

Introducing the Body-QoL[®]: A New Patient-Reported Outcome Instrument for Measuring Body Satisfaction-Related Quality of Life in Aesthetic and Post-bariatric Body Contouring Patients



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Abstract

Objective To develop a new patient-reported outcome instrument (PRO) to measure body-related satisfaction quality of life (QoL).

Methods Standard 3-phase PRO design was followed; in the first phase, a qualitative design was used in 45 patients to develop a conceptual framework and to create preliminary scale domains and items. In phase 2, large-scale population testing on 1340 subjects was performed to reduce items and domains. In phase 3, final testing of the developed instrument on 34 patients was performed. Statistics used include Factor, RASCH, and multivariate regression analysis. Psychometric properties measured were internal reliability, item-rest, item-test, and test–retest correlations.

Results The PRO-developed instrument is composed of four domains (satisfaction with the abdomen, sex life, self-esteem and social life, and physical symptoms) and 20 items in total. The score can range from 20 (worst) to 100 (best). Responsiveness was 100 %, internal reliability 93.3 %, and test–retest concordance 97.7 %. Body image-related QoL was superior in men than women ($p < 0.001$) and decreased with increasing age ($p = 0.004$) and BMI ($p < 0.001$). Post-bariatric body contouring patients score lower than cosmetic patients in all domains of the Body-QoL instrument ($p < 0.001$). After surgery, the score improves by on average 21.9 ± 16.9 (effect size 1.8, $p < 0.001$).

Conclusions Body satisfaction-related QoL can be measured reliably with the Body-QoL instrument. It can be used to quantify the improvement in cosmetic and post-bariatric patients including non- or minimally invasive procedures, suction assisted lipectomy, abdominoplasty, lipoabdominoplasty, and lower body lift and to give an evidence-based approach to standard practice.

Level of Evidence I This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords Body contouring · Massive weight loss · Patient-reported outcome measurement · Scale · Body image

Background

Evidence-based medicine has changed the way in which health practitioners provide medicine [1–3]. Nowadays in most areas of medicine, if a new treatment has not been proven effective in a properly designed randomized controlled trial, it is very unlikely to become standard practice; on the contrary, classic interventions that have proven ineffective quickly become forgotten and replaced by newer more effective interventions [4, 5].

All study designs that aim to determine the efficacy of a treatment should at least specify an intervention, a population in whom the intervention will be tested and an outcome that must be clinically relevant to patients. [6, 7].

In aesthetic surgery, the direct objective is making a segment of the anatomy more beautiful. Although beautification of the body is the obvious objective for patients,

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the reasons to undergo a risky and expensive procedure are of a more complex nature [8]. Dissatisfaction with body image can negatively impact on several aspects of quality of life (QoL). Patients that are not satisfied with their body image often have sex life impairment; low self-esteem, social isolation, and feel rejected by their peers, even impacting their function at work, social and personal life. Mild cases of abdominal skin sagging present few physical symptoms; but moderate to severe abdominal ptosis can lead to a bulge sensation in the abdominal area, pain and fold moisture-related problems such as excoriation or fungus development. These symptoms are not unique to the massive weight loss (MWL) population, but also shared with those so-called cosmetic patients [8, 9].

Accordingly, the underlying objective of cosmetic procedures is to improve QoL by means of making the body more beautiful. Therefore, a reliable way to measure the efficacy of body contouring surgery (BCS) is to measure its impact on QoL from the patients' perspective and to consequently measure all psychological, social, and physical aspects that a patient may feel are attributable to their self-body image impairment.

The current best approach to measure qualitative outcomes is through questionnaires developed using systematic and reproducible methods [10–12], using a mixed qualitative and quantitative approach. These rigorously developed questionnaires are valid and reproducible and as a result are trusted that they accurately measure the phenomena for which they were developed. In particular, instruments that assess phenomena from the patient perspective are called Patient-Reported Outcome Measures (PRO or PROMs).

No such instruments exist specifically designed for BCS patients, neither cosmetic, nor MWL patients. [13, 14]

Given the lack of a valid instrument for such a common problem, we aimed to develop a new PRO to measure body-related satisfaction and QoL for patients undergoing body contouring procedures such as liposuction, abdominoplasty, or body lift.

Methods

Design

The study was approved by the ethics committee and Institutional Review Board [15]. All patients gave written informed consent to participate in the study.

A standard 3-phase design for PRO development was followed [16, 17]; the detailed information of the design has been described [9].

Briefly, phase 1a aimed to create the preliminary instrument, exhaustive literature review, and in-depth

interviews with 16 patients before and after the surgeries were performed. From the literature review and in-depth interviews, a preliminary instrument was created. This was subsequently tested for understanding and wording on an independent sample of 29 patients before the surgery, following which the preliminary Body-QoL reached 5 domains and 120 items.

In phase 2, the preliminary Body-QoL was tested in a large scale and scope of patients. Three samples were drawn: (1) general population, (2) a surgical cohort of patients undergoing BCS, and (3) a historic population of patients between 1 and 3 years after BCS. The objective of phase 2 is to reduce the number of items and domains to the most robust and sensitive ones, using appropriate statistical tests to select the items.

In phase 3, the reduced scale was tested on another sample of patients to measure the final psychometric properties.

Sampling and Patients

In phase 2, we aimed to sample a large scope of patients ranging from normal individuals to most severely diseased. For that reason, we sampled members of the general population and BCS patients. For the general population group, forms were distributed by paper to non-plastic surgery patients and patient companions at the hospital, university students, and hospital staff, and electronically distributed freely and anonymously by email, Google drive, and Facebook.

The historical population was conformed by all the patients in whom BCS had been performed, including liposuction, abdominoplasty, lipoabdominoplasty, and lower body lift. Patients were contacted by telephone and email.

The before/after cohort was composed of all patients operated on between June 2013 and March 2014 at our institution scheduled for BCS procedures that consented to participate in the study and returned at least one form. The preoperative Body-QoL instrument was administered prior to the surgery in the week before or as soon as the patient attended the hospital. The postoperative Body-QoL application was administered by email 3 months after the surgery.

Preliminary Body-QoL Characteristics and Other Variables

The phase 2 Body-QoL was a 120-item instrument clustered in five domains: (A) clothing and physical appearance, (B) sexual and emotional life, (C) body image and self-esteem, (D) social relations, and (E) physical symptoms. Items were organized as Likert questions in which a

statement is made and the patient rates their agreement with the statement on an ordinal scale ranging from 1 to 5 (strongly disagree to strongly agree).

After the reduction of the instrument, the final scale was administered to a small sample of 34 patients and repeated 2–4 weeks after to determine test–retest correlation coefficient, and time to complete the scale and scale responsiveness.

The Body-QoL questionnaire was self-administered in paper or in electronic forms that can be answered via personal computer or handheld devices such smart phones or tablets on our website (<http://www.bodyqol.org>).

Besides the Body-QoL questionnaire, demographic characteristics were asked, and in the before/after surgery cohort population comorbidities, surgical procedures and technical aspects of the surgery were also recorded.

Statistics

The total study sample population of phase 2 was divided into an exploratory sample and a confirmatory sample. The exploratory sample comprised the general population that had not had any previous BCS as well as the before form of the surgical cohort. The confirmatory sample comprised the patients in the control group that did have previous BCS, the historic patients, and the “after” form response of the before/after surgical cohort.

For the item reduction, only the exploratory sample was used.

In the exploratory sample, RASCH analysis and Factor analysis were performed to select the best discriminating items and to reduce domains.

We reduced the items until we reached a lower boundary of Cronbach’s alpha of 90 %.

Once adequate internal consistency was achieved, we tested the selected items in confirmatory factor analysis.

Finally, to evaluate our construct validity, the reduced scale was tested on the confirmatory population (initially left out from the analysis) performing logistic regression to test the capacity to predict the score after the surgery and to test predictive validity or the capacity to discriminate between the control population that want to have BCS from people who were fit, with normal body mass index and who do not want to have BCS. Also, linear models were used to assess how different risk factors and population groups affected the Body-QoL score.

Among the psychometric properties of the scale, we calculated item responsiveness, internal reliability (Cronbach’s alpha), item-test correlation, item-rest correlation, test–retest concordance correlation coefficient, and time to complete the scale [13, 21].

Other standard statistical tests used were Mann–Whitney and Kruskal–Wallis tests to test ordinal outcomes

between different groups, *t* test and one-way ANOVA to test continuous or normalized variables between groups, and linear and fractional polynomial regression models and Z proportion test for binary variables.

In all statistical tests, an alpha value equal to or less than 0.0500 was considered statistically significant.

For data analysis, STATA[®] 12.0 (StataCorp, TX, USA) and SPSS[®] software were used. Body-QoL electronic administration was performed via our study website or powered by Google Drive forms.

Bias Control

Specific maneuvers to control bias inherent to PRO [10, 12, 16, 17] development were undertaken. To assure *content validity* (face validity), domain and item generation were performed using qualitative methods (in-depth interviews) in phase 1a; furthermore, an exhaustive literature review was performed and expert opinions were retrieved. During phase 1b, pilot-testing for feedback of relevance was done in 29 patients. Also in phase 2, unstructured interviews were performed with patients to enquire about problems in the preliminary instrument; however, no relevant information was retrieved that differed from previous phases.

In the absence of a gold standard or reference pattern to compare with, to test *construct validity*, different populations were compared. A priori, at least it was expected that the Body-QoL:

- Score was lower in the obese population than the eutrophic population.
- Score was lower in preoperative BCS patients than in the general population.
- Improves after BCS in all domains.
- Score was lower in post-bariatric patients compared with cosmetic patients.

Sensitivity to change validity was tested determining change in preoperative versus postoperative scores. Also, *predictive validity* was tested, calculating the capacity of the Body-QoL score to differentiate between the preoperative and postoperative population.

Results

In phase two, a total of 1346 forms were completed by 1200 persons. The response rate for the surgical before/after cohort was 63.7 % (109/171). The response rate for the general population cannot be calculated exactly, but the dropout rate (patients that stopped responding after opening the form) was 15.7 % (211/1346). The general characteristics of populations are depicted in Table 1.

Table 1 Study population characteristics

General population <i>n</i> = 1029			
Characteristic			
Age (years)			
Mean ± SD			30.7 ± 10.0
p25, p50, p75			24, 28, 35
Range			15–75
Gender			
Female			737 (71.6 %)
Male			288 (28 %)
NA			4 (0.4 %)
BMI (m/Kg ²)			
Mean ± SD			23.7 ± 3.8
p25, p50, p75			20.8, 23.3, 25.7
Range			16.9–41.8
Previous body contouring surgery			82 (8.0 %)
Education level			
Professional			413 (40.3 %)
Professional (unfinished/student)			272 (26.5 %)
Master degree or doctorate			228 (22.2 %)
High school			89 (8.7 %)
Post-doctoral			17 (1.7 %)
High school (unfinished/student)			6 (0.6 %)
Preparatory (unfinished)			1 (0.1 %)
NA			3 (0.3 %)
Surgery population (<i>n</i> = 171) returned at least 1 scale (<i>n</i> = 109)			
Characteristic	Before only (<i>n</i> = 55)	After only (<i>n</i> = 37)	Before and after (<i>n</i> = 17)
Age (years)			
	[All groups]		
Mean ± SD	37.5 ± 8.6		
p25, p50, p75	32, 37, 42.5		
Range	20–70		
Age (years)	38.7 ± 7.9	37.7 ± 8.4	39.5 ± 9.5
Gender			
Female	70 (97.2 % %)	53 (98.2 %)	17 (100 %)
Male	0 (0.0 %)	1 (1.9 %)	0 (0.0 %)
NA	2 (2.8 %)	0 (0.0 %)	0 (0.0 %)
BMI (m/Kg ²)			
	[All groups]		
Mean ± SD	25.3 ± 1.9		
p25, p50, p75	23.9, 25.5, 26.6		
Range	19.3–29.0		
BMI (m/Kg ²)	24.9 ± 2.1	25.7 ± 1.7	25.2 ± 1.9
Previous bariatric surgery	11 (15.3 % %)	6 (11.1 %)	5 (39.4 %)
Comorbidities	15 (8.8 %)		
Anxiety/depression	57 (33.3 %)		
Surgery type			
	Abdominoplasty or lipoabdominoplasty	144 (84.2 %)	
	Liposuction	13 (7.6 %)	
	Lower body lift	5 (2.3 %)	
Matarasso ptosis classification			
	I	2 (1.4 %)	
	II	14 (10 %)	

Table 1 continued

Surgery population (<i>n</i> = 171) returned at least 1 scale (<i>n</i> = 109)			
Characteristic	Before only (<i>n</i> = 55)	After only (<i>n</i> = 37)	Before and after (<i>n</i> = 17)
	III	80 (57.4 %)	
	IV	44 (31.4 %)	

NA Data not available

Totals may not sum 100 % due to approximation or missing data

Table 2 Domains, items, and scoring of the definitive Body-QoL[®] instrument

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Satisfaction with your body					
Currently regarding your body:					
I feel comfortable showing my tummy	1	2	3	4	5
I like my tummy when I look at it	1	2	3	4	5
My tummy is beautiful	1	2	3	4	5
My tummy is firm	1	2	3	4	5
I dislike my overhanging belly	5	4	3	2	1
Sex life					
Regarding how your body affects your sex life:					
I feel comfortable during sex	1	2	3	4	5
I feel sexually confident	1	2	3	4	5
I feel sexy being naked	1	2	3	4	5
I avoid letting my partner touch me because I feel ugly	5	4	3	2	1
I avoid letting my partner see me naked	5	4	3	2	1
Self-esteem and social performance					
Currently, regarding yourself:					
I feel beautiful/handsome	1	2	3	4	5
I feel attractive being dressed	1	2	3	4	5
People who see me think I'm attractive	1	2	3	4	5
I feel confident in my appearance at a social event	1	2	3	4	5
I have felt rejected by my peers because of my physical appearance	5	4	3	2	1
Physical symptoms					
Regarding your frustrations:					
In the summer, I get fungus on my tummy	5	4	3	2	1
The waistband squeezes my tummy	5	4	3	2	1
I get a bad smell from my tummy folds when it's hot, like in the summer	5	4	3	2	1
My tummy gets wet	5	4	3	2	1
I feel a "bulge" in my pants	5	4	3	2	1

After RASCH and Factor analysis, four factors explain our construct with robust internal reliability. Therefore, we decided to reorganize our scale in four domains of 5 items each, ranging from 20 (worst) to 100 (best) score. Resulting domains after reduction are (1) satisfaction with your body, (2) sex life, (3) self-esteem and social performance, and (4) physical symptoms.

Scale internal reliability was 93.3 % for the whole population, 93.6 % for cosmetic patients, and 92.2 % for post-bariatric patients. By surgery type, reliability was 93.4 % for liposuction, 93.6 % for abdominoplasty, and 96.3 % for body-lift patients. Responsiveness of the scale was 100 %. Time to complete the final instrument was 4.3 ± 2.3 min. The definitive Body-QoL instrument is

Table 3 Psychometric properties of the Body-QoL[®] instrument

Domain	Responsiveness (%)	Cronbach's alpha [§] (%)	Item-test correlation [†] (%)	Item-rest correlation [†] (%)	Test-retest correlation coefficient [‡] (%)
A. Satisfaction with your body	100	92.90	73.80	69.40	95.70
B. Sex life	100	92.90	73.30	69.30	93.10
C. Body image and self-esteem	100	93.10	61.90	57.90	90.60
D. Physical symptoms	100	93.20	55.30	50.40	82.40
Body-QoL instrument	100	93.30	66.08	61.75	97.70

[§] Ideal value >80 %

[†] Ideal value between 20 and 80 %

[‡] Ideal value >80 %

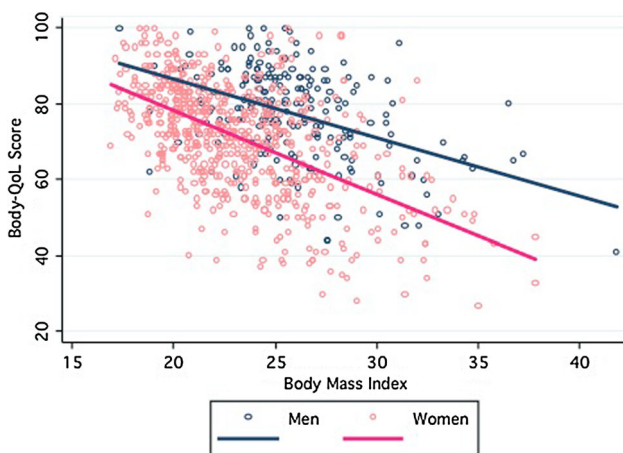


Fig. 1 Scatter plot and linear regression fit plot of Body-QoL[®] scores and BMI stratified by gender

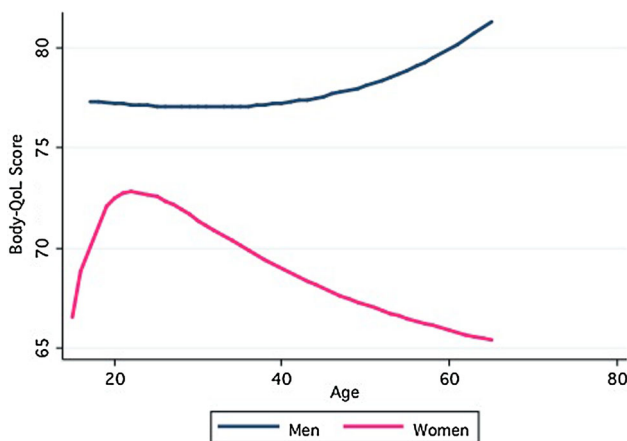


Fig. 2 Body-QoL[®] scores by age and gender regression fit plot

shown in Table 2, and psychometric properties collapsed by domain are depicted in Table 3.

Among the studied factors in the multivariate analysis, female gender ($p < 0.001$), increasing BMI ($p < 0.001$), and increasing age ($p = 0.004$) significantly decrease

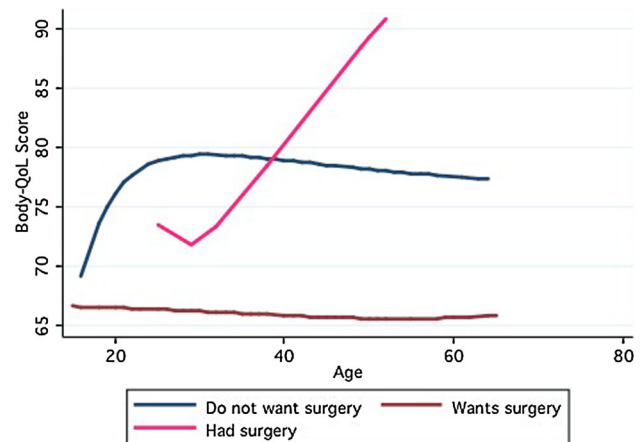


Fig. 3 Body-QoL[®] scores stratified by women who want surgery (red), women who do not want surgery (blue), and women who have had surgery (pink)

body-related QoL (Figs. 1 and 2). Also, patients who did not want to have any BCS scored better than patients who wanted to have a procedure (median 79 vs. 67 points, $p < 0.0001$) and patients who have had previous BCS scored better than the control population regardless of their desire to have a BCS or not (median 86 vs. 74, $p < 0.0001$, Fig. 3). The detailed descriptive statistics of Body-QoL score stratified by gender, age, and BMI are shown in Table 4.

In the surgical cohort, the score improved significantly from preoperative and 3 months after surgery [53 (IQR 42–60) to 82 (IQR 72–91)], $p = 0.0008$, Fig. 4) Differences between preoperative and postoperative scores were on average 21.9 ± 16.9 (range 4–55) with an effect size ($\Delta\text{Score}/\text{SD}_1$) of 1.8.

Also, all domain scores showed significant improvements in body satisfaction (Fig. 5). Preoperative scores were significantly different ($p = 0.0391$) between liposuction (58.5 ± 23.3), lipoabdominoplasty (52.1 ± 11.8), and body-lift patients (50.3 ± 13.6), as shown in Fig. 6. In post-bariatric patients, preoperative and postoperative

Table 4 Detailed descriptive statistics of Body-QoL[®] scores stratified by gender, age, and BMI

Age (years)	Males score					Females score						
	n	mean ± SD	p25, p50, p75	Range	BMI (kg/m ²)	n	mean ± SD	p25, p50, p75	Range	BMI (kg/m ²)		
<20	≤18.5	18.5–24.9	25.0–29.9	30.0–34.9	35–39.9	≥40	≤18.5	18.5–24.9	25.0–29.9	30.0–34.9	35–39.9	≥40
	0	10	2	2	0	0	1	18	4	1	0	0
	–	84.3 ± 11.5	82.5 ± 6.7	53.5 ± 3.5	–	–	79	69.0 ± 8.7	65.0 ± 6.8	57	–	–
	–	77, 89, 90	78, 82.5, 87	51, 53, 56	–	–	–	66, 71.5, 75	59, 64.5, 71	–	–	–
20–29.9	–	62–100	78–87	51–56	–	–	–	46–79	58–73	–	–	–
	1	59	41	7	1	0	22	239	35	11	1	0
	100	80.8 ± 8.9	73.8 ± 11.3	66.7 ± 17.2	65	–	83.4 ± 8.6	74.7 ± 11.9	67.9 ± 12.9	55.2 ± 12.9	45	–
	–	76, 81, 87	66, 73, 82	48, 65, 80	–	–	78, 82, 89	67, 76, 83	57, 69, 77	46, 51, 61	–	–
30–39.9	–	58–99	50–94	48–96	–	–	69–100	37–100	41–98	39–86	–	–
	0	21	30	7	2	0	4	118	49	9	1	0
	–	84.3 ± 8.8	76.3 ± 14.3	66.3 ± 10.8	73.5 ± 84.5	–	86.5 ± 7.9	74.9 ± 10.6	60.0 ± 13.8	47.3 ± 13.9	43	–
	–	76, 88, 89	70, 80.5, 87	61, 65, 72	67, 73.5, 80	–	81, 86.5, 92	67, 75, 83	45, 57, 70	34, 51, 61	–	–
40–49.9	–	68–100	44–99	51–86	67, 80	–	77–96	51–98	30–81	27–63	–	–
	0	5	8	4	0	0	0	36	23	6	0	0
	–	81 ± 5.8	76.3 ± 7.9	70.3 ± 8.1	–	–	–	74.5 ± 11.0	61.4 ± 18.4	55.3 ± 14.3	–	–
	–	75, 81, 89	70, 76, 83	64, 72, 76	–	–	–	66, 73, 82	46, 62, 76	43, 52, 61	–	–
50–59.9	–	75–89	65–87	59–77	–	–	–	54–99	28–92	43–81	–	–
	0	3	9	0	1	1	0	9	8	3	0	0
	–	85.3 ± 8.4	82.9 ± 11.4	–	33	41	–	74.3 ± 11.4	65.3 ± 10.8	52.3 ± 14.0	–	–
	–	80, 81, 95	80, 84, 87	–	–	–	–	62, 75, 85	56, 63, 74	39, 51, 67	–	–
≥60	–	80–95	58–100	–	–	–	–	61–88	53–82	39–67	–	–
	0	0	1	1	0	0	0	7	3	0	0	0
	–	–	89	60	–	–	–	79.2 ± 4.1	50.0 ± 11	–	–	–
	–	–	–	–	–	–	–	76, 80, 83	39, 50, 61	–	–	–
–	–	–	–	–	–	–	73–85	39–61	–	–	–	

Number of observations, mean ± standard deviation, percentile 25th, 50th, and 75th, and range of Body-QoL total score stratified by gender, decade of age, and weight classification according to BMI (underweight, normal, overweight, obese stage I, II and III)
 Postoperative patient scores and patients who did not declare gender were excluded from the table

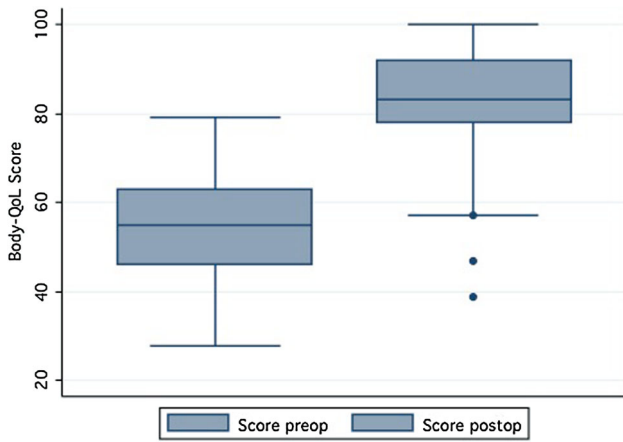


Fig. 4 Box-plot of Body-QoL[®] scores before and after body contouring surgery ($p = 0.0008$, paired Wilcoxon rank sum test)

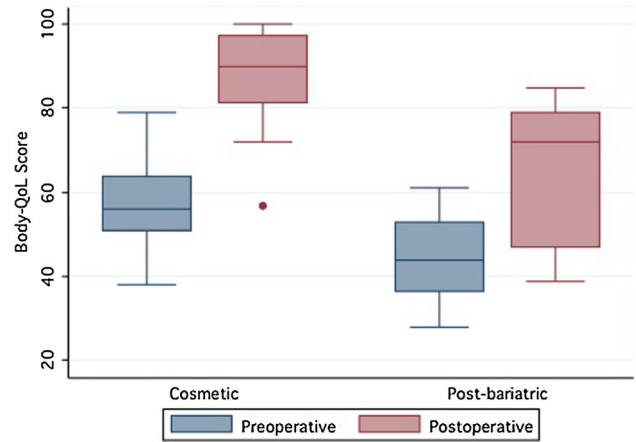


Fig. 7 Preoperative and postoperative box-plots of Body-QoL[®] scores separated between cosmetic (left) and post-bariatric (right) patients

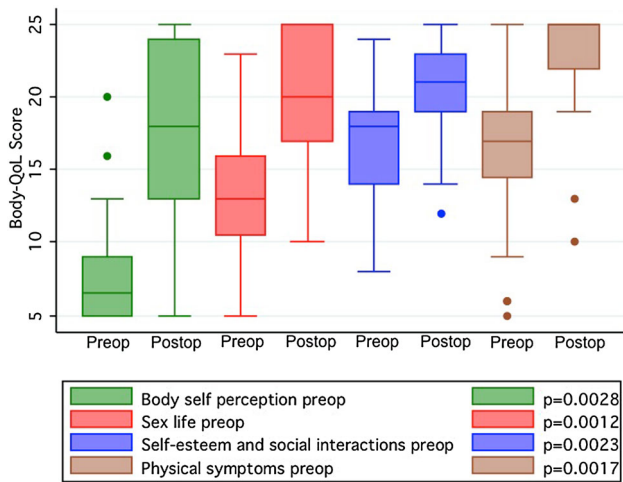


Fig. 5 Preoperative (left) and postoperative (right) box-plot depicting Body-QoL[®] score in each domain

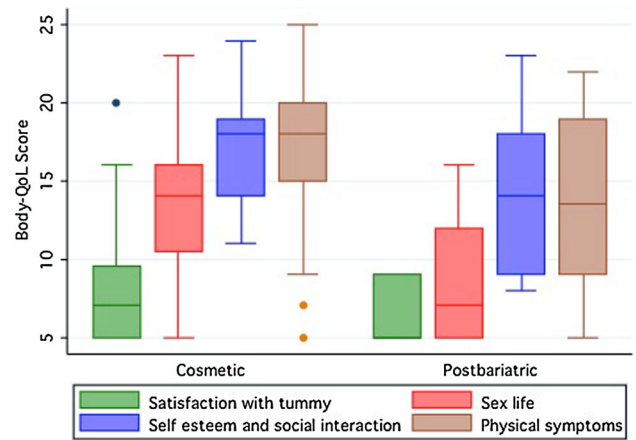


Fig. 8 Preoperative and postoperative box-plots of Body-QoL[®] scores separated between cosmetic (left) and post-bariatric (right) patients detailed by domain

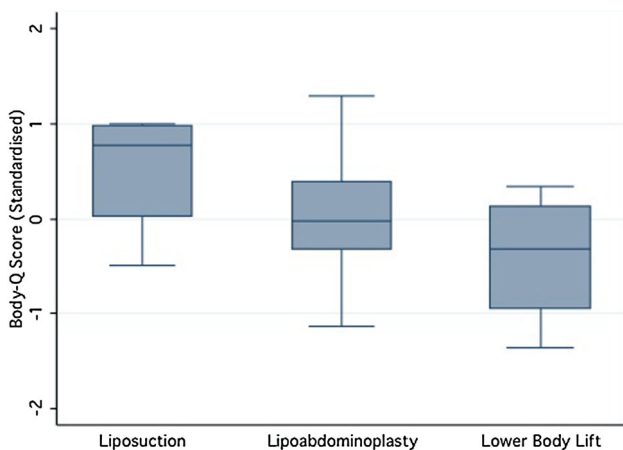


Fig. 6 Normalized Body-QoL[®] scores stratified by surgery (Mean 52.2 [0], SD 12.1 [1])

scores were lower than in cosmetic patients ($p = 0.0142$ and $p = 0.0206$), but the improvement before and after the surgery was equal between populations (22.2 ± 5.3 vs. 21.2 ± 6.1 , $p = 0.9179$, Fig. 7). Post-bariatric patients scored lower on all domains compared with cosmetic patients (p values 0.0312, 0.0026, 0.0057, and 0.0104 for domains A, B, C, and D, respectively, Fig. 8).

Discussion

Our study was conducted according to current best standards for PRO development [10, 16, 17]. In phase 1, items were developed taking account of the patient perspective, expert opinion, and comprehensive literature review to ensure content validity.

Large-scale application in phase 2 was conducted in a large scope population, including individuals of widespread ages, weight, BMI, level of education, and desire for surgery and in both preoperative and postoperative patients. The reason for that methodological decision was to ensure the good performance of the Body-QoL in all populations, so the instrument can be used to measure satisfaction with the body not only in plastic surgery patients but also in other populations such as bariatric surgery patients or other scientific fields. Definitive items were chosen according to their psychometric properties, focusing on the development of an instrument sensitive to change and with content validity for the whole spectrum of disease, reflected in the patient characteristics for their BMI, abdominal ptosis severity, and the surgery performed (liposuction, lipoabdominoplasty, or abdominoplasty and body lift). After item reduction, all our previous hypotheses to validate our construct validity were proven; in the absence of a gold standard or reference pattern, the mentioned comparisons built up our construct validity.

We chose to keep scoring as simple as possible, giving all items a score from 1 to 5, in that way the total score is calculated easily, by just adding each domain subtotal score and allowing direct comparison between preoperative and postoperative or any comparison that a clinician or researcher wants to perform.

The main threats to validity in PRO are the content validity (ensuring that the instrument includes all the scope of the phenomena to be measured) and construct validity (demonstrating that the instrument performs as theoretically expected or compared with a gold standard) [10, 16, 17]. As described in the methods section, we take care to prevent bias in all research steps.

Other researchers have chosen to develop different scales based on the procedure. We think that PRO should be patient based rather than procedure based. In our perspective as plastic surgeons and researchers, the satisfaction with the body is a continuum ranging from mild dissatisfaction to severe dissatisfaction, quite often (but not always) dissatisfaction is related to anatomical abnormalities, and a wide range of procedures can be selected to improve the anatomical problem and consequently restore body-related satisfaction. If a single scale is developed for each procedure, for example, one for liposuction, one for abdominoplasty, and another for body lift, then it will be impossible to compare differences between populations or procedures. Any clinician is aware that more than often a single patient can choose between different procedures with similar results, and in plastic surgery, there are a wide range of procedures and combinations than can be performed; from our point of view, it would be impractical to use and implement one different scale for different procedures. Therefore, we choose to approach the phenomena

‘body related QoL’ from a generic perspective to compare different procedures and different populations.

Another question that this study cannot answer is if the motivations for surgery are the same in other populations in different countries and continents. Although widespread availability of plastic surgery can lead to the assumption that motivations should be the same, these assumptions must be tested, validating the Body-QoL questionnaire in other languages and different populations.

This is the first reported PRO specifically developed to measure body satisfaction-related QoL for plastic surgery patients. Other generic instruments like SF 36 [18], Patient Health Questionnaire, and Generalized Anxiety Disorder [19] have been used and failed to demonstrate improvement of QoL after BCS on MWL populations. We think that the difference in our findings can be explained because generic instruments are not sensitive enough to detect such changes. Other instruments related to obesity have been used with good results [20–24], but quite often they ask questions that are not relevant for the cosmetic population (lipoabdominoplasty or lipoplasty patients). [13, 14]

In our study, we found that patients with higher BMI have lower self-esteem; this has been properly documented previously by several authors [25, 26]. An interesting finding is that men, even when they get older, have higher self-esteem than women, although our study can only show association and we can only hypothesize about our results. In fact women suffer at least a twofold increase in depression, anxiety, and somatic complaints than men [27]; moreover, women feel pressed by the media, peers, and couples to look slimmer and younger, and this is a transcultural phenomena [28–31] and indirectly supported by the fact that more than 90 % of cosmetic procedures globally are performed on women [32]. Although in males, body-related QoL decreases with obesity, it increase with age suggesting that self-esteem in males is related to other life aspects, different than body image, like professional or academic success, money income, or power. Our explanation for the observed phenomena is merely theoretical, due to the lack of evidence in gender determinations of self-esteem [33].

Our data show that liposuction patients score higher than lipoabdominoplasty patients and the latter higher than body-lift patients, this can be explained by a gradient of the body contour distortion (decrease on the Body-QoL score), the more severe, the more aggressive procedure is needed to restore the body contour.

Surprisingly, patients who had previous body contouring procedures scored better on the Body-QoL than other women, even women who did not want a body contouring procedure. We think that this finding may be true in nature or related to this subgroup of women being more self-conscious about their body-related QoL.

The Body-QoL instrument can be easily used in clinical practice, it is self-administered, and the questions are in lay language. It should be used at least one time before surgery and one time after surgery, once definitive results are achieved.

The Body-QoL opens a whole new research area providing a means of measuring something that has never been measured before. It can be used to compare before and after within patients and can also be used to compare between techniques used as a main outcome measure in randomized controlled trials. Also in cohort or case–control studies, it can be used to identify the profile of patients with lower or better improvement in body satisfaction-related QoL.

In the development of the Body-QoL, two different problems emerge: (1) surgeon perspective of the result and (2) postoperative pain and discomfort experienced by the patient after surgery. We choose to separate the phenomena into three different scales. Accordingly, the Body-QoL[®] aims to measure QoL, the Body-PPDS[®] (Postoperative Pain and Disability Scale) to measure impairment from the patient perspective, and the Body-PSSOAS[®] (Patient/Surgeon Subjective/Objective Assessment Scale) will target the surgeons' and patients' perspectives of technical details of the surgery such as contour, naturalness of the result, and scar problems. Both the Body-PSSOAS and Body-PPDS are in phase 2 of development and together they all conform the Body-PROM instrument.

Conclusion

Body satisfaction-related QoL can be measured with high reliability with the Body-QoL instrument. It has adequate sensitivity to change, good reliability and consistence. Body-related QoL perception is better in men than women and decreases as body mass index increases. Regarding age, satisfaction with body in men slightly increases with age; women on the contrary improve their body satisfaction reaching their peak in their 20's and steadily decreasing after their 30's. Patients who have undergone BCS have better body satisfaction than patients who have not. Also, patients improve their body satisfaction after surgery. MWL patients have worse body satisfaction than other groups of patients; they improve after surgery reaching values similar to those of the normal population.

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Financial disclosure Stefan Danilla owns intellectual proprietary patent registry for Body-QoL[®] and Body-PROM[®]. The Body-PROM[®] and its modules (Body-QoL, Body-PSSOAS and Body-PPDS) are free to use for academic and non-profit organization.

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