ORIGINAL RESEARCH

Ortho-perio integrated approach in periodontally compromised patients

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ABSTRACT

Background: It goes without saying that patients undergoing orthodontic treatment must have sound and robust periodontal health. Does this imply that we will refuse orthodontic treatment to the growing number of individuals who experience aesthetic and functional issues more frequently as a result of periodontal disease and pathological tooth migration? In order to restore periodontal health, an integrated strategy is required, in which orthodontic treatment is administered after periodontal therapy. To position the teeth in a structurally balanced and functionally effective posture, orthodontic treatment should be carried out under strict plaque control procedures. **Aim**: To familiarize the practicing clinicians both in the field of orthodontics and periodontics with current thoughts and successful clinical techniques used in the field of periodontology to regenerate lost periodontal structures. Furthermore, it aims to integrate such techniques into the orthodontic treatment of patients with severe bone loss. **Material and methods**: This study had 100 individuals in total. Between the test and control groups, a 1.0 mm difference in clinical attachment level (CAL) was deemed clinically significant. The control group included patients handled by obtaining and maintaining stable periodontal health, while the test group included individuals getting orthodontic treatment after treatment for periodontitis. 50 patients in each group were required to detect a clinically significant difference in CAL of 1.0 mm, standard deviation (SD) of 1.0 mm, with a power of 80%, and a -level error of 0.05.At T0, parameters were recorded for each of the 100 patients who underwent a thorough periodontal evaluation. Block randomization was completed by an investigator (DK) who was not involved in administering orthodontic or periodontal therapy, analysing data, or achieving periodontal stabilisation. Using random allocation software, various balanced combinations of three tests and three controls were created in blocks of six. For the assignment of each block to each participant, another random selection of blocks was made. The research design did not blind clinicians or patients. However, because all patients and their data were numbered consecutively, the person analysing the data was blinded. **Results**: In this study, all the 100 patients completed the trial, and healing was uneventful in all patients. There were no statistically significant differences at baseline in demographic, clinical, or radiological parameters between the two groups.All clinical periodontal markers in both groups improved statistically significantly (P >.05) over time, with no discernible differences between the groups. **Conclusion**: Orthodontic treatment after periodontal stabilization does not have any detrimental effect on periodontal health in adult periodontally compromised orthodontic patients and may add to the benefits achieved by periodontal treatment alone.

Key words: Intrusion, multidisciplinary approach, orthodontic intervention, regeneration

INTRODUCTION

An increasing number of adult patients are now seeking orthodontic treatment due to an increased focus of society on esthetics and health consciousness. With the incidence of periodontal problems shown to increase with age, ortho-perio interactions play an important role in management of these patients.[1] Orthodontic problems in the majority of these adult patients are a consequence of their underlying periodontal issues leading to reduced periodontal support and resulting in pathological migration, proclination of maxillary anterior teeth, interdental spacing, rotation and overeruption, resulting in compromised function and esthetics.[2] Unfortunately there is no evidence-based solution to these problems and, with an increasing number of adults with malocclusion and compromised periodontium seeking orthodontic treatment, it is important to clarify the various issues involved in managing periodontally compromised dentitions.

Orthodontic treatment in periodontally involved patients has been reported in a few clinical studies[3,4] and case reports.[5,6]

Multidisciplinary approach is often necessary to treat complex dental problems in our patients and there cannot be a better example than ortho perio interaction. Orthodontic treatment is based on the principle that if prolonged pressure is applied to a tooth, it will move as the surrounding bone remodels. Bone is selectively removed in some areas and added in others. In essence, the tooth moves through the bone carrying its attachment apparatus with it, as the socket of the tooth migrates. Since this response is mediated by the periodontal ligament, tooth movement is primarily a periodontal ligament phenomenon.[7] This being the situation, it is mandatory to see that good periodontal health prevails before, during, and after orthodontic treatment. It could be an oral prophylactic procedure in adolescent patients or advanced periodontal treatment in adults so as to eliminate the presence of inflammation in the presence of which carrying out orthodontic treatment will have deleterious effect. The orthodontic literature has presented different treatment modalities for the management of adult orthodontic patients with mild to moderate bone loss. However, the management of adult orthodontic patients with severe bone loss continues to present a challenge. All the experienced clinicians would agree that a well aligned dentition may be more conducive to periodontal health than a crowded dentition. The most important factor in the initiation, progression, and recurrence of periodontal problems is the presence of microbial plaque. Inadequate maintenance of oral hygiene during orthodontic treatment increases the risk of developing gingival inflammation. There is evidence of increase in the lactobacillus count in saliva after appliance placement.[8] Many adult patients seek orthodontic treatment for aesthetic improvement due to the mal-alignment of the anterior teeth secondary to periodontal breakdown. But the aesthetics may not be the only concern for the clinician as malocclusion more often than not leads to trauma from occlusion, which would aggravate the deterioration of the dentition.

Hence, this study was conducted to assess the Ortho-perio integrated approach in periodontally compromised patients.

MATERIAL AND METHODS

This study had 100 individuals in total. Between the test and control groups, a 1.0 mm difference in clinical attachment level (CAL) was deemed clinically significant. The control group included patients handled by obtaining and maintaining stable periodontal health, while the test group included individuals getting orthodontic treatment after treatment for periodontitis.

50 patients in each group were required to detect a clinically significant difference in CAL of 1.0 mm, standard deviation (SD) of 1.0 mm, with a power of 80%, and a -level error of 0.05.At T0, parameters were recorded for each of the 100 patients who underwent a thorough periodontal evaluation. Block randomization was completed by an investigator (DK) who was not involved in administering orthodontic or periodontal therapy, analysing data, or achieving periodontal stabilisation.Using random allocation software, various balanced combinations of three tests and three controls were created in blocks of six.For the assignment of each block to each participant, another random selection of blocks was made.The research design did not blind clinicians or patients.However, because all patients and their data were numbered consecutively, the person analysing the data was blinded.

The collected data were organised on an MS Office Excel sheet, and SPSS v 21.0 (IBM, Armonk, NY, USA) was used to analyse the data statistically. The Shapiro-Wilk test for normality of numerical data showed that the data followed a normal curve. To assess changes in clinical and radiological parameters at various time intervals (T0, T1, and T2), paired and unpaired t-tests were performed for intragroup and intergroup comparisons, respectively. CAL, PD, and ABL changes in patients were assessed using mean SD, and a chi-square test was used to compare changes in the frequencies of the three groupings over time.P .05 was regarded as statistically significant for all statistical tests, keeping the error at 5% and the error at 20%, providing the study 80% power.

RESULTS

All 100 patients completed the trial, and healing was uneventful in all patients.

Table 1 shows that there were no statistically significant differences at baseline in demographic, clinical, or radiological parameters between the two groups.

Table 1: Comparison of Baseline Parameters Between Test and Control Group Patients

Variable	Control group (n=50)	Test group (n=50)	P value
Age	32.21±6.24	31.36±5.89	0.513
Gender : males	35	25	0.067
Females	15	25	
Mean clinical parameters : mean+SD (standard deviation)			
PI	2.23±0.72	2.26±0.61	0.801
GI	2.18±0.63	2.21±0.65	0.963
BOP	1.32±0.52	1.37±0.59	0.427

PPD	2.67±0.77	3.46±0.72	0.117
CAD	3.59±0.83	3.78±0.76	0.348
Mean radiological parameters : mean±SD (standard deviation)			
Mild alveolar bone loss	2.46±0.23	2.49±0.24	0.107
Moderate alveolar bone loss	4.23±0.71	4.25±0.20	0.054
Severe alveolar bone loss	6.83±1.09	6.89±1.07	0.503

All clinical periodontal markers in both groups improved statistically significantly (P >.05) over time, with no discernible differences between the groups.

A shift in the frequencies of the three subgroups in the test and control groups was observed after evaluating the number of sites in the mild, moderate, and severe categories of CAL, PD, and ABL. In subgroup analysis for PD, the test group showed an increase in mild sites and a decrease in sites with severe and moderate periodontitis of 47% and 97%, respectively. It was discovered that the control group had an increase of 35% in mild sites and a decrease of 94% in severe and 59% in moderate locations.

DISCUSSION

The fact that orthodontic treatment has been shown to have small detrimental effects on the periodontium even in periodontally healthy individuals is a cause of concern, especially in an already compromised dentition.[9] Systematic reviews on this issue have repeatedly cited a lack of scientific evidence on the effect of orthodontic treatment on osseous and non-osseous periodontal parameters in periodontally compromised patients.[10] This study attempted to address whether it is safe to subject periodontitis patients to orthodontic therapy.

In this study, all the 100 patients completed the trial, and healing was uneventful in all patients.Therewere no statistically significant differences at baseline in demographic, clinical, or radiological parameters between the two groups.All clinical periodontal markers in both groups improved statistically significantly (P >.05) over time, with no discernible differences between the groups.

A shift in the frequencies of the three subgroups in the test and control groups was observed after evaluating the number of sites in the mild, moderate, and severe categories of CAL, PD, and ABL. In subgroup analysis for PD, the test group showed an increase in mild sites and a decrease in sites with severe and moderate periodontitis of 47% and 97%, respectively. It was discovered that the control group had an increase of 35% in mild sites and a decrease of 94% in severe and 59% in moderate locations.

In the absence of RCTs on orthodontic management of periodontally compromised patients, it was not possible to compare the findings of the present trial with other studies. Orthodontic treatment in periodontally compromised dentitions was mainly reported previously in case reports, case series, and a few clinical controlled trials, and most reported findings similar to the current trial, namely improvement in periodontal health parameters.[11,12] However, loss of CAL and ABL has also been reported.[13,14] Thus, positive and negative results have been reported. Also, most studieswith positive results focused on the effect of orthodontic treatment in management of infrabony defects, reporting periodontal parameters in relation to the tooth with such defects. Absence of randomization and lack of a control group were some of the other limitations of those studies, deterring a definite, conclusive result. This was the first RCT on this subject and, hence, the results have great clinical significance.

Vardimon et al. hypothesized that bone repair could be due to orthodontic treatment acting as a mechanical stimulus.[15] Ogihara et al.[16] reported that mechanical stresses exerted on the alveolar bone led to activation of angiogenic growth factors like vascular endothelial growth factor, by which angiogenesis led to osteogenesis during bone formation and remodeling.

CONCLUSION

It can be concluded that orthodontic treatment does not have a deleterious effect on periodontal health after periodontal stabilization in periodontally compromised patients.

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