



Occurrence of Oral Health Problems in Children Undergoing Orthodontic Procedure

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ABSTRACT

Objective: To evaluate the frequency of problems faced by patients undergoing orthodontic procedure.
Methods: This epidemiological study was done among 318 patients undergoing orthodontic therapy in dental Institution and different orthodontic. The age group of the study subjects ranged from 10 to 15 years with a mean age of 12.64 years. The study proforma recorded information about dental caries status, gingivitis, plaque, oral ulcers and white spot lesions. Calculated values of the test were compared with the tabular value at 95% confidence level to assure the significance of the test at p value of 0.05.
Results: It was observed that most of the subjects found with gingival problems (67.9%) and dental caries (53.6%), whereas few subjects had white spot lesions (22.7%) and ulcers in the oral cavity (12.4%). In the present study, girls had higher mean score of gingival index (2.34±2.723) compared to boy's scores (1.83±1.364). However, boys (2.87±2.643) had more scores of plaque accumulation than girl (2.46±2.564). Overall significant difference of DMFT scores was obtained.
Conclusion: The study observed high occurrence of dental disorders among orthodontic patients as the brackets causes hindrance in maintaining oral care.

KEYWORDS

Caries, Gingivitis, Orthodontic Patients, Ulceration, WSLs

INTRODUCTION

Orthodontic treatment helps in improving facial and dental aesthetics; above all it builds self-esteem of the patient.¹ The main goal of this treatment is to improve dental occlusion and make teeth in proper alignment, which ultimately results in a good functioning of dentition.²

Along with the merits of orthodontic procedures, it has many complications which are faced by the patients. Few studies discovered such issues as pain, food accumulation under brackets and discomfort that may occur.³ The orthodontic treatment can ascribe to inadequate removal or elimination of plaque and food debris from the restricted areas for clearance due to the appliance.⁴ Various studies have shown that problems associated with malocclusion such as traumatic oral ulcers and gingival diseases.^{2,5} Importance of oral hygiene in orthodontic patients is always intensified to prevent any further gingival disease.⁶ Other common problem associated with orthodontic appliances is halitosis, which is also correlated with oral plaque level.⁷

As bands, brackets, elastics and ligature wires support the accumulation of microbial flora and food deposits. In time, the plaque accumulation around the orthodontic braces may cause dental caries.⁸ Orthodontic treatment produces a local change in the oral environment, with changes in the compo-

sition of bacterial plaque and consequently the development of caries.⁹

The demineralization of enamel adjacent to orthodontic brackets is a significant clinical problem.

White spot lesions develop as a result of prolonged plaque accumulation on the affected surface, commonly due to inadequate oral hygiene. It has been reported that there is a significant increase in the prevalence and severity of enamel demineralization after orthodontic treatment when compared with untreated control subjects.¹⁰

Therefore, changeable access to dental care, inadequate oral hygiene and many other disability-related factors may account for complications. The purpose of study is to access the oral health complications faced by orthodontic patients.

METHODOLOGY

This epidemiological study was conducted among 318 patients undergoing orthodontic therapy in dental Institution and different orthodontic centers in the city during February to September 2015. The number of boys was and girls. The age group of the study subjects ranged from 10 to 15 years with a mean age of 12.64 years.

Before the commencement of study, a pilot study was performed on 40 subjects to evaluate the occurrence of dental problems in order to ensure the degree of repeatability (Cronbach's alpha=0.80). A written informed consent was obtained from the participants.

Inclusion & Exclusion criteria

Patients with orthodontic brackets and free from systemic diseases were included in the sample. Patients who were not willing to participate were excluded.

Examination

The study proforma composed of five components, the first component consisted of demographic variables. The second, third, fourth, fifth & sixth components recorded information about dental caries status, gingivitis, plaque, oral ulcers and white spot lesions.

The dental caries status of subjects was checked by W.H.O. Oral Health Survey basic methods 1997.¹¹

The gingival index, given by Loe and Silness was used for recording the severity of gingivitis.¹² The inner and outer aspects of the six index teeth, using the criteria of the plaque index of Silness and Loe.¹³

The WSL index (Gorelick et al., 1982) was used for evaluation of the buccal surfaces of the anterior teeth, premolars, and first molars in both maxilla and mandible.¹⁴

Statistical analysis

Data were analyzed with SPSS software version 16.0. Quantitative values were compared using Student's t test. Calculated values of the test were compared with the tabular value at 95% confidence level to assure the significance of the test at p value of 0.05.

RESULTS

The data revealed a number of complications with orthodontic braces among patients. It was observed that most of the subjects found with gingival problems (67.9%) and dental caries (53.6%), whereas few subjects had white spot lesions (22.7%) and ulcers in the oral cavity (12.4%) as illustrated in Graph 1. Further it was noticed that the severity of white spot lesions was in mild form in 11.6%, moderate in 7.4% and severe in 3.7% subjects (Graph 2).

In the present study, girls had higher mean score of gingival index (2.34±2.723) compared to boy's scores (1.83±1.364). The findings also showed significant differences regarding plaque index according to gender, in which boys (2.87±2.643) had more scores of plaque accumulation than girls (2.46±2.564) as mentioned in Table 1.

According to dental caries status, male patients showed significantly higher mean index of Decayed teeth (DT) and Missing teeth (MT) as 1.11±1.476 and 0.79±0.947 respectively. Whereas, female patients had more filled teeth mean value (1.76±1.373) than their counterparts (1.31±1.833) as shown in Table 2.

DISCUSSION

Orthodontic treatment carries with it the risks of tissue damage, treatment failure and increased predisposition to dental disorders as oral mucosa is thin membrane causing any vesicles and bullae to break rapidly into ulcers. These ulcers are easily traumatized from brackets & bands, as they become acclimatized to orthodontic appliances.¹⁵

In the present study, most common findings were gingivitis (67.9%) and dental caries (53.6%). The prevalence of ulcers was 12.4%. However Mainali observed prevalence of oral ulcerations as 40.8%, dental caries as 29.2%, periodontal problems 25.8% and TMJ pain 9.2%.¹⁶

The overall prevalence of white spot lesions (WSLs) was

22.7% among the study subjects. However many studies showed its prevalence among orthodontic patients ranging from 0 to 97%.^{17,18}

In the recent investigations, it was shown that the incidence of WSLs among orthodontic populations as 73-95%, which is much higher than the present study.^{19,20} The study showed a range of severity of WSLs as 11.6% patients had mild form, 7.4% having moderate and 3.7% having severe form. Whereas Akin et al showed that 35% of patients had mild WSLs, and the remaining WSLs were severely affected, either with severe WSL (25%) or with cavitation (5%).²¹ It has been stated that the progress of white spot lesions under fixed orthodontic bands is a tremendously rapid procedure, even when cement that containing fluoride is used for bonding.

The results of DT and MT were more among boys and girls showed more number of FT component. These findings clarified that girls take more care regarding their oral health compared to boys. Also the overall results of DMFT were significant according to gender which was comparable to many studies.^{22,23}

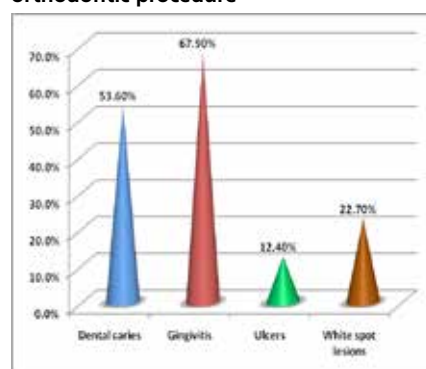
Overall the prevalence of DMFT experienced in present study was higher than studies reported by Shailee et al among children in Shimla,²⁴ Martignon et al reported DMF-S as 6.7 in 12-29 years Colombian subjects receiving fixed orthodontic treatment.²⁵

Gingivitis is the most common dental problem encountered in this study. It has been observed that orthodontic movement has resulted in an increase in the amount gingival inflammation.²⁶ It is well established that orthodontic treatment is implicated for changing oral environment by providing retention sites for dental plaque and increases the risk of developing caries.²⁷

CONCLUSION

The study showed higher occurrence of dental problems among orthodontic patients such as caries, gingival diseases, oral ulcers and white spot lesions. Orthodontic practitioners should play a very important role in preventing progression of these complications by regularly assessing the oral health of the patients undergoing orthodontics.

Graph 1: Frequency of oral problems encountered with orthodontic procedure



Graph 2: Showing severity of white spot lesions

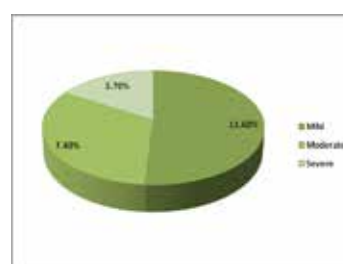


Table 1: Prevalence of gingivitis and dental plaque among orthodontic patients according to gender

| Components | Groups | No | Mean | SD | Sig. |
|----------------|--------|-----|------|-------|------|
| Gingival index | Boys | 184 | 1.83 | 1.364 | .000 |
| | Girls | 134 | 2.34 | 2.723 | |
| Plaque index | Boys | 184 | 2.87 | 2.643 | .000 |
| | Girls | 134 | 2.46 | 2.564 | |

Table 2: Prevalence of DT, MT, FT & DMFT among orthodontic patients

| Components | Groups | No | Mean | SD | Sig. |
|---------------|--------|-----|------|-------|------|
| Decayed teeth | Boys | 184 | 1.11 | 1.476 | .000 |
| | Girls | 134 | .80 | 1.087 | |
| Missing teeth | Boys | 184 | .79 | .947 | .034 |
| | Girls | 134 | .64 | .853 | |
| Filled teeth | Boys | 184 | 1.31 | 1.833 | .006 |
| | Girls | 134 | 1.76 | 1.373 | |
| DMFT | Boys | 184 | 1.27 | 1.826 | .013 |
| | Girls | 134 | 1.07 | 1.673 | |

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