

## Self-perception of facial profile among Saudi patients with dentofacial deformity

Sulaiman E. S. AlEmran, BDS, MS, PhD

هدفت هذه الدراسة إلى تقييم تأثير عمليات الإبقاء والتلميع على سطح مواد الكومبوز (دايراكت وكومبوزالاس) باستخدام نظام الإبقاء والتلميع الزائد. تم تحضير ٤٥ عينة أسطوانية من كل مادة، ١٥ عينة من كل مادة استخدمت للمقارنة حيث تمت عملية البلورة من خلال شريط مايكر دون إلهائها أو تلميعها. أيضا تم إبقاء ١٥ عينة من كل مادة باستخدام نظام الإبقاء فقط، كما تم إبقاء وتلميع ١٥ عينة من كل مادة باستخدام نظام الإبقاء والتلميع الزائد. جميع العينات حضرت في درجة حرارة الغرفة وحفظت في فرن معلمي بدرجة حرارة ٣٧ لمدة ٣ أيام قبل اختبارها. تمت دراسة وتصوير جميع العينات بدرجات تكبير مختلفة باستخدام المهرين المسامي والإلكتروني، كما تمت دراسة عشوائية السطح باستخدام جهاز تحليل عشوائية السطح. أظهرت النتائج أن السطح الأنعم هو الذي استخدم فيه شريط مايكر دون إبقاء أو تلميع، أما السطح الذي يده في العنونة فهو سطح مادة الدايراكت بعد الإبقاء والتلميع، يده مسطح مادة الكومبوزالاس بعد الإبقاء فقط. يستنتج من هذه الدراسة أن عمليات الإبقاء وعمليات الإبقاء والتلميع فشلت في إنتاج سطح مماثلة في العنونة للسطوح التي لم يتم إلهائها أو تلميعها واستخدام فيها شريط مايكر.

The purpose of this study was to characterize the self-perception of facial profile among Saudi patients with dentofacial deformity and to correlate the findings with their educational level, social status, gender, chief complaint, type of dentofacial deformity and with the degree of patients' agreement to undergo orthognathic surgery. One hundred and fifteen Saudi patients with dentofacial deformity participated in the study. Clinical examination, soft tissue cephalometric analysis and patient perception assessment were done on all patients. Findings revealed that most of the patients had university-level education (56.5%) and were unmarried (92.2%) and that more males (58.3%) sought clinic consultation than female patients (41.71%). Majority of the patients were mainly concerned about their facial appearance, which was reflected in the high demand for orthognathic surgery (63.5%). About one third of the study patients (28.7%) were exact in their facial profile self-perception and only 20% of the total samples were far from the right perception. There was positive correlation between high educational level and self-perception of facial profile leading to a higher demand for orthognathic surgery when compared to low education level group. Furthermore, among the different classification of dentofacial deformity, patients with skeletal class III expressed higher demand for surgical correction.

### Introduction

Dentofacial deformity is a severe discrepancy in the size, form and interrelationship of the jaws to the cranial base, which is not normally corrected by orthodontic treatment alone. There is therefore indication for surgical correction in severe skeletal and/or dentoalveolar discrepancy in the jaws that cannot be corrected or camouflaged by teeth movement alone. The face is the main source of vocal and emotional communication and is considered a major concern for physical attractiveness. Improvement of dentofacial appearance has been reported to be a strong motivating factor for many individuals who decide to undergo orthodontic and/or orthognathic treatment.<sup>1</sup>

The adverse psychological and psychosocial effects caused by dentofacial deformity are considered an integral part of society's overall responsibility towards health care. Physical defects are routinely clinically documented. Its effects on psycho-social aspects, however, are often misinterpreted and not properly documented while managing dentofacial deformity. In the past, clinicians used to ignore the value of perception

of dentofacial disfigurement by the patient or his family and its effect on patients' motivation for orthognathic surgery and patient satisfaction on final result. During the late 1960s, orthodontists began to acknowledge the role of subjective factors such as perception of facial appearance or esthetic satisfaction in determining patient's behavior.<sup>2</sup> The importance of dentofacial complex on the development of personality and psychological interaction has been recognized by Story,<sup>3</sup> who stated that, "the mouth and face are invested together and used for the expression of many feelings and emotional conflicts outside orthodontics". Boverman et al<sup>4</sup> emphasized the great emotional significance of orofacial areas and its relation to self-image and found in their study evidence that women place relatively greater importance on physical attractiveness of facial appearance than men.

Hershon et al<sup>5</sup> conducted a study on self-perception of facial profile on forty-two orthodontic patients and on a control non-orthodontic patients group. They concluded that both orthodontic and non-orthodontic groups had under-estimated the position of their lips.

Received 3 July 2000, Revised 27 Sept. 2000

Accepted 21 October 2000

Assistant Professor, Division of Orthodontics  
Dept. of Preventive Dental Sciences & Dean, College of  
Dentistry, King Saud University, Riyadh, Saudi Arabia

Address reprint requests to:

Dr. Sulaiman E.S. AlEmran  
PO Box 60169  
Riyadh, Saudi Arabia  
Email: [selemran@ksu.edu.sa](mailto:selemran@ksu.edu.sa)

Bell et al<sup>6</sup> conducted a study on eighty patients to evaluate the influence of self-perception of facial profiles on the decision to undergo orthognathic surgery. They found that patients who agreed to have surgical correction were well aware of their dentofacial deformity, whereas patients who decided against surgery had to be influenced by others to undergo surgical correction. Bell and colleagues<sup>6</sup> concluded therefore that the patient's self-perception was an important factor in the decision to elect surgical correction. They also reported that class III patients had difficulty in differentiating between mandibular prognathism and maxillary retrognathism. Similarly, class II patients also found difficulty in differentiating between retruded mandible and protruded maxilla. Maxwell and Kiyak<sup>7</sup> studied the relationship between psychosocial factors and patient's self-perception and found that depressed individuals viewed themselves more negatively than non-depressed individuals despite the absence of differences in the judgments by others to same individuals and that perception of facial defect was important in a patient's willingness to seek treatment. They concluded that the patients' general feeling about their facial appearance revealed some relationship to their willingness for seeking orthodontic treatment.<sup>7</sup>

It is evident that the amount of soft tissues thickness determines the final facial profile of the patient.<sup>8,9</sup> Czamecki et al<sup>10</sup> assessed the role of the nose, lips and chin in achieving balanced facial profile and reported that more lip protrusion was accepted for both male and female faces when either a large nose or a large chin was present.

The selection of appropriate treatment plan is not only based on the clinician's assessment of the final result with regard to esthetic function and stability but also on the patient's objectives and perceptions of need. Thus, it is suggested that information regarding the patient's perception of facial profile and its influence on the decision to undergo orthognathic surgery should be taken into consideration during the planning for surgical correction. This might lead to a better prediction of result and to patient's satisfaction on final result. It is also assumed that perception of facial deformity and the decision for orthognathic surgery vary among different populations and even within the same population. Education, socio-economic status, culture and religious background are factors, which may influence a person's perception of facial deformity and demand for orthodontic treatment.

The purpose of this study was to determine the

perception of facial profile among Saudi patients with dentofacial deformity and to correlate the findings with the educational level, social status, gender, chief complaint, type of dentofacial deformity and with the degree of patients' agreement to undergo orthognathic surgery.

### Materials and Methods

The study was conducted on 115 patients who attended the orthognathic surgery clinic of the Orthodontic Division in the College of Dentistry, King Saud University, Riyadh. The sample involved all patients, who were screened and listed in the waiting list for orthognathic surgery during the period from 1997 to 1999. All the patients were adult Saudis, with no previous history of orthodontic treatment. Patients with cleft lip and palate or severe genetically disturbances were not included. Patients' personal data, which included name, gender, age, social status, educational level and the chief complaint were registered. Patient's self-perception of facial profile was evaluated using a method developed by Bell et al<sup>6</sup>. The method (Fig. 1) divided facial discrepancy into four variables: vertical (A), maxillary (B), mandibular (C), and dentoalveolar (D). Each variable

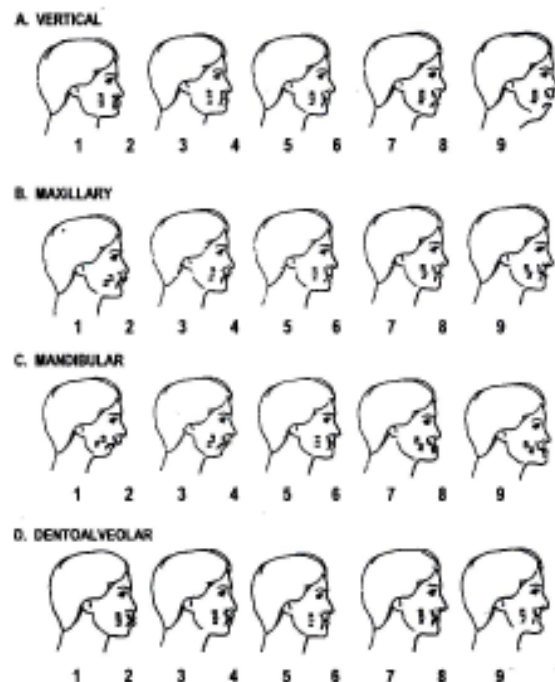


Fig. 1. The rating scale of facial profile developed by Bell et al<sup>6</sup> for assessment of patient perception.

consisted of five profiles and the assessment of patient's perception was based on assigned points from one to nine. A patient who was able to identify the four dentofacial variables from A to D correctly, received 4 points, which indicated an exact perception. In the situation where a patient failed to identify some or all variables correctly, the points score was reduced accordingly (Table 1).

Table 1. Classification for assessment of the self-perception.

| Perception           | Description                        | Scores   |
|----------------------|------------------------------------|----------|
| 1- Exact perception  | Identified all variables correctly | 4 points |
| 2- Close to correct  | Three correctly                    | 3 points |
| 3- 50% correct       | Two correctly                      | 2 points |
| 4- Away from correct | Only one correctly or none         | 1 point  |

The pre-treatment lateral cephalometric radiographs for all patients were digitized using the Dentofacial Planner plus (1.5 software program).<sup>\*</sup> Legan's analysis for soft tissue<sup>11</sup> was used to compute measurement for each patient. The measurements which are comparable to Bell's rating scale<sup>6</sup> are as follows: G-Sn and Sn-Me' representing vertical excess/deficiency, Sn-G representing maxillary prognathism/retrognathism, Pg'-G representing mandibular prognathism/retrognathism and the distance perpendicular from Ls to Sn-Pg' and Li to Sn-Pg' representing dentoalveolar protrusion (Fig. 2). Intra-examiner error of cephalometric measure-

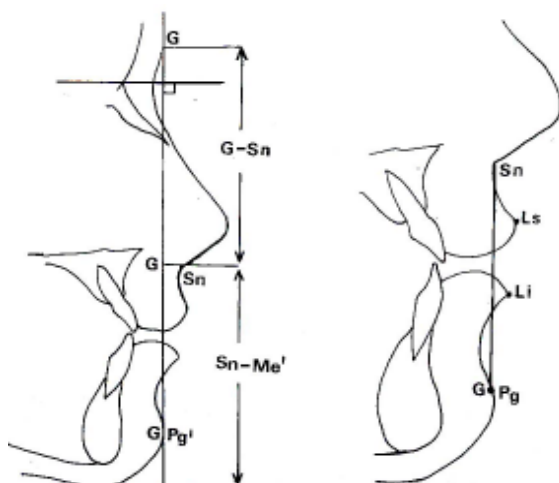


Fig. 2. Tracing shows the anteroposterior measurement which was carried out for maxillary, mandibular, dentoalveolar dimensions and the vertical facial height proportionality (Legan et al<sup>10</sup>)

<sup>\*</sup>Dentofacial Software Inc. Toronto, Ontario, Canada M5X 1C9

ments was determined by applying Pearson correlation and Dahlberg's test on randomly repeated measurements. The two tests showed high degree of correlation (0.984-0.995) with no significant difference between the two observations for all variables using the paired T-test. After assessment of self-perception, patients were briefed in general about the procedures involved in orthodontic treatment and jaw surgical correction. Patient agreement or disagreement for the surgical approach was then registered. For patients who indicated agreement for surgical intervention, the level of their agreement was also determined by requesting the patients to mark the level of their agreement on a given ascending scale from one to ten. To facilitate statistical correlation of patient's demand with other variables, it was reclassified as low, moderate and high demand according to the recorded scores (Table 2).

Table 2. Reclassification of patient's demand.

| Range       | Demand   |
|-------------|----------|
| Score 1- 5  | Low      |
| Score 6 - 8 | Moderate |
| Score 9-10  | High     |

The obtained data were analyzed using SPSS statistics software program and presented in the form of tables and figures. Mean age and frequency distribution were calculated for all variables. Chi-square test was used to determine the significant relationship between different variables.

## Results

**Gender and age distribution:** Gender distribution revealed that 58.3% of the study sample were male and 41.7% were female patients. In addition, majority of the patients were unmarried at 92.2% with 7.8% married. The age range was between 17 and 34 years with a mean of 21.4 years (Table 3). **Educational level:** Most of the patients (56.5%) had university-level educational background, 35.7% had secondary school level, 5.2% had intermediate school level and only 2.6% had primary school level.

**Chief complaint:** As explained by the patients themselves, the majority of them were mainly concerned about their facial (49.6%) and dental appearance (25.5%) respectively. Others, 8.7%

Table 3. Age distribution of study subjects.

| Age group (years) | Percentage |
|-------------------|------------|
| 15-20             | 54%        |
| 21 -25            | 32%        |
| 26-30             | 10%        |
| 31 -35            | 4%         |

complained of speech problem, 11.3% suffered from masticatory problem and only 5.2% had TMJ pain.

**Patient demand for orthognathic surgery:** Most of the patients (63.5%) showed high treatment demand for orthognathic surgery followed by 26.1% who indicated moderate demand and only 10.4% with low demand for orthognathic surgery.

Of the skeletal class III patients, 49.1% expressed high demand for surgery while only 43.8% of class II and 6.8% of class I expressed the same.

**Patient self-perception:** In our subjects, 34.7% showed an exact perception of their dentofacial deformity while 23.6% were close to the correct perception. Those who were able to perceive half of their dentofacial deformity were 21.7% while 13.9% were far from the correct perception.

It was evident that patients who had their facial appearance as the main chief complaint showed better self-perception of their dentofacial deformity (Fig. 3).

A significant correlation ( $P < 0.05$ ) was found between self-perception and educational level where patients with higher educational level perceived themselves better than others (Fig. 4). Although the frequency distribution of gender

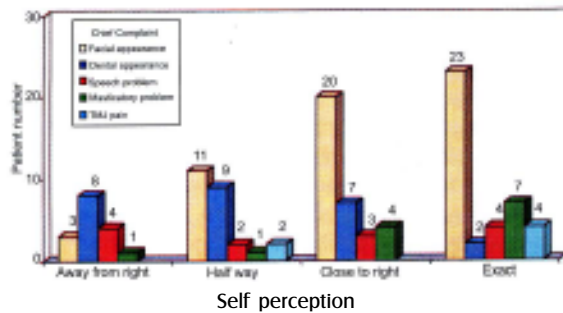


Fig. 3. Correlation between patient's main chief complaint and demand for orthognathic surgery.

indicated more male patients than females, in the present study, female patients were able to reach an exact perception or close to an exact perception better than male patients (Fig. 5).

The findings also revealed that patients with class III skeletal deformity were able to perceive their facial deformity better than class II and class I skeletal deformity patients respectively (Fig. 6).

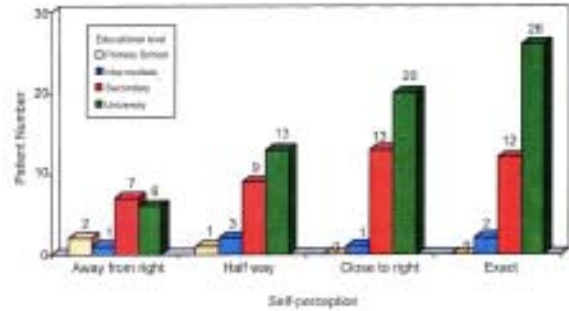


Fig. 4. Patient's perception of facial profile correlated with educational level.

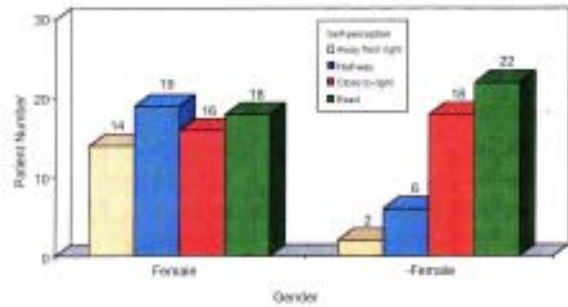


Fig. 5. Patient's perception of facial profile correlated with gender.

Patients who were single demanded orthognathic surgery more than married patients and were able to perceive their dentofacial deformity more accurately (Fig. 7). It was evident from the

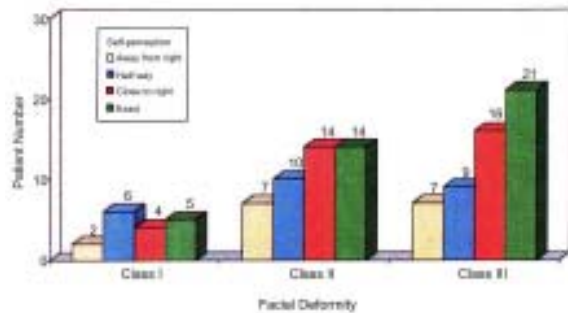


Fig. 6. Patient's perception of facial profile correlated with different types of dentofacial deformity.

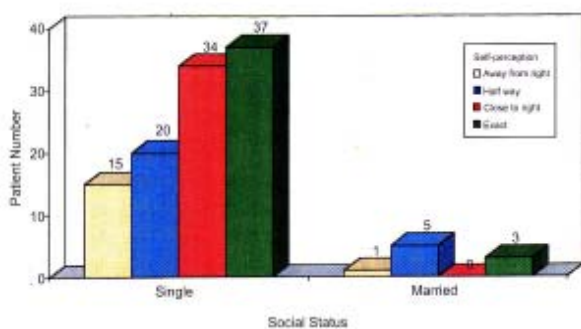


Fig. 7. Patient perception of facial profile correlated with social status.

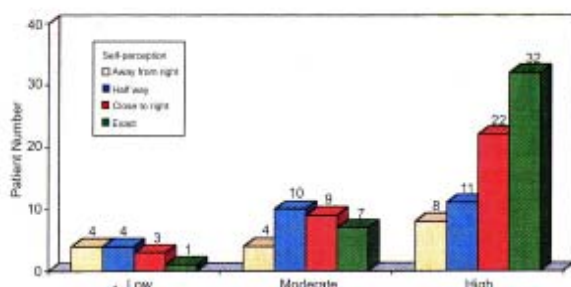


Fig. 8. Patient perception of facial profile correlated with the degree of demand for orthognathic surgery

present findings that patients with low demand for orthognathic surgery had low perception or were totally unable, to comprehend their dentofacial deformity, whereas, patients with high demand for orthognathic surgery were often able to reach an exact or close to an exact perception of their dentofacial deformity. This difference was significant ( $P < 0.01$ ) (Fig. 8).

## Discussion

The use of lateral profile view for evaluating a patient's perception of facial deformity has an advantage in illustrating the following facial components: anteroposterior discrepancy in skeletal, dentoalveolar, soft tissue components and vertical facial proportion.

Facial symmetry and transversal jaw relationship cannot be evaluated using lateral profile view. This requires an analysis of a patient's frontal view. In the present study, it was found difficult to illustrate the facial deformity by using a diagram of frontal view, since most of facial discrepancies could only be diagnosed by using lateral profile view. There is no index specified in previous studies aimed at measuring patient's demand for orthognathic surgery. In the present study, information was obtained

regarding patient's agreement for surgical treatment and the level of this agreement graded from one to ten.

Complaint from facial appearance was expressed in 49.6% of the patients. This indicated to a large extent that dentofacial appearance was a major concern of most Saudi patients who were attending orthognathic surgery clinic. Previous reports showed that dentofacial appearance was major concern of the patients who sought orthodontic treatment and reported a relationship between the dentofacial appearance and social acceptance.<sup>12,14</sup> In our study, facial appearance was considered the most important physical characteristic feature in the development of facial self-satisfaction by Saudi patients.

Dental anomalies that included crowding, spacing, overjet and overbite were expressed as the chief complaint in 25.2% of the patients. Graber and Lucker<sup>15</sup> found that overjet and dental crowding or spacing was considered to be a more significant factor in determining patient self-satisfaction with dental appearance. Helm et al<sup>16</sup> reported that increased overjet more than 6 mm in females and 9 mm in males led to dissatisfaction of dental appearance. In the present study on Saudi patients, correction of similar dental anomalies was also considered significant for self-satisfaction of dental appearance.

On the other hand, functional problems including mastication and TMJ pain were expressed as chief complaint by some patients. The result revealed that 11.3% complained of masticatory insufficiency while only 5.2% complained of TMJ pain. Victorin et al<sup>17</sup> found that 76% of the subjects desired masticatory improvement. On the other hand, Laufer and colleagues<sup>18</sup> reported that 40% of the subjects suffered from masticatory problem. Kiyak et al<sup>1</sup> reported that 41% of male patients complained from masticatory function, while TMJ problem was found in 16% of female and 3.4% in male patients. The reduced frequency of functional problem complaint as presented in this study might be explained by the following reasons: I) the age group, which represented a mean age of 21.4 years was rather young to present functional problem, since most functional problems and TMJ disorder appear in older subjects;<sup>19</sup> II) for the younger age group, it would seem that main concentration would be on the improvement of facial appearance; and III) Saudi patients may have limited information regarding management of functional problems and TMJ disorder by the dentist.

In this study, some of the patients (22.6%) with

skeletal class III and class II deformities could not identify the defective jaw or whether the mandible was protruded or the maxilla was retruded or vice versa. This is in agreement with the findings of Bell and colleagues<sup>6</sup> in their study.

Saudi women perceived themselves better than men. This most likely indicates that women are more precise and can distinguish between what they like and dislike regarding their facial appearance. Sheats et al<sup>20</sup> found that females (35%) demonstrated more concern regarding their dentofacial appearance than males (19%). This finding also corresponds with other studies.<sup>21-23</sup>

In the present study subjects, 63.5% had shown a high demand for orthognathic surgery. This could be due to the psychosocial adverse effect present with severe facial deformity and the determination of those patients on improving their facial appearance.

Patients in higher educational level group were able to perceive their dentofacial deformity better than others and expressed a higher treatment demand. This most likely indicates that patient's awareness is influenced by educational level. These findings were also supported by the significant correlation found between patient's demand, self-perception and educational level.

On the other hand, 10.4% of patients expressed low demand for orthognathic surgery. Their attention was concentrated on dental anomalies and they neglected their skeletal defect. This group was mainly male patients with lower educational level and they often indicated weak perception of facial defect. Treatment demand in this group was most probably the result of parents' or friends' pressure. Bell et al<sup>6</sup> reported that a patient planning to undergo surgery may be influenced to some extent by the opinion of others, but the ultimate decision was made primarily by the patient himself.

In contrast to gender frequency distribution where males were higher than females, the demand for orthognathic surgery was slightly lower among male patients compared to female patients in this study is in agreement with the report of Balki and Zahrani,<sup>24</sup> and of Kawari<sup>25</sup> who studied similar ethnic groups. This finding may suggest that esthetic improvement was considered a major goal for women in undergoing orthognathic surgery. This is confirmed by the increased self-perception of females than males and suggested that physical attractiveness assumes a greater role for women who are unable to form satisfactory relationship with others. Proffit et al<sup>26</sup> found that women were twice more

likely than men to seek clinical evaluation for dentofacial discrepancy and more likely to receive surgical treatment once evaluated.

Most previously reported studies in Western countries revealed that females demanded orthognathic surgery more frequently than reported in this study.<sup>4,26</sup> This may be due to two possible reasons. First, females in Western countries may have better knowledge regarding orthognathic surgery. Second, social, cultural and religious background might play a role in limiting the demand for orthognathic surgery by Saudi females. The Saudi females are brought up in a close family environment strictly supervised by their parents.

Patients with class III skeletal deformity expressed higher demand for surgery than for any other type of dentofacial deformity. This is in agreement with Proffit et al<sup>26</sup> who found that individuals with long face or skeletal class III appeared more likely to seek evaluation and surgical treatment than other groups of patients with facial deformity. Patients with class II skeletal deformity showed lower demand compared to class III skeletal deformity. This may be due to the fact that patients with skeletal class II could hide their skeletal defect either by forward posturing of the mandible (Sunday bite) or by camouflaging their defect through growing beard (in male patients) which in turn make them more socially accepted than individuals with long face or skeletal class III.

### Conclusions

1. Patients who were able to perceive their deformity shared high demand for orthognathic surgery and were at a higher educational level.
2. Patients with skeletal class III deformity were better with their perception of facial profile and expressed higher demand for surgical correction.
3. When facial appearance was the chief complaint, better perception of facial profile and high demand for orthognathic surgery was noticed.
4. Although more Saudi male patients requested dentofacial consultation, the female patients showed better perception of facial profile.
5. The majority of Saudi patients with dentofacial deformity who sought clinical evaluation were unmarried and belonged to a younger age group.

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