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CORRIGENDUM

# Quality of life assessment in orthognathic surgery patients with dentofacial deformity

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**ABSTRACT**

**Background:** Evaluating the quality of life of participant with normal facial features in the Kurdish society and quality of life assessment of patients with dentofacial deformities corrected by orthognathic surgery and comparing their satisfaction with those of patients with dentofacial deformities, the comparison is performed by applying the orthognathic quality of life questionnaire (OQLQ).

**Materials and Methods:** Three groups of participants were interviewed, and orthognathic quality of life questionnaire (OQLQ) was used to assess generic health-related quality of life. They were asked to complete the Kurdish version of the 22-item orthognathic quality of life questionnaire (OQLQ) of SJ cunningham for the control, the deformity and the operated patient groups. Responses were compared using paired t-tests, with the significance level set to $P<0.05$.

**Results:** The results showed that there is a strong impact of the dentofacial deformity on people in the society, and there is a significant difference between the QOL of normal people in comparison with people with dentofacial deformities $P<0.05$. In addition There were statistical differences in the satisfaction of four domains of the questionnaire (oral function, facial aesthetics, psychological, and social aspects), between QOL of patients that had correction of the deformity and the non-operated patients with same kind of deformities. This indicated that quality of life was significantly higher in patients operated on by orthognathic surgery ($P<0.001$). Results showed statistical differences between groups and suggested that people with no deformity (normal) and those subjected to orthognathic surgery have a better quality of life compared to those with a facial deformity and experiencing a QOL that is near normal.

**Conclusion:** Dentofacial correction by orthognathic surgery seems to have a positive effect on the quality of life and it is an effective method in normalization of the social and psychological state.

**Keywords:** Orthognathic surgery; Dentofacial deformities; Quality of life.

## Material and Methods

### Patients and participants

To evaluate the difference in the quality of life of patients with dentofacial deformity to a normal people, the study was conducted on (300) three hundred eligible participants enrolled in this study. One hundred (100) patients were those visited the Department of Oral Maxillofacial Surgery, Sulaymaniyah teaching Hospital, Sulaymaniyah, Kurdistan, Iraq, complaining of dissatisfaction with their dentofacial features, diagnosed as having dentofacial deformities clinically and radiologically and prepared for facial deformity correction by orthognathic surgery. Another one hundred patients (100) patients had visited the dental center for dental problem and were satisfied and have no complain regarding their dentofacial features. This group is considered normal people regarding the facial features. The last group of patients (100 patient), were collected from the old records, all of them where operated on by orthognathic surgery to correct dentofacial deformity before at least one year. They were called back for interview and to assess this satisfaction.

**Inclusion Criteria:** adult from 20-30 years of age, healthy, non-syndromic and not known to have a psychological illness.

**Exclusion Criteria:** younger than 20, older than 30, medically compromised, syndromic and adults that have been treated by any neuro drug, or diagnosed as having psychological illness, trauma, or had any facial surgical procedure.

The 300 participant were divided in three groups:

Group I comprise 100, normal adult (control group) with normal facial features and no dentofacial deformities.

Group II, include 100 patients with facial deformity and not corrected by surgery (not operated); some patients in this group were in the orthodontic phase before orthognathic surgery.

Group III, include 100 patients with a facial deformity and were subjected to correction by orthognathic surgery preceded or not by orthodontic treatment, ended before at least one year.

### Instruments and Data Collection

Orthognathic quality of life questionnaire (OQLQ) of SJ cunningham et al [12,13] was used to evaluate the patient satisfaction and quality of life of participants included in this study the questionnaire consists of 22 questions are rated on a 5-point Likert scale ranging from (score 0) "does not bother me at all" 1= 'means it bothers you a little'; 2 and 3= 'lie between these statements and 4= 'means it bothers you a lot. Mean range from (Score 0)= 'means does not bother you to (score 4) "bothers me a lot".

The questions addressed four main domains (areas) as follows:

- Facial aesthetics: measure patient satisfaction with facial appearance and smile. Scale as an aesthetic impact (items 1, 7, 10, 11, and 14, range 0 to 20).

- Oral function: measure patient problems in mastication and speech. Scale as an oral function (2 to 6, range 0 to 20).

- Psychological impact: the effect of the dentofacial deformity on the patient's conscious awareness. Scale as awareness impact (8, 9, 12, and 13, range 0 to 16).

- Social impact: the effect of the dentofacial deformity on the patient's social life. Scale as a social impact (items 15 to 22, range 0 to 32).

The total score is 0 to 88 divided as Aesthetic (0-20), Oral function (0-20), Psychological (0-16) and Social (0-32). A lower score indicates a better quality of life and vice versa. The questionnaire was translated into Kurdish language using a standardized forward-backward linguistic translation method. The content validity of the questionnaire was approved by five maxillofacial and psychiatric specialists. Demographic information of all patients in the study was collected and registered information about age and gender were also collected, (Table 2) shows demographic data. All participant were interviewed and asked to fill the OQLQ form after taking the participant consent to fill the questionnaire and participate in the study. The QOL was assessed using self-administered 22-item Orthognathic quality of life questionnaire. The Orthognathic Quality of Life Questionnaire (OQLQ) was developed as an instrument to estimate the quality of life in patients treated with orthognathic surgery in 2000 and validated in 2002 by cunningham et al. [12,13,14].

### Data Analysis

Descriptive summary statistics were generated for the questionnaires the "IBM SPSS Statistics version 25" was used for the analysis of the data, and both descrip-

tive and inferential statistics were used. Furthermore, a P-values of (≤0.05 and <0.001) were considered as statistically significant, and highly significant associations, respectively. Also, the Student's T-Test was used to compare numerical independent and dependent variable pairs.

### Ethical considerations

The research protocol was approved in advance by the ethics committee of the Kurdistan Board for medical specialty and written informed consent was obtained from all subjects prior to the investigation.

## Results

The study sample consisted of three groups involved 100 participant each. The whole sample average age was 25.5 years (S.D. 4.77). Female was most (205/300, 68%) and also single were most (205/300, 68%). (Table 2) show demographic information on the whole sample. The OQLQ questionnaire composed of 22 questions is divided into 4 main domains as follow social aspects (questions 15-22), facial aesthetics (1, 7, 10, 11, and 14), oral function (2-6) and psychological aspects (8, 9, 12, and 13) (Table 3).

### • Facial aesthetics

In this domain (facial aesthetics) the mean±SD was (5.03±0.17) for groups I (control group), and (5.96± 1.41) for group III (operated group) (Figure 1) (Table 3,4) the two response of "It does not bother me" and "It does not apply to me" were more frequent in groups I (control) and group III (operated group) patient satisfaction about facial aesthetic 75%, 70% respectively. In addition, participants of group II (deformity group) showed more frequent response of "It does bother me" mean±SD (8.88±1.92) patient satisfaction 55%, there was a significant statistical similarity between groups I and III in the "facial aesthetics" domain (P<.001) and there was a difference between these groups and group II in the same domain (P<.001). As a result showed how the surgery had changed such dissatisfaction in those who had their deformity corrected.

### • Oral function

In this domain "oral function" group II (deformity group) showed significant higher responses of dissatisfaction with the oral function than group I and group III due to patient satisfaction 65% (Figure 2) (table 3,4). Groups I (control) and group III (operated group) responded more by "It does not apply to me," which reflects higher degree of QOL, and more satisfaction 75%, 70% respectively, There was a significant statistical similarity between the response of groups I and III in the "oral function" domain reflecting higher quality of function (P<.001).

### • Social aspects

In this domain "social aspects" Similar responses were found the mean±SD (8.01±0.10) groups I and (9.47±.48) group III a responses of "It does not bother me" or "It does not apply to me" were more frequent in groups I and III with a statistical similarity (P<.001) which reveals a similarity in the QOL and degree of social aspect satisfaction between these two groups 75%, 70% respectively. Patients of group II (deformity group) reported a significant higher degree of dissatisfaction in the social domains mean±SD (11.28±2.55) (P<.001) patient satisfaction 65% (Figure 3) (Table 3, 4).

### • Psychological aspects

In this domain "psychological aspects" the results mimic the results of other domain. Groups I and III showed a relative balance between all answers patient satisfaction 75%, 65% respectively and there was a significant statistical similarity between groups I and III in the "psychological aspect" domain (P<.001) but regarding group II, had a responses that reveals higher degree of psychological dissatisfaction and lower QOL in a statically significant way (P<.001) patient satisfaction 55% (Figure 4) (Table 3, 4).

Total score (Figure 5) (Table 3, 4) is the mean scores of each group (in the whole questionnaire) a total score analysis there was a similarity between groups I (normal control) and III (operated group) the QOL scores were low (22 in group I and 26 in group III), patient satisfaction in group I (normal group) and group III (operated group) 75%, 70% respectively. Whereas individuals in group II (deformity group) presented higher mean scores [34] patient satisfaction in the (60%). There was a significant statistical difference in overall total score among the 3 groups (group II>group III >group) (P<.001).

| All Domain | | Normal (Control) & Preoperative (Dentofacial deformity) | | | Normal (Control) & Postoperative (After correction) | | | Preoperative (Dentofacial deformity) & Postoperative (After correction) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean±SD | 95% Cl | P-value | Mean ± SD | 95% Cl | P-value | Mean ± SD | 95% Cl | P-value |
| Facial aesthetic | 100 | 5.03±0.17 | -2.08 - -1.42 | <0.001 | 5.03±0.17 | -1.01 - -0.41 | <0.001 | 8.88±1.92 | 0.78 - 1.30 | <0.001 |
| Facial aesthetic | 100 | 8.88±1.92 | | | 5.96±1.41 | | | 5.96±1.41 | | |
| Oral function | 100 | 5.02±0.14 | -4.23 - -3.47 | <0.001 | 5.02±0.14 | -1.21 - -0.65 | <0.001 | 6.77±1.67 | 2.57 - 3.27 | <0.001 |
| Oral function | 100 | 6.77±1.67 | | | 5.73±1.51 | | | 5.73±1.51 | | |
| Psychological | 100 | 4.05±0.22 | -3.36 - -2.72 | <0.001 | 4.05±0.22 | -2.07 - -1.37 | <0.001 | 7.09±1.61 | 1.06 - 1.58 | <0.001 |
| Psychological | 100 | 7.09±1.61 | | | 5.77±1.76 | | | 5.77±1.76 | | |
| Social | 100 | 7.09±1.61 | -3.77 - -2.77 | <0.001 | 8.01±0.1 | -1.94 - -0.98 | <0.001 | 11.28±2.55 | 1.46 - 2.16 | <0.001 |
| Social | 100 | 8.01±0.1 | | | 9.47±2.48 | | | 9.47±2.48 | | |
| Total scores | 100 | 22.11±0.35 | -4.92 - -2.34 | <0.001 | 22.11±0.35 | 2.76 - -1.86 | <0.001 | 34.02±5.01 | 2.98 - 3.89 | <0.001 |
| Total scores | 100 | 34.02±5.01 | | | 26.93±5.64 | | | 26.93±5.64 | | |

*Table 3.* Comparison of mean scores of OQLQ between control and case groups.

| All Domain | Normal (Control) & Preoperative (Dentofacial deformity) | | Normal (Control) & Postoperative (After correction) | | Preoperative (Dentofacial deformity) & Postoperative (After correction) | |
|---|---|---|---|---|---|---|
| | Percentage % | P-value | Percentage % | P-value | Percentage % | P-value |
| Facial aesthetic | 75% | <0.001 | 75% | <0.001 | 55% | <0.001 |
| Facial aesthetic | 55% | | 70% | | 70% | |
| Oral function | 75% | <0.001 | 75% | <0.001 | 65% | <0.001 |
| Oral function | 65% | | 70% | | 70% | |
| Psychological | 75% | <0.001 | 75% | <0.001 | 55% | <0.001 |
| Psychological | 55% | | 65% | | 65% | |
| Social | 75% | <0.001 | 75% | <0.001 | 65% | <0.001 |
| Social | 65% | | 70% | | 70% | |
| Total scores | 75% | <0.001 | 75% | <0.001 | 70% | <0.001 |
| Total scores | 60% | | 70% | | 70% | |

*Table 4.* Comparison of scores percentage of OQLQ between all three groups.

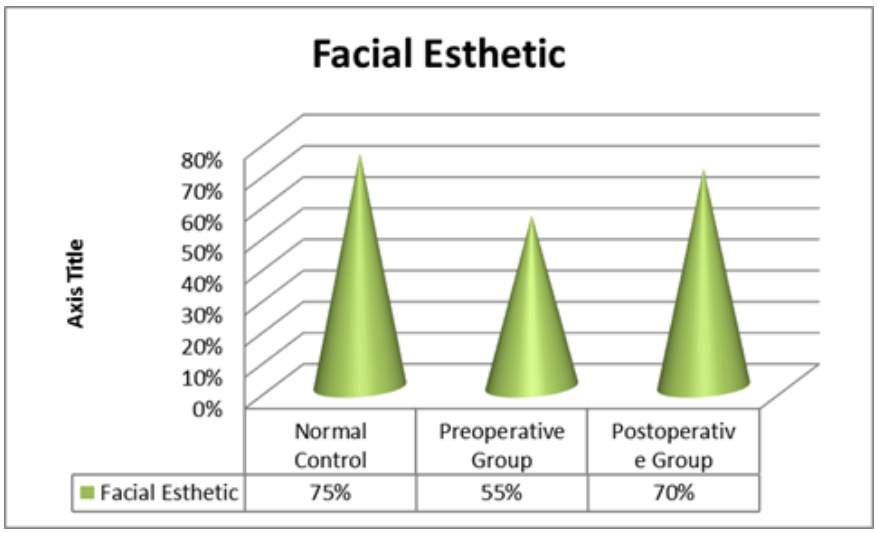


*Figure 1.* Scores percentage for the "facial esthetic".

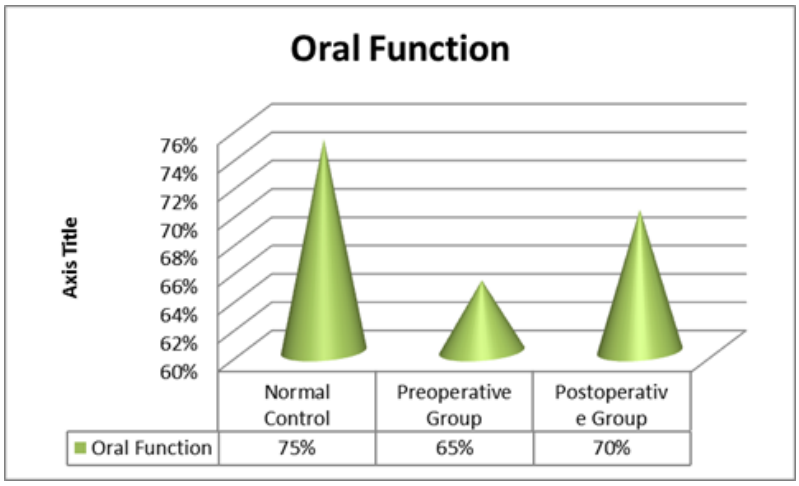


*Figure 2.* Scores percentage for the "oral function".

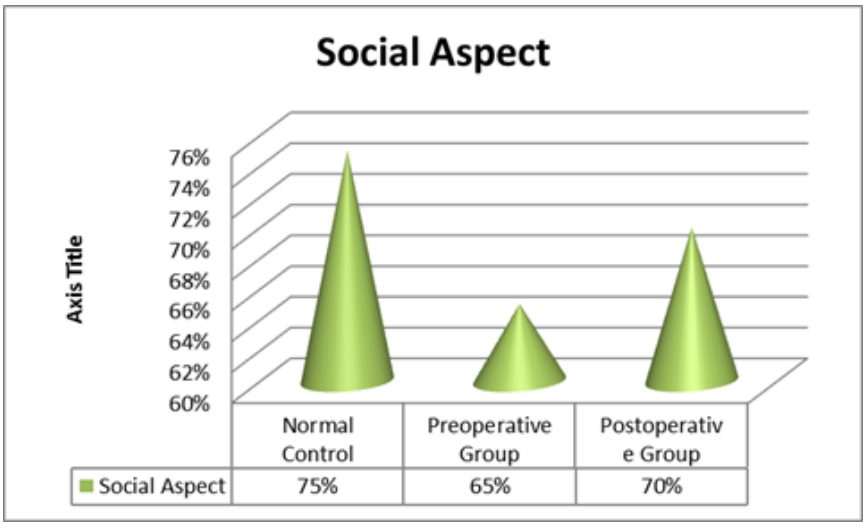


*Figure 3.* Scores percentage for the "social aspects".

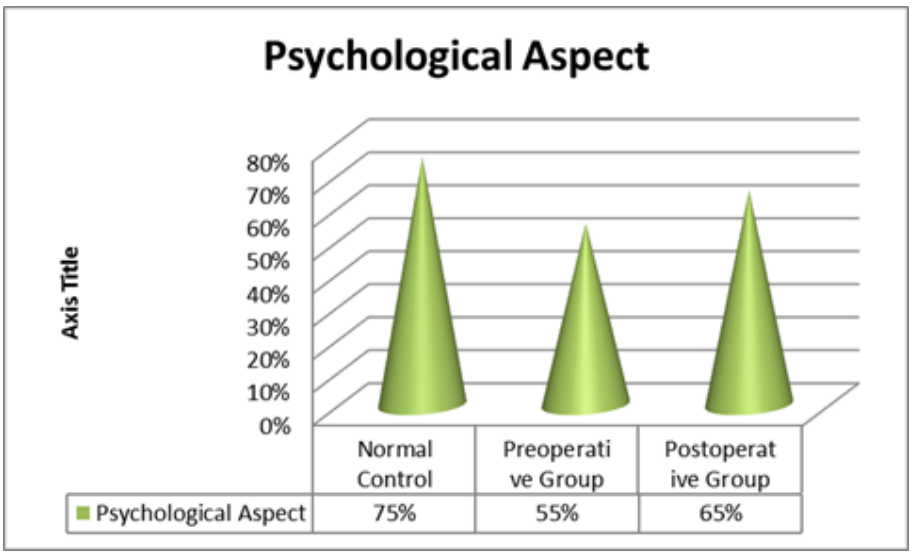


*Figure 4.* Scores percentage for the "psychological aspect".

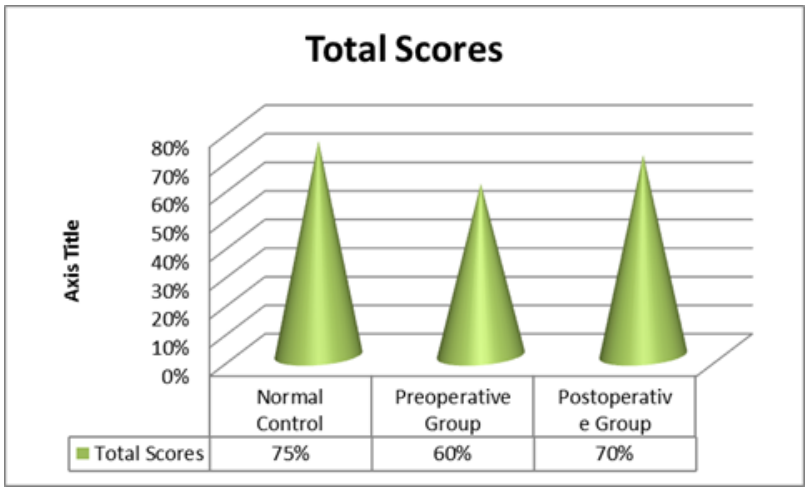


*Figure 5.* Total score percentage for all groups.

## Discussion

In recent times, people have directed great care towards their appearance and how it can affect their careers, relationships, self-confidence and generally quality of life (QOL). Health defines by the World health organization (WHO) as "a state of complete physical, mental and social wellbeing and not merely the absence of any disease or infirmity" [15]. In every person the QOL is affected by a compromise in the physical, mental and social dimensions of health. Dentofacial deformities result in a compromise in aesthetics, function as well as overall psychological status of the patients [16]. The need of such kinds of studies in the middle east is more justified, the society falls in the fast rhythm of social and financial competition, the development of the individualization spirit, and the limitation o may by unequal chances for education and employment . all this opposes the moral heritage that may fail to fill the gaps and elevate the self-esteem of the individual to the normal. Acceptable quality of life measurement is itself challenging, in addition to the ambiguous socially perception of the deformity and "cosmetic surgery".

Most patients who visit a clinic for the first time with dentofacial deformities frequently behave in a shy, defensive, and passive manner due to of a lack of confidence in their appearance [17]. Facial appearance leads to impacts and influences on many aspects of life such as social interactions, chances when seeking employment, being chosen as a partner, and their personality characteristics; therefore it affects their QOL. Therefore orthognathic surgery in these patients has become more important because it has been widely performed to improve dentofacial deformities [18,19]. The initial question that this study aimed to answer was whether dentofacial deformity has the negative influence on the patient's quality of life and whether surgical correction of this deformity could change this negative influence or the deformity is only an aggravating factor of an already existed psychological disturbance. Previous studies showed the growing interest in investigating the impact of facial deformities on quality of life [14]. This current study in our locality showed that there were significant proximity similarities in patients' quality of life after correction by orthognathic surgery compared with normal people in our society. Therefore, we could assume that individuals who lived with the deformity and were later subjected to the orthognathic surgery had experienced a significant improvement in their QOL in social and psychological aspect in comparing the satisfaction in patients with deformity (non operated group) first to the normal sample, the result was 60%, 75% respectively, this can express how the deformity can affect and has an impact on the QOL degree by (18.7%) significantly and then by comparing the corrected group to the normal group (70%, 75%) we see that QOL of the corrected people is very much improved by the surgery and become very near to the normal by 93.3% significantly. Our finding is consistent with similar studies conducted in China and the USA using the same questionnaire [20,21]. Furthermore, this finding is supported by many other studies that show remarkable improvements in patients' wellbeing in different aspects including psychological, functional, social and emotional [13,22,23,24,25–28]. These findings illustrate the effectiveness of orthognathic surgery beyond its surgical complications like swelling, bleeding, and pain.

Regarding nominating the third group (operated group) we think that if the patient will answer preoperative QOL questionnaire, the patient will remember own report during answering the post operative questionnaire, the patients own psychological problem, that may not be related to the deformity will manipulate the post operative reports in a revenge or unsatisfaction relation with society as a whole and this will lead to internal bias. This study provides assessment of quality of life of normal people, we feel that the individual with dentofacial deformity usually develop a psychological burden that will build up an inside destruction in the personality, and a different Psychosocial responses for being beautiful or normal again, this may make them still reporting poor self-esteem. In addition, the difficulties that the patient suffers during the recovery, and the financial impact of the surgery may negatively affect the assessment. On contrary, the excitement of the patient by the new look after the orthognathic surgery may give a "temporary " quick elevation in QOL score, the score that are going to be flatter and shallower after the patient involvement in life. and in an attempt to minimize the internal bias, the selection of the third group (operated patient) was based on inclusion of only the patients that had their orthognathic and the concomitant orthodontic treatment finished not less than one year, as it could be a good time for the patient adapt his or her new condition.

In terms of different aspects of patients' QOL, maximum changes occurred in the esthetic, functional domain and then social and psychological aspects, respectively. These results are similar to previous studies [20,22,29]. According to Cunningham et al. [13] quality of life, as a concept explored in clinical research, is related to patients' health, making this concept a

multidimensional one. The same author assessed the quality of life in another study [12] and found a significant correlation between the "social aspects" and "aesthetics" domains after orthognathic surgery, thus corroborating the findings of the present study. Ribeiro-Neto et al. [14] made a comparative study on the three groups OQLQ and stated that significant changes were observed in the aesthetic, psychological, social and function domains, also corroborating the findings of the present study.

Lee et al. [24] evaluated the quality of life through three different instruments and showed statistical differences in all 4 domains through the application of the OQLQ. They [6,30] also reported improvement in the quality of life after surgery, even in the early stages, after applying the condition-specific questionnaire (OQLQ). According to those authors, the orthognathic surgery corrects the dentofacial deformity, and the questionnaire (OQLQ) addresses specific issues. They conclude that the OQLQ is highly capable of identifying changes in the quality of life of treated patients. With regard to the present study, we also addressed the importance of the outcome after correction by orthognathic surgery. Almost all of these studies evaluated different patients in different groups based on previously described characteristics (methodology). This methodology was chosen by us the authors to include a larger number of participants and to assess the quality of life of different individuals with or without facial deformity. However, the authors showed that patients without facial deformity answered the questionnaire similar to those who had the deformity and had been treated. Most studies assessing orthognathic surgery showed improvement in the quality of life after it [30-33].

The majority of the participants were dissatisfied with their facial appearance and smile in the pre-treatment evaluation. This was more evident in females. This is understandable because females tend to be more open to express concerns and feelings regarding aesthetics and appearance. Interestingly, the females in our study population felt that their job was affected due to their dentofacial deformity. The present study shows a greater change in pre-operative and post-operative scores of facial aesthetics and functional domain which is similar to previous studies but in contrast, to study by Abdullah et al. [6] in their study, the difference in social aspect domain was greatest. They also found the changes in scores of awareness domain to be very small finding it is similar to other studies and contributed that malocclusion and their treatment had little effect on general quality of life. This is again in contrast to the present study. In the present study, we find that mean score changes in awareness domain is similar to changes in other domain of OQLQ. This could be attributed to the fact that all the patients in our study were well educated and were more conscious about their appearance.

## Conclusions

The present study showed a highly significant impact of the dentofacial deformity on the QOL in comparison with normal people and there is a significant success of surgery in elevating the QOL and achieving a near normal QOL for those with dentofacial deformities in our society. The improvement involved all domains with the facial aesthetics domain was shown to be more important for patients than were social aspects and oral function. However, the social and psychological domains of quality of life improves in patients who have their dentofacial deformities corrected and they recover their self-esteem, concluded that orthognathic surgery has a significant benefit in elevating and normalizing QOL patients with a dentofacial deformity.

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