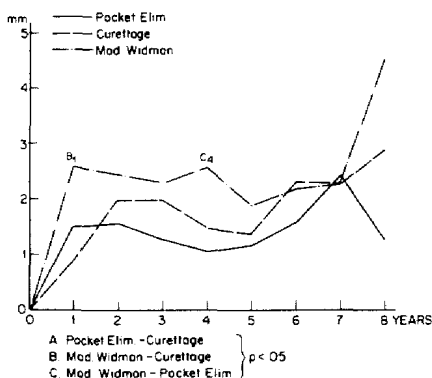
The differences in gain or loss of attach-

ATTACHMENT CHANGE (Patient Means) FOR INITIAL POCKETS (Maxillary Anteriors) 1-3 mm. BY TREATMENT METHOD



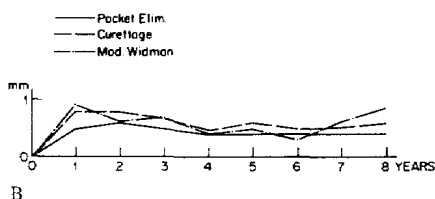
A

ATTACHMENT CHANGE (Patient Means) FOR INITIAL POCKETS (Maxillary Anteriors) 7-12 mm BY TREATMENT METHOD



C

ATTACHMENT CHANGE (Patient Means) FOR INITIAL POCKETS (Maxillary Anteriors) 4-6 mm. BY TREATMENT METHOD



B

Fig. 10A. Attachment change for initial pockets 1-3 mm.

*Veränderung des parodontalen Attachment (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Oberkieferfrontzähne).*

*Modification de l'attachement (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (dents antérieures du haut).*

Fig. 10B. Attachment change for initial pockets 4-6 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 4-6 mm.*

*Modification de l'attachement pour les culs-de-sac initiaux de 4-6 mm.*

Fig. 10C. Attachment change for initial pockets 7-12 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 7-12 mm.*

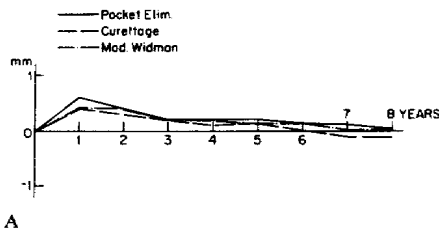
*Modification de l'attachement pour les culs-de-sac initiaux de 7-12 mm.*

ment also were similar following the three modalities of treatment with a few exceptions, as for example, for deep pockets in the mandibular anterior region where significantly more attachment was gained following modified Widman flap surgery and subgingival curettage than following attempts on surgical pocket elimination. The comparatively poor results following subgingival curettage in deep mandibular bicuspid pockets cannot be explained readily.

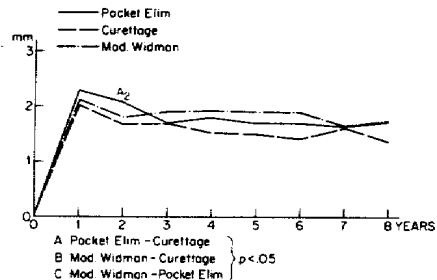
There was a trend, often not significant statistically, to lose more attachment in shallow crevices (Class I, 1-3 mm) following

surgical pocket elimination than following the two other methods. While in true periodontal pockets deeper or equal to 4 mm there was a sustained gain of attachment over 8 years following all methods of treatment, there was a loss of attachment in the shallow crevices (Class I, 1-3 mm), and this slightly progressive loss was not entirely limited to the impact of the surgical treatment during the first postoperative year. A similar loss of attachment following frequent conservative treatments of incipient periodontal lesions also has been reported by Suomi et al. (1971).

POCKET REDUCTION (Patient Mean) FOR INITIAL POCKETS  
(Mandibular Anteriors) 1-3 mm. BY TREATMENT METHOD



POCKET REDUCTION (Patient Means) FOR INITIAL POCKETS  
(Mandibular Anteriors) 4-6 mm. BY TREATMENT METHOD



POCKET REDUCTION (Patient Means) FOR INITIAL POCKETS  
(Mandibular Anteriors) 7-12 mm BY TREATMENT METHOD

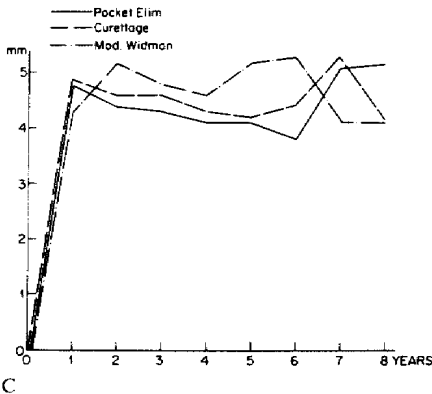


Fig. 11A. Pocket reduction for initial pockets 1-3 mm.

Taschenreduktion (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Unterkieferfrontzähne).

Réduction des culs-de-sac (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (dents antérieures du bas).

Fig. 11B. Pocket reduction for initial pockets 4-6 mm.

Taschenreduktion bei initialen Taschentiefen von 4-6 mm.

Réduction des culs-de-sac pour les culs-de-sac initiaux de 4-6 mm.

Fig. 11C. Pocket reduction for initial pockets 7-12 mm.

Taschenreduktion bei initialen Taschentiefen von 7-12 mm.

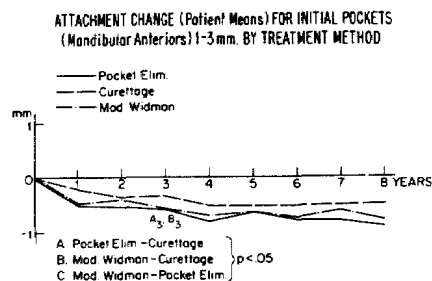
Réduction des culs-de-sac pour les culs-de-sac initiaux de 7-12 mm.

Although all patients had prophylaxis every 3 months, many of them had less than perfect plaque control and sometimes moderately severe gingivitis. It may be that a 3-month recall schedule as used in this study is more effective in preventing anaerobic reinfection of pockets (Waerhaug 1978) and destruction of attachment than in prevention of more directly surface related incipient periodontal lesions in gingivitis.

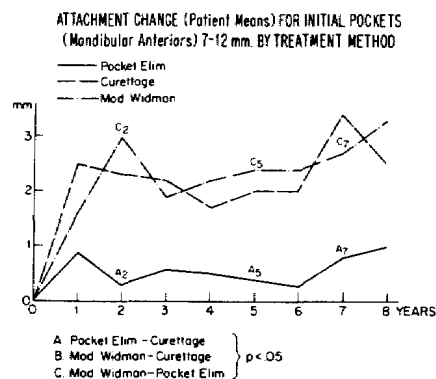
Another obvious question is what impact furcation involvement of the molars had on the results following the various treatment

modalities. More than 50% of the molars with pockets had various degrees of furcation involvement. However, our measurement of pocket depth and attachment levels were obtained on the mesial and distal aspects of the roots and on the buccal aspects of the mesiobuccal roots as well as the lingual aspect of the mesial roots of mandibular and the palatal roots of maxillary molars.

On the basis of our measurements, it appeared that the molars of which a large percentage had furcation involvement res-



A



C

ponded about as well to treatment as other tooth groups, which is not too surprising on the basis of reports from other longitudinal studies (Hirschfeld & Wasserman 1978, Ross & Thompson 1978). However, this question will be discussed in detail in a subsequent report on tooth loss.

### Conclusions

1. Similar results with regard to sustained reduction of pocket depth and gain of attachment in pockets 4 mm and deeper can be expected with few exceptions following subgingival curettage, modified Widman flap surgery, and pocket elim-

ATTACHMENT CHANGE (Patient Means) FOR INITIAL POCKETS (Mandibular Anteriors) 4-6 mm. BY TREATMENT METHOD

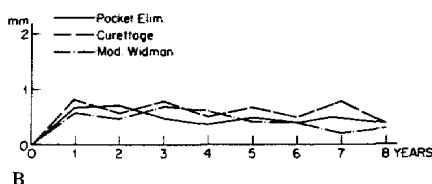


Fig. 12A. Attachment change for initial pockets 1-3 mm.

*Veränderung des parodontalen Attachment (Mittelwerte der Patienten) bei initialen Taschentiefen von 1-3 mm (Unterkieferfrontzähne).*

*Modification de l'attachement (moyenne des patients) pour les culs-de-sac initiaux de 1-3 mm (dents antérieures du bas).*

Fig. 12B. Attachment change for initial pockets 4-6 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 4-6 mm.*

*Modification de l'attachement pour les culs-de-sac initiaux de 4-6 mm.*

Fig. 12C. Attachment change for initial pockets 7-12 mm.

*Veränderung des parodontalen Attachment bei initialen Taschentiefen von 7-12 mm.*

*Modification de l'attachement pour les culs-de-sac initiaux de 7-12 mm.*

- ination or reduction surgery for any tooth type.
2. The greatest pocket reduction and gain of attachment occurred for the deep pockets (7-12 mm) following all types of treatment and for all tooth types.
3. No greater sustained benefit with regard to pocket reduction and gain of attachment occurred following surgical elimination of 4-6 mm pockets, than following more conservative methods although such pockets technically could be eliminated surgically.
4. Although curettage showed consistently less pocket reduction in moderately diseased tooth groups, attachment level

responses were as favorable and in most instances better than for pocket elimination.

#### Acknowledgment

We wish to thank Neil Wright for technical assistance in data management.

#### Zusammenfassung

*Behandlungsergebnisse nach drei parodontalen Therapieformen. Die Vergleiche gehen von dem Zahntyp und den initialen Taschentiefen aus.* Die Behandlungsergebnisse nach drei parodontalen Therapieformen (subgingivale Kürettage, modifizierte Lappenoperation nach Wiedman und chirurgische Taschenreduktion bzw. -entfernung) wurden bei 78 Patienten während einer Zeitspanne von über 8 Jahren nachuntersucht. Die Taschentiefen und die klinischen Attachmentniveaus, bezogen auf die verschiedenen Zahntypen (Oberkiefermolaren, Unterkiefermolaren, Oberkieferprämolaren, Unterkieferprämolaren, Oberkieferfrontzähne, Unterkieferfrontzähne), wurden miteinander verglichen. Die vorliegende Analyse geht von einer Gruppierung der Schwere vorliegender Erkrankung nach der Tiefe des gingivalen Sulcus oder der Zahnfleischtasche aus (Klasse I, 1-3 mm; Klasse II, 4-6 mm und Klasse III, 7-12 mm). Die bei dem einzelnen Patienten registrierten Messungen bilden die experimentelle Einheit der statistischen Analyse. Die Verminderung der Taschentiefen und der Gewinn an klinischem Attachment blieb während der achtjährigen Beobachtungszeit bei Zahnfleischtaschen von 4 mm und mehr nach allen drei Therapieformen erhalten. Keine der drei Therapieformen war hinsichtlich beibehaltener Taschenreduktion und beibehaltenem Gewinn an klinischem Attachment den beiden anderen konstant überlegen.

Im Vergleich zu den konservativen Behandlungsformen verbesserte die chirurgische Taschenreduktion bzw. -entfernung keinesfalls, weder bei leichteren noch bei schwereren parodontalen Läsionen, die Prognose für die Beibehaltung der Parodontalstütze in irgendeiner Region der Mundhöhle. Trotz regelmässiger Prophylaxe und Instruktion in der Eigenbehandlung - in regelmässigen Abständen von drei Monaten durchgeführt - wurde in Regionen mit flachen gingivalen Sulci (1-3 mm) leichter progressiver Verlust an parodontalem Attachment beobachtet.

#### Résumé

*Comparaison entre les résultats de trois méthodes de traitement parodontal, suivant le type de dent, et la profondeur initiale des culs-de-sac*

Pendant huit années, les résultats obtenus chez 78 patients après traitement parodontal par trois méthodes différentes (curetage subgingival, opération suivant la modification de la méthode du lambeau de Widman et opération d'élimination ou de réduction des culs-de-sac) ont été comparés en ce qui concerne les variations de la profondeur des culs-de-sac et du niveau clinique de l'attachement, suivant le type de dent (molaires supérieures, molaires inférieures, prémolaires supérieures, prémolaires inférieures, dents antérieures de la mâchoire supérieure et de la mâchoire inférieure). L'analyse était basée sur une classification des groupes suivant la sévérité de l'atteinte, d'après la profondeur initiale des sillons et culs-de-sac gingivo-dentaires (Classe I, 1-3 mm; Classe II, 4-6 mm et Classe III, 7-12 mm) et l'analyse statistique portait sur les moyennes des mesures des patients.

Pour les culs-de-sac de 4 mm et plus, une réduction de la profondeur des culs-de-sac et une amélioration de l'attachement clinique avait lieu avec les trois méthodes de traitement et persistaient pendant les huit années. Aucun des modes de traitement ne donnait de résultats constamment supérieurs aux deux autres en ce qui concernait la réduction prolongée de la profondeur des culs-de-sac et l'amélioration de l'attachement clinique.

Par rapport aux méthodes plus conservatrices, l'élimination ou la réduction chirurgicale des culs-de-sac n'améliorait en aucune localisation de la bouche le pronostic de maintien du support parodontal, ni pour les lésions parodontales modérées, ni pour les lésions avancées.

Bien que les détartrages et les instructions d'hygiène bucco-dentaire aient eu lieu tous les trois mois, une légère perte de l'attachement continuait à se produire progressivement au niveau des sillons gingivo-dentaires peu profonds (1-3 mm).

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