

# Stress level Assessment in Orthodontic Patients Receiving Treatment from three months: A quasi experimental study

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## ABSTRACT

**Aim:** To assess the degree of stress in patients before seeking orthodontic treatment and after three months of active orthodontic treatment.

**Methods :** This quasi study was carried out on ninety two patients seeking orthodontic treatment at a dental college by comparing different stress parameters using non probability sampling technique. Stress level was assessed at baseline (T0) and after 3 months (T1) using "The Modified Counseling Team International Stress Indicators Questionnaire". The questionnaire comprised of five indicators i.e., physical, behavioral, sleep, emotional and personal habits. With each indicator having different questions but same point scale ranging from very low to dnager. It was use on 92 patients of orthodontic department from October 2018 to January 2019. The data was statistically analyzed through SPSS. Standard deviations and means of continuous variables were calculated for each group as descriptive statistics.

**Results:** Significant correlations were found among the variables from T0 to T1 except the sleep indicator variable. There was a reduction in all stress indicators such as physical, behavioral, emotional and personal habits except the sleep stress indicator ( $p < 0.05$ ) through the study.

**Conclusions:** Over all stress reduction was seen with time. Substantial redcution in physical, behavioral, emotional and personal habit stress was seen. Sleep stress level showed no significant variance before and after treatment. However femlaes showed reduced stress level as compared to males.

**Keywords:** Anxiety, Orthodontic Treatment, Self esteem, Stress level

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## INTRODUCTION

Mental health is defined as a state of soundness, in which every person realizes his own prospective, and can cope with the normal stresses of life. Psychological stress greatly affect mental health of an individual<sup>1</sup>. Psychological stress is described as a relationship between the person and the environment that is appraised by the person as taxing or surpassing his or her resources and risking his or her well-being. <sup>2</sup> Stress is a response to threat in a situation and anxiety is a reaction<sup>3-5</sup>. Until now, stress related to emotions has not been considered as most probable element, while it is quite clear that stress situations are diligently linked to both the endocrine and immune systems. Stressful situations originate fright and anxiety which are considered as risk factors for a number of diseases<sup>6</sup>.

Dental stress has both psychological and physiological effects. It leads not only to escape or delay of dental treatment, but it may also effect individuals mostly by causing sleep related problems, mental distress and low self-confidence<sup>7,8</sup>. The prevalence of dental stress is documented as 23% by Do Nascimento et al<sup>9</sup> and 46% by Malvania et al<sup>10</sup>. It has been increased from 4 to 23 percent of the general population over the last thirty three years<sup>11</sup>. Several researchers have assigned dental anxiety to the prediction of pain. <sup>12</sup> Pain experienced during

orthodontic treatment has been reported as one of the main reason of agitation. <sup>13,14</sup> Patients having painful past dental practice are more anxious than those who have pain-free practice<sup>15</sup>.

There have been a limited number of studies reported in the orthodontic literature that have measured the degrees of stress in patients seeking orthodontic therapy. Orthodontic treatment has been shown to cause dental stress.<sup>16</sup> Patient's perception regarding the aspect of the orthodontic device acts as a major stress producing factor especially the problem of wearing it<sup>17</sup>. Lewis and Brown stated that 25 percent of patients were tensed of using orthodontic appliances. <sup>18</sup> Before and following application of orthodontic appliance social anxiety develop as well as the fear of being rejected by peers<sup>19</sup>.

Sari et al stated that patients who were waiting for orthodontic therapy were more stressed than those who had been experiencing treatment for 1 year. Stress level of dental patients lessens as they develop more acquaintance with the orthodontist and dental environment<sup>20</sup> Ligia et al propose that the level of stress and anxiety decreases by understanding the psychological status of patient at the beginning. <sup>17</sup> Multiple indicators should be used for the assessment of different aspects of dental stress<sup>21</sup>.

To the best of our knowledge, this is the pioneer study in our region validating The Modified Counseling Team International Stress Indicators Questionnaire to measure the stress level in orthodontic patients. Determining the causes and factors contributing to stress in patient will help orthodontists to manage patient's stress in advance which

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Received on 17-07-2019

Accepted on 07-11-2019

will result in more compliant orthodontic patients. The study aimed to compare the stress level before and after three months of active orthodontic treatment among patients by using The Modified Counseling Team International Stress Indicators Questionnaire visiting a private dental hospital.

## MATERIALS AND METHODS

This questionnaire-based quasi experimental study was sanctioned by the official review board and ethical committee of the institute (Ref: PRIME/IRB/2018-0104) with strict following of the ethical protocols.. The tool was first validated through a pilot study done on 30 subjects. By using openepi, the total sample size was calculated as 92 by using the mean of dental anxiety (T1 group) 8.66+ 2.10 and 7.08+2.52 in the (T2 group) by keeping 95% confidence interval with 90% power of the test. <sup>14</sup> It was carried out on ninety two patients (females: 53 and males: 39) that were reported to orthodontics department from October 2018 to January 2019. Informed consent were signed by all the subjects and it was guaranteed that their answers will be kept trusted. Patients were given basic information's related to orthodontic treatment, its effects and possible consequences. Our inclusion criteria were:

1. Age ranging between 15-25 years,
2. No record of prior orthodontic therapy
3. Skeletal and dental class I, II and III malocclusions.

The exclusion criteria included:

1. Patients with mandibular asymmetries
2. Craniofacial syndromes
3. Extensive prosthetic appliances and patients with any psychic disorder.

**Data collection (Questionnaire Design):** Stress level of patients was assessed using The Modified Counseling Team International Stress Indicators Questionnaire. The first set of questionnaires was given before the treatment (T0) and the other was given after three months of orthodontic treatment (T1) to the same patients. The questionnaire comprised of different indicators including physical, behavioral, sleep, emotional and personal habits. Each indicator had different questions but had same five

point scale ranging from very low to danger. Final score of stress level after adding all the responses is expressed as:

1. Physical indicator was based on 17 questions (Score: 17- 23 = very low, 24-30 = medium, 31-37 = high, 38-42 = very high &  $\geq 43$  = danger).
2. Sleep indicator was based on 5 questions (Score: 5-6 = very low, 7-8 = medium, 9-10 = high, 11-12 = very high and  $\geq 14$  = danger).
3. Behavioral indicator was based on 10 questions (Score: 10-14 = very low, 15-20 = medium, 21-25 = high, 26-29 = very high and  $\geq 30$  = danger).
4. Emotional indicator was based on 18 questions (Score: 18-23 = very low, 24-30 = medium, 31-37 = high, 38-45 = very high &  $\geq 46$  = danger).
5. Personal habit was based on 9 questions (Score: 9-15 = very low, 16-20 = medium, 21-22 = high, 23-25 = very high &  $\geq 30$  = danger).

**Statistical Analysis:** The composed data was entered and interpreted through SPSS software (version 20, SPSS Inc, Chicago, Ill). Descriptive statistics was calculated for each group as standard deviations and means of the continuous variables. For comparison of the means of pre and post treatment variables between the groups, paired sample T-test was applied. The P-values below 0.05 were considered statistically significant.

## RESULTS

Frequency of age and gender distribution is given in Fig. 1. Intra class correlation coefficients were calculated and 95% confidence intervals were used to measure the reliability for each variable. Significant correlations were found among the variables from T0 to T1 except the sleep indicator variable (Table 1). Statistical Comparisons of the groups and descriptive statistics of the variables at T0 and T1 are given in Table 2. Significant differences were seen throughout the study between the variables of two groups including physical, behavioral, emotional and personal habits stress indicator; no significant difference in sleep stress value was observed Table 2.

Fig 1: Shows the distribution frequency of age and gender

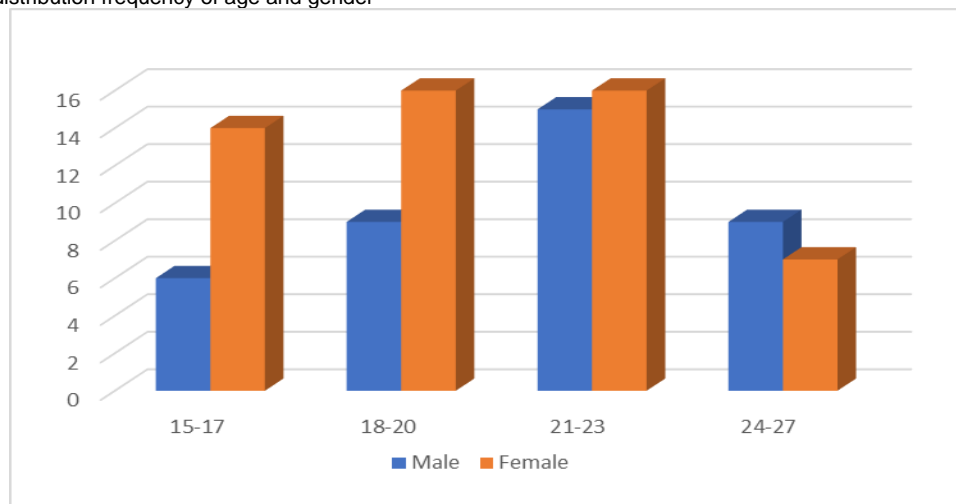


Table 1: The reliability results for the stress variables at T0 and T1

Groups	Correlation	95% CI	
		Lower Bound	Upper Bound
Pre op indicator of Physical stress Post op indicator of Physical stress	.227	0.556	1.052
Pre op indicator of Sleep stress Post op indicator of Sleep stress	.188	0.186	0.077
Pre op indicator of Behavioral stress Post op indicator of Behavioral stress	.448	0.67	1.069
Post op indicator of Emotional stress Pre op indicator of Emotional stress	.574	0.656	1.083
Pre op indicator of Personal habits stress Post op indicator of Personal habits stress	.585	0.661	1.057

Table 2: The means, standard deviations and comparison between the groups for physical, sleep, behavioral, emotional and personal habits stress at T0 and T1.

Groups	Mean	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Pre-op indicator of physical stress Post-op indicator of physical stress	.804	1.197	.125	.000*
Pre-op indicator of sleep stress Post-op indicator of sleep stress	.054	.635	.066	.414
Pre-op indicator of behavioral stress Post-op indicator of behavioral stress	.870	.963	.100	.000*
Pre-op indicator of emotional stress Post-op indicator of emotional stress	.870	1.029	.107	.000*
Pre-op indicator of personal habits Post-op indicator of personal habits	.859	.956	.100	.000*

\*Significant difference between groups

## DISCUSSION

Our supposition was that the patients that were stressed at the beginning of orthodontic therapy became less hesitant afterwards. In our study, stress levels of patients prominently minimized with the passage of time and greater improvement was seen in female with the passage of time. We explored the multi dimensionality of patient stress level through different parameters. Physical, behavioral, emotional and personal habits values significantly decreased from T0 (before orthodontic treatment) to T1 (after three months of active orthodontic treatment). Reduction in stress level observed credited to the enhancement in self-confidence and familiarity with environment and orthodontic procedure at every appointment, this finding agrees with the study of Sergl et al. <sup>22</sup> Similarly study by sari et al mentioned that dental stress was higher initially but it subsided with time. <sup>20</sup> Personality and psychological status have an impact on dental anxiety and stress. It might back up the basis of understanding of the study subjects being more anxiety at the start of the treatment then after three months of active treatment. During this period they got familiar with the dentist and adapted to their fixed orthodontic appliance. <sup>14</sup> The results of our study showed significant amount of stress reduction after three months of active treatment.

An interesting outcome of our study was that females reported more reduction in stress level and improvement in self- esteem as compare to males after three months of treatment.

Kanegane et al stated that there was no correlation between dental stress and gender, <sup>23</sup> many studies have shown that dental stress is less common in males than females. <sup>24-27</sup> Females are generally supposed to have greater phobia of procedures, specifically to certain

stimulus like (needle prick). However an important element which should be taken in account is females reveals their feelings completely while males tends to hide them, <sup>28</sup> so overcoming their fears and mentioning it could be one of the cause of higher level of stress reduction reported in females.

Spielberger et al reported that subjects under 14 years of age may not have a stable psychological personality and this should be the least age limit for psychological researches. <sup>29</sup> We therefore did not included those cases below the age of 14 years in our study. Our selection criteria had minimum age limit of 15 years. Patients were treated by the same practitioner in order to remove the pleasant and unpleasant effects of different doctor patient relationships on patient psyche.

This study is limited to the use of large group of patients and short time period after commencement of the treatment. Secondly patients of maximum age group will show stress which cannot be associated with the stress level of 15 years old patient. Also patients were not chosen in terms of their class and severity of malocclusion. Dentists need to have good communication with their patients and have pleasant atmosphere. By developing good relationship and establishing source of stress among patients, orthodontist will be able to understand and reduce the stress level of patients in an effective way and hence can boost the standard of patient care.

## CONCLUSION

1. Overall stress level of the orthodontic patients decreased with the passage of time due to friendly environment and improved self-esteem.
2. There was a major reduction in physical, behavioral, emotional and personal habits stress.

3. There was no significant difference in the sleep stress level initially and after the three months of orthodontic treatment.
4. Stress level of females reduced more as compared to males.

## REFERENCES

1. Chacko A, Tikku T, Srivastava K. Evaluation of psychological stress in orthodontic PG students in India. *Int J Orthod Rehabil.* 2017; 8 (1): 19.
2. Lazarus RS, Folkman S. *Stress, appraisal, and coping.* Springer publishing company; 1984 Mar 15.
3. Mustafa S, Younis R, Islam H, Durrani O. Dental fear in patients pursuing orthodontic treatment. *POJ.* 2017; 9 (1): 37-42.
4. Krochak M. The psychodynamics of dental anxiety and dental phobia. *Dent Clin North Am.* 1988; 32 (4): 647.
5. Chadwick BL. Assessing the anxious patient. *Dent update.* 2002; 29 (9): 448-54.
6. Peruzzo DC, Benatti BB, Ambrosano GM, Nogueira-Filho GR, Sallum EA, Casati MZ, Nociti FH. A systematic review of stress and psychological factors as possible risk factors for periodontal disease. *J Periodontol.* 2007; 78 (8): 1491-504.
7. Cohen SM, Fiske J, Newton JT. Behavioural dentistry: The impact of dental anxiety on daily living. *Br Dent J.* 2000; 189 (7): 385.
8. Curson I, Coplans MP. The need for sedation in conservative dentistry. An investigation in the inner London area. *Br Dent J.* 1970; 128 (1): 19.
9. Nascimento DL, Araújo AC, Gusmão ES, Cimões R. Anxiety and fear of dental treatment among users of public health services. *Oral Health Prev Dent.* 2011;9 (4).
10. Malvania EA, Ajithkrishnan CG. Prevalence and socio-demographic correlates of dental anxiety among a group of adult patients attending a dental institution in Vadodara city, Gujarat, India. *Indian J Dent Res.* 2011; 22 (1): 179.
11. Locker D, Liddell A, Shapiro D. Diagnostic categories of dental anxiety: a population-based study. *Behav Res Ther.* 1999; 37 (1): 25-37.
12. Vassend O. Anxiety, pain and discomfort associated with dental treatment. *Behav Res Ther.* 1993; 31 (7): 659-66.
13. Weiner AA. Etiology of dental anxiety: psychological trauma or CNS chemical imbalance?. *Gen. Dent.* 1990; 38: 39-43.
14. Yıldırım E, Karacay S. Evaluation of anxiety level changes during the first three months of orthodontic treatment. *Korean J Orthod.* 2012; 42 (4): 201-6.
15. Vaida L, Dalai C, Dima R. Evaluation of anxiety level in children and adolescents requesting orthodontic treatment. *OHDMBSC.* 2007; 6 (3): 57-61.
16. Crowley RE, Klebanoff SG, Singer JL, Napoli PJ. Relationship between personality factors and cooperation in dental treatment. *J Dent Res.* 1956; 35 (1):157-65.
17. Vaida L, Todor BI, Bertossi D, Corega C. Correlations between stress, anxiety and coping mechanisms in orthodontic patients. *Iranian J Public Health.* 2015; 44(1): 147.
18. Lewis H, Brown W. The attitude of patients to the wearing of a removable orthodontic appliance. *Br Dent J.* 1973; 134 (3): 87.
19. Pervez H, Ahmed I, Gul-e-Erum NK. Evaluation of anxiety level changes during the first three months of orthodontic treatment in Pakistani population. *J Dent Oral Hyg.* 2015; 7(7): 102-6.
20. Sari Z, Uysal T, Karaman AI, Sargin N, Üre Ö. Does orthodontic treatment affect patients' and parents' anxiety levels? *Eur J Orthod.* 2005; 27 (2): 155-9.
21. Porritt J, Buchanan H, Hall M, Gilchrist F, Marshman Z. Assessing children's dental anxiety: a systematic review of current measures. *Community Dent Oral Epidemiol.* 2013; 41 (2): 130-42.
22. Sergl HG, Zentner A. A comparative assessment of acceptance of different types of functional appliances. *Eur J Orthod.* 1998; 20 (5): 517-24.
23. Saatchi M, Abtahi M, Mohammadi G, Mirdamadi M, Binandeh ES. The prevalence of dental anxiety and fear in patients referred to Isfahan Dental School, Iran. *Dent Res J (Isfahan).* 2015; 12 (3): 248.
24. Arslan S, Tarım Ertaş E, Ülker M. The relationship between dental fear and sociodemographic variables. *Erciyes Medical Journal.* 2011; 33 (4): 295-300.
25. Erten H, Akarslan ZZ, Bodrumlu E. Dental fear and anxiety levels of patients attending a dental clinic. *Quintessence Int.* 2006; 37 (4).
26. Kirova DG. Dental anxiety among dental students. *Journal of IMAB.* 2011;17(2):137
27. Ali S, Farooq I, Khan SQ, Moheet IA, Al-Jandan BA, Al-Khalifa KS. Self-reported anxiety of dental procedures among dental students and its relation to gender and level of education. *J Taibah Univ Med Sci.* 2015; 10 (4): 449-53.
28. Farooq I, Ali S. A cross sectional study of gender differences in dental anxiety prevailing in the students of a Pakistani dental college. *Saudi J Dent Res.* 2015; 6 (1): 21-5.
29. Spielberger C, Gorsuch R, Lushene R. *Manual for the state-trait anxiety inventory.* 1970. Palo Alto: Consulting Psychologists Press Google Scholar. 2015.