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Oral health problems in patients receiving orthodontic treatment - A survey

Kamal Hasan¹, Kathiravan Selvarasu*¹, Saravana Dinesh²

INTRODUCTION

Orthodontic treatments are done to correct malocclusions and craniofacial abnormalities, by providing proper alignment of teeth, provide harmony between occlusal and jaw relationship, help improve mastication, phonation, with beneficial effects on the general and oral health, individual’s comfort and self-esteem, and having a positive role in improving their quality of life. Orthodontic treatment is also done to improve their facial esthetics.[1] The main goal of this treatment is to improve dental occlusion and make teeth in proper alignment, which restores the normal function of dentition.[2] A persons occlusion status is generally determined by two major characteristics: Intra-arch relationship which is the relationship of the teeth each arch which leads to a smoothly curving line of occlusion and interarch relationship which is the pattern of occlusal contacts between the upper and lower teeth (Proffit, 1986). A physiologic occlusion is distinguished from a pathological occlusion in such a way that the components work well and without pain, and remains in a good state of health (Ross, 1970, which can either be occlusion or malocclusion. In this situation, the teeth remain firm without any migration or lead to pain during and after contact. The temporomandibular joint and associated structures should function freely without any pain. In an epidemiological study, the terminology of occlusion encompassed all the occlusal variations ranged as ideal occlusion, normal occlusion, and malocclusion. Researches have been conducted to explore issues as pain and food accumulation under brackets, leading to poor hygiene and discomfort that may occur during treatment.[3] 95% of the orthodontic patients experience various degrees of pain during orthodontic treatment.[4] Various problems associated with malocclusion such as traumatic oral ulcers, temporomandibular joint

ABSTRACT

Introduction: Patients receiving orthodontic treatment often report on varying oral complications throughout orthodontic treatment. Complications may be of varying degree of pain, whereby patients often complain. Along with the benefits of orthodontic procedure, it has also many complications which are faced by the patients undergoing the treatment. The complications include pain, food accumulation under brackets, and discomfort associated with the treatment. Studies have shown that most common problems associated with malocclusions are ulcers. Aim: This study aims to assess the oral health problems in patients receiving orthodontic treatment. Materials and Methods: A survey of nine questionnaires was designed to evaluate patient’s complications throughout orthodontic treatment. Questionnaire was given to the patients wearing orthodontic appliance. Sheet is filled by the patients. Uneducated patients were guided chairside with each question explained along with answers for support. Completed questionnaires were received from 50 patients. Results: Based on the questionnaire given, 15% of the patients undergone orthodontic treatment during the age of 13–15 while 25% of them at the age of 15–18 and the remaining 60% are >18 years of age. 62% of the patients undergone orthodontic treatment due to malalignment of teeth, 17% due to improper chewing, 13% due to difficulty in speech, and the remaining 8% due to facial appearance. Conclusion: This survey is done to assess the problems faced by patients during orthodontic treatment and bring awareness on the same.

KEY WORDS: Complications, Oral health, Orthodontics, Problems

INTRODUCTION

Orthodontic treatments are done to correct malocclusions and craniofacial abnormalities, by providing proper alignment of teeth, provide harmony between occlusal and jaw relationship, help improve mastication, phonation, with beneficial effects on the general and oral health, individual’s comfort and self-esteem, and having a positive role in improving their quality of life. Orthodontic treatment is also done to improve their facial esthetics.[1] The main goal of this treatment is to improve dental occlusion and make teeth in proper alignment, which restores the normal function of dentition.[2] A persons occlusion status is generally determined by two major characteristics: Intra-arch relationship which is the relationship of the teeth each arch which leads to a smoothly curving line of occlusion and interarch relationship which is the pattern of occlusal contacts between the upper and lower teeth (Proffit, 1986). A physiologic occlusion is distinguished from a pathological occlusion in such a way that the components work well and without pain, and remains in a good state of health (Ross, 1970, which can either be occlusion or malocclusion. In this situation, the teeth remain firm without any migration or lead to pain during and after contact. The temporomandibular joint and associated structures should function freely without any pain. In an epidemiological study, the terminology of occlusion encompassed all the occlusal variations ranged as ideal occlusion, normal occlusion, and malocclusion. Researches have been conducted to explore issues as pain and food accumulation under brackets, leading to poor hygiene and discomfort that may occur during treatment.[3] 95% of the orthodontic patients experience various degrees of pain during orthodontic treatment.[4] Various problems associated with malocclusion such as traumatic oral ulcers, temporomandibular joint

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¹Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India, ²Department of Orthodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

*Corresponding author: Kathiravan Selvarasu, Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, 162, Poonamallee High Road, Vellapanchavadi, Chennai - 600077, Tamil Nadu, India. Phone: +91-9677202463. E-mail: dr.kathiromfs@gmail.com

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problems, and periodontal diseases and also affect the facial profile.\(^5\) On that case, orthodontics has the potential to cause significant damage to hard and soft tissues to reform the malocclusion which was caused previously. During the orthodontic treatment or throughout the orthodontic treatment, patient is advised to maintain a high standard oral hygiene to minimize oral problem and maintain oral health. Root resorption is a common complication that occurs during orthodontic treatment, but there is some proof that once appliances are removed the resorption stops. Some of the risk pointers for root resorption are summarized. Soft tissue damage includes that caused by archwires. It is essential that adequate safety measures are included with this type of treatment.\(^6\)

Throughout orthodontic treatment, both intraoral and extraoral tissues are at threat of injury. Orthodontic appliance parts such as the archwires, brackets, bands, and other parts related to it can cause ulcerations in mouth.\(^7,8\) Moreover, rapid demineralization of tooth found around the orthodontic appliances even after 1 month of placement.\(^9\) The formation of demineralization spots and pits increases the chances of caries.\(^10\) The margins of orthodontic bands usually run along proximal to the subgingival area. Gingivitis may develop in patients who do not institute proper oral hygiene measures.\(^11,12\) Patients often experience gingival bleeding, increased plaque accumulation, calculus formation, as well as dental caries formation during orthodontic treatment.\(^13\) During orthodontic procedure, patients feel difficulty in maintaining their oral hygiene as teeth are malposed which cause inconvenience in cleaning. This leads to more accumulation of microorganisms in the oral cavity. Further, microorganisms play an important role in the etiology of plaque that leads to periodontal diseases and caries which has been discussed in the literature since years. Plaque is a precursor of dental problems, and plaque retention sites are particularly prone to tooth decay and gum problems. Fixed orthodontic appliances may weaken plaque removal, proper oral hygiene, and overall affect the dental health. Plaque accumulates on brackets and the resins used for bonding.

Oral hygiene practice is utmost important during orthodontic treatment because bands, brackets, ligature wires, and elastics are prone to accumulation of microbial flora and food particles. The plaque accumulation around orthodontic appliances may cause periodontitis and dental caries.\(^14,15\)

**MATERIALS AND METHODS**

The study was conducted randomly among 50 patients of both genders who visited Saveetha Dental College and Hospitals, Department of Orthodontics. Only those people who were undergoing orthodontic treatment and had completed orthodontic treatment with fixed appliances in both upper and lower arches were included in the study. Confidentiality was assured for the patients. A survey of nine questionnaires was designed to evaluate patient’s complications throughout orthodontic treatment. Questionnaire was given to the patients wearing orthodontic appliance. Sheet is filled by the patients. Uneducated patients were guided chairside with each question explained along with answers for support. Completed questionnaires were received from 50 patients.

**RESULTS**

In the current study a total of 50 patient were surveyed amongst which 15% were between the age group of 13-15 years, 25% were between the ages of 15-18 years and 60% were above the age of 18 years [Table 1]. Improper alignment (62%) was the common reason for patients seeking orthodontic treatment followed by improper chewing (17%), difficulty in speech (13%), facial appearance (8%) [Table 2]. About 92% of the individuals had problems during the course of their orthodontic treatment [Table 3]. Pain elicited

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**Table 1: Age of the patient undergoing orthodontic treatment**

<table>
<thead>
<tr>
<th>Age of the patient undergoing orthodontic treatment</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13–15</td>
<td>15</td>
</tr>
<tr>
<td>15–18</td>
<td>25</td>
</tr>
<tr>
<td>18 and above</td>
<td>60</td>
</tr>
</tbody>
</table>

**Table 2: Reason for orthodontic treatment**

<table>
<thead>
<tr>
<th>Cause of treatment</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improper alignment</td>
<td>62</td>
</tr>
<tr>
<td>Improper chewing</td>
<td>17</td>
</tr>
<tr>
<td>Difficulty in speech</td>
<td>13</td>
</tr>
<tr>
<td>Facial appearance</td>
<td>8</td>
</tr>
</tbody>
</table>

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Graph 1: Other oral complications

DISCUSSION

Continuous evaluation of home care procedures in orthodontic patients should remain a number one priority in the orthodontic practice. When the decision is made to remove orthodontic appliances due to poor oral hygiene, treatment modalities should be implemented to help enhance the remineralization process. Once the oral environment has shifted from disease to health, an assessment can be made about the patient’s readiness to follow through with their care. If dental professionals unite in implementing a preventive mentality within our practices, we will help promote a healthy oral environment in the pediatric patients we treat.

The results of descriptive analyses showed that majority of the patients (90%) were above the age of 18 years. Age range of the patients being surveyed was 13–25 years.

Orthodontic treatment carries the risks of tissue damages. It is important that the practitioners are aware of these risks. The most common finding in this
The study was ulceration of soft mucosa and the results were consistent with other studies. Oral ulcerations formed by rubbing of the lips and cheeks on brackets.

Based on the questionnaire given, 15% of the patients undergone orthodontic treatment during the age of 13–15 while 25% of them at the age of 15–18 and the remaining 60% are >18 years of age. 62% of the patients undergone orthodontic treatment due to malalignment of teeth, 17% due to improper chewing, 13% due to difficulty in speech, and the remaining 8% due to facial appearance. 92 individuals of 100 experienced problems during orthodontic treatment while the remaining eight individuals did not experience any oral health issues. 10% of them experienced difficulty in speech during orthodontic treatment, 40% of the patients experienced pain during chewing, 30% experienced mouth ulcerations, and the remaining 20% had difficulty in maintaining oral hygiene. In this survey, 6% of the patients experienced irritation of burning sensations, 56% had pain/pressure during chewing, 15% of them experienced headache, and the remaining 23% experienced tooth mobility throughout orthodontic treatment. Other than that, 45 individuals experienced teeth discoloration throughout the orthodontic treatment while remaining 55 individuals did not experience any teeth discoloration and 70% of the patients experienced lip ulcers while 30% of them did not experience lip ulcers. Other oral health problems had been conducted to the patients and 15% experienced caries problem and 15% bleeding gums and the most common problem which experienced by the patient was calculus which was 70% of the patients.

This is similar to a study conducted by Akshay Gupta et al. in which the dental problems came across during the orthodontic procedure were oral ulcerations (47.6%), caries (34.3%), and periodontal diseases (18.1%). Most of the ulcers were traumatic caused by orthodontic wires, i.e., 72.6% followed by aphthous ulcers (27.4%). However, in a study conducted by Sogi et al., orthodontically treated subjects exhibited statistically significantly lower decayed-missing-filled teeth (DMFT) and disease-modifying therapy values than untreated individuals. Treatment performed by a certified orthodontist resulted in statistically significantly better treatment results with more Class I relationships and less crowding. The remaining degree of orthodontic treatment need was also lower in subjects treated by a certified orthodontist. A moderate to very high degree of treatment need (dental health component degrees III–V) was present in 59% of the subjects treated by a general practitioner, but only 29% of the subjects treated by a certified orthodontist. There was a study conducted by Peterson in Nigerian population. The present study was undertaken to describe the oral health status of children and adults in the Republic of Niger and to provide baseline data for the organization and evaluation of systematic oral health promotion programs in the country. The WHO pathfinder sampling procedures were applied to obtain representative samples of the following age groups: 6 years (n = 373), 12 years (n = 400), 18 years (n = 300), and 35–44 years (n = 400). Data were collected in 1997 according to the WHO methods including information on dental caries and community periodontal index of treatment needs (CPITNs). In 6 years old, 56% had caries and a mean score of 1.3 DMFT was observed among the 12 years old; the 35–44 years old had an average score of 5.7 DMFT. Differences in dental caries prevalence were found according to sex, province, and urbanization. 99% of individuals at age 18, and 87% at age 35–44 had maximum CPITN score 2 (calculus). Where 6 and 35–44 years old are concerned, the data may indicate increasing levels of dental caries. The implementation of primary prevention and community-based oral health education is, therefore, a matter of urgency.

CONCLUSION

The risks associated with orthodontic treatment are measured and reduced to prevent further complications throughout orthodontic treatment. Complications being a result of a multifactorial process including aspects related to patient, orthodontist, and the technical features of orthodontic appliances and procedures. The most important factor in preventing oral complications during orthodontic treatment is patient’s compliance which always contributes to a high standard outcome and minimum side effects. The results revealed higher prevalence of dental problems as oral ulcers, dental caries, and periodontal diseases among orthodontic patients. Orthodontic practitioners should advise their patients to maintain proper oral hygiene. Clearly, there are a number of sources of the potential iatrogenic damage to the patient during orthodontic treatment. However, severe damage is rare. Severe malocclusions have more to benefit from treatment than less severe malocclusions, and motivation between such groups may vary. Individuals should be assessed for risk factors for all aspects of care. Lack of treatment can result in damage, physical, or psychosocial. Discontinuation of treatment without full correction of the malocclusion, although a last resort, can leave the patient worse off than before treatment. Good clinical practice, careful patient selection, and information on a patient’s responsibility are essential to minimize tissue damage. Moreover, other complications such as soft tissue alterations, temporo-mandibular joint disorders, allergic reactions, and infective endocarditis may be other complications which may face by patients wearing orthodontic appliances.
REFERENCES