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Patient comfort level among various age groups during orthodontic treatment- a cross-sectional survey

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Abstract: Orthodontic patients experience pain and discomfort to a varying degree during the course of treatment. One of the most important goals of orthodontic dental care is helping patients in their attempts to reach an acceptable level of satisfaction with their oral cavity and dentition. Dentofacial problems have known definitive effects on patient satisfaction and comfort with their appliance because it affects esthetics, performance, and function. The aim of this study was to assess the comfort level among various age groups during the orthodontic treatment. A questionnaire comprising 13 questions was created in an online survey platform and the link was shared to the patients . The patient data was collected from the case records of patients visiting Saveetha dental College for treatment. Statistical analysis was done using IBM SPSS software version 20.0. 44% of the respondents feel that their appliance is not at all comfortable and about 32% of the people are embarrassed to wear the appliance in public. Chi-square test was done for the association of gender and embarrassment of wearing appliances in public and the p value 0.001* was found to be statistically significant . This concludes that more male patients feel embarrassed to wear the appliance in public and patients of age group 15-20 years feel that the appliance is more tight , eliciting pain.

Keywords: Adolescents ; Appliance ; Comfort ; Orthodontics ; Pain innovative technique.

INTRODUCTION

An increasing number of patients seek orthodontic treatment because malocclusion has a significant effect on their quality of life (Jones, 1984) . Orthodontic appliances represent foreign objects inserted in a physically and psychologically sensitive area of the body (Sivamurthy and Sundari, 2016; Vikram *et al.*, 2017). It's usually obvious to others that they are being worn and it's possible that susceptible individuals may be self-conscious about wearing them in public (Dinesh *et al.*, 2013; Felicita, 2018) . Children in particular are subjected to social ridicule from their peers (Sergl, Klages and Pempera, 1992; Kamisetty *et al.*, 2015).

Yet orthodontic patients are expected to remain compliant and cooperative throughout the treatment which may last for several years (Krishnan, Pandian and Kumar S, 2015; Samantha, Sundari and Chandrasekhar, 2017) .The patients' psychological response to orthodontic treatment and their ability to adapt to appliances are clearly a very significant concern (Herren *et al.*, 1966). The discomfort of orthodontic treatment has a negative effect on patient compliance (Rubika, Sumathi Felicita and Sivambiga, 2015; Viswanath *et al.*, 2015) .

Among the adverse effects of orthodontic treatment, speech difficulty is one of the major complications (Jain, Kumar and Manjula, 2014; Felicita, 2017b) . Apart from the original speech problems caused by malocclusion, orthodontic appliances can also lead to speech disturbances because they are a foreign body in the oral cavity (Felicita, Chandrasekar and Shanthasundari, 2012; Felicita, 2017a). Specifically, orthodontic appliances often fit against the palate and the surface of the teeth, which affects the movement of the tongue and the space of the oral cavity, resulting in the distortion of some specific sounds .

In addition, it has been reported that various types of orthodontic appliances such as labial and lingual fixed appliances , tongue thrusts ,palatal expanders and Hawley retainers may influence speech clarity (Ramesh Kumar *et al.*, 2011; Pandian, Krishnan and Kumar, 2018).

While many studies have taken the standpoint of operators, patient's own perceptions of their treatment have been rarely sought.

Our department is passionate about research we have published numerous high quality articles in this domain over the past years (Abraham *et al.*, 2005; Devaki, Sathivel and BalajiRaghavendran, 2009; Neelakantan *et al.*, 2010, 2015; Arja *et al.*, 2013; Ramshankar *et al.*, 2014; Sumathi *et al.*, 2014; Surapaneni and Jainu, 2014; Surapaneni, Priya and Mallika, 2014; Ramamoorthi, Nivedhitha and Divyanand, 2015; Manivannan *et al.*, 2017; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; J *et al.*, 2018; Ravindiran and Praveenkumar, 2018; Malli Sureshbabu *et al.*, 2019; Mehta *et al.*, 2019; Krishnaswamy *et al.*, 2020; Samuel, Acharya and Rao, 2020; Sathish and Karthick, 2020)

The aim of this study was to evaluate the experience of patients wearing fixed and removable orthodontic appliances to and evaluate their comfort level.

MATERIALS AND METHODS

Study design and setting: A total of 100 patients who were undergoing orthodontic treatment in Saveetha dental college were randomly selected. The patients details were collected from the patient records and were contacted through for the distribution of the questionnaire created in an online survey platform.

Ethical Approval: The study was commenced after approval from the institutional review board (Ethical approval number : SDC/SIHEC/2020/DIASDATA/0619-0320).

Informed consent: A written informed consent was obtained from all the study subjects.

Subjects and Procedures: The questionnaire was randomly distributed to 100 patients who were undergoing Orthodontic treatment at Saveetha dental college. The following data retrieved from the dental records: Patient's name , age, gender and contact number . The questionnaire comprised 13 questions which used a four point Likert type scale where each item responded is scored indicating the degree of agreement with the statement - Not at all, Little , Much and Very much.

Statistical analysis: The statistical analysis was done using SPSS software version 21.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics (percentage and mean) and Inferential statistics (Chi Square test) were done.

RESULTS AND DISCUSSION

Of the total hundred participants, 40% were female and 60% were male. They were split into two age groups 15 to 20 years which comprised 53% and 21 to 26 years which comprised 47% of the population.

Figure 1 day depicts the pie chart on the type of appliance where 64% were using fixed appliances and 36% used removable Orthodontic appliances.

In figure 2 appliance comfort has been depicted. Around 44% feel that the appliance is not at all comfortable followed by 40% of the respondents mentioning that the appliance is a little comfortable and 10% responding appliance is much comfortable and 6% responding at the appliance is very much comfortable.

Figure 3 was on appliance tightness. 51% of them feel that appliance is a little tight followed by 20% responding it is much tight, 19% as not at all tight and 10% as very much tight.

Figure 4 represents the interference of appliance in speech - 55% of the respondents state that it is very much interfering with the speaking followed by 25% much interference in speaking 12% as a little interference in speaking and 8% has stated that appliance has not at all interfered in their speech.

Figure 5 represents the response to being embarrassed to wear the appliance in public. 32% are very much embarrassed to wear the appliance in public, followed by 29% a little embarrassed to wear it in public, 26% much embarrassed and 13% not at all embarrassed about wearing the appliance in public. Figure 6 is the association of age and type of appliance which has a p value of about 0.652. In figure 7 the association of age and appliance comfort has been depicted . The p value was 0.028* (statistically significant). In figure 8 , for the association of age with appliance tightness, p value was 0.12 ($p > 0.05$; statistically insignificant) .Figure 9 depicts the association of gender and being embarrassed to wear their appliance in public has been demonstrated. The p value for this is about 0.001* which is statistically significant. Also , males were more embarrassed to wear the appliance in public than females.

For efficient clinical management of orthodontic patients , It is suggested to predict their behaviour and compliance during the treatment (Lewis and Brown, 1973) . The amount of initial pain and discomfort experienced by the patient predicts the acceptance of the appliance and treatment in general (Oliver and Knapman, 1985). Patient self-confidence is affected by speech impairment during social interactions when focused on face, eyes and mouth (Sergl, Klages and Zentner, 1998). The case in our study was about 32% of the people were embarrassed to wear the appliance in public and in 55% of the patients they applied and interfered in their speech. It is to be noted that for an adolescent patient whose motivation for orthodontic treatment is guided primarily by the perception of their own appearances, during treatment they feel even more being the centre of attention of peers and acquaintances (Nanda and Kierl, 1992).

Another predictor of the discomfort during orthodontic treatment revealed in the present work was the value of dental aesthetics (Woolass *et al.*, 1988) . The more pleasing the appliance looks aesthetically , the lower was the complaint intensity of feeling of tightness (Sergl and Zentner, 2000). So dentists might try to incorporate more aesthetic measures in the kids and adolescents in their removable appliance so that the kids might feel good using them. It is the role of the dentist to make their patients as comfortable as possible and also deliver the appliance in the correct functioning way.

CONCLUSION

Prior to the orthodontic treatment, patients should be forewarned about the practical difficulties that may be induced by orthodontic appliances. Advice regarding the adaptation time should also be given. Dentists should advise the patients to speak more slowly and to accept some speech distortions during the period of adaptation. Patients can be counseled about the changes to expect with relation to pain, discomfort, speech, chewing, and swallowing immediately after an appliance is placed and up to a week after wearing it. The patient's psychological response to orthodontic treatment and ability to adapt to the appliance might be significantly improved with anticipatory guidance. Providing such information to patients can be expected to expedite the adaptation period and improve cooperation.

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Conflicts of interest: There are no conflicts of interest.

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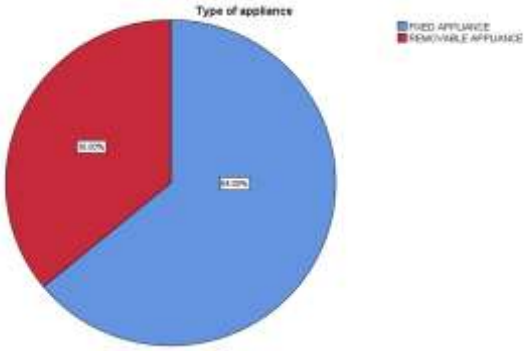

Fig.1: Pie chart depicts the type of appliance used .36% of them used removable appliances (red) and 64% of them wore fixed appliances (blue) .

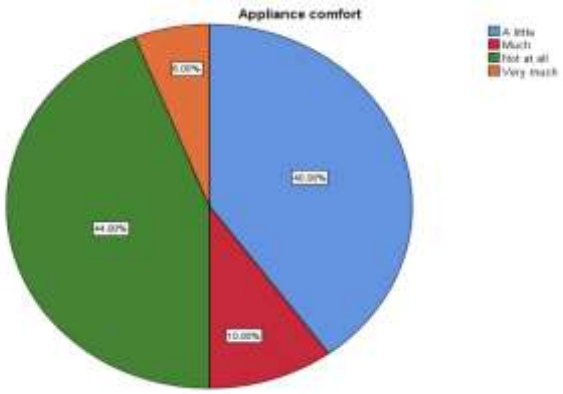

Figure 2: Pie chart depicts the appliance comfort . 40% report the appliance is little comfortable (blue) , 10% report the appliance to be much comfortable (red) , 6% report the appliance to be very much comfortable (orange) and 44% reported the appliance to be not at all comfortable(green) .

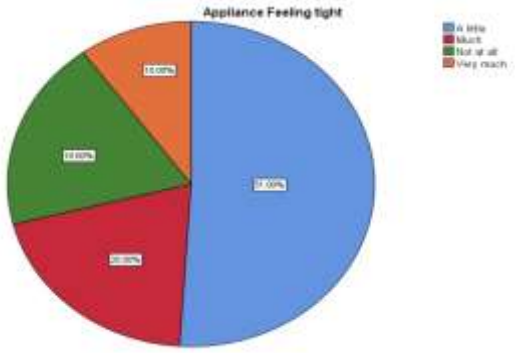

Fig.3: Pie chart denotes the appliance tightness. Half of them ie, 51% reported the appliance to be a little tight (blue) , 20% reported the appliance to be much tight (red) , 10% reported the appliance to be very much tight (orange) and the remaining 19% reported the appliance to be not at all tight (green).

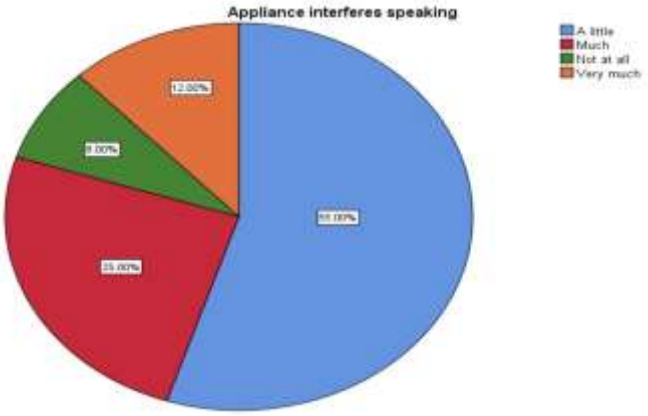

Fig.4: Pie chart denotes the appliance in speech interference. More than half ie, 55% reported that the appliance interferes in speech a little (blue) , 25% reported the appliance interference in speech to be much (red) , 12% reported the appliance interference in speech to be very much (orange) and the remaining 8% reported the appliance does not interfere with speech at all (green).

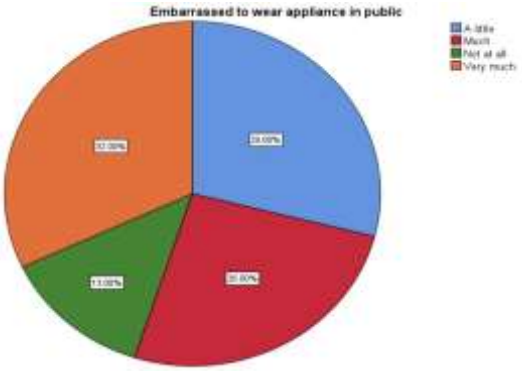

Fig.5: Pie chart depicts the response of embarrassment to wear the appliance in public. 29% of the respondents reported that they are a little embarrassed to wear the appliance in public (blue) , 26% reported being much embarrassed (red) , 32% reported being very much embarrassed (orange) and the remaining 13% reported that they are not at all embarrassed to wear the appliance in public (green).

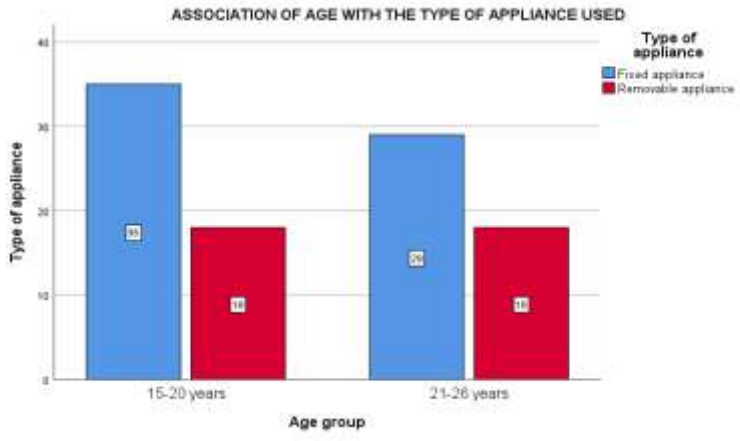

Fig.6: Bar graph depicts the association of age and type of appliance . X axis represents the age group and Y axis denotes the type of appliance. Chi-square test was done and was found to be statistically insignificant[Pearson's Chi - Square value is 0.20; p-0.652 (p>0.05)] More patients with fixed appliances fall into the age group of 15-20 years than 21-26 years , and those who use removable appliances are the same in number for both the age groups.

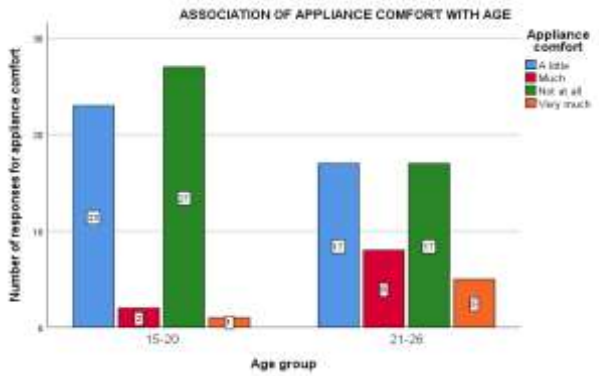

Fig.7: Bar graph depicting the association of age and appliance comfort , X axis represents the age group and Y axis denotes the responses to appliance comfort. Chi-square test was done and was found to be statistically significant[Pearson's Chi - Square value is 0.11; p - 0.028* (p<0.05)]. Patients in the age group of 15-20 years have responded the most for appliances to be not at all comfortable .

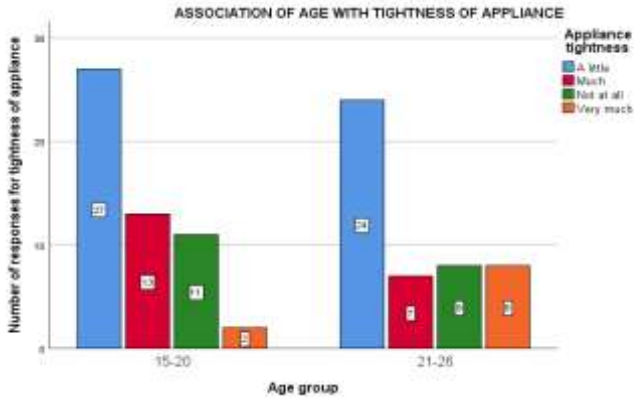

Fig.8: Bar graph depicting the association of age and appliance feeling tight. X axis denotes the age group and Y axis denotes the response for appliance tightness. Chi-square test was done and was found to be statistically insignificant[Pearson's Chi - Square value is 2.71; p - 0.12 (p<0.05)]. Patients in the age group of 21-26 years have responded the most for appliances to be very much tight .

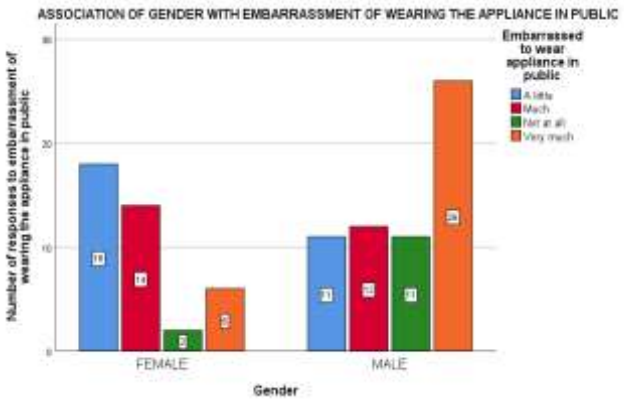

Fig.9: Bar graph depicting the association of gender and response to embarrassment of wearing appliances in public. X axis denotes the gender and Y axis denotes the response to embarrassment to wear appliances in public . Chi-square test was done and was found to be statistically significant[Pearson's Chi - Square value is 0.26; p - 0.001* (p<0.05)]. Males are more embarrassed to wear the appliance in public than females .