Maintenance therapy in young adults with sever generalized periodontitis

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Abstract:

Introduction & aim:-

The purpose of this study was to evaluate one year of maintenance therapy in young adults with sever periodontitis who had previously received periodontal therapy consisting of root planing and scaling followed by open flap debridement.

Materials & Method:-

Subjects were evaluated with clinical and microbiological measurements at 3,6,9 and 12 months following the completion of active therapy. Subjects were included in the study if they completed a minimum of two evaluation appointments.

Monitoring of these subjects during the maintenance phase was analyzed bythree methods:-

First, changes in mean attachment level and mean probing depth were calculated at 3-month intervals to determine if the subjects continued to lose or gain attachment and/or had periodontal pockets of increasing or decreasing depth.

Second, the rate of periodontal breakdown was determined and compared to breakdown rates of subjects in other patient populations.

Third, future changes in attachments level were related to the presence or absence of two putative periodontal pathogens, Actinobacillusactinomycetemcomitansand Porpheromonas gingivalis in subgingival plaque.

Results:-The results showed that the mean attachment level remained constant in 13-subjects who completed one year of maintenance therapy. Mean probing depth increased at a yearly rate of 0.19mm and in periodontally – involved sites pocket depth increased at a yearly rate of 0.65mm both of which were statically significantly different from 0 ($p<0.05$).

The reminder of the data in the study was from 21 subjects who had completed at least two recall appointments. In these subjects sites infected with A.actinomycetemcomitans and P.gingivalis exhibited significantly greater probing depth than non-infected sites.

At 11 different sites in 6 subjects, P. gingivalis was detected in 16 samples and those sites had average additional attachment losses of 0.72mm after 3-months. This additional attachment loss was significantly greater($p<0.05$) than that at sites having no detectableP.gingivalis, which experienced little or no additional loss in attachment level(average=0.0007mm) .

A. actinomycetemcomitans(Aa) was detected in 35 samples from 29 different sites in 12 subjects; however, no additional attachment loss was found 3 months later.

Conclution:-

These results indicate that P.gingivalis, but not A.actinomycetemcomitans, may be predictive of future attachment loss in young adults with severe generalized periodontitis and that the frequency of periodontal breakdown may be higher in patient than that in other patient population.

Key words: periodontitis, early onset/ prevention and control; follow –up studies.

Introduction:-

Studies show that in the absence of maintenance therapy, clinical improvements due to active periodontal therapy can be regulated[1,2,3].

This research focuses on the maintenance phase of therapy for subjects with sever periodontitis (sp), the treatment of which is consisted of two phases of active periodontal therapy, root scaling and planing, and open flap curettage [4].

One of the major goals of the maintenance phase of periodontal therapy is to prevent further attachment loss. It is difficult to clinically determine when maintenancetherapy is failing [5,6].

Recently, studies have focused on site specific periodontal breakdown as the response variableof interest in longitudinal periodontal clinical trials [7,8,9,10].

Investigators monitor subjects every 2-3 months to determine if periodontal breakdown has occurred at specific sites. The findings here have challenged previous concepts of slowly linearly progressing attachment lose, suggesting that periodontitis is episodic and site-specific.Finally, a number of recent investigations have suggested that progressive periodontaldisease is related to specificPeriodontal pathogens [11-13] and that microbiological assays for these organisms might provide information on present or future periodontal disease progression. Among periodontal pathogens the strongest evidence is for Actinobacillus actinomycetemcomitans and Porphyromonas gingivalis[12-13].

The purpose of this study is to investigate the efficacy of maintenance therapy in young adults with sever generalized periodontitis.

Materials and methods:

We evaluate the maintenance phase of therapy by two clinical methods, mean attachment loss and frequency of sites with periodontal disease progression. We also determined the presence of two suspected periodontal pathogens, A. actinomycetemcomitans and P. gingivalis, in subgingival sites as predictors of future attachment loss.

Subject sample:-Subjects were systemically healthy .Pregnant females or patients with a history of rheumatic fever and valvular heart disease were excluded from this study. The subjects sample consisted of individuals with sever generalized periodontitis (sp). Subjects had periodontal attachment loss greater

than 5mm in at least one site at eight or moreteeth, three of whichmust be other than first molars and incisors.

Microbiological sampling:-Eight sites from eight different teethwere selected for specific microbiological sampling before the start of therapy . Sampled sites had at least 4mm of attachment loss andprobing depth greater than 5mm. After the sample site was isolated with cotton rolls and air dried, supragingival dental plaque was removed using asterile curette. 3 fine paper points were then inserted in anapical direction to the depth of the periodontal sulcus, so that the tip of the paper points were in close proximity to the deepest part of the interproximal subgingival space. After 30 seconds the paper points were removed with sterile forceps and were placed in a vials containing 1ml of Ringer's solution with 2% formalin. Vials were capped and sentforimmunofluorescence analysis including determination of the presence [14] and relative proportion ofA. actinomycetemcomitans and P.gingivalis using polyclonal antisera specific for either A. actinomycetemcomitans or P. gingivals. The number of fluorescent cells as a present of the total cell count was then determined for each bacterial species.

Clinical evaluations:-

In this study, evaluation of the subjects included microbiological sampling followed by clinical examination at baseline, 3 months after initial therapy , and at 3- months intervals aftersurgical treatments for one year.

Clinical measurements consisted of a plaque index(PI)[15], gingival index (GI)[16],bleeding on probing (BOP)[17],suppuration(SI),probing depth(PD), attachment loss(AL),and the distance from the gingival margin to the cement-enamel junction CTE). Three measurements were made from the buceal aspects of each tooth, one at the mesio- buccal and one at the disto- buccal, both as close to the contact area as possible while the probe in line with the long axis of the tooth. An additional measurement was made at the mid- buccal , and a mid- lingual measurement. PI,GI and BOP were assessed at the same4 areas.

The presence or absence of suppuration was evaluated on the buccal and the lingual surface of each tooth.

The two clinical measurements of attachments level and probing depth measurementwere compared after both clinical examination finished.

Maintenance Therapy:

After open- flap debridement , subjects were monitored every 3months for up to one year . During these maintenancevisits the following procedures were performed:

(1) Microbiological samples were obtained at 8 preselected sites.

(2) The previously described clinical exam was performed.

(3) Subjects were given oral hygiene instruction .

(4) Maintenancetherapy was provided consisting of scaling and root planning and a prophylaxis.

Results:-

Data from 13 subjects who completed all four maintenance recall visits suggest that the periodontal condition of the SP patients was not stable . While the mean attachment level of all sites remained consistent (Table 1), mean probing depth significantly increased slightly ($P<0.001$) from an initial mean level of 2.95±0.04 mm to 3.14±0.04 after first 3-months period .Both mean gingival inflammation and the mean proportion of sites which bled on probing significantly decreased from the initial 3-month postsurgical mean measurement ($P<0.001$).

Mean plaque index followed a similar pattern with a slight decreased at 6 and 9months of 0.54± 0.02 to 0.60±0.02 respectively from the initial 3-month postsurgical value of 0.68±0.02 ($P<0.01$). The 12-month value increased slightly from the 6 and 9-month values , but the increase was statistically not significant.

Changes in the clinical indices at the microbial sample sites were similar to those measured at all sites over the year of maintenance therapy. Sample sites experienced a much larger increase in pocket depth, increasing from an initial postsurgical mean of 4.09±0.17 to 4.74±0.20 after one year (table 2).

The mean plaque index and the proportion of bleeding sites were decreased over the year of maintenance therapy,insignificantly were that of gingival index .

Mean levels of both periodontal pathogens remained constant during the maintenance phase with exception of the one year value for P. gingivals. At one year, the mean level of P. gingivalis was statistically significantly higher ($P<0.01$)at 0.68±0.02, than previous values which ranged from 0.07±0.03 to 0.09±0.05. in a similar manner, the mean proportion of sites harboring P. gingivals at 12-months was much higher, 0.14±0.03than prior values which ranged from 0.03± 0.17 to 0.05±0.02.

Analysis of sites which had large gains or losses in attachment level revealed asymmetrical pattern for both probing attachment level measurements and pocket depth measurement.

Alarge change in attachment level was of ≥2mm. measured by both examiners. The larger changes were rare with 112 sites gaining attachment and 122 sites losing attachment out of a total of 5190 sites measured (table3).

Sites which "lost" attachment had prior mean attachment levels of 3.48±0.24(table3), which was similar to the mean attachment level of 3.10 ± 0.23 of sites which "gained" attachment.

In a similar manner, the mean attachment level in sites which "lost" attachment was 6.18±0.27 compared to the mean of 5.79±0.30 in sites 3 months prior to gaining attachment.

The next step was depend on the presence or absence of the two target periodontal pathogens and to relate clinical measurement of these pathogens. 35 samples from 29 different sites in 12 subjects were infected with A.actinomycetemcomitans, while 16 samples from 11 sites in 6 subjects were infected with P. gingivalis. Site which had either of those pathogens had deeper

probing depth measurement and more attachment loss than those sites without these bacteria (P<0.05)(table 4).

Sites with P.gingivalis show significant loss of attachment 0.72 mm ±0.34 in the next 3 months and no loss of attachment for sites with A.actinomycetemcomitans. The other clinical measure of gingivals recession, plaque index, gingival inflammation and the bleeding on probbingis based on the presence of these species.

Table1. Subject with one year of maintenance therapy (mean ±standard error; sites n=1364; subjects 5n=13)

	3 months	6 months	9 months	12 months
Probing depth	2.95±0.04	3.05±0.04	3.20±0.04	3.14±0.04
Attachment loss	3.19±0.07	3.27±0.07	3.22±0.07	3.14±0.07
CEJ	0.24±0.05	0.22±0.05	0.03±0.05	-0.006±0.05
Plaque index	0.68±0.02	0.54±0.02	0.54±0.02	0.60±0.02
Gingival index	0.87±0.02	0.73±0.02	0.77±0.02	0.72±0.02
Bleeding on probing (BOP) index	0.35±0.01	0.28±0.01	0.28±0.01	0.26±0.01

Negative value indicates that the gingival margin is below the CEJ.

Table2. Clinical and microbiological results of microbial sampled sites in subjects with one year of maintenance therapy (mean ±standard error sites n=98; subjects n=13)

	3 months	6 months	9 months	12 months
Probing depth	4.09±0.17	4.35±0.15	4.78±0.24	4.74±0.20
Attachment loss	4.15±0.22	4.28±0.23	4.33±0.30	4.23±0.27
CEJ	0.07±0.16	-0.07±0.16	-0.44±0.16	-0.05±0.16
Plaque index	0.65±0.09	0.48±0.08	0.48±0.08	0.53±0.08
Gingival index	1.12±0.08	0.096±0.08	0.97±0.08	0.85±0.08
Bleeding index	0.46±0.05	0.30±0.05	0.36±0.05	0.37±0.05

Table3

Analysis of large changes in attachment level (Number of subjects=21; gain or loss was defined as at least 2mm change measured by both clinical examiners)

	No change(n=4956)		Gain(n=112)		Loss(n=122)	
	prior	present	prior	present	prior	present
Probing depth	**2.95±0.02**	**3.02±0.02**	**5.06±0.20**	**3.77±0.17**	**3.66±0.4**	**5.37±0.21**
Attachment loss	**3.15±0.03**	**3.11±0.04**	**5.79±0.30**	**3.10±0.23**	**3.48±0.24**	**6.18±0.27**
CEJ	**0.19±0.01**	**0.10±0.03**	**0.71±0.18**	**-0.66±0.18**	**-0.18±0.19**	**0.82±0.19**
Plaque index	**0.63±0.01**	**0.59±0.01**	**0.77±0.08**	**0.58±0.08**	**0.86±0.09**	**0.91±0.08**
Gingival index	**0.82±0.01**	**0.77±0.01**	**0.85±0.08**	**0.79±0.07**	**1.07±0.07**	**1.02±0.07**
Bleeding index	**0.30±0.01**	**0.27±0.01**	**0.39±0.05**	**0.21±0.04**	**0.39±0.04**	**0.44±0.05**

Negative value indicates that the gingival margin is below the CEJ

Table 4. Clinical values of microbial sample sites (number of subjects=21)Dichotomized by the presence / Absence of target species (mean ±standard errors).

	A.actinomycetemcomitans		P. gingivals	
	None 356	Present 35	None 375	Present 16
Attachment loss	4.20±0.14	5.22±0.44	4.27±0.14	5.06±0.57
Change in ALnext 3months	-0.03±0.07	0.01±0.21	-0.0007±0.07	-0.72±0.34
Probing depth	4.22±0.10	5.03±0.36	4.25±0.10	5.59±0.35
CEJ	0.07±0.16	-0.07±0.16	-0.44±0.16	-0.50±0.16
Plaque index	0.55±0.04	0.25±0.14	0.55±0.04	-0.56±0.20
Gingival index	1.03±0.04	1.00±0.14	1.03±0.04	1.19±0.16
Bleeding index	0.38±0.03	0.43±0.08	0.38±0.02	0.43±0.12

Discussion:-

The major goal of maintenance therapy is to prevent further loss of attachment . In the present study ,the mean attachment level remained stable over a one –year period of time. An increase in mean probing depth during one year of maintenance therapy for young adults with sever periodontal disease , which was due to coronal migration of the gingival margin.

The stability of attachment levels in young adult with sever periodontal disease over a longer period of maintenance therapy may be poor , due to deepening periodontal pockets and possible future attachment loss .

The yearly rate of periodontal breakdown in our study of 9% of sites is nearly 3times that of studies involving subjects with chronic adult periodontitis.

Due to frequent and large errors in the measurement of attachment level has been shown to account for a significant number of sites which have been categorized as periodontal "breakdown" sites.

Investigators attributing influences on periodontal breakdown rates be reporting factors which influences errors in attachment level measurement(19)

n the present study the both species P. gingivalis and A.actinomycetemcomitanswere found in sites with significantly deeper probing depth measurements as compared to sites of shallow depth.

The present study found a statistically significant relationship, between further attachment loss and the present of P. gingivalis ,but no relationship could be demonstrated between the presence of either A.actinomycetemcomitans or P. gingivalis and periodontal breakdown .

Two explanations can be offered for these results .

One possible explanation is that increases in attachment loss which were related to the presence of P. gingivalis maybe of a magnitude of less than 2mm over a 3-month interval.

Since the minimum detection level of periodontal breakdown is 2mm,smaller changes in attachment level could not be detected and no relationship between P. gingivalis and attachment loss could be demonstrated .

Another possible explanation in that the majority of periodontal breakdowns are not real , but rather due to measurementserrors.

For both of the above explanations the present of P. gingivalis at a site may be related to a future over allmean loss in periodontal attachment without a corresponding increase in the frequencyof "periodontal breakdowns " at those sites.

An alternative explanation is that shallow pocket were more likely to lose periodontal attachment and deep pocket were more likely to gain periodontal attachment in an almost equal proportion of sites.

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