Periodontal considerations in the use of bonds or bands on molars in adolescents and adults

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During the past decade, bonding brackets directly to tooth surfaces has become the most widely used method of securing fixed orthodontic appliances. During the same period, there has also been a dramatic increase in the number and percentage of adults receiving orthodontic treatment. Yet few systematic studies of the periodontal implications of these changes have been undertaken. To date, most studies of periodontal disease among orthodontic patients have been conducted on adolescents whose teeth had been banded.[1-12] Only one study has been reported which compares treatment-associated periodontal changes in adolescents treated with banded appliances and those treated with bonded appliances.[13] The results of that investigation show less plaque accumulation and gingival inflammation around bonded teeth than around banded teeth. However, the periodontal status of banded and bonded molars could not be compared in that study because all molar teeth in the sample had been banded. Other studies of adolescents undergoing fixed orthodontic treatment have reported that plaque accumulation and periodontal in-

Abstract

This longitudinal study compared the periodontal status of bonded and banded molars in 20 adult and 40 adolescent patients before, during and after treatment with fixed orthodontic appliances. Plaque accumulation (measured by the Plaque Index), gingival inflammation (measured by the Gingival Index and the bleeding tendency), and pocket depth were assessed by one examiner at sites along the mesio-buccal line angle of the maxillary right first molar and the mandibular left first molar. Assessments were made immediately prior to the placement of fixed appliances (pretreatment), at 1, 3, 6, 9, 12 and 18 months after appliances were placed; and 3 months after appliances were removed (posttreatment). Loss of attachment between the pretreatment and posttreatment visits also was determined. At pretreatment, no significant differences were found in gingival inflammation between maxillary and mandibular banded and bonded molars. During treatment, both maxillary and mandibular banded molars showed significantly ($p<0.05$) greater gingival inflammation and plaque accumulation than did bonded molars. Three months after appliance removal, the maxillary molars that had been banded continued to show significantly more gingival inflammation and loss of attachment than did the maxillary molars that had been bonded. When all banded and bonded teeth were grouped by patient age, mean values for plaque accumulation and gingival inflammation in the maxillary molar regions were significantly greater for adolescents than for adults.

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Key Words

Periodontal disease • Fixed appliances • Adult orthodontic treatment

Table 1
Distribution of bonded versus banded molars

Group	Bonded	Banded	Total
Maxillary			
Adult	6	8	14
Adolescent	5	28	33
Total	11	36	47
Mandibular			
Adult	6	8	14
Adolescent	16	17	33
Total	22	25	47

flammation are more severe on molars than on anterior teeth[2,3,10] and there is reason to suspect that bonded molars experience less gingival inflammation than do banded molars.[14] Another recent study[15] which did compare adolescents and adults showed that adolescents receiving fixed orthodontic treatment have more periodontal inflammation and accumulate more plaque than adults receiving similar treatment. However, in that study, no comparisons were made between banded and bonded teeth.

This study was designed to test several hypotheses concerning differences in periodontal response to orthodontic treatment. Because periodontal pathology is most likely to be observed first in the molar interproximal region,[16,17] that region was adopted as our experimental locus. The hypotheses tested were: (1) during orthodontic treatment, banded molars in adolescents and adults have significantly greater plaque accumulation and gingival inflammation than bonded molars; (2) during orthodontic treatment, loss of attachment is greater for banded molars than for bonded molars, and (3) adolescents experience greater plaque accumulation and gingival inflammation than adults before, during and after orthodontic treatment.

Materials and methods

Study population

The sample consisted of 60 consecutive patients, adolescents and adults, who were to receive fixed (edgewise) orthodontic treatment in both arches at the Orthodontic Clinic of the School of Dentistry, University of California San Francisco, and who met the following criteria: (1) no history of rheumatic fever, congenital heart disease, blood dyscrasias, diabetes mellitus or juvenile periodontitis; (2) no antibiotic therapy or use of oral irrigators or topical chemical agents known to inhibit plaque during the previous 6 months; (3) between 10 and 16 years old for the adolescent group and over 21 for the adult group; (4) willing to undergo periodontal treatment prior to orthodontic treatment if necessary; and (5) willing to provide written consent to participate according to the guidelines of the University of California Committee on Human Research.

At the outset of the study there were 20 subjects (12 female, 8 male) in the adult group and 40 subjects (24 female, 16 male) in the adolescent group. The mean age for the adult group was 31.4 years (range, 23 to 54 years). The mean age for the adolescent group was 12.5 years (range, 10 to 16 years).

Periodontal examinations

Assessment of pocket depth[18] and of three clinical indices — the Plaque Index[19] (to measure plaque accumulation), the Gingival Index[20] and bleeding tendency[21] (to measure gingival inflammation) — were carried out for each subject at the pretreatment examination (before appliance placement); at 1, 3, 6, 9, 12 and 18 months after appliance placement; and 3 months after appliance removal. In addition, loss of attachment[18] was measured pretreatment and 3 months after appliance removal. All measurements were made by the same examiner. For each patient, assessments were made at two representative sites: on the mesio-buccal aspects of the maxillary right first permanent molar and the mandibular left first permanent molar. Pocket depth was defined as the distance from the gingival margin to the bottom of the clinical pocket and was measured with a calibrated Michigan "O" periodontal probe with an end diameter of 0.5mm. Loss of attachment was measured as the distance from the cemento-enamel junction to the base of the pocket. If the examiner could not probe apical to the cemento-enamel junction, loss of attachment was recorded as zero millimeters. All probing measurements were rounded to the nearest millimeter. Tooth loss during treatment was recorded and classified as to cause.

Measurement errors for pocket depth and loss of attachment were determined by calculating the means and standard deviations of absolute differences between replicate measurements.[18] The percentages of intraexaminer reproducibility for Plaque Index, Gingival Index and bleeding ten-

dency were determined by repeated measurements at 6- to 9-month intervals to assure a minimum of 85% reproducibility. The kappa statistic was used to quantify agreement beyond chance for the three clinical indices.[22]

Procedures

The periodontal status of each subject was evaluated prior to the start of orthodontic treatment. None of the adolescents showed evidence of periodontitis. Ten of the adults were diagnosed as having generalized moderate to advanced periodontitis. Prior to orthodontic treatment, each of these 10 subjects received periodontal treatment including surgical pocket elimination where indicated. Four of the 10 subjects had a total of eight severely periodontally compromised teeth (pocket depths greater than 6mm and/or advanced furcal involvement). None of these compromised teeth were study site teeth and none of the study site teeth had pocket depths exceeding 4mm. Thus, it may be said that all studied molars in the 10 adults treated for periodontitis had healthy, though possibly reduced, periodontal tissue support when orthodontic treatment began. The 10 adults were placed on a 3- to 4-month recall schedule for periodontal maintenance. The remaining adults and all the adolescents were asked to schedule regular 6-month dental checkups with their general dentists.

Shortly after the pretreatment recordings of periodontal status were made, all patients received routine brushing and flossing instruction from the same plaque-control therapist who also reinforced the instructions on an individual basis at the subsequent monthly orthodontic visits. During the fixed appliance phase of treatment, patients found to be using oral irrigating devices, antibiotics or topical chemical agents known to inhibit plaque were removed from the study.

Orthodontic treatment

Maxillary and mandibular full arch edgewise orthodontic appliances were placed for each subject and routine orthodontic treatment was delivered as necessary. Shortly after appliances were removed, most patients received an upper removable Hawley retainer and either a lower Hawley retainer or a fixed lower lingual canine-to-canine bonded retainer. Six of the adults received orthognathic surgery in addition to fixed orthodontic treatment. (The orthognathic surgery was generally performed during the last 6 months of active orthodontic treatment.) None of the patients had fiberotomies or surgical exposure of impacted teeth. The distribution of banded and bonded maxillary or mandibular molars among the adults and adolescents is shown in Table 1.

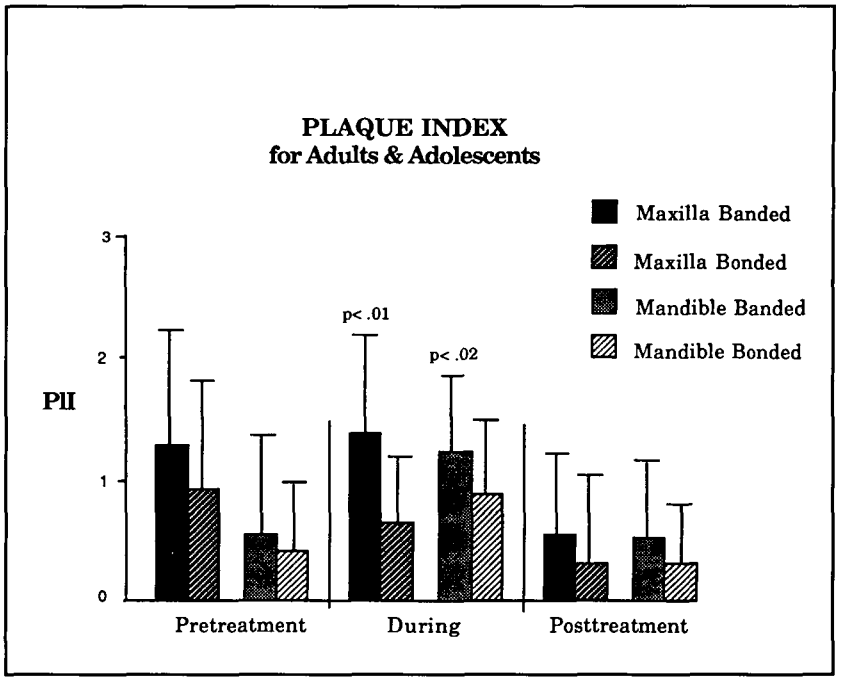


Figure 1
Mean Plaque Index (PII) of the combined adult and adolescent groups for maxillary or mandibular banded or bonded molars before appliances were placed (pretreatment), during orthodontic treatment, and 3 months after orthodontic treatment (posttreatment). P values appear above the greater mean values where significant differences were found between banded and bonded sites. Bars indicate standard deviations in this and subsequent figures.

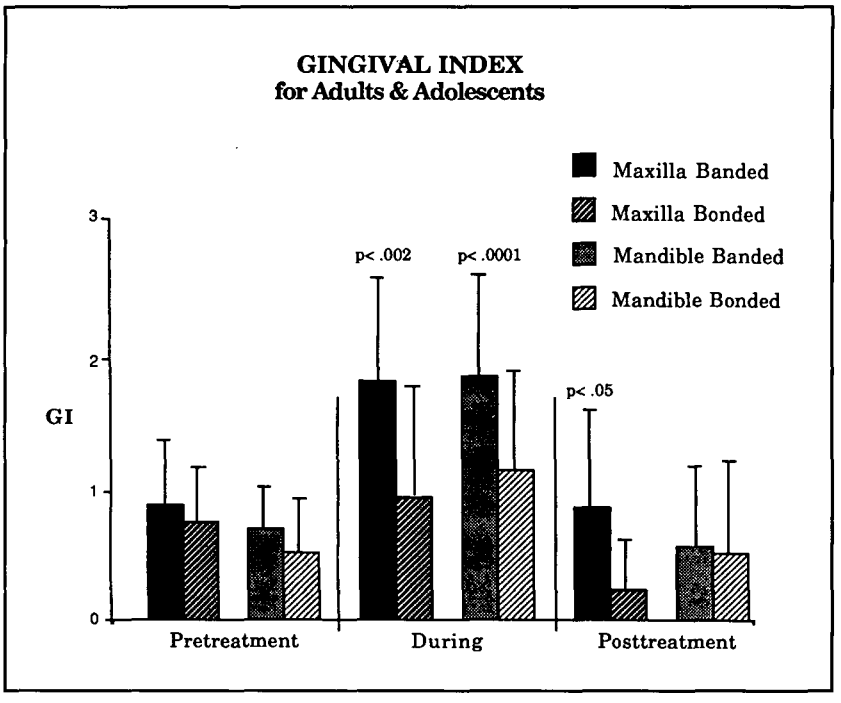
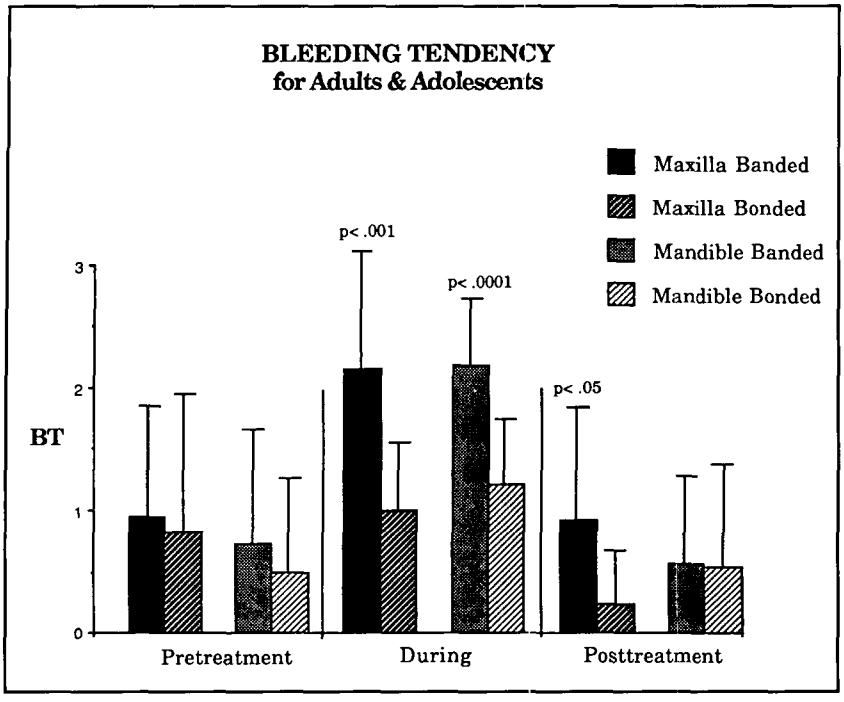


Figure 2
Mean Gingival Index (GI) of the combined adult and adolescent groups for maxillary or mandibular banded or bonded molars before appliances were placed, during threatment and 3 months after treatment.



Figures 3
Mean bleeding tendency (BT) of the combined adult and adolescent maxillary and mandibular banded or bonded molars before appliances were placed, during treatment and 3 months after treatment.

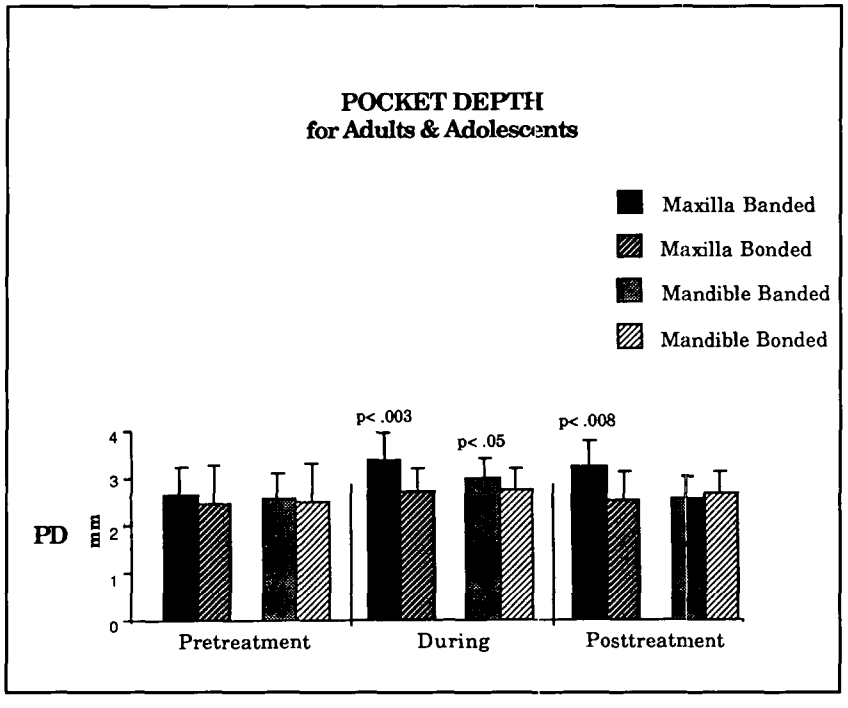


Figure 4
Mean pocket depth (PD) of the combined adult and adolescent groups for maxillary or mandibular banded or bonded molars before appliances were placed, during treatment and 3 months after treatment.

Statistical analysis

For the purposes of analysis, the 1- through 18-month clinical recordings of periodontal status for each site were combined (collapsed), yielding overall mean values for each variable for the entire 18 months of observation. Then, individual two-way analyses of variance were performed for each of the subgroups (adults versus adolescents, banded versus bonded) of maxillary and mandibular molars to determine intergroup differences at three stages (pretreatment, during orthodontic treatment, and 3 months after treatment). P-values of less than 0.05 were considered statistically significant. Data entry errors were checked by duplicating all computer entries from the original raw data forms.

Because some subjects had upper or lower bonded molars with the opposing molars banded, data for maxillary molars were analyzed separately from data for mandibular molars. In this way, it was possible to avoid using the same individual as a source for banded and bonded study sites in one analysis. This approach also made it possible to identify differences in periodontal status between maxillary and mandibular molars.

Results

Study population

Of the original sample of 40 adolescents and 20 adults, three adults and two adolescents were removed because they moved from the area and transferred their care to other orthodontists. Three other adolescents were excluded because the bonds which had originally been placed on their maxillary teeth repeatedly became loose and had to be replaced with bands. Three other adults and two adolescents did not complete the study because they missed multiple treatment appointments or study-related periodontal examinations. Complete study data were obtained for 14 adults and 33 adolescents. The mean treatment time for these adults was 22.2 months (SD=5.1 months); the mean treatment time for the adolescents was 26.2 months (SD=4.2 months).

Periodontal findings

The statistical data in this report are arranged such that higher values for any clinical measurement imply less favorable periodontal conditions. At the pretreatment baseline, there were no significant differences in periodontal status between banded and bonded molars (maxillary or mandibular) for the combined adult and adolescent groups (Figure 1-4). However, when pretreatment data for all banded and bonded adults were

Table 2
Maxillary Molars
Means, standard deviations and differences expressed in p values of all clinical measurements for combined adult and combined adolescent banded and bonded maxillary molars

	PRETREATMENT			DURING TREATMENT			POSTTREATMENT		
	adults (n = 14)	adolescents (n = 33)	p value of difference	adults (n = 14)	adolescents (n = 33)	p value of difference	adults (n = 14)	adolescents (n = 33)	p value of difference
Plaque Index	0.43±0.51	1.33±0.89	.007	0.40±0.32	1.34±0.71	.002	0.35±0.69	0.85±0.59	.04
Gingival Index	0.29 ±0.73	1.06±0.83	.008	1.06±0.75	1.79±0.45	.001	0.08±0.28	0.96±0.77	.006
Bleeding Tendency	0.40±0.85	1.12±0.93	.01	1.28±0.96	2.11±0.62	.01	0.09±.30	1.03±0.87	.008
Pocket Depth (in mm)	2.29±0.73	2.72±0.63	------	2.79±0.65	3.41±0.49	.004	2.50±0.58	3.31±0.49	.003
Attachment Loss (in mm)	1.01±	0.01±0.11	.004	-----	-----	-----	1.23±1.74	0.36±0.48	.04
Attachment Loss differences (in mm)	-----	-----	------	-----	-----	-----	0.15±0.38	0.36±0.49	-----

Table 3
Mandibular Molars
Means, standard deviations and differences expressed in p values of all clinical measurements for combined adult and combined adolescent banded and bonded maxillary molars

	PRETREATMENT			DURING TREATMENT			POSTTREATMENT		
	adults (n = 14)	adolescents (n = 33)	p value of difference	adults (n = 14)	adolescents (n = 33)	p value of difference	adults (n = 14)	adolescents (n = 33)	p value of difference
Plaque Index	0.56±0.64	0.36±0.65	------	0.67±0.46	1.06±0.62	.03	0.16±0.30	0.48±0.56	.02
Gingival Index	0.57 ±0.93	0.61±0.79	------	1.41±0.57	1.51±0.53	------	0.19±0.33	0.69±0.80	.03
Bleeding Tendency	0.64±1.08	0.52±0.79	------	1.67±0.80	1.70±0.72	------	0.21±.0.30	0.71±0.83	.04
Pocket Depth (in mm)	2.50±0.85	2.55±0.62	------	2.76±0.62	2.92±0.34	------	2.39±0.55	2.73±0.38	.03
Attachment Loss (in mm)	0.71±1.13	0.03±0.18	.04	------	------	------	1.08±1.44	0.11±0.31	.05
Attachment Loss differences (in mm)	------	------	------	------	------	------	0.31±0.48	0.07±0.39	------

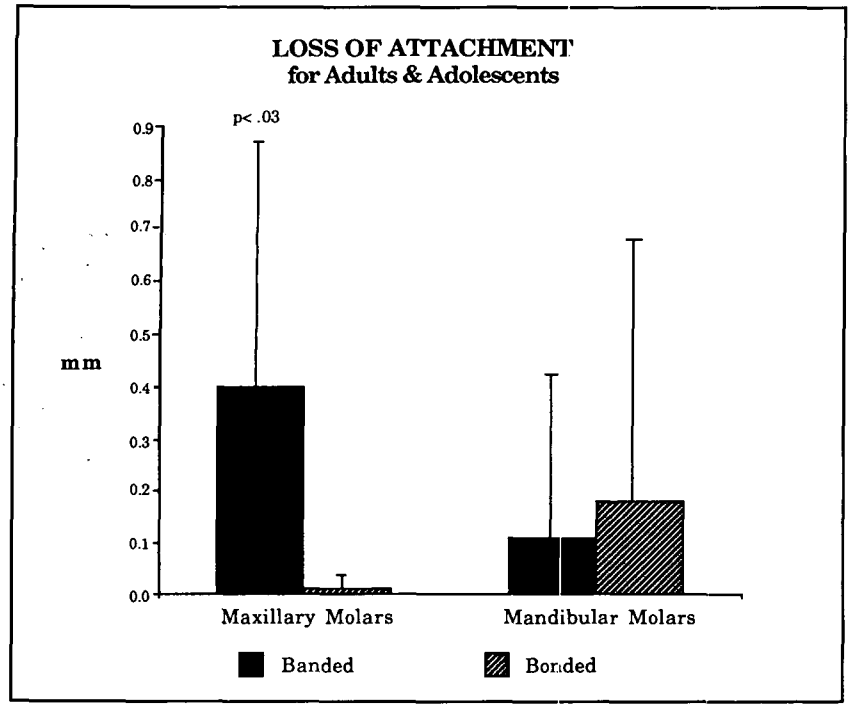


Figure 5
Mean loss of attachment for the combined adults or adolescent groups for maxillary or mandibular banded or bonded molars.

pooled and compared with similar data for adolescents, adolescent maxillary (but not mandibular) molars had significantly higher values than did adult molars for Plaque Index, Gingival Index and bleeding tendency but not for pocket depth or loss of attachment (Tables 2 and 3).

During the period of active orthodontic treatment (based on the evidence of pooled 1- to 18-month data for the combined adult and adolescent groups), the values for the Plaque and Gingival indices, bleeding tendency and pocket depth were all significantly higher for banded maxillary and mandibular molars than for analogous bonded molars (Figures 1-4). When all adolescents were compared with all adults, significantly higher levels for all clinical measurements were found for maxillary molars, but no corresponding significant differences were found for mandibular molars. (Tables 2 and 3).

At the posttreatment examination (3 months after appliance removal), there were significantly higher values for the Gingival Index, bleeding tendency and pocket depth for the combined adult and adolescent groups when banded maxillary molars were compared to bonded maxillary molars (Figures 1-4). In addition, significantly higher mean values were found for all clinical measurements for both maxillary and mandibular molars when the entire adolescent group was compared to the entire adult group (Tables 2 and 3).

For the combined adult and adolescent groups, loss of attachment between the pretreatment and posttreatment examinations was significantly greater for maxillary banded molars than for maxillary bonded molars (Figure 5). Significant loss of attachment was found for the adults when compared to adolescents at both pretreatment and posttreatment examination for both maxillary and mandibular molars, but the *differences* in loss of attachment for the two groups between the pretreatment and posttreatment examinations were not significant (Tables 2 and 3).

Six of the 10 adults who were originally treated for periodontitis completed the study. Among these six, compliance with the periodontal maintenance schedule during orthodontic treatment was excellent, with only two patients missing a single scheduled periodontal maintenance visit each. With regard to the eight non-study teeth which were severely compromised pretreatment (discussed under Materials and methods), two molars and one canine (each in a different subject) were lost during the study period because of periodontal abscesses. Except for planned extraction for orthodontic purposes, no other teeth were lost.

Repeated measurements of the Plaque Index, the Gingival Index, and the bleeding tendency showed a mean percentage agreement of 86.4%. The kappa statistic for clinical indices had a mean value of 0.71 with a range of 0.65 to 0.84. The measurement error for pocket depth was 9.42mm (SD=0.26); the measurement error flor loss of attachment was 0.53mm (SD+0.34).

Discussion

This discussion deals with three general topics: overall impressions about the findings, comments on a number of specific issues and consideration of study limitations.

Overall impressions

The results of this study tended in general to confirm the three hypotheses advanced in the introduction. The data show that: (1) Banded molars in both adolescents and adults had significantly more plaque accumulation and gingival inflammation than bonded molars; (2) Banded maxillary molars in both adolescents and adults had significantly more loss of attachment during treatment than bonded maxillary molars. It should be noted, however, that corresponding differences for mandibular molars were not significant. (3) Adolescents, whether banded or bonded, showed more plaque accumulation and gingival inflammation than adults before, during and after orthodontic treatment. It was also noted that maxillary molars in general exhibited a greater amount of periodontal inflammation during treat-

ment and greater loss of attachment following treatment than did mandibular molars. Several earlier studies[2,6,10] had reported similar findings.

Specific issues

In this study, the individuals in the banded group who had the greatest loss of attachment were invariably the subjects with the poorest plaque removal and highest levels of gingival inflammation. This observation is in agreement with those of previous studies.[2,3,10,15] However, it has been reported that when loss of attachment measurements are made in inflamed tissue, the probe tip tends to penetrate through the sulcular epithelium into connective tissue.[23] Since our final probing for attachment loss was performed only 3 months after appliances were removed (at which point connective tissue inflammation in the adolescents may not yet have fully subsided), loss of attachment for these subjects may have been overestimated.

A highly probable explanation for the differences in periodontal status and loss of attachment between banded and bonded molars is that plaque removal on the banded molars was made more difficult by the overhanging gingival margins of the orthodontic bands, causing prolonged gingival inflammation and eventual loss of attachment.[24] An alternative possible explanation for at least part of the loss of attachment is the mechanical injury caused by the subgingival placement of orthodontic bands.[25] In this study, it was not possible to distinguish between these two causes of loss of attachment.

Many of our findings are consistent with those of previous studies. These include the observations that molars with orthodontic bands have more plaque accumulation,[1-11] gingival inflammation,[1-11] and loss of attachment[2,3,10] than nonbanded teeth or than banded or bonded anterior teeth. Further, they have a quantitatively and qualitatively different type of bacterial flora whose presence is positively associated with gingival inflammation.[26,27]

Only mesiobuccal surfaces were used as study sites. This may have led to underestimation of the actual amount of periodontal inflammation and loss of attachment. However, a previous study[16] yielded evidence that distal proximal surfaces show recordings of periodontal destruction similar to those of the mesial surfaces. Buccal surfaces were not sampled because these surfaces tend to show less periodontal inflammation than proximal sites[17,28] and are more likely to show toothbrush abrasion.[29] Lingual surfaces were not used as study sites because they are considered susceptible to increased examiner error.[18] The intra examiner percentage agreement for clinical indices and the kappa statistic corresponded well with those reported by others.[18,22,30]

Figure 6A

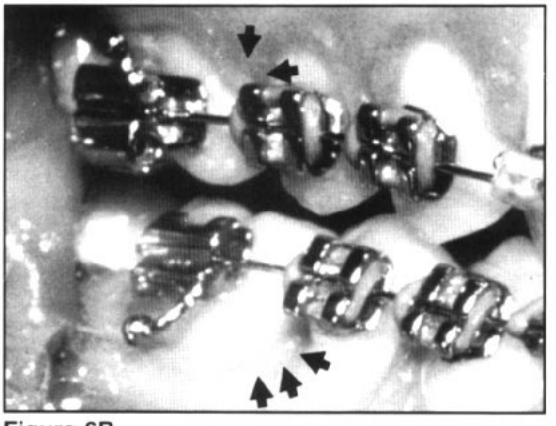


Figure 6B

Figure 6A-B
A. Intraoral photograph showing typical appearance of maxillary and mandibular banded molars in an adolescent patient late in orthodontic treatment. Note the enlarged gingiva at the gingival aspect of the molar bands (see arrows).
B. Typical appearance of maxillary and mandibular bonded molars, with adjacent healthy tissue (see arrows), of an adult subject also late in treatment. Note the longer clinical crown than would be expected in an adolescent, which allows the bond (or band) to be placed a greater distance from the gingival margin and thus avoiding a potential area of plaque accumulation adjacent to the gingival crevice.

When the periodontal status of all adults was compared with that of all adolescents, statistically significant differences were detected before, during and after orthodontic treatment. In a previously published study[15] which examined six standard sites including the proximal-facial surfaces of incisors, canines and molars for the adult group and the first 15 adolescents who furnished the clinical recordings for this study, significantly lower mean values were found among the adults for Plaque Index, Gingival Index, and bleeding tendency but not for loss of attachment. There are several possible reasons why lower plaque accumulation and gingival inflammation levels were found for adults than for adolescents during orthodontic treatment. First, adults generally have teeth that are more fully erupted and have longer clinical crowns than adolescents. For this reason, bonded attachments and band margins in adults can be located further occlusally with respect to the gingival margin (see Figure 6) than is usually possible in adolescents, thus facilitating plaque removal.[15] Secondly, the increased hormonal levels that occur during pubertal growth during

adolescence are associated with an increased degree of periodontal inflammation and gingival hyperplasia.[9] Thirdly, the periodontal indices used in this study are weighted heavily toward inflammatory changes such as redness, swelling and bleeding that are characteristic of gingivitis, a condition which is more prevalent in adolescents[31] than in adults. Finally, this study and other studies[2,3,9,15] have demonstrated that as many as half of all adolescents treated with fixed orthodontic appliances develop significant gingivitis during orthodontic treatment even if a structured plaque control program is in effect, whereas adult patients generally show good to excellent plaque removal and less periodontal inflammation.[15]

Among the eight teeth identified at pretreatment baseline examinations as having pocket depths greater than 6mm or advanced furcal involvement, three were lost to periodontal abscesses during orthodontic treatment. Although none of these teeth were included in the study sample, this high percentage of loss may warrant consideration by clinicians in the planning of orthodontic treatment for adult patients with severely periodontally compromised teeth. Aside from planned extractions for optimization of orthodontic treatment, no other teeth were lost for any reason during this study.

The findings of this study are predicated on the delivery of preventive periodontal treatment in conjunction with orthodontic treatment. For those patients diagnosed as having periodontitis, periodontal treatment to arrest active disease was provided before orthodontic treatment. In addition, during orthodontic treatment, all patients received monthly reinforcement of instructions in plaque removal. Periodontal maintenance visits with subgingival debridement were performed at 3-month intervals during orthodontic treatment to maintain healthy gingival tissue for those adults who had received periodontal treatment. (The biologic rationale for the 3-month periodontal maintenance interval is the observation that after periodontal pockets have been thoroughly cleansed, it generally takes subgingival pathogenic bacteria 6 to 8 weeks to repopulate.)[32] All the adolescents, and all adults judged not to require periodontal treatment, were instructed to have dental examinations and prophylaxes at 6-month intervals before and during orthodontic treatment.

Study limitations

In this study, an effort was made to investigate an important clinical question without conscious bias and using a reasonably well-balanced prospective design. We believe that this effort was fairly successful and that this study has produced useful information which augments our previous knowledge. However, the study has several consequential flaws which we now indicate in an attempt to create improved conditions for further research in this area. We believe that there are three main areas which should be improved when planning future studies.

First, in the present study, the subjects were assigned to treatment not randomly, but rather on the basis of the treating clinician's perception of the clinical needs of each individual patient. In some instances, the decision as to whether an adolescent was to be banded or bonded on the upper arch may have been influenced by whether or not a headgear was to be used. (The clinicians treating these patients typically believed that a bonded attachment to a molar might not be strong enough to withstand the forces applied if a facebow were attached to the molar.) This may explain why so few adolescents in this study had bonded maxillary molars. Another factor in the clinician's decision whether to bond or band a molar may have been the height of the clinical crown. (Short clinical crowns tend to place the gingival portions of bonded brackets close to the gingival margin where moisture contamination from the crevicular fluid may jeopardize the bond. See Figure 6.) It is also possible that adolescent or adult teeth with short clinical crowns are more prone to inflammation because the band margins tend to be placed more apically in the sulcus.[27]

Strictly speaking, since subjects were not randomly assigned to treatment, we cannot be certain that observed differences between different treatment groups were actually due to the primary treatment variables (i.e. age and type of attachment) or whether they were due to other criteria which inadvertently influenced assignment to treatment. For example, if a disproportionately high proportion of short crowned teeth tended to be assigned to the banded group and if shortness of crown is itself disposed to increased plaque retention, then some of the perceived elevation in Plaque Index observed in the banded teeth could have been due not to the bands themselves but rather to shortness of the crowns. In brief, it may properly be said that unless subjects have been randomly assigned to treatment, one cannot be sure that observed differences are due to the effects of treatment rather than to selection bias.

The second general problem concerns sample sizes — more particularly the investigators' underestimation of the percentage of subjects that would be lost to follow-up during the course of

study. Although (given sufficient homogeneity) the original sample sizes of 20 adults and 40 adolescents may have been sufficient for the detection of most clinically relevant between-group differences, the attrition on the sample during the course of the study was underestimated. Future studies, particularly prospective studies, should define sample sizes with less optimistic assumptions about retention of subjects through time.

The third problem is that the measurements of clinical parameters were made by an investigator whose familiarity with the aims of the study made "blind" measurement impossible. Thus, although the single measurer made strong attempts to maintain impartiality, it is necessary to note that his personal biases or his inadvertent overcorrections for those biases may have influenced the reported values.

Conclusions

The conclusions of the prospective longitudinal study of periodontal considerations in the choice of molar bonds versus bands in adults and adolescents are:

1. Significantly more plaque accumulation and gingival inflammation were found at interproximal sites of banded molars than at interproximal sites of bonded molars during orthodontic treatment of adults and adolescents.

2. Significantly greater interproximal loss of attachment was observed for banded maxillary molars than bonded maxillary molars.

3. Significantly higher mean values for plaque accumulation and gingival inflammation were seen for adolescents than for adults at the maxillary molar site before, during and after orthodontic treatment, and that a similar pattern was observed at the mandibular molar site at the posttreatment examination.

Although many considerations (including the use of headgear and the height of the clinical crown) enter into the decision to band or bond molars, the results of this study suggest that, so far as the maintenance of periodontal health is concerned for both adults and adolescents, bonding provides better conditions than banding.

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