



ORIGINAL ARTICLE

# Assessment of the Quality of Life in Moroccan Patients Undergoing Orthognathic Surgery

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## ABSTRACT

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**Objective:** Dentofacial deformities can affect patient “quality of life” (QoL), and orthognathic surgery can improve this QoL. The aim of the present study is to assess changes in QoL in Moroccan adult patients with dentofacial deformities undergoing orthodontic surgical treatment.

**Methods:** 32 patients (21 females and 11 males; mean age  $27 \pm 5.96$  years) completed a specific questionnaire of QoL once the surgical phase is completed. The questionnaire includes 22 questions marked on a 4-point scale depending on how much the question covered by the statement disturbs the respondent. The 22 questions contribute to four aspects: social aspects of dentofacial deformities, facial aesthetic, oral function, and awareness of dentofacial aesthetics.

**Results:** A significant difference in QoL was observed before surgery between men and women. On the other hand, 73.6% stated of patients said that they were uncomfortable by their dentofacial appearance before surgery, and almost half of the patients have made functional limitations before surgery. After surgery, 85.42% of patients reported a positive change in their QoL. Class III patients reported greater pre-surgical aesthetic and functional restrictions than Class II skeletal patients. In post-surgery, patients in both skeletal classes showed significant improvement in their QoL, so improving the aesthetics, oral functions and self-confidence are the main motivators to seek orthognathic treatment for our patients.

**Conclusion:** Improving the aesthetics, oral functions and self-confidence are the main motivators to seek orthognathic treatment for Moroccan patients.

**Keywords:** Quality of life, satisfaction, orthodontics, orthognathic surgery

## INTRODUCTION

The notion of the “quality of life” (QoL) was defined by the World Health Organization (1993) as the perception of people in terms of their situation in life, in the cultural context, and in values with whom they live according to their objectives, expectations, models, and concerns (1). QoL is essentially a subjective concept that cannot be judged by others. It is a broad concept that has been affected in a complex way by physical health, psychological state, level of independence, social relations, personal beliefs, and their relation to the specificity of their environment (2).

The issue of QoL is attracting increasing interest from many researchers. It is a concept that groups together different areas of life and is strongly subject to individual experiences. This QoL is defined as a sense of well-being associated with satisfaction or dissatisfaction in the important aspects of individual life (3).

Even though hardware tools can measure QoL, it is accessible to other means of evaluation questionnaires. This QoL is open from different angles, that is, psychological well-being, ability to function properly, participation in different aspects of life, quantity and quality of relationships with other people, and physical conditions (4-6).

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In 2000, Cunningham et al. (7, 8) have developed a self-assessment questionnaire especially in response to the inadequacy of existing instruments to measure QoL of patients with severe dentofacial skeletal malformations and 22 questions on QoL. Orthognathic surgery was consolidated by a 4-point scale as part of a development phase and complex validation.

The planning and the results of orthognathic surgery must be compatible with the objectives and normative values, which may differ from the perceived improvement in patients after surgery and overall QoL (8).

Over the years, studies have shown that most patients with dentofacial deformities seek treatment to improve facial and dental aesthetics (9). In addition, some studies report that the primary motivation includes improvements in masticatory function rather than changes in appearance (10).

Patients also seek treatment in order to obtain psychosocial benefits including improvements in relationships and psychological well-being through improving their self-esteem (11).

Hence, the aim of the present study was to assess the changes of QoL in patients undergoing orthognathic surgery for the correction of skeletal malformations. Furthermore, the study intended to improve the ability of clinicians to explicitly analyze the perceptions of patients in improving QoL in orthognathic surgery.

## METHODS

The protocol of our study has been validated and approved by the ethics committee of our institution. Patient consent for the present study was obtained from all patients. The questionnaires were distributed to 32 patients when surgical phase has been completed, and all questionnaires were returned and fully completed.

### Patients

All subjects who fulfilled the following criteria were approached and asked to participate in the study:

- patients over 18 years,
- patients who will benefit from orthodontic and surgical treatment for maxillo-mandibular disharmony regardless of severity,
- patients undergoing orthognathic surgery (osteotomy of the maxillary and/or mandibular osteotomy).

Patients with clefts, specific syndromes, and facial deformities due to trauma or congenital malformation were not included. All subjects were asked to complete the condition specific questionnaire (QoL) (7).

### Questionnaires

The Orthognathic Quality of Life Questionnaire (OQLQ) consists of two parts. The first part contains the general and specific information of the patient: age, gender, occupation, type of skeletal abnormality, and type of surgery performed. The second part consists of 22 questions with a 4-point scale rating according

to how much the issue covered by the question bothers the respondent.

The 22 items contribute to four sections: social aspects of dentofacial deformities (questions 15-22), facial aesthetics (questions 1, 7, 10, 11, and 14), oral function (questions 2-6), and awareness of dentofacial aesthetics (questions 8, 9, 12, and 13).

Before providing answers regarding the pre-surgical part, the patient was asked to see his or her photos before surgery in order to remember facial condition as all the questionnaires were distributed after the surgical phase of the treatment has been achieved.

### Statistical Analysis

Analysis of data was carried out using the statistical software Excel 2010 and EPI version 7.1.3.10. The descriptive analysis with Pearson's chi-square test was used to compare the different cohort categories of patients (age, sex, type of skeletal abnormality, and type of surgery) before and after surgery and also to compare inter-sex results, inter-classes of abnormality, and different types of surgery. A p value of less than 0.05 is considered as statistically significant.

## RESULTS

All of the questionnaires distributed to the patients were filled out in their entirety. No one remarked that they had been unable to or inadequately understand the questions. Thirty-two patients (21 females and 11 males) with a mean age of  $27 \pm 5.96$  years completed the study. Skeletal class II was present in 25% of surveyed patients, whereas skeletal class III in 75% of main patients. A total of 6.25% of patients underwent surgery only in the upper jaw and 31.25% underwent surgery of the lower jaw, whereas a bimaxillary surgery was carried out in 62.5% of our patients (Table 1).

**Table 1.** Distribution of age, gender, occupation, skeletal abnormality, and type of surgery realized among sample patients (n=32)

		Frequency n=32	Percentage
Age	Mean+SD	27±5.96	
	Range	19-43	
	≤27 years	17	53.40%
	>27 years	15	47.60%
Gender	Female	21	65.60%
	Male	11	34.40%
Occupation	Student	12	37.50%
	Employee	15	46.88%
	Other	5	15.62%
Abnormality	Class II	8	25%
	Class III	24	75%
Surgery	Upper jaw	2	5.25%
	Lower jaw	10	31.25%
	Both	20	62.50%

**Table 2.** Percentage of orthodontists/residents who responded to questions regarding infection control procedures according to the place of work

	1: Bothers you a little +				2 ++				3 +++				4: Bothers you a lot +++++				N/D: The statement does not apply to you or does not bother you at all				p
	Before		After		Before		After		Before		After		Before		After		Before		After		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Question 1	4	12,50	12	37,50	6	18,80	2	6,30	8	25,00	1	3,10	12	37,50	0	0,00	2	6,30	17	53,10	0,332
Question 2	4	12,50	12	37,50	5	15,60	4	12,50	11	34,40	1	3,10	9	28,10	1	3,10	3	9,40	14	43,80	0,737
Question 3	5	15,60	10	31,30	5	15,60	4	12,50	11	34,40	1	3,10	8	25,00	1	3,10	3	9,40	16	50,00	0,822
Question 4	5	15,60	12	37,50	8	25,00	3	9,40	10	31,30	1	3,10	5	15,60	0	0,00	4	12,50	16	50,00	0,095
Question 5	8	25,00	9	28,10	8	25,00	2	6,30	7	21,50	2	6,30	5	12,50	0	0,00	5	15,60	19	59,40	0,174
Question 6	13	40,60	9	28,10	5	15,60	8	25,00	2	6,30	1	3,10	2	6,30	0	0,00	10	31,30	14	43,80	0,001
Question 7	3	9,40	5	15,60	1	3,10	1	3,10	3	9,40	0	0,00	22	68,80	0	0,00	3	9,40	26	81,30	0,464
Question 8	3	9,40	9	28,10	9	28,10	1	3,10	4	12,50	2	6,30	11	34,40	9	28,10	5	15,60	11	34,40	0,005
Question 9	5	15,60	8	25,00	7	21,90	3	9,40	7	21,90	3	9,40	9	28,10	6	18,80	4	12,50	12	37,50	0,517
Question 10	3	9,40	9	28,10	2	6,30	1	3,10	4	12,50	0	0,00	17	53,10	0	0,00	6	18,80	22	68,80	0,425
Question 11	4	12,50	10	31,30	2	6,30	1	3,10	4	12,50	0	0,00	16	50,00	0	0,00	6	18,80	21	65,60	0,533
Question 12	6	18,80	8	25,00	2	6,30	7	21,90	14	43,80	2	6,30	5	15,60	0	0,00	5	15,60	15	46,90	0,004
Question 13	5	15,60	9	28,10	1	3,10	6	18,80	12	37,50	1	3,10	7	21,90	0	0,00	7	21,90	16	50,00	0,053
Question 14	3	9,40	4	12,50	3	9,40	0	0,00	1	3,10	0	0,00	22	68,80	1	3,10	3	9,40	27	27	0,533
Question 15	5	15,60	4	12,50	6	18,80	0	0,00	6	18,80	0	0,00	6	18,80	0	0,00	9	28,10	28	87,50	0,371
Question 16	4	12,50	7	21,90	3	9,40	2	6,30	8	25,00	0	0,00	9	28,10	0	0,00	8	25,00	23	71,90	0,345
Question 17	3	9,40	7	21,90	3	9,40	2	6,30	8	25,00	0	0,00	10	31,30	0	0,00	8	25,00	23	71,90	0,599
Question 18	4	12,50	8	25,00	5	15,60	5	15,60	9	28,10	2	6,30	6	18,80	0	0,00	8	25,00	17	53,10	0,260
Question 19	2	6,30	5	15,60	5	15,60	0	0,00	6	18,80	2	6,30	12	37,50	0	0,00	7	21,90	25	78,10	0,796
Question 20	4	12,50	6	18,80	4	12,50	1	3,10	8	25,00	0	0,00	11	34,40	0	0,00	5	15,60	25	78,10	0,559
Question 21	5	15,60	8	25,00	3	9,40	3	9,40	10	31,30	6	18,80	10	31,30	0	0,00	4	12,50	15	46,90	0,022
Question 22	3	9,40	10	31,30	2	6,30	2	6,30	9	28,10	1	3,10	10	31,30	0	0,00	8	25,00	19	59,40	0,317

Absolute and relative frequency distributions of the responses to questions 1-22 are presented in Table 2.

Twenty patients reported that they dislike the appearance of their teeth. More than half of all patients felt very limited by dentofacial deformity when they are biting and chewing. A total of 46.9% of patients said that they avoid foods often or very often (question 4). At least 34% of patients reported restrictions in eating in public because of malocclusion (question 5). The degree of perception of aesthetic impairment (question 14) was negative for 71.9% of patients. A total of 56% of patients reported that they avoid smiling when they meet people. A total of 65.6% of patients said that they hated taking pictures (question 10), and 62.5% reported that they hated being taken in videos (question 11). However, only 12.6% of patients complained of pain in the face or jaw (question 6).

After surgery treatment, 85.42% of patients reported positive changes in their QoL. In fact, 84.40% of patients said that they are not bothered anymore by the appearance of their faces (question 14), whereas 87.50% claimed that they do not cover their mouths any more when they meet people for the first time (question 15). A very large percentage of patients said that they

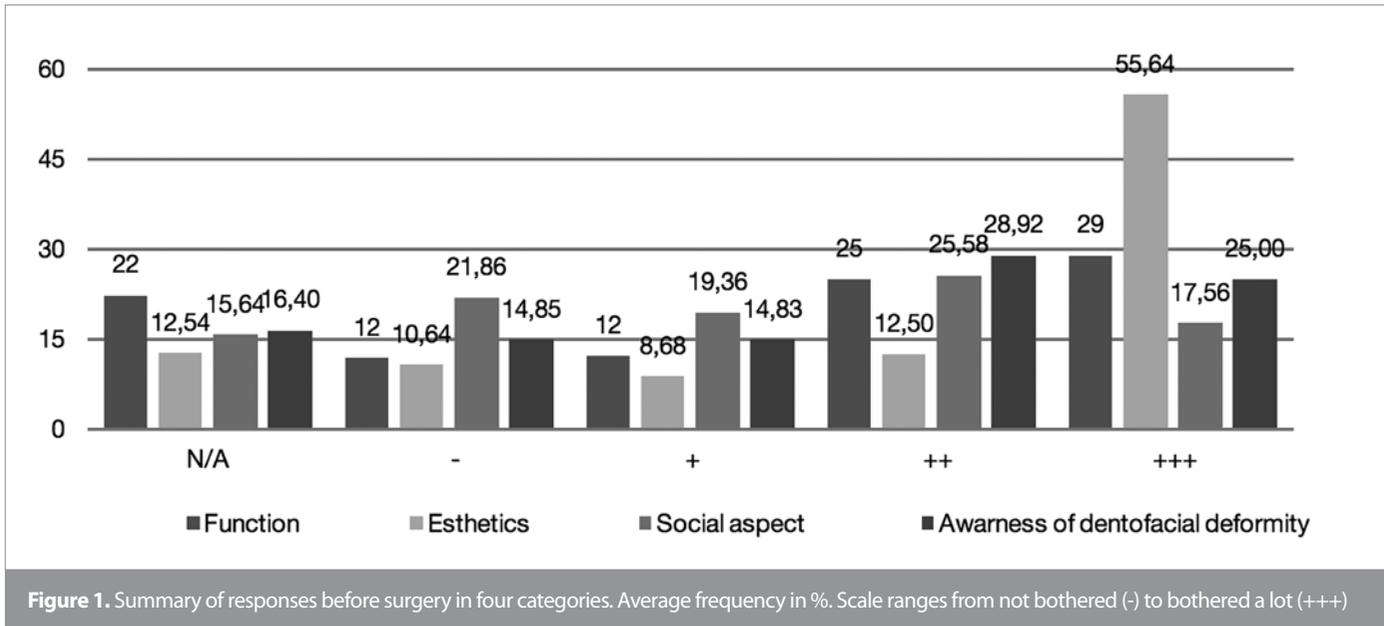
do not lack confidence when they are in a social environment and that they always smile when they meet people (questions 19 and 20 with 78.10%). A total of 81.30% of patients said that it does not bother them to see a side view of their face (question 7). However, 46.90% still spend a lot of time studying their faces and teeth in the mirror (questions 8-9). On average, before surgery, female patients were more likely to say that they avoided taking photos, pictures, or videos owing to their appearance or were most hurt by remarks about their appearance. Regarding patients questioned after surgery, a significant percentage of female patients said that they spend a lot of time studying their faces in the mirror after surgery.

The difference in frequency distribution before and after surgery of class III patients showed significant improvement in the assessment of facial aesthetics.

The comparison between responses to questions between class II and III patients before surgery shows that class III patients reported more restrictions than class II patients. Whatever type of surgery (uni or bimaxillary surgery), patients did not show significant differences in their answers to questions before surgery. Furthermore, patients who underwent bimaxillary

**Table 3.** Mean (M) and standard deviation (SD) in the four categories

	Our study (n=32)		Cunningham et al. (8) (n=65)		Bock et al. (10) (n=50)	
	M	SD	M	SD	M	SD
Function	6.60	1.13	8.23	5.51	12.08	5.63
Aesthetics	11.51	7.67	13.27	5.92	11.48	5.48
Social aspects	7.17	2.35	15.07	10.39	14.73	8.94
Awareness of dentofacial deformity	6.59	1.95	7.20	5.40	9.86	3.81

**Figure 1.** Summary of responses before surgery in four categories. Average frequency in %. Scale ranges from not bothered (-) to bothered a lot (+++)

surgery did not report significantly different functional restrictions. No statistical differences were apparent in the responses to questions after surgery.

As suggested by Cunningham et al. (7), we have grouped the responses of patients before and after surgery into four categories:

- the social aspects of dentofacial deformity (questions 15-22),
- the facial aesthetics (questions 1, 7, 10, 11, and 14),
- the oral functions (questions 2-6),
- the awareness of dentofacial aesthetics (questions 8, 9, 12, and 13).

In Table 3, the average values of the four categories of our study showed increasing satisfaction especially for aesthetic.

## DISCUSSION

Measuring QoL for the evaluation of health care is a growing field with more than 1000 new items every year, indexed under the term "quality of life" (12). The researchers found that the outcomes of patient-based healthcare measures, including QoL, are a very important contribution, unlike traditional measures that are not relevant to the patient (13). When oral health is compromised, health and overall QoL may be affected. (14).

The QoL tests integrate in a single point different physical, social, psychological, emotional, or spiritual criteria. We distinguish

between generic tests and specific tests. Currently in the field of dentistry, the best known of these measures is the impact of the profile on oral health or the oral health impact profile, which was designed for patients to determine the perception of the social impact of oral diseases. Other instruments include the social impact of dental diseases, which was one of the first socio-dental indicators; index of geriatric/general assessment of oral health (General Oral Health Assessment Index and Dental Impact Profile) (15). Cunningham et al. (7, 8) used a stepwise process to develop the questionnaire used in our study. In their first study, their questionnaire demonstrated a high level of validity and reliability (16). They produced a more specific evaluation for patients undergoing orthognathic surgery by comparing two general questionnaires evaluating QoL (Short-Form Health Survey, EuroQoL) (7).

Patients with severe dentofacial deformities may require an orthognathic surgical approach in addition to orthodontic treatment. Improving QoL is one of the objectives of this form of intervention. Patients requiring this form of treatment are generally young and fit, which limits the relevance of existing instruments. This was the basis for the development of a questionnaire specifically designed for this group of patients. This instrument is known as OQLQ (7).

Our study was a retrospective study for the assessment of QoL in patients undergoing orthognathic surgery for the correction of skeletal malformations with a sample of 32 patients. This is

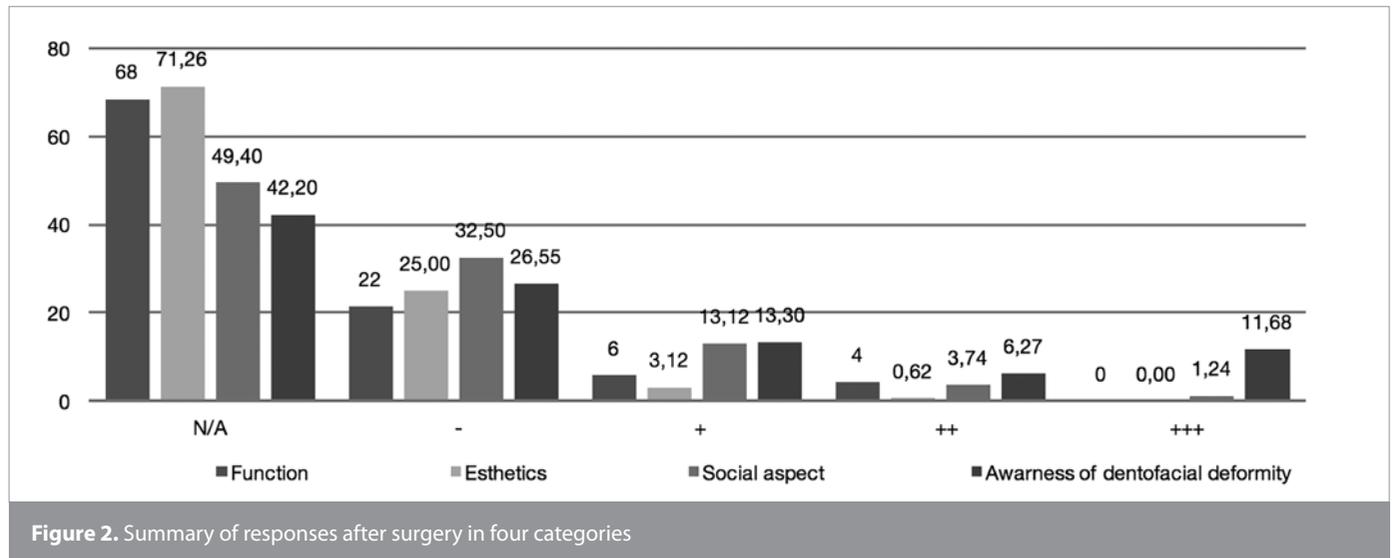


Figure 2. Summary of responses after surgery in four categories

justified by the difficulty of accepting this treatment modality in our socioeconomic and cultural context and also because of the disparity of the periods of care and the treatments between the different orthodontists. On the other hand, a prospective longitudinal study with an evaluation at the beginning and the end of the treatment would have been more relevant. Furthermore, no similar studies have been conducted at the national level.

Our sample included more women than men. Several authors reported similar gender distribution, offering also a reason that female patients were more likely to perceive a skeletal malocclusion as an aesthetic compromise (17). Therefore, Kroger et al., (18) and Schmidt et al. (6) are more motivated to follow the treatment (19). Studies also show that women tend to give greater priority to the aesthetics and are more likely to feel disabled by compromised appearance than men owing to the need to meet certain expectations, be attractive, and take into account characteristics such as prestige, usability, and intelligence in our society. (20, 21). Furthermore, in our study, female patients showed a better satisfaction after surgery than male patients unlike in the study of Emadian et al. (22) who found a similar satisfaction score in males and females and concluded that QoL was not related to gender.

The potential of orthodontic surgery to improve facial aesthetics, orofacial functions, and psychological well-being was reported in several studies. These results are essential because the orthodontic surgical treatment is complex and expensive. In the present study, patient demand for orthognathic surgery appears to be largely related to the desire to improve their physical and facial appearance. Thus, 73.6% of patients reported that they are embarrassed by their dentofacial aesthetics. Previous studies revealed that the motivations of patients seeking treatment were mainly related to appearance and self-image rather than functional reasons (16, 23, 24). In 2005, Sadek and Salem (25) conducted a study of 114 Egyptian patients. The present study showed that 95% of patients have shown that improving the appearance and facial aesthetics was the main objective for their choice of orthognathic surgical treatment, against 6% of patients for functional problems. In 2008, Al-Ah-

mad et al. (26) achieved a satisfaction survey of 38 patients who underwent an orthognathic surgical treatment at the university hospital in Amman, Jordan. A total of 50% of patients reported that dissatisfaction with their aesthetic appearance was the main reason for seeking treatment, 42.1% mentioned a combination of aesthetic and functional problems, and only 7.9% for functional reasons.

In our study, patients with abnormal skeletal class III showed greater aesthetic and functional impairment prior to surgery patients as class II. Furthermore, their postoperative satisfaction showed no significant difference. The type of malocclusion is related to the perception by patients of their own attractiveness. Cunningham et al. (27) reported that the patient's perception of his malocclusion was a significant predictor of body image. In the study by Johnston et al. (28) including 162 patients, 95 with Class II and 67 with Class III, 67.97% of Class II subjects and 86% of Class III subjects wanted to improve their appearance. This difference was statistically significant. Indeed, older patients, female patients, and Class III patients were less likely to be satisfied with their profiles.

Patients with Class III skeletal malocclusion had more negative preoperative opinions about their own attractiveness and self-confidence than patients with Class II skeletal malocclusion (29). Postoperatively in the study of Espeland et al. (30), patients with both Class II and Class III anomalies reported improvement of their attractiveness and self-confidence, with a noticeable improvement in Class III patients. The results agree well with those of our study.

Bock et al. (10), and Cunningham et al. (8) have observed considerable restrictions on QoL (Table 3) in their patients' follow-up study before orthognathic surgery. The average values for the four categories were similar to the results of our study. Although data vary widely, the relationships are generally similar. Our patients were more likely to complain about the aesthetic appearance of their face, whereas the oral functions and social aspects appeared less important for our patients, unlike the study of Abdullah (31) who concluded that the social aspects domain was shown to be more

important for patients than facial aesthetics and oral function. In 2003, Motegi et al. (32) used a specific questionnaire on QoL with a 7-point scale and observed a primarily aesthetic restriction, as opposed to functional reasons in 93 patients.

To study QoL in patients with dentofacial disharmony, various approaches have been undertaken, but a consensus on a standard method of assessing is not yet established, and limited responsiveness of generic measure to assess oral diseases stresses the importance of developing specific QoL measures to oral conditions. (33).

## CONCLUSION

At the end of our work, we can conclude that:

- The study of the relationship between maxillofacial disharmony and the patient's QoL in Moroccan patients is of major interest.
- Moroccan women give greater priority to their dentofacial aesthetics owing to an increased need to meet certain social requirements.
- Moroccan patient's demand for orthodontic surgical treatment is largely linked to the desire to improve their physical and facial appearance.
- Patients with Class III skeletal abnormalities had greater aesthetic and functional impairment than patients with Class II skeletal abnormalities.
- Orthodontic surgical treatment has a positive impact on QoL of Moroccan patients.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the Ethics committee of the Casablanca School of Dentistry.

**Informed Consent:** Written informed consent was obtained from all the patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept - L.O.; Design - L.O.; Supervision - L.O.; Resources - L.O., L.E.; Materials - L.O., L.E.; Data Collection and/or Processing - L.O., L.E.; Analysis and/or Interpretation - L.E.; Literature Search - L.E.; Writing Manuscript - L.E.; Critical Review - L.O.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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