



## An overview of patient-reported outcome measures to analyze the quality of life after orthognathic surgery

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### ABSTRACT

Society imparts great importance to physical appearance in this modern age. The physical and psycho-social impact of a dentofacial deformity on an individual is often impossible to assess with certainty. A facial deformity can profoundly affect the quality of life and thereby entailing lifelong adjustments. Facial aesthetics affect an individual's confidence and their overall acceptance in society, which in turn has an apparent effect on their quality of life. Corrective jaw surgeries are indicated in cases not amenable to produce acceptable post-treatment results with orthodontics alone. Orthognathic surgery aims to produce a more aesthetic facial appearance and strives to improve stomatognathic functions in the process. WHO defines Quality of Life as- An individual's perception of their position in life in the context of the culture and value systems in which they live and concerning their goals, expectations, standards and concerns. It is a broad-ranging concept affected in a complicated way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment. The impact of dentofacial deformities on an individual's holistic emotional, physical and social development has been a focus of research for a long time. Several patients reported outcome scales are employed to assess the quality of life and this review aims to discuss the use of these scales as an indicator of successful surgical treatment. At the same time, these scales may serve as a patient education tool because a holistic health indicator is required which considers the psychological well being of the patient along with regards to functional and aesthetic demands before formulating a surgical treatment plan.

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### INTRODUCTION

The decision of an individual to partake in any corrective jaw surgery depends upon the aesthetic, functional, psychological and social impact of the dentofacial deformity on their quality of life. Facial aesthetics play a pivotal role in the emotional and psychological well being of the individual. Patients with severe dentofacial deformities usually opt for an ortho-surgical treatment to achieve a functionally robust and aesthetically acceptable treatment outcome.

Evidence-based dentistry suggests that any treatment should be designed based on a systematic

assessment of clinically relevant scientific data such as an individual's chief complaint, dental history, medical history, treatment needs, preferences and expectations. Patients usually report for ortho-surgical treatment as a result of their chief complaint aiming to achieve a specific treatment outcome which in turn helps in improving their overall quality of life as (Miguel *et al.*, 2014).

The concept of quality of life is subjective and thus can not be judged by others. Patient expectations are usually different from those of the clinicians. Therefore pre-treatment investigations should include questionnaire-based subjective scales as they provide an insight into the impact and perception of the patient towards their problem (Alanko *et al.*, 2010; Choi *et al.*, 2010). These results can help in guiding the treatment course by prioritizing patient expectations in general and oral healthcare delivery system.

Currently, a significant chunk of research is focused on the effect of orthognathic surgery on the quality of life of the patient (Lee *et al.*, 2007). Patient acceptability of facial aesthetics post-treatment is of paramount importance when dealing with any cosmetic procedure, as the "perfect result" from a surgeon's point of view might not be congruent with that of the patient's wishes, making it imperative to include patient inputs in their expectations (Cano *et al.*, 2009).

There is no shortage of published literature on the importance of quality of life prior and post orthognathic surgery. This article aims to enlist the various types of patient-reported outcome instruments reported in the literature for the evaluation of improvement in the quality of life of patients post-surgery (Table 1).

## HISTORY

A surge in the use of patient-reported psychometric outcome measures in medicine and surgery for assessment of the quality of life emerged during the early 1970s. The shift in focus of the entire health care community from the usage of traditional clinical outcome measures to those involving the functional and psychological well-being allowed for a holistic post-operative assessment (Stewart and Ware, 1992). This occurred as a result of the inclusion of a broader definition of health as a "complete state of physical, mental, and social well-being" (World Health Organization, 1947). And an ethical responsibility of surgeons to illustrate evidence of successful treatment outcomes incorporating this broader definition of health.

Assessment of improvement in the quality of life objectively in the post orthognathic surgery phase is difficult since the patient's life is neither extended nor the disease cured in the traditional understanding of health care needs (Murphy *et al.*, 2011; Abdullah, 2015). Health-related quality of life (HRQoL) has multiple variables which must include physical, social and psychological aspects to help in quantification without bias. A lot of general health, general oral health as well as particular condition-specific outcome measures have been employed to assess the impact of orthognathic surgery in patients. A generic health questionnaire can compare the post-surgical outcomes with those of other ailments. However, without the use of specific and targeted outcome measures, it is not possible to address the needs and issues faced by individuals with dentofacial deformities. For example, 36 items Short Form Health Survey (SF-36) was unable to differentiate in quality of life amongst those with and without dentofacial deformities (Lee *et al.*, 2008).

In the late 1980s, a need to study the social and psychological impact of oral diseases comprehensively was first addressed. The first to realize the importance of oral health-related quality of life were Reisine *et al.* In 1994, Slade developed Oral Health Impact Profile (OHIP-49) questionnaire as the first generic oral health tool (Slade and Spencer, 1994). In 1997, Slade improved the OHIP-49 to the Short Form Oral Health Impact Profile Questionnaire (OHIP-14) (Slade, 1997).

OHIP was widely used but was designed for older people. Thus, Cunningham *et al.* (2000) developed a specific outcome measure for patients undergoing orthognathic surgery called Orthognathic Quality of Life Questionnaire (OQLQ) using sources such as literature reviews as well as unstructured interviews with clinicians and patients. OQLQ was developed as a quality of life questionnaire for patients with dentofacial deformities. It is a condition-specific instrument which focuses on a particular condition and population. This makes the scale responsive to even the smallest yet clinically significant and essential changes in post-operative health of the individual undergoing surgery.

## Patient reported outcome measures

The various patient-reported outcome measures reported in the literature and used in orthognathic surgery for assessment of patient satisfaction are as follows (Soh and Narayanan, 2013; Finlay *et al.*, 1995) (Table 1).

**Table 1: Available patient-reported outcome measures in literature include**

S. No	Patient reported outcome measures
1	16-factor Personality Questionnaire
2	Beck Depression Inventory
3	Body Cathexis Scale
4	Body Dysmorphic Disorder Examination
5	Body Image Assessment Questionnaire
6	Body Satisfaction Scale
7	Derogatis Stress Profile
8	Derriford Appearance Scale
9	Eysenck Personality Inventory
10	Family Environment Scales
11	General Health Questionnaire
12	Geriatric/General Oral Health Assessment Index
13	Global Transition Scale
14	Goal Attainment Scale
15	Health Opinion Survey
16	Hospital Anxiety and Depression Scale
17	Impact Message Inventory
18	Introspectiveness Inventory
19	Maslach Burnout Inventory
20	Millon Behavioral Health Inventory
21	Millon Clinical Multiaxial Inventory III
22	Minnesota Multiphasic Personality Inventory
23	Motives for Surgical-Orthodontic Treatment
24	Oral Health Impact Profile
25	Oral Health Status Questionnaire
26	Orthognathic Quality of Life Questionnaire
27	Profile of Mood States
28	Recognition and Satisfaction Scale Modified
29	Rosenberg Self-Esteem Scale
30	Rotter's Internality/Externality Scale
31	Self Report Questionnaire
32	Self-Esteem Inventory
33	Self-Rating Questionnaire for Depression
34	Short Form Health Survey
35	Short Form Social Support Questionnaire
36	Sickness Impact Profile Psychosocial Dimension
37	Sickness Impact Profile
38	Social Impacts of Dental Disease Measure
39	State-Trait Anxiety Inventory
40	Surgical Audit
41	Symptom Checklist 90 Revised
42	Tennessee Self-Concept Scale
43	Visual Analogue Scale
44	Ward Adjustment Scale
45	Yatabe-Guilford Personality Inventory
46	Zung Depression Inventory

## ORTHOGNATHIC QUALITY OF LIFE QUESTIONNAIRE (OQLQ)

The OQLQ was developed and popularised by Cunningham in the year 2002. It measures and assesses the impact of various dentofacial deformities on the quality of life of an individual. The original questionnaire consists of a total of 22 items which have been used to assess the effects of dentofacial deformities on the QoL of patients by using the following four domains:

1. Facial esthetics (five items; total score range, 0–20 points);
2. Oral function (five items; total score range, 0–20 points);
3. Awareness of dentofacial esthetics (four items; total score range, 0–16 points); and
4. Social aspects of a dentofacial deformity (eight items; total score range, 0–32 points).

Within a domain each item was scored on a 5-point Likert scale with responses ranging from 1 point, indicating "bothers you a little," to 4 points, indicating "bothers you a lot," and 0 points indicating "the statement does not apply to you or the dentofacial deformity does not bother you." Total OQLQ scores range from 0–88 points where higher scores indicated a worsened quality of life. Studies conducted in different parts of the world have validated this patient-reported outcome measure for use in measuring and assessing the quality of life in patients undergoing orthognathic surgery.

## FACE-Q

In 2015 a review of the literature was commissioned by the United Kingdom Department of Health to identify patient-reported outcome measures for cosmetic treatment which incorporated adequate psychometric analysis of patients (Liddle *et al.*, 2015). From this review, nine such instruments of patient-reported outcome measures were identified out of which three met the latest recommendations for both the development as well as validation of patient-reported outcome measures. These scales are BREAST-Q (Pusic *et al.*, 2009), FACE-Q (Klassen *et al.*, 2010) and Skindex (Chren, 2012).

FACE-Q is composed of more than 40 independently functioning scales and checklists to assess the experiences and results of any aesthetic facial surgical and non-surgical procedure from the patient's perspective (Pusic *et al.*, 2013). Thereby it provides

an unprecedented insight into their health-related quality of life and satisfaction post-treatment. Patients are provided to fill the questionnaire pre-operatively to provide a baseline measurement and postoperatively after their treatment is performed at a specific time depending upon the nature of the research being done. Conceptually FACE-Q framework developed as a result of very detailed and extensive research involving patients undergoing facial aesthetic surgery, evaluation of already existing research literature, and inputs from healthcare providers operating on individuals requiring facial rejuvenation and reconstruction.

As a part of patient evaluation both the researchers and clinicians may review the scores for individual scales with a score point from 0-100 and monitor changes in these scores from previous visits (e.g. Has satisfaction decreased or increased?). As with all quality of life outcome measure in general, the observed trends over some time are more valuable than absolute scores preoperatively or postoperatively when considering individual patient care.

FACE-Q provides the ability to have a tailored version of the questionnaire, which suits the needs of the research question and provisions available to the clinician and researcher. A tailor-made approach is possible because FACE-Q consists of about 40 scales which measure various concepts of importance to patients. FACE-Q consists of the following four domains of treatment procedure (Denadai *et al.*, 2020):

1. Satisfaction with Facial Appearance
2. Health-Related Quality of Life
3. Adverse Effects
4. Process of Care

Each domain consists of one or more than one independently functioning scales from where a subset of scales, relevant to a specific research objective or depending upon the patient population, can be administered. Each subset of FACE-Q scale consists of a questionnaire which evaluates the most important and primary concept of patient satisfaction. The questions forming these scales are clinically relevant in their hierarchy. For example, in the Satisfaction with Facial Appearance scale, items range from "How satisfied are you with how symmetric your face looks?" to "How satisfied are you with how your face looks under bright lights?"

Based on independent FACE-Q scale scores, a higher score entails a better quality of life and greater treatment satisfaction for the patient. Overall there is

no quantifiable FACE-Q score. However, total scores for each independent scale is quantifiable. Therefore FACE-Q can be used for evaluation and assessment of the quality of life in patients undergoing treatment for dentofacial deformities as the outcome of these cosmetic procedures depend mainly on patient perception of treatment outcome and their satisfaction.

## CONCLUSION

Elective surgeries like orthognathic surgery are primarily cosmetic and should include the psychological analysis of the patient towards the already present dentofacial deformity and their expectations from the surgical treatment. Failing to do so may result in dissatisfaction of the patient even if the surgical outcome is ideal. The patient-reported outcome measures to take into account the various physical and psychometric criteria which can be used to assess the acceptance of surgical outcome by the patient even before the surgery. Also, these patients reported outcome measures could be used to determine the need for psychological counselling before and after the treatment. Based on the available literature and its review, the authors suggest the utilization of FACE-Q in the assessment of QOL for patients undergoing orthognathic surgery as it is one of the foremost and commonly performed cosmetic surgery by oral and maxillofacial surgeons.

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## Conflict of Interest

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