REMOVABLE ORTHODONTIC APPLIANCES AND PATIENT PERCEIVED PROBLEMS

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ABSTRACT

Objective: To evaluate the problems as perceived by the patients during orthodontic treatment with removable appliances.

Study Design: Cross sectional study.

Place and Duration of Study: Orthodontic department, Armed Forces Institute of Dentistry, Rawalpindi Pakistan, from Jan 2017 to Dec 2017.

Methodology: A total of 200 participants were included in the study who were wearing removable orthodontic appliances for at least 6 months. The patients were divided into three age groups according to convenience, ranged from 10 to 40 years. Outcome variable were analyzed by questionnaire and patients were interviewed in different dental colleges of Pakistan. Questionnaire included 10 items and covered physical, functional, psychological and social problems associated with wearing of removable orthodontic appliances.

Results: In this study, 89 (44.5%) patients were male and 111(55.5%) were female with the age range of 10 to 40 years. Total 104 (52%) patients felt pain after insertion of removable appliances. A relatively increased number of female patients believed that appliance was effective (44.5%) and comfortable (40%) to wear. Halitosis (39%) was the most frequent problem faced by the patients in studied population.

Conclusion: Despite a few problems associated with wearing, the removable orthodontic appliances remained an effective and viable treatment option for uncomplicated malocclusions.

Keywords: Dental problems, Halitosis, Oral ulcers, Removable appliances.

INTRODUCTION

Orthodontic appliances are devices which create and or transmit forces to individual teeth or group of teeth or maxillofacial skeletal units so as to bring about changes within bone with or without tooth movement which will help to achieve the treatment goals of functional efficiency, structural balance and esthetic harmony[1]. Removable appliances can be removed from mouth and consist of acrylic and wire component and have been widely used in orthodontics either for correcting malocclusion problems or for retention of treatment results[2].

Removable appliance when used patient's compliance is of crucial importance for successful outcome as orthodontic treatment[2-4] usually carried out in variety of age groups and in a multitude of problems, a great number of external and internal factors can influence the compliance[2]. Compliance is generally poor in young patients regardless of their gender and psychological maturity[5]. The complexity of factors determining patient's makes the assessment of compliance a difficult task in for research puporse[1]. Literature[2] has suggested that adults are more critical of dental esthetics and report a higher need of orthodontic treatment than children.

Adult patients are presented with numerous modalities for orthodontic therapy including but not limited to fixed appliances and removable appliances[5]. Pain and discomfort are the recognized effects of orthodontic treatment[1] which can impair compliance of patient and can lead to avoidance or even discontinuation of treatment. Several studies[6,7] pointed out pain associated with orthodontic treatment have a potential impact on daily life primarily psychological discomfort. Halitosis or oral malodor is an unlikeable or bad breath arising from oral cavity, which

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is a common problem which could effects the social relationships[1].

After doing this study we were able to judge the efficacy of removable orthodontic appliances and able to minimize the problem that are faced by the patients while wearing removable orthodontic appliances.

METHODOLOGY

This study was conducted at orthodontic department of hospitals affiliated with teaching institutes of Pakistan. A questionnaire was designed keeping in view potential problems faced by the patients during treatment with removable orthodontic appliances. Patients who were under treatment with removable orthodontic appliances at-least from six months were requested to fill a consent form and questionnaire. Total 350 questioners were filled by the patients at Armed forces institute of dentistry Rawalpindi, Abbottabad International Dental College Abbottabad, Hamdard University Dental Hospital Karachi and Bibi Asifa Dental College Larkana. After complete assessment, 35 questioners were rejected, because they did not fulfilled the inclusion criteria. Participants' age was ranged from 10 to 40 years and they were divided into three equal age groups. Sampling technique was kept non-probability convenience. Duration of study was one year. Inclusion criteria in this study were the participants who were treated with removable appliances irrespective of malocclusion and who accepted to fill a valid questionnaire. Exclusion criteria included syndromic patients, presence of pathology detectable in the oral cavity, history of obstructive sleep apnea, subjects with neurological deficit and patients with previous history of orthodontic treatment. Data from all of the institutes was gathered. Data were analyzed using statistical software SPSS version 24. The questionnaire was then tested for reliability and variability. Mean and standard deviation were utilized to describe quantitative variables like age. Frequency and percentages were calculated for different variables.

RESULTS

Out of 200 patients 89 (44.5%) were male and 111(55.5%) were female. The age of the patient is divided into 3 groups according to convenience

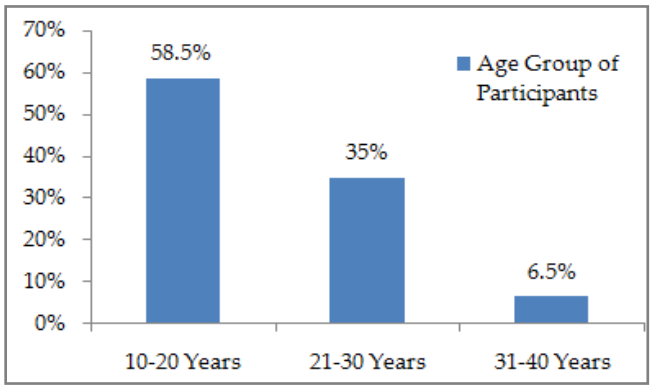

Figure: Distribution of patients according to their age groups.

(figure). A total of 104 (52%) patients felt pain after insertion of removable appliances (table). A relatively increased number of female patients believe that appliance is effective and comfortable to wear. Poor oral hygiene is the most frequent problem (64%) faced by the patients in studied population. Relatively less number of patients feels difficult in speech 14%. Oral ulcers were present in 22% of patients.

Table: Patient perceived problems in studied population.

S. No.	Patients perceived problems	Yes		No	
		Male	Female	Male	Female
1	Discomfort	35 (17.5%)	25 (12.5%)	60 (30%)	80 (40%)
2	Ineffective	18 (9%)	20 (10%)	73 (36.5%)	89 (44.5%)
3	Pain	46 (23%)	58 (29%)	50 (25%)	46 (23%)
4	Poor Oral Hygiene	59 (29.5%)	69 (34.5%)	38 (19%)	34 (17%)
5	Oral ulcers	22 (11%)	22 (11%)	100 (50%)	56 (28%)
6	Halitosis	28 (14%)	50 (25%)	72 (36%)	50 (25%)
7	Difficulty in speech	12 (6%)	16 (8%)	126 (63%)	46 (23%)

DISCUSSION

Removable appliances were pioneered by George Crozat[8] in the US. In the recent decades with the innovation of fixed appliances the removable appliances for tooth movement were gradually less used. However, there are many conditions in which these would be appliance of choice for tooth movements, especially if early intervention is required. In recent decades intra oral removable orthodontic appliances are less discussed in the orthodontic literature and fewer researchers tend to investigate there indications and advantages. According to Profit *et al*[9] removable appliances have advantages as they are affordable for patients, easily adjustable for orthodontist and in selected however treatment with fixed appliances may be shortened by a previous treatment with a removable appliance. While the use of removable appliances presents obvious advantage for socially active people but success of treatment can be patient dependent[10].

In this study, a relatively increased number of female patients believe that appliance is effective (89) and comfortable (80) to wear; this may be due to as males are not as much as conscious as female patients in wearing removable appliances in social settings. Discomfort caused by orthodontic appliances may significantly affect patient's compliance with treatment and aesthetic impairment are the primary reasons for poor cooperation[11] and sometimes treatment discontinuation or early termination[12] these find-ing are non-consistent with our results as 70% of patients believed that prescribed appliance was comfortable to wear. Clinician might improve acceptance by selecting an appliance design, which would allow comfortable wear and facilitate adaptation to the appliance. Despite increasing number of adults seeking orthodontic treatment satisfaction with orthodontic treatment irrespective of appliances used, good communication played a major role. It is known that removable appliances may cause discomfort including unpleasant tactile sensation, pressure on mucosa, stretching of soft tissues, displacement of tongue, soreness of the teeth and pain[11]. Patient wearing removable appliances experienced less pain as compared to those who are wearing fixed orthodontic appliances in which pain is somewhat more prolong. In our study, 58 female patients feel pain after insertion of appliance, there is a non-linear relationship between age, gender, psychological state and cultural background in pain perception following placement of an orthodontic appliance[13]. It is clear from the published literature[14] that females express more pain than males, and adolescents report higher levels of pain than pre-adolescents and adults but influencing factors are still not fully understood. The younger age groups reported more pain probably due to fact that in this particular age there is tendency to over rate their problems and also in this age they represent a period of intense social and affective relationships in which smile have a strong potential to influence the individual physical attractiveness. Traditionally, it is believed that females are fragile and sensitive to pain, while males can tolerate pain[15]. Conflicting results have, however, been reported with some showing that males are more willing to tolerate pain than females, but for others[16] there is no differences between males and females in reporting the feeling of pain and associated inconvenience with respect to threshold.

In our study, age was identified as an important factor that affected compliance negatively by increasing from middle childhood to early adulthood. In our study prevalence of patients reporting for orthodontic treatment with removable appliances was high in age group under 20 years probably at this age they are more concerned about esthetic, similar results was seen in another study[17] as, the prevalence of children from high schools using removable orthodontic appliances was 5.4%. These results were lower than other studies[17,18]. Krey and Hirsch[19] found that 16% of 11-14 year old children used removable orthodontic appliances in Germany. In England, Chestnutt *et al*[18] observed that 28% of 12 year-old children and 18% of 15 year-old children used removable orthodontic appliances[17]. An important strength of this study was that the ques-

tionnaire had previously been shown to have good reliability and validity[20].

In our study 64% patients feeling difficulty in maintaining oral hygiene similar results hasbeen shown by Hagg *et al* in their study[21] the presence of orthodontic attachments on labial or lingual surfaces of the teeth is likely to be the reason for this observation as they interfere in cleaning methods, furthermore the presence of rough surface of the appliance acts as a plaque trap and a gingival irritant played a contributory role. Essential requirement of any orthodontic treatment is the maintenance of oral hygiene so as to control the growth of bacterial plaque over the tooth surfaces, as orthodontic patients are at risk of developing dental lesions especially when their compliance to oral hygiene instructions is poor.

In this study 14% of the total patients feel difficulty in speech conceivably the removable appliance reduces and alters the intra oral space, implying difficulty for the tongue in creating speech sounds these results are consistent with the study done by Wiedael, Bondemark[20]. Speech problems in the removable appliance group may also be contributing factor to the negative effect on social life and leisure activities, for instance speech distortion may be affected by the device that impairs the movement or appearance of soft and hard oral tissues. Halitosis is a wide spread condition and is a big handicap for the patients can be related to intraoral factors including gram-negative anaerobic microorganisms in dental plaque, periodontal pockets, saliva and dorsum of the tongue, in this study 38% of the total studied population suffered from bad breath (halitosis), in another study[22] which was conducted in USA reported 10-30% of population suffers from bad breath our results were slightly higher from this study. The findings of our study indicate that removable orthodontic appliances are still effective in treatment of uncomplicated malocclusions and take a considerable share in contemporary orthodontic treatment. These appliances can resolve minor to mild malocclusions, however the key success of treatment is patient's compliance, although these appliances may interfere in oral hygiene maintenance which can be managed with appropriate instructions and advice.

RECOMMEDATION

Compliance with removable orthodontic appliances is suboptimal and discomfort caused by these appliances may significantly affect patient's acquiescence. Despite the availability of alternative compliance free orthodontic treatment options including fixed orthodontic mechanotherapy, fixed functional appliance, implant supported devices and fixed retainers, the removable orthodontic appliances continue to be popular. Patients perceived problems associated with the use of these removable orthodontic appliances can be minimized by improving appliance design, educating the patient and parents and by a close follow up at regular intervals. There is need for further prospective research evaluating the effectiveness of interventions to improve compliance with orthodontic adjuncts and exploring patients experience with removable appliances.

CONCLUSION

Despite a few problems associated with wearing, the removable orthodontic appliances remained an effective and viable treatment option for uncomplicated malocclusions.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any authors.

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