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Original Research

Comorbidity of Body Dysmorphic Disorder and Obsessive-Compulsive Disorder in Orthognathic Surgery Patients

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ABSTRACT

Objective: Body dysmorphic disorder (BDD) is a mental health disorder in which a person believes that their actual physical features appear worse than they truly are. The aim of this study is to examine the presence of BDD and its comorbidity with anxiety, depression, and obsessive-compulsive disorder (OCD) in patients with planned orthognathic surgery for dentofacial deformities.

Methods: In this study conducted on patients scheduled for orthognathic surgery, the presence of BDD, OCD, depression, anxiety, and stress was determined by administering the Florida Obsessive-Compulsive Inventory (FOCI), Depression, Anxiety, and Stress Scale-21 (DASS-21), and Body Image Disturbance Questionnaire (BIDQ) prior to the surgery. An independent samples t-test evaluated differences between group means, Pearson's correlation coefficient demonstrated the linear relationship between two variables, and the chi-square test assessed the relationship between two categorical variables. A p-value below 0.05 was deemed statistically significant. A total of 108 patients were included in the study, with 54 patients Class 2 and 54 patients Class 3.

Results: BIDQ, FOCI, depression, anxiety, and stress, males showed statistically significant higher results compared to females ($p < 0.05$). There were no statistically significant differences in BIDQ, FOCI, depression, and stress between Class 2 and Class 3 patients ($p > 0.05$). Of the 108 patients included in the study, a total of 20.4% (n=22) were found to be BDD positive. Among the female patients, 10% (n=6) were BDD positive, while among the male patients, 33.3% (n=16) were BDD positive. When evaluated in terms of skeletal classification, 14.8% (n=8) of Class 2 patients were BDD positive, while 25.9% (n=14) of Class 3 patients were BDD positive.

Conclusions: Surgeons performing orthognathic surgery should be familiar with common and often severe body image disturbances. When evaluating patients seeking orthognathic surgery, their psychological conditions should be carefully considered.

Keywords: Orthognathic surgery; Body dysmorphic disorder; Obsessive-compulsive disorder

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INTRODUCTION

Body dysmorphic disorder (BDD) is a mental health disorder in which a person believes that their actual physical features appear worse than they truly are [1, 2] In this condition, the individual perceives themselves as excessively ugly, shapeless, or distorted, and this belief can negatively impact their social life, work life, and daily activities [3]. People with this disorder worry that these flaws will be noticed, mocked, or criticized by others. As a result, many individuals may limit or avoid social interactions, and they may lose their jobs or struggle academically [4, 5]. While BDD can be related to specific areas of the body such as the skin, hair, breasts, muscles, or genitalia, the face, which is a crucial aspect of individuals' social identity, tends to be the structure most affected by this disorder [1]. The prevalence of BDD in the general population ranges from 1% to 3%, but may be higher in some populations [1,4]. BDD can negatively impact social and occupational functioning and lead to other mental health problems such as depression and anxiety [5].

Individuals with BDD often seek general medical treatments, including surgery, to correct their perceived flaws [6]. However, in these cases, the person will still remain dissatisfied after treatment, and the disorder can progressively worsen and become more distressing [7]. Studies in the literature have reported a higher prevalence of BDD in patients with severe dentofacial deformities requiring orthognathic surgery compared to individuals without dentofacial deformities [8,9]. Furthermore, there is evidence of a reverse relationship between the severity of BDD symptoms and satisfaction with orthognathic surgery outcomes [10]. However, the relationship between the type of dentofacial deformity and BDD has not been examined in the literature.

Main Points

- Body Dysmorphic Disorder (BDD) prevalence is significantly higher in orthognathic surgery patients compared to the general population.
- Male patients exhibited higher scores in BDD, OCD, depression, anxiety, and stress compared to female patients.
- Class 3 skeletal deformity patients showed higher anxiety levels compared to Class 2, but no significant difference in BDD, OCD, depression, and stress.
- Surgeons should consider the psychological conditions, including BDD, when evaluating patients for orthognathic surgery.

The aim of this study is to examine the presence of BDD and its comorbidity with anxiety, depression, and obsessive-compulsive disorder (OCD) in patients with planned orthognathic surgery for dentofacial deformities. Additionally, the study aims to identify differences based on the skeletal relationship of the jaws that constitute the dentofacial deformity.

MATERIALS AND METHODS

This prospective cohort study has been approved by the Tokat Gaziosmanpaşa University Clinical Research Ethics Committee with the registration number 22-KAEK-043. Written and verbal consent has been obtained from the patients in accordance with the Helsinki Declaration. The study was conducted on patients referred to the Department of Oral and Maxillofacial Surgery at Tokat Gaziosmanpaşa University Faculty of Dentistry for the correction of dentofacial deformities and who underwent orthognathic surgery.

Inclusion criteria: (I) Patients aged between 18 and 40 years, (II) Patients with dentofacial deformities, (III) Patients who have completed skeletal growth and development, (IV) Patients who perceive their problematic area to be only their mouth and jaws without complaints about other parts of their body, (V) Patients without chronic or metabolic diseases (VI) Patients without a history of trauma in the jaw and facial region, (VII) Patients without any substance use habits.

Exclusion criteria: (I) Patients with cleft palate or lip, (II) Patients with planned genioplasty only, (III) Patients with a pre-existing psychiatric diagnosis, (IV) Patients using psychiatric medications, (V) Patients with dentofacial deformities but without planned orthognathic surgery.

Scales Used in the Study

The included patients were given three separate self-assessment questionnaires prior to surgery: the Florida Obsessive-Compulsive Inventory (FOCI) [11]1989 a, the Depression, Anxiety, and Stress Scale-21 (DASS-21)[12], and the Body Image Disturbance Questionnaire (BIDQ) [13].

The BIDQ contains 7 questions, with 2 sections: A and B, excluding the 3rd and 4th questions. Each question in section

A has Likert-type options ranging from 1 (none) to 5 (extreme), while section B asks individuals to describe the topic mentioned in the question in their own words in written form. By summing the scores of the 7 included questions, a value between 7 and 35 is obtained. Additionally, this total score can be divided by the number of questions to obtain a single average value. In this study, patients with an average score of 3 or higher were considered positive for BDD. Higher scores indicate a negative body perception and severe negative impact on psychosocial functioning, while lower scores indicate the absence of a distressing issue in body image. It was necessary to have an evaluation from a specialist psychiatrist to assess patients' self-statements. Therefore, in the questions where patients provided written explanations, their statements were not taken into account in the evaluation [13].

The FOCI consists of 5 items and requires individuals to rate the severity of repetitive thoughts and behaviors over the past 7 days. Patients with an average score of 2 or higher on this questionnaire were considered positive for OCD [11]1989 a.

The DASS-21 questionnaire assesses depression, anxiety, and stress parameters within a single test. Participants can respond to the questions on a scale of 0 (never) to 3 (always). Based on the total score, patients are classified as having normal, mild, moderate, severe, or extremely severe levels of depression, anxiety, and stress [12].

Statistical Analysis

The statistical analysis was performed using IBM SPSS Version 26.0 software (IBM Statistical Package for the Social Sciences (SPSS) Version 26, SPSS Inc., IBM Co., Somers, NY). Descriptive analyses were conducted to provide information about the general characteristics of the groups. Continuous variables were presented as mean ± standard deviation, while categorical variables were presented as n (%). The normal distribution of the data was examined through skewness and kurtosis analyses. Data with skewness and kurtosis values between -3 and +3 were considered to have a normal distribution. Independent samples t-test was used to assess the significance of the difference between the means obtained from two independent groups. The strength of the linear relationship between two variables was demonstrated using Pearson's correlation coefficient. The relationship between two categorical variables was evaluated using the chi-square test. If the p-value was less than 0.05, the result was considered statistically significant.

RESULTS

A total of 108 patients were included in the study, with 54 patients Class 2 and 54 patients Class 3, based on inclusion and exclusion criteria. Among the patients, there were 60 female individuals with an average age of 21.48±3.61, and 48 male individuals with an average age of 21.63±3.11. The age, gender, and skeletal relationship status of the patients are presented in Table 1.

The average total BIDQ scores for females were found to be 11.97 ± 5.624, while for males, it was 14.73 ± 6.93. When examining the average total depression scores, females had a score of 4.03 ± 3.769, whereas males had a score of 7.71 ± 5.21. Looking at the average total anxiety scores, females had a score of 4.95 ± 4.69, while males had a score of 7.71 ± 4.959. As for the average total stress scores, females had a score of 5.95 ± 4.83, while males had a score of 9.23 ± 5.665. When examining the average total OCD scores, females had a score of 5.30 ± 4.72, whereas males had a score of 8.19 ± 4.945. It was observed that males had higher scores than females in all scales (Table 2). When analyzing the effect of gender on BDD, OCD, depression, anxiety, and stress, males showed statistically significant higher results compared to females ($p < 0.05$).

The average total BIDQ scores for Class 2 patients were found to be 12.56 ± 6.297, while for Class 3 patients, it was 13.83 ± 6.416. When examining the average total depression scores, Class 2 patients had a score of 4.93 ± 5.061, whereas Class 3 patients had a score of 6.41 ± 4.466. Looking at the average total anxiety scores, Class 2 patients had a score of 5.04 ± 4.99, while Class 3 patients had a score of 7.31 ± 4.762. As for the average total stress scores, Class 2 patients had a score of 6.78 ± 5.69, while Class 3 patients had a score of 8.04 ± 5.313. When examining the average total OCD scores, Class 2 patients had a score of 5.8 ± 5.152, whereas Class 3 patients had a score of 7.37 ± 4.783 (Table 3). According to this table, patients with Class 3 skeletal deformities had higher scores in all scales compared to patients with Class 2 skeletal deformities. When evaluating the examined parameters, there were no statistically significant differences in BIDQ, FOCI, depression, and stress between Class 2 and Class 3 patients ($p > 0.05$) (Table 3). There was only a statistically significant difference in anxiety between Class 2 and Class 3 patients ($p < 0.05$).

Of the 108 patients included in the study, a total of 20.4% (n=22) were found to be BDD positive. Among the female patients, 10% (n=6) were BDD positive, while among the male patients,

33.3% (n=16) were BDD positive. When evaluated in terms of skeletal classification, 14.8% (n=8) of Class 2 patients were BDD positive, while 25.9% (n=14) of Class 3 patients were BDD positive. Among the BDD positive female patients (n=6), it was observed that 16.7% (n=1) had Class 2 skeletal deformity, while 83.3% (n=5) had Class 3 skeletal deformity. On the other hand, among the BDD positive male patients (n=16), 43.7% (n=7) had Class 2 skeletal deformity, while 56.3% (n=9) had Class 3 skeletal deformity. There was a statistically significant difference between females and males in terms of BDD occurrence in individuals (p=0.003), while there was no statistically significant difference between Class 2 and Class 3 deformities (p=0.152) (Table 4).

The Pearson correlation test was used to examine the correlation between the investigated parameters, and the results are shown in Table 5. As a result, there was a statistically significant correlation between depression, anxiety, stress, FOCI, and BIDQ scores (p <0.001). There was a very high correlation between depression and anxiety (r=0.827) and stress (r=0.852), while there was a moderate correlation between BDD and depression (r=0.575), and a high correlation between OCD (r=0.741). There was a very high correlation between anxiety and stress (r=0.859), a moderate correlation between anxiety and BDD (r=0.502), and a high correlation between OCD (r=0.752). There was a moderate correlation between stress and BDD (r=0.502).

Table 1. Age, gender and skeletal relationship status of the patients

		Skeletal Relationship of the Jaws		Age (Mean±SD)	Total
		Class 2	Class 3		
Gender	**Female**	35	25	21.48±3.61	60
	Male	19	29	21.63±3.11	48
Total		54	54		108

Table 2. BIDQ, FOCI, DASS-21 scores by gender groups

						95% Confidence Interval of Difference		
	Gender	**n**	**Mean**	**SD**	**t**	**Lower**	**Upper**	**p**
BIDQ	Female	60	11.97	5.624	2.951	-0.391	-0.076	0.004
	Male	48	14.73	6.930				
Depression	Female	60	4.03	3.769	-3.514	-1.429	-0.396	0.001
	Male	48	7.71	5.210				
Anxiety	Female	60	4.95	4.699	-2.944	-1.569	-0.306	0.004
	Male	48	7.71	4.959				
Stress	Female	60	5.95	4.983	-3.373	-1.424	-0.368	0.001
	Male	48	9.23	5.665				
FOCI	Female	60	5.30	4.720	-3.573	-0.493	-0.140	0.001
	Male	48	8.19	4.945				

Table 3. BIDQ, FOCI, DASS-21 scores by skeletal relationship groups

	Gender	n	Mean	SD	t	95% Confidence Interval of Difference		p
						Lower	Upper	
BIDQ	Class 2	54	12.56	6.297	-1.434	-0.265	0.043	0.155
	Class 3	54	13.83	6.416				
Depression	Class 2	54	4.93	5.061	-1.202	-0.834	0.204	0.232
	Class 3	54	6.41	4.466				
Anxiety	Class 2	54	5.04	4.990	-2.925	-1.554	-0.298	0.004
	Class 3	54	7.31	4.762				
Stress	Class 2	54	6.78	5.699	-0.895	-0.774	0.292	0.373
	Class 3	54	8.04	5.313				
FOCI	Class 2	54	5.80	5.152	-1.440	-0.308	0.049	0.153
	Class 3	54	7.37	4.783				

Table 4. Examination of the presence of BDD according to gender and skeletal relationship status

		BDD Negative	BDD Positive	p
Gender	**Female**	54	6	0.003
	Male	32	16	
Skeletal Relationship	**Class 2**	46	8	0.152
	Class 3	40	14	
Total		86	22	

Table 5. Examining the correlation between BIDQ, FOCI and DASS-21 scores.

		Depression	Anxiety	Stress	BIDQ	FOCI
Rho	**Depression**	1.000	0.827	0.852	0.575	0.741
	Anxiety	0.827	1.000	0.859	0.502	0.752
	Stress	0.852	0.859	1.000	0.482	0.714
	BIDQ	0.575	0.502	0.482	1.000	0.566
	FOCI	0.741	0.752	0.714	0.566	1.000
p	**Depression**	-	0.000	0.000	0.000	0.000
	Anxiety	0.000	-	0.000	0.000	0.000
	Stress	0.000	0.000	-	0.000	0.000
	BIDQ	0.000	0.000	0.000	-	0.000
	FOCI	0.000	0.000	0.000	0.000	-

DISCUSSION

BDD is a diagnosis that encompasses distress caused by perceived physical abnormalities, such as a scar or the shape or size of a body part, or dissatisfaction with another personal characteristic [14]. Individuals with BDD have unrealistic views about their appearance, believing they appear abnormal or deformed even though they are not. Many of these patients seek cosmetic procedures, including orthognathic surgery, for perceived flaws in their appearance [15]. This condition can have significant negative impacts on mental health, because available data indicates that cosmetic treatments often do not improve BDD symptoms, and patients with BDD are typically disappointed with the outcomes [16].

Our study investigated BDD and psychological issues such as obsession, depression, anxiety, and stress that accompany this disorder in patients scheduled for orthognathic surgery. Similar to the existing literature, self-report questionnaires were used to assess these parameters. The scores obtained from the questionnaires were evaluated, and the relationship between the obtained data was examined.

Studies indicate that the prevalence of BDD is significantly higher among individuals seeking aesthetic surgeries compared to the general population [17-19]. The rate of BDD in cosmetic surgery patients ranges from 2.21% to 56.67%, with a notable predominance in females (approximately 74-76%) [20]. Moreover, comorbidity with Obsessive-Compulsive Disorder (OCD) is also higher in this population, with rates around 15% compared to 0.2-7% in the general population [21, 22].

Ribeiro evaluated the prevalence of BDD in plastic surgery and dermatology patients through a systematic review and meta-analysis [23]. The rate of BDD occurrence in plastic surgery patients was found to be 15.04% (ranging from 2.21% to 56.67%) with a mean age of 34.54 ± 12.4. Furthermore, the majority of BDD-positive patients were females (74.38%). When examining dermatology patients, the rate of BDD occurrence was 12.65% (ranging from 4.52% to 36.16%) with a mean age of 27.79 ± 9.03. Once again the majority of patients were females (76.09%) [23].

In a study conducted by Buhlmann et al.[24] in Germany, a total of 2510 patients were included. They examined patients who had symptoms of BDD according to the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) using self-report questionnaires to assess suicidal tendencies and the prevalence of BDD in plastic surgery patients. The overall prevalence of BDD in the general population was found to be 1.8% (n=45). Additionally, individuals with BDD reported significantly higher rates of cosmetic surgery history (15.6% vs. 3.0%) compared to those without BDD as well as higher rates of suicidal thoughts (31.0% vs. 3.5%) and suicide attempts due to appearance concerns (22.2% vs. 2.1%) [24]. In another study conducted by Mortada et al.[25] on patients visiting a cosmetic and plastic surgery clinic, a total of 344 patients were included with 86% of them being female. The patients were asked to complete BIDQ, which has high sensitivity in diagnosing BDD. Among the included patients, 19.4% were found to be positive for BDD. The most commonly requested surgeries by the patients were abdominoplasty (21.2%) and removal of skin lesions (21.2%) [25].

The prevalence of BDD is higher in patients seeking orthognathic surgery compared to the general population [15]. When examining studies investigating BDD prevalence in patients seeking orthodontic and orthognathic surgery in the literature, it is observed that the rate of BDD is higher in female patients [26, 27]. However, there are studies that show a higher rate of BDD in male patients, contrary to this [28]. According to the results of our study, 20.4% (n=22) of the 108 patients who underwent orthognathic surgery were found to be positive for BDD. The rate of BDD in female patients was 10% (n=6), while in male patients, this rate was 33.3% (n=16).

Patients with BDD often have other psychological problems such as obsession, depression, and anxiety [29]. The co-occurrence of Axis I disorders, especially major depressive disorder and anxiety disorders, with BDD is associated with increased impairment in functioning and a higher rate of suicide attempts [30, 31]. In our study, when investigating OCD in patients with BDD, 72.7% (n=16) of BDD-positive patients were found to have OCD. Among the OCD-positive patients, 45% were also positive for BDD.

Patients with BDD often have three times or more Axis I disorders compared to other psychiatric outpatients [32]. In a study conducted by Hollander et al., major depression was found to occur in 68% of BDD-positive patients [33]. Another study by Phillips and Diaz [34] reported a major depression rate of 82% in BDD-positive patients. In our study, it was found that 68% of BDD-positive patients exhibited moderate to severe symptoms

of depression.

Many studies in the literature show a high correlation between BDD and anxiety [35]. Studies have demonstrated anxiety rates ranging from 12% to 68.8% in patients with BDD symptoms [36]. In our study, 50% of BDD-positive patients exhibited severe anxiety, while 72.7% exhibited moderate to severe anxiety. Another study examining stress levels in BDD-positive patients reported statistically significant higher stress levels in individuals with BDD [37].

When examining patients seeking aesthetic surgical treatments in the literature, it is often observed that women have higher rates of psychological distress. However, there are also studies that indicate a higher prevalence of psychological distress in male patients. In a study conducted by Nicodemo et al.[38] on 29 patients with Class III skeletal deformities who were planning orthognathic surgery, the patients self-assessed their self-esteem using the Rosenberg Self-Esteem Scale and filled out the Self-Report Scale before surgery and at 6 months post-surgery. At the end of the study, increased self-esteem and decreased depressive symptoms were observed in female patients following the surgical intervention, while no changes in self-esteem or depression were observed in male patients [38]. In our study, when evaluating the parameters according to gender, it is observed that males have higher scores in all parameters compared to females. In the study by Mortada et al., they reported that women seeking aesthetic surgery had a higher prevalence of psychological disorders compared to men [25]. This could be attributed to the fact that the majority of patients seeking aesthetic and cosmetic surgery are women. However, more comprehensive studies with larger sample sizes and minimal confounding factors are needed to investigate the effect of gender on psychological disorders.

Contrary to the findings of our study, many studies in the literature have reported that levels of depression, anxiety, and stress are higher in female compared to male [39-41]. There are several potential reasons for the discrepancy between our results and those reported in the literature. Firstly, the impact of psychological conditions may vary across different age groups. Secondly, the cultural context of the society in which our study was conducted may influence how male express emotional and psychological difficulties. Male may be more reticent in expressing emotional problems and seeking help compared to female, leading to higher levels of depression and anxiety. Thirdly, the structure of the survey questions, the data collection process, and the analysis methods may have influenced our findings. Male might express themselves more openly and clearly in such surveys, which could result in differing outcomes.

Limitations

Our study had certain limitations. The evaluation of deformity severity was not included for Class 2 and Class 3 patients in our study. Additionally, a version of the Body Image Disturbance Questionnaire (BIDQ) adapted specifically for the maxillofacial region would allow for a more sensitive and accurate assessment. Furthermore, a comprehensive clinical and radiological evaluation by a specialist psychiatrist is necessary to diagnose psychological disorders such as BDD, OCD, depression, anxiety, and stress. Self-report questionnaires alone are not sufficient for making a diagnosis. In studies like these, it would be more ideal to consult a psychiatric specialist for patients exhibiting signs of psychological disorders such as BDD, OCD, depression, anxiety, and stress, and conduct further clinical evaluations.

CONCLUSION

In conclusion, this study examined the conditions of BDD, OCD, depression, anxiety, and stress in patients with Class 2 and Class 3 malocclusions undergoing orthognathic surgery. The prevalence rate of BDD was 20.4%, OCD rate was 32.4%. These results indicate a higher incidence of psychological problems in patients scheduled for orthognathic surgery compared to the general population.

Although Class 3 patients had higher scores in all parameters compared to Class 2 patients, no statistically significant difference was found between Class 2 and Class 3 patients in terms of BDD, OCD, depression, and stress conditions. Only anxiety was significantly higher in Class 3 patients. When examining the impact of gender on BDD, OCD, depression, anxiety, and stress, males exhibited statistically significantly higher results than females.

Therefore, surgeons performing orthognathic surgery should be familiar with common and often severe body image disturbances. Patients with BDD have unrealistic beliefs about their appearance, thinking they look abnormal or deformed when they are not. Many of these patients seek cosmetic procedures, including orthognathic surgery, for perceived aesthetic flaws. When evaluating patients seeking orthognathic surgery, their psychological conditions should be carefully considered. The patient's expectations should be thoroughly analyzed before

the operation, and the potential changes in their appearance and functional movements brought about by the surgery should be realistically explained. Future multidisciplinary studies involving maxillofacial surgeons, psychiatrists, and psychologists in larger patient populations will be useful in determining BDD and OCD comorbidities in the orthognathic surgery patient population.

Conflict of interest: The authors declare that there is no conflict of interest.

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Patient consent: In this study conducted within the scope of the Decleration of Helsinki, written and verbal consent was obtained from the patients.

Ethics statement

This prospective cohort study has been approved by the Tokat Gaziosmanpaşa University Clinical Research Ethics Committee with the registration number 22-KAEK-043. Written and verbal consent has been obtained from the patients in accordance with the Helsinki Declaration.

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