OPEN ACCESS
ORIGINAL ARTICLE

ORTHODONTIC TREATMENT DURATION AND ITS IMPACT ON PATIENT WELL-BEING: ASSESSING DEPRESSION IN EXTENDED CARE

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ABSTRACT

Objective: *This study investigated whether prolonged orthodontic treatment of more than three years can cause depression in patients.*

Methodology: *This was a cross-sectional comparative study conducted by selecting two groups of orthodontic patients each comprising a sample of 63 participants. Group 1 (G1) with orthodontic treatment exceeding three years, and Group 2 (G2) with 8-12 months of orthodontic treatment. The Beck Depression Inventory (BDI) score was employed to assess depression in both groups with the help of a questionnaire.The mean BDI score of the two groups were compared with the Independent sample T-test. The level of significance was set at $p \leq 5$.*

Results: *Results indicated the highest BDI score frequency of 10 (15.9%) in G1 group. In G2 group the highest BDI score frequency was 3 (15.1%). Independent sample T- test showed a statistically significant difference in depression level, between the two groups ($p = 0.000$), with G1 (treatment time of more than three years) showing a mean BDI score of 11.03 (mild depression) and G2 (treatment time of one year) as 3.21 (normal ups and downs).*

Conclusion: *These findings suggest that extended orthodontic treatment of more than 3 years can cause mild depression in orthodontic patients.*

Key Words: *BDI, Depression, Orthodontic treatment, Mental Health.*

This article may be cited as: Amin B, Naureen S, Kiani GH, Hameed U, Hameed A, Hameed U. Orthodontic treatment duration and its impact on patient well-being: Assessing depression in extended care. Pak Oral Dent J 2023; 43(4):180-185.

INTRODUCTION

Orthodontic treatment is a transformative process that not only addresses functional and aesthetic issues but also has the potential to impact the patient's emotional well-being.[1] The duration of orthodontic treatment varies greatly but the current best evidence suggests that comprehensive treatment lasts, on average, less than two years.[2] Several factors can affect the orthodontic treatment duration, including missed sessions, treatment plan, and bracket debonding. In addition, the type of bracket, molar relationship at the treatment onset, and extraction or non-extraction strategy also appear to play a role in prolonged orthodontic treatment.[3] An increased risk of root resorption and white spot lesions is also associated with longer treatment time, which can lead to patient disappointment.[4] In addition, patient compliance and quality of life-related to oral health may be affected by prolonged orthodontic treatment, especially in adults.[5] Delay in appointments during orthodontic treatment due to any reason can lead to serious harm.[6] A recent study found that awake bruxism occurs in some orthodontic patients leading to higher levels of anxiety and depression along with poor oral health-related quality of life.[7] Delay in treatment was the biggest concern of

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Received for Publication: Sept 14, 2023
Revised: Nov 5, 2023
Approved: Nov6, 2023

patients undergoing orthodontic treatment during the COVID-19 pandemic and was significantly associated with stress.[8] According to the Mental Health Society anxiety and depression are the most common disorders in children and adolescents.[9]

Numerous studies[10,11] are available on anxiety assessment in orthodontic patients however there is a gap in the literature on the issue that an increase in orthodontic treatment time can initiate depression or not. It is imperative to recognize that prolonged treatment duration may inadvertently contribute to clinical depression. This unique intersection of dental care and mental health necessitates a comprehensive approach to patient care, that acknowledges and addresses the potential depressive symptoms. In this context, this paper aims to delineate a structured framework for diagnosing depression in patients undergoing extended orthodontic treatment for more than three years.

MATERALS AND METHODS

This was a cross-sectional comparative study conducted at Rawal Institute of Health Sciences RIHS from January 2023 to April 2023. To carry out this study, two groups of patients were selected from the orthodontic department of RIHS. The first group G1 comprised patients who had been undergoing orthodontic treatment for more than three years and the second group G2 included patients who had been in treatment for 8-12 months. Inclusion criteria were simple extraction cases with a camouflage orthodontic plan. Younger patients who started treatment with growth-modifying appliances were also included in the study. Any patients with a history of pretreatment depression were excluded from the study. Severe skeletal or syndromic cases were also excluded.Nonprobability convenience sampling was done. The sample size was determined by a WHO calculator considering 95% confidence level and probability of 50%. It consisted of a total sample of 126, with 63 patients in each group. A letter of permission was received from the Ethical Committee of RIHS. Each participant was told about the study in detail and a written informed consent was taken from the participants.

The data collection instrument included a questionnaire for the assessment of depression. The depression symptoms were measured using the Beck Depression Inventory (BDI).[12] It is a self-report questionnaire consisting of 21 questions and is used to measure the severity of depression. After completing the questionnaire, the score for each of the twenty-one questions was added by counting the number of each question marked. Each participant could attain a total score of sixty-three. This means that the participant circled the highest number, i.e. three on all twenty-one questions. The lowest possible score on the scale for each question was zero. The level of depression was evaluated according to the Table below.

Score 1-10: These ups and downs are considered normal

Score 11-16: Mild mood disturbance

Score 17-20: Borderline clinical depression

Score 21-30: Moderate depression

Score 31-40: Severe depression

Data analysis was conducted using the SPSS Software (Version 20). Descriptive statistics was done and the frequency distribution of each variable was calculated. Means for age, gender, and depression in both groups were also calculated. To perform the statistical test, mean values of BDI scores in the G1 and G2 groups were compared using an independent sample t-test. A p-value of less than or equal to 0.05 was considered significant.

RESULTS

Results of the study revealed that the mean age in G1(under treatment for more than 3 years) and G2 (under treatment for 8-12 months) samples was 17.08±1.15 years and 14.78±.67 years respectively. Gender distribution (Table I) showed G1:27.8% females, and 22.2% males, and G2: 31.7% females, and 18.3% males. Mean BDI scores for G1 and G2 groups were 11.03 and 3.21 (Figure I).This indicates a higher level of depression in G1 group as compared to G2.The BDI Scores in G1 (Table II) ranged from 5 to 16, with the highest frequency in the range of 10 (15.9%). In G2, BDI scores (Table III) ranged from 0 to 7, with the highest frequency in the range of 3 (15.1%).

Beck Depression Inventory (BDI) scores in the G1 group undergoing treatment for more than three years, and the G2 group undergoing treatment for 8-12 months were compared using SPSS 23. An Independent Sample T-test was applied (Table IV). The results of the test indicated a significant difference (p=0.000) in the levels of depression between the two groups.

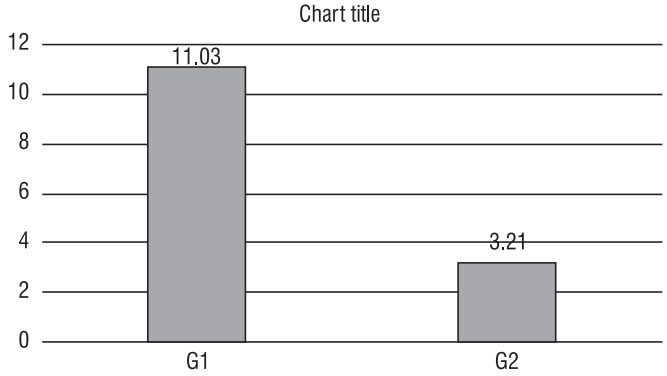

Fig 1: Mean Bdi Score in G1 and G2 Groups

TABLE 1: PERCENTAGE OF GENDER IN G1 AND G2 STUDY GROUPS

		Frequency	Percent	Valid percent
Group 1	female	35	27.8%	27.8%
	male	28	22.2%	22.2
	total	63	100%	100%
Group 2	female	40	31.7%	31.7%
	male	23	18.3%	18.3%
	total	63	100%	100%

TABLE 2: FREQUENCY FOR BDI SCORE IN GROUP I

BDI Score Group I		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	2	1.6	3.2	3.2
	6	2	1.6	3.2	6.3
	8	3	2.4	4.8	11.1
	9	4	3.2	6.3	17.5
	10	20	15.9	31.7	49.2
	11	9	7.1	14.3	63.5
	12	11	8.7	17.5	81.0
	14	5	4.0	7.9	88.9
	16	7	5.6	11.1	100.0
	Total	63	50.0	100.0	
Missing	System	63	50.0		
Total		126	100.0		

TABLE 2: FREQUENCY FOR BDI SCORE IN GROUP I

BDI Score Group II		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	1.6	3.2	3.2
	1	8	6.3	12.7	15.9
	2	12	9.5	19.0	34.9
	3	19	15.1	30.2	65.1
	4	9	7.1	14.3	79.4
	5	5	4.0	7.9	87.3
	6	4	3.2	6.3	93.7
	7	4	3.2	6.3	100.0
	Total	63	50.0	100.0	
Missing	System	63	50.0		
Total		126	100.0		

TABLE 4: INDEPENDENT SAMPLE T-TEST FOR GROUPS G1 AND G2

Independent Sample T-Test									
	Levene's Test for Equality of Variances							Confidence Interval 95%	
	F	Sig.	t	df	Sig. (2-tailed)	Mean diff	Standard error difference	Lower	upper
Equal variances assumed	4.431	.037	19.753	124	.000	7.66667	.39170	6.89138	8.44196
Equal variances not assumed			19.753	108.959	.000	7.66667	.39170	6.89032	8.44301

DISCUSSION

The psychological status and mental health of children and their parents during the long orthodontic treatment period have never been investigated. The results of our study revealed that the G1 group, undergoing orthodontic treatment for more than three years showed a mean BDI score of 11.03 which falls in the mild mood disturbance category according to the BDI scale, however, the 8-12month treatment group, showed a mean BDI score of 3.29 which falls in the category of normal ups and downs. These results are inconsistent with previous studies that believe that orthodontic treatment improves the social acceptance and self-concept of patients by enhancing dental and facial aesthetics.[13] Kolenda demonstrated a high association of self-perceived appearance with oral health-related quality of life. Dental appearance also has a psychosocial impact on private and job-related interactions, which can increase the motivation of treatment seekers.[14] Imani claimed in his study that orthodontic treatment significantly enhances the mental health status of the patients and also improves their attitude toward body image.[15] A study conducted by Bensen indicated that people with malocclusions have worse oral health–related quality of life (OHRQOL) than people without malocclusions.[16] Minghui et al also found that orthodontic procedures can not only increase self-confidence but also have a positive impact on the mental health of adolescents.[17] These results are contradictory to our results, possibly due to the different treatment duration and research questions. Additionally, most of these studies were conducted within six months to almost a year of starting orthodontic treatment.

According to the research, this is the first study to examine the presence of depression in orthodontic patients over time. The literature assessing anxiety and depression symptoms in patients after three years of orthodontic treatment is scarce. In our study, the BDI scores for G1 and G2 were significantly different according to the t-test. p = 0.00. These results are consistent with the growing body of evidence suggesting a possible association between increased duration of orthodontic treatment and level of depression. Naseri and Baherimoghadam found that the children's acceptance and motivation in treating malocclusion with removable appliances were only good before the appliance was given.[18] Johal et al. found that patients undergoing fixed orthodontic therapy had a negative impact on the overall oral health-related quality of life, during the first 3 months of treatment.[5] Several factors may contribute to this phenomenon. Patients undergoing prolonged treatment periods may experience frustration, disappointment, and decreased quality of life due to factors such as root resorption, dental caries, and compliance issues.[3] In addition, external factors such as the COVID-19 pandemic may also lead to delays in treatment, further increasing the feeling of stress and anxiety among orthodontic patients.[8] It has been reported that fear of pain also affects the patient's cooperation during long treatment periods reducing their satisfaction level, and even their quality of life.[19] A significant proportion of patients decided to halt orthodontic therapy due to pain in the past, due to which orthodontists are trying newer methods for alleviating pain employing the use of technology.[20] Previous mental health and orthodontic treatment studies focused on functional problems associated with orthodontic treatment such as temporomandibular joint dysfunction. These dysfunctions were related to

psychosocial factors such as stress, personality disorders, and anxiety.[7] Local studies have mostly examined anxiety in orthodontic patients and provide no insight into depression. Khokhar and Jan found that 46% of orthodontic patients in Pakistani samples had mild anxiety scores[21]. Naureen and Kiani revealed that a banding/bonding appointment is most important for the orthodontist to overcome patients' treatment-related concerns and fears.[22]

The study's use of the Beck Depression Inventory (BDI) as an assessment tool provides a standardized measure of depression severity, adding validity to the results. It is worth noting that this study excluded patients with pre-existing depression, which strengthens the argument that prolonged orthodontic treatment may be a contributing factor to the development of depressive symptoms in orthodontic patients. However, the limited sample size and single-center design are the limitations of this study. Further studies with improved study design can further validate these findings.

This study highlights the importance of psychological health parameters and the need to provide greater psychosocial support for patients undertaking orthodontic treatment for more than 3 years with fixed mechanotherapy. Although the level of depression is mild still patients should be offered counseling and support by either the orthodontist or a psychologist to prevent further complications. Structured physical exercise add-on therapy integrated into patients ' daily lives can also reduce their depressive symptoms.[23]

CONCLUSION

The study concludes that prolonged orthodontic treatment of more than 3 years can cause mild depression in orthodontic patients. This emphasizes the importance of controlling the treatment delaying factors and focus on comprehensive approach to patient care. Furthermore an orthodontist should keep an eye on patient's mental health and overall well-being in case of increased treatment time.

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