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Periodontal Response of Teeth to Orthodontic Tooth Movement- A Comparative Study.

Rashmi Sinha[1], Ankita Agarwal[1], Suraj Kumar[2]
[1]Senior Resident, NMCH Patna.
[2]Senior Resident, Saptrishi Cancer Centre, Jabalpur

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ABSTRACT

Background: The force of orthodontic treatment, is basically categorized as controlled trauma,[1] that can damage the pulp because of the absence of collateral blood supply in the pulp tissues makes pulp as the most sensitive tissues of the whole body. The problem is not the accumulations, but there is a likelihood of conversion of the supra gingival plaque accumulations into sub gingival plaque while tipping or intrusion tooth movements that favors the change of gingivitis into periodontitis. The present study was conducted with the aim to determine the periodontal response to orthodontic tooth movement. **Methods**: The present prospective observational study was conducted in the department for a period of 1 year. Before the start of treatment, clinical attachment and probing depth was measured. These parameters were also measured after active tooth movement and tooth retention. Difference in clinical attachment was noted before and at the end of the treatment. All the data was arranged in a tabulated form and analyzed using SPSS software. The data was expressed as mean +/- standard deviation. **Results**: The mean age of the subjects was 28.75+/-3.64 years. There were 66.7% (n=20) males and 33.3% (n=10) females. The baseline probing depth amongst control teeth was 4.4+/-0.5 and after tooth movement was 3.7+/-0.5 and after retention was 3.6+/-0.05. The mean difference in clinical attachment loss after tooth movement on mesial and distal side was -0.5+/-1.7 and -0.6+/-0.9 respectively. The mean difference in clinical attachment loss after tooth retention on mesial and distal side was -0.7+/-1.4 and -0.8+/-1.1 respectively. **Conclusion**: Orthodontic movement of teeth may be detrimental for the periodontal health when realignment of the teeth have been considered.

Keywords: probing, periodontal, orthodontic.

INTRODUCTION

The force of orthodontic treatment, is basically categorized as controlled trauma,[1] that can damage the pulp because of the absence of collateral blood supply in the pulp tissues makes pulp as the most sensitive tissues of the whole body. The indications, which can be identified earlier in the tissues of pulp, after orthodontic movement is applied are hemodynamic alterations that increase the volume of the blood vessels and circulatory conditions within the initial hours.[2,3] When an orthodontic force is functional, the reaction of pulp tissue is by hyperemia at first, and then followed by degranulation of the mast cells which is characterized by cell damage and biochemical alterations. The primary reason for the occurrence and progression of the gingival inflammation and periodontitis is plaque with bacteria. Orthodontic movement is sometimes regarded as a predisposing risk factor for periodontal disorders, as orthodontic appliances may prevent complete oral hygiene protocols leading to an increased bacterial accumulations .The problem is not the accumulations, but there is a likelihood of conversion of the supra gingival plaque accumulations into sub gingival plaque while tipping or intrusion tooth movements that favors the change of gingivitis into periodontitis.[4] However, inflammation should always be controlled to make sure that the supra-crestal connective tissue is always healthy and that the height of crestal alveolar bone remains to its original level.[5] The present study was conducted with the aim to determine the periodontal response to orthodontic tooth movement.

Name & Address of Corresponding Author
Dr. Rashmi Sinha
Senior Resident,
NMCH,
Patna.

MATERIALS AND METHODS

The present prospective observational study was conducted in the department of dentistry in our institute for a period of 1 year. All the subjects were informed about the study and a written consent was obtained from them in their vernacular

language. Clinical and radiographic examinations were carried out at the initiation of the study to determine the status of periodontal and gingival tissues. Extraction of 2nd and 4th premolars was carried out which was followed by ligature placement after 2 months. This ligature was removed after 3 weeks. Two months after ligature removal examination was carried out at the initiation of orthodontic movement. During this period active tooth movement continued. Retention device was place for 5-6 months for retaining the tooth position. After 5-6 months when the tooth was retained re-examination was carried out for the same periodontal and gingival parameters. Before the start of treatment, clinical attachment and probing depth was measured. These parameters were also measured after active tooth movement and tooth retention. Difference in clinical attachment was noted before and at the end of the treatment. All the data was arranged in a tabulated form and analyzed using SPSS software. The data was expressed as mean +/- standard deviation.

RESULTS

[Table 1] illustrates the demographic details of the study. The mean age of the subjects was 28.75+/-3.64 years. There were 66.7% (n=20) males and 33.3% (n=10) females. Majority of subjects i.e. 66.7% (n=20) belonged to middle class and there were equal number of subjects in lower and upper class i.e. 5.

[Table 2] shows the clinical results of the study. The baseline probing depth amongst control teeth was 4.4+/-0.5 and after tooth movement was 3.7+/-0.5 and after retention was 3.6+/-0.05. The change in clinical attachment after active tooth movement was 0.4+/-1.3 and after retention was 0.8+/-1.2. The baseline probing depth on mesial side of case teeth were 4.6+/-0.4 and after tooth movement and retention was 5.4+/-0.9 and 5.1+/-0.8 respectively. The baseline probing depth on distal side of case teeth were 4.3+/-1.0 and after tooth movement and retention was 5.8+/-1.2 and 5.1+/-1.6 respectively. The mean difference in clinical attachment loss after tooth movement on mesial and distal side was -0.5+/-1.7 and -0.6+/-0.9 respectively. The mean difference in clinical attachment loss after tooth retention on mesial and distal side was -0.7+/-1.4 and -0.8+/-1.1 respectively.

Table 1: Demographic characteristics of the study

Variable	Mean	Percentage
Age (years)	28.75+/-3.64	
Gender		
Male	20	66.7
Females	10	33.3
Socioeconomic status		
Upper class	5	16.7
Middle class	20	66.7
Lower class	5	16.7

Table 2: Clinical results of the study

Clinical variable assessed	Control teeth	Mesial side of case teeth	Distal side of case teeth
Probing depth			
Baseline	4.4+/-0.5	4.6+/-0.4	4.3+/-1.0
After tooth movement	3.7+/-0.5	5.4+/-0.9	5.8+/-1.2
After retention	3.6+/-0.05	5.1+/-0.8	5.1+/-1.6
Clinical attachment change			
After active tooth movement	0.4+/-1.3	-0.5+/-1.7	-0.6+/-0.9
After retention	0.8+/-1.2	-0.7+/-1.4	-0.8+/-1.1

DISCUSSION

The question on whether orthodontic movement of tooth may have any deleterious consequences on the periodontal health has been studied in a number of clinical and experimental reviews.[6,7] The results of these experiments have shown that, provided periodontal health and proper oral hygiene standards are retained during orthodontic therapy, only clinically insignificant damages occur on the supporting tissues.[8] However, if the oral hygiene is less efficient and periodontal inflammation is seen during the orthodontic management, the studies have shown an elevated risk for adverse events on the periodontal tissues.[9-14] However, the vast majority of the clinical evaluations performed, that aimed at evaluating the action of orthodontic treatment methodology on the periodontal structures, have been passed out amongst children or adolescents who very rarely demonstrate the signs of destructive periodontal disorder. As per our study, The baseline probing depth amongst control teeth was 4.4+/-0.5 and after tooth movement was 3.7+/-0.5 and after retention was 3.6+/-0.05. The change in clinical attachment after active tooth movement was 0.4+/-1.3 and after retention was 0.8+/-1.2. The baseline probing depth on mesial side of case teeth were 4.6+/-0.4 and after tooth movement and retention was 5.4+/-0.9 and 5.1+/-0.8 respectively. The baseline probing depth on distal side of case teeth were 4.3+/-1.0 and after tooth movement and retention was 5.8+/-1.2 and 5.1+/-1.6 respectively. The mean difference in clinical attachment loss after tooth movement on mesial and distal side was -0.5+/-1.7 and -0.6+/-0.9 respectively. The mean difference in clinical attachment loss after tooth retention on mesial and distal side was -0.7+/-1.4 and -0.8+/-1.1 respectively. Experiments involving histologic analysis are therefore important to elucidate the possible deleterious actions on the connective tissue attachment level. Studies like this have shown that orthodontic forces per se are very less likely to convert gingivitis into a destructive periodontitis.[6,15] This may be since the fact that plaque- induced inflammatory lesion in a case of gingivitis is restricted to the supraalveolar connective tissue region, whereas the

tissue changes occurring as a result of orthodontic movement of tooth are restricted to the connective tissue present between the root and the surrounding bone. The progress of destructive periodontal disorder, however, may result in the creation of infrabony.[16] Also, infrabony pockets may be formed by orthodontic tipping or intruding actions of teeth possess bacterial plaque.

CONCLUSION

Orthodontic movement of teeth may be detrimental for the periodontal health when realignment of the teeth have been considered. Infrabony pockets are frequently associated with periodontal tissues so, before the initiation of the orthodontic treatment, periodontal health of the teeth should be restored.

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