



BODY-Q®

A User's Guide for Researchers and Clinicians

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1. What is the BODY-Q?

The BODY-Q is a rigorously developed patient-reported outcome measure (PROM) designed to evaluate outcomes for obesity, weight loss treatments (e.g., diet, exercise, and bariatric surgery/medicine), and body contouring to remove excess skin after massive weight loss and for cosmetic reasons. The BODY-Q can be used to measure outcomes in research and clinical practice from the perspective of patients.

2. How was the BODY-Q Developed and Validated?

The BODY-Q represents a new generation of PROMs developed using a modern psychometric approach called Rasch Measurement Theory (RMT). In RMT, scales that compose a PROM are each designed to measure a unidimensional construct. In scale development, data that meet the requirement of the Rasch model provide interval-level measurement. When a scale has high content validity and is targeted to measure a concept as experienced by a sample, accurate tracking of clinical change can be achieved. In addition to research, BODY-Q scales can be used with individual patients to inform clinical care.

Figure 1 shows the multiphase mixed methods approach used by our team to develop Q-Portfolio instruments. We followed internationally recommended guidelines for PROM development to ensure that the BODY-Q meets requirements of regulatory bodies.

The BODY-Q is composed of a series of independently functioning scales that measure four overarching domains (appearance, health-related quality of life (HRQOL), eating concerns, and experience of healthcare). Figure 2 shows the BODY-Q conceptual framework. The modular approach taken to develop the BODY-Q means that only the subset of scales/checklists most relevant to a specific research objective or clinical patient population needs to be administered. The modular approach also makes it possible to add in new scales to fill gaps that are identified.

To develop the BODY-Q, in Phase 1, a literature review [1] and 63 patient interviews were conducted to create the BODY-Q conceptual framework and a set of scales that measure concepts that matter to patients who undergo weight loss and/or body contouring [2-4]. The scales were further refined through 22 patient interviews and input from nine clinical experts. In phase 2, 18 BODY-Q scales were shown to evidence reliability, validity, and responsiveness in an international (Canada, USA, and UK) field-test study that involved 403 pre- and post-weight loss and 331 pre- and post-body contouring surgery patients [5-7]. The original BODY-Q field-test publications described the psychometric performance of these 18 scales and an obesity-specific symptoms checklist.

A separate publication describes two additional scales that were field-tested in an international sample of cosmetic patients having body contouring or a facial aesthetic procedure [8]. These scales measure expectations and appearance-related distress. The

field-test sample included 90 body contouring and 278 facial aesthetics participants. The psychometric analysis for the two scales supported their reliability and validity.

Based on the initial qualitative data, we developed nine new scales, which were refined with feedback from patients and experts and field-tested internationally. First, we developed and tested scales to measure the appearance of the chest and nipples to provide a means to measure outcomes of chest contouring [9]. These scales were field-tested in a sample of 689 participants aged 16 years and older from Canada, USA, Denmark, and the Netherlands having chest surgery for different reasons, i.e., gynaecomastia (N=174), massive weight loss (N=224), and gender-affirming surgery (N=291). We also added a scale to measure appearance of stretch marks and field-tested this scale in an international sample (N=630) [10]. A scale to measure appearance of cellulite was also developed and field-tested in a US sample (N=2129) [11].

Most recently, we developed five scales to measure eating-related concerns for patients undergoing any form of weight loss, including bariatric surgery [12-13]. Content validity for the eating-related scales was established through input from 17 patients and 19 experts. The scales were field-tested in four countries (Denmark, the Netherlands, Canada, USA) with 4004 participants [13].

Normative data for the BODY-Q was published and based on a sample of 4051 participants from 12 European and North American countries [14]. Participants were aged 18 years or older and were recruited through the crowdsourcing platforms. The BODY-Q was completed by 4051 (2052 North American and 1999 European) participants. Normative reference values are available stratified by age, body mass index (BMI), and gender. These normative values can be used as reference in research and clinical practice. In a separate publication, using the normative sample, the psychometric properties of the BODY-Q scales were examined in detail and evidenced acceptable reliability and validity [15].

In summary, the BODY-Q currently has one checklist and 29 independently functioning scales (see Table 1). All BODY-Q scales have been shown to evidence strong psychometric performance in their respective field-test studies [8-11, 13,16]. In an independent systematic review of 24 quality of life measures developed or validated for use in bariatric and body contouring surgery, the BODY-Q was shown to possess the strongest evidence for quality of measurement properties [17]. The BODY-Q can be used in research and clinical practice to measure outcomes of treatments for weight loss and body contouring from the patient perspective.

Figure 1: The multiphase mixed methods approach our team follows to develop PRO measures. Reprinted from Poulsen L, McEvenue G, Klassen A, et al. Patient-Reported Outcome Measures: BODY-Q. Clin Plastic Surg. 2019; 46:15-24 [16].

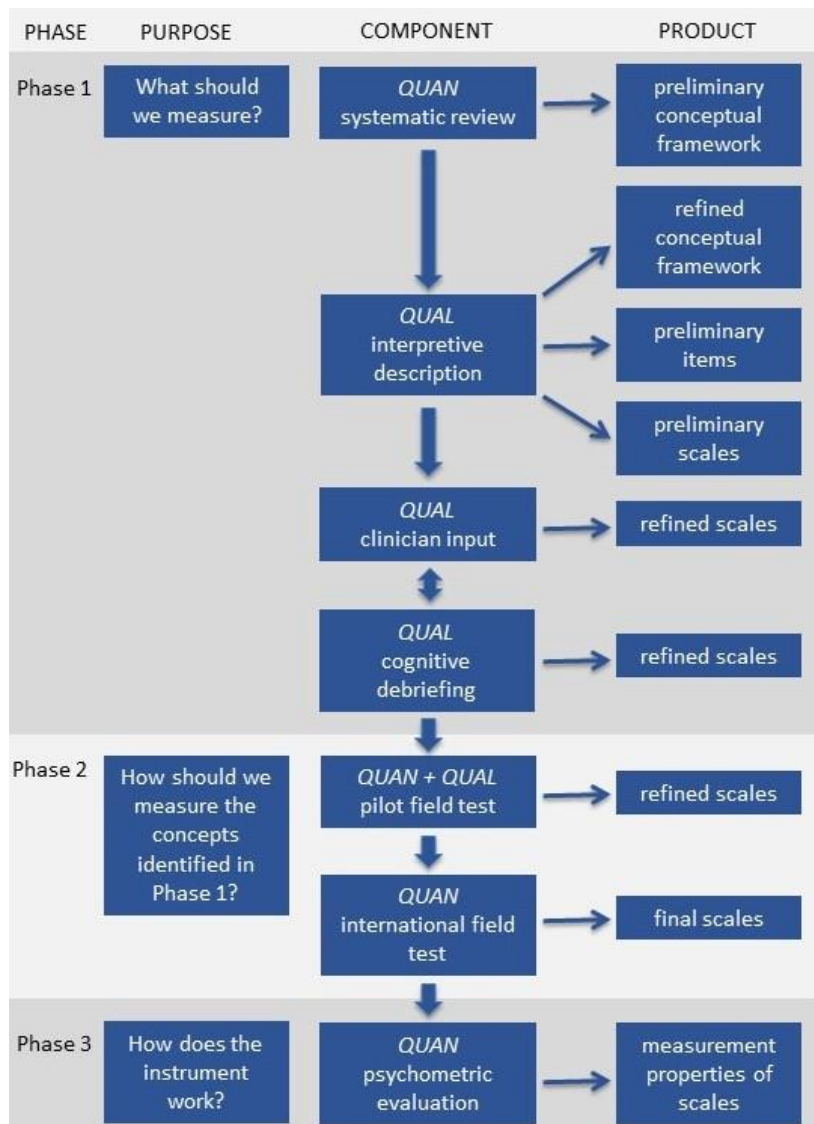
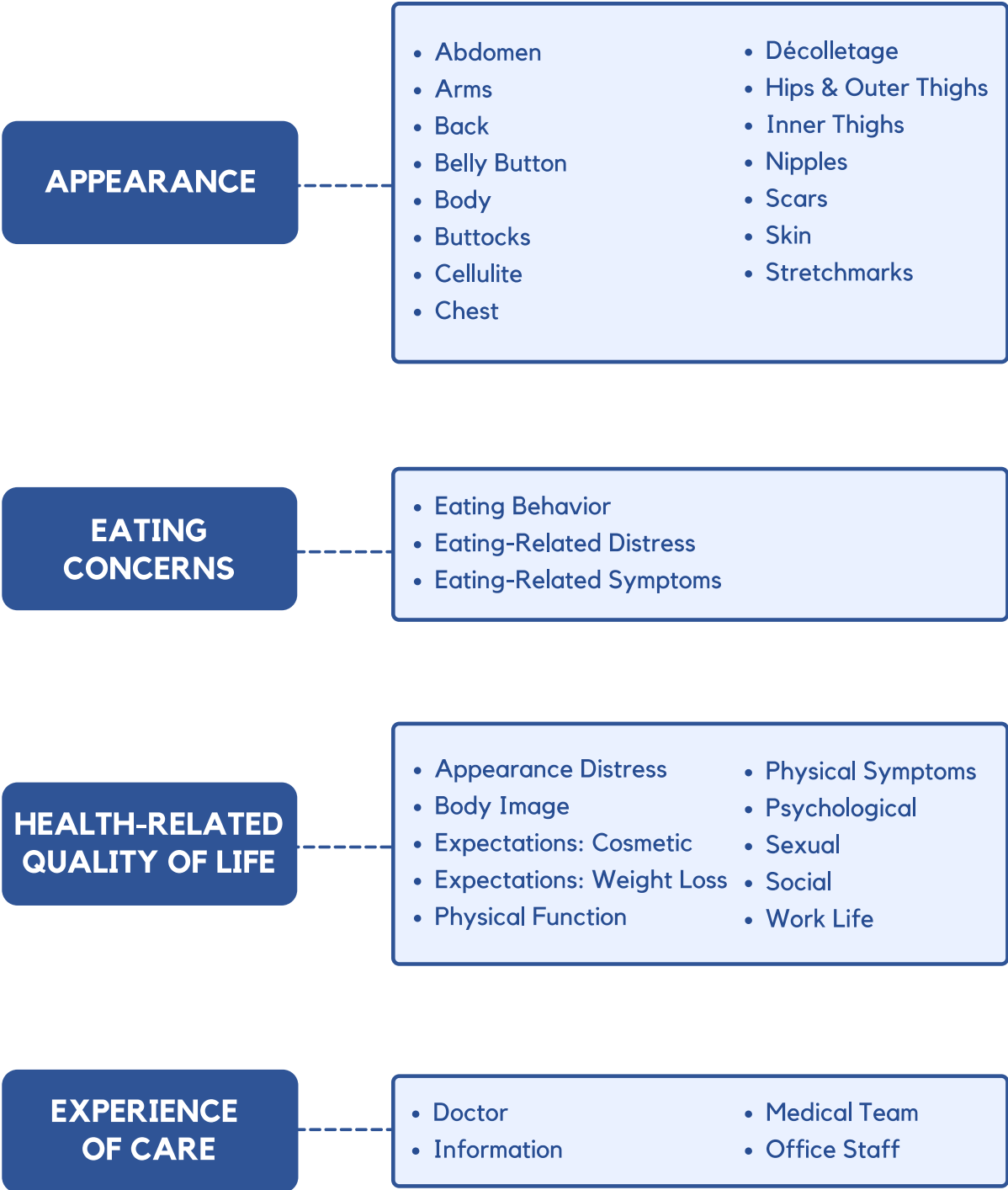


Figure 2: BODY-Q Conceptual Framework



3. BODY-Q Scales

Table 1 shows the BODY-Q scales and checklist including the context of use, number of items, response options, recall period, and Flesch-Kincaid (FK) grade reading level. Below the table is a brief description of each scale.

Table 1: Description of BODY-Q scales

Name of scale	Context	Items	Response options	Recall	FK
Appearance					
Abdomen	1,2,3	7	dissatisfied/ satisfied	past week	3.1
Arms	1,2,3	7	dissatisfied/ satisfied	past week	1.4
Back	1,2,3	4	dissatisfied/ satisfied	past week	0
Body	1,2,3	10	dissatisfied/ satisfied	past week	2.1
Buttocks	1,2,3	5	dissatisfied/ satisfied	past week	1.2
Cellulite	1,2,3	11	not at all/ extremely bothered	past week	4.2
Chest	3	10	dissatisfied/ satisfied	past week	2.7
Hips & Outer Thighs	1,2,3	5	dissatisfied/ satisfied	past week	1.2
Inner Thighs	1,2,3	4	dissatisfied/ satisfied	past week	0.6
Nipples	3	5	dissatisfied/ satisfied	past week	0.9
Scars	3	10	not at all/ extremely bothered	past week	1.2
Skin	3	7	not at all/ extremely bothered	past week	3.2
Stretch Marks	1,2,3	10	not at all/ extremely bothered	past week	1.4
Health-Related Quality of Life					
Appearance Distress	1,2,3	8	agree/ disagree	n/a	2.7
Body Image	1,2,3	7	agree/ disagree	past week	2.5
Expectations: Cosmetic	3	8	agree/ disagree	n/a	1.5
Expectations: Weight Loss	1,2	15	likely/unlikely	n/a	2.0
Physical Function	1,2,3	7	all the time/never	past week	2.7
Physical Symptoms	1,2,3	10	all the time/never	past week	2.8
Psychological Function	1,2,3	10	agree/ disagree	past week	3.5
Sexual Function	1,2,3	5	agree/ disagree	n/a	5.3
Social Function	1,2,3	10	agree/ disagree	past week	3.7
Work Life	1,2	10	agree/ disagree	last working	5.5
Eating-Related Concerns					
Eating Behavior	1,2	9	always/never	past week	3.0
Eating-Related Distress	1,2	10	always/never	past week	10.1
Eating-Related Symptoms	2	15	always/never	past week	6.5
Experience of Care					
Doctor	1,2,3	10	agree/ disagree	n/a	4.2
Information	1,2,3	10	dissatisfied/ satisfied	n/a	5.0
Medical Team	1,2,3	10	agree/ disagree	n/a	3.6
Office Staff	1,2,3	10	agree/ disagree	n/a	3.9

Context of Use: 1 = weight management programs; 2 = bariatric surgery; 3 = surgical and nonsurgical body contouring procedures performed after weight loss or for cosmetic purposes

APPEARANCE

Abdomen: This 7-item scale measures satisfaction with the appearance of the abdomen. Items ask about abdomen shape and size, how clothes fit, as well as how the abdomen looks from the side, in a swimsuit, and when naked.

Arms: This 7-item scale measures satisfaction with the appearance of the upper arms. Items ask about upper arm size, shape, skin, as well as how the upper arms look when lifted and when not covered.

Back: This 4-item scale measures satisfaction with the appearance of the back. Items ask about the back in terms of how toned and smooth the back looks, as well as how the back looks from different angles and when naked.

Body: This 10-item scale measures satisfaction with the appearance of the body. Items ask about the body in terms of size, shape, how clothes fit, as well as how the body looks from the side, behind, in a swimsuit, and when unclothed.

Buttocks: This 5-item scale measures satisfaction with the appearance of the buttocks. Items ask about the size, shape, and skin, as well as how the buttocks look from the side.

Cellulite: This 11-item scale measures how much someone is bothered by the appearance of cellulite. Items ask about being bothered by the amount of cellulite, how noticeable it is, as well as how it looks up close.

Chest: This 10-item scale measures satisfaction with the appearance of the chest. Items ask about how the chest looks in a loose and snug T-shirt, the shape of the chest, and how the chest looks in the mirror without a shirt on.

Hips and Outer Thighs: This 5-item scale measures satisfaction with the appearance of the hips and outer thighs. Items ask about size, shape, and skin, as well as how the hips and outer thighs look from behind.

Inner Thighs: This 4-item scale measures satisfaction with the appearance of the inner thighs. Items ask how smooth and toned the inner thighs are, as well as how the skin looks and how the inner thighs look when naked.

Nipples: This 5-item scale is a companion to the chest scale. Items ask about satisfaction with the appearance of the nipples, including their size, shape, and how much they show through a snug T-shirt.

Scars: This 10-item scale measures how much someone is bothered by the appearance of body contouring scars. Items ask about their width, location, length, and colour, as well as how noticeable they are and people seeing them.

Skin: This 7-item scale measures how much someone is bothered by the appearance of excess skin. Items ask about the amount of excess skin, how it hangs, having to dress in a way to hide the excess skin, and how the excess skin looks when naked.

Stretch Marks: This 10-item scale measures how much someone is bothered by the appearance of stretch marks. Items ask about being bothered by how wide they are, their length, their location, how noticeable they are, and how they look up close.

HEALTH-RELATED QUALITY OF LIFE

Appearance Distress: This 8-item scale measures appearance-related distress in people seeking cosmetic treatments for the body or the face. Respondents are asked to indicate how much they agree/disagree with feeling unhappy, stressed, down, or anxious about how they look, as well as avoiding being around people.

Body Image: This 7-item scale measures body image. Items ask respondents to indicate how much they agree/disagree that they are proud of their body, happy with their body, and feel positive towards their body.

Expectations: Cosmetic: This 8-item scale measures how people seeking cosmetic treatments for the body (e.g., liposuction) or face (e.g., facelift, Botox) expect their appearance and life might change after treatment, e.g., good things will happen to them and they will look fantastic.

Expectations: Weight Loss: This 15-item scale measures how people seeking weight loss treatment think their life will change after weight loss. Respondents are asked to imagine that two years have passed since treatment, and to indicate how likely a series of statements apply to them, e.g., have more energy, feel happier, and have self-control when eating.

Physical Function: This 7-item scale asks respondents to indicate how often they experience problems with physical activities, including getting up from a bed, standing for a long period of time, and doing moderate exercise.

Physical Symptoms: This 10-item checklist asks how often someone experiences a set of obesity-specific symptoms, including feeling tired during the day, back pain, shortness of breath with mild exercise, and excess perspiration.

Psychological Function: This 10-item scale measures psychological function. Items ask respondents to indicate how much they agree/disagree that they feel happy, confident, proud of themselves, and in control of their life.

Sexual Function: This 5-item scale measures sexual function. Items ask respondents to indicate how much they agree/disagree that they are satisfied with their sex life, comfortable having lights on during sex, and sexually attractive when undressed.

Social Function: This 10-item scale measures social function. Items ask respondents to indicate how much they agree/disagree that they feel accepted by people, that they make a good first impression, and feel confident in a group situation.

Work Life: This 10-item scale measures how much a person's weight affects their work life. Items ask respondents to indicate how much they agree/disagree that they feel accepted at work, have similar opportunities, and feel comfortable eating around other people.

EATING-RELATED CONCERNS

Eating Behavior: This 9-item scale measures eating habits. Items ask how often respondents feel satisfied after eating, eat healthy foods their body needs, show self-control when they eat, and eat the right amount of food.

Eating-Related Distress: This 10-item scale measures eating-related distress. Items ask respondents to indicate how often after eating they feel embarrassed, discouraged, ashamed, unhappy, and guilty.

Eating-Related Symptoms: This 15-item scale measures problems related to eating. Items ask how often someone experiences problems related to eating. Items include vomiting, dizziness, heartburn, pain, nausea, and bloating.

EXPERIENCE OF CARE

Doctor: This 10-item scale measures a patient's experience of care in terms of how they were treated by their doctor/surgeon. Items ask respondents to indicate how much they agree/disagree that the doctor treated them with respect, made them feel comfortable, and spent enough time with them.

Information: This 10-item scale measures the patient's experience of care in terms of the information they received from their medical team. Items ask respondents to indicate how satisfied they are with the information they received about how the surgery could be done, activities to avoid during recovery, and complications that could happen.

Medical Team: This 10-item scale measures a patient's experience of care in terms of how they were treated by members of the medical team. Items ask respondents to indicate how much they agree/disagree that the medical team were thorough, were easy to talk to, and worked together as a team.

Office Staff: This 10-item scale measures the patient experience of care in terms of how they were treated by members of the office staff. Items ask respondents to indicate how much they agree/disagree that the office staff were caring, were attentive to their needs, and welcomed them at the front desk.

4. Administration of the BODY-Q

The BODY-Q was designed to be completed by patients on their own (self-report). Each scale is independently functioning, which means that only scales relevant to the clinical situation or research question need be completed. Brief instructions and the timeframe for reporting are provided at the start of each scale. The original BODY-Q scales were field-tested using two modes of data collection as follows: paper-and-pencil and online using Research Electronic Data Capture System (REDCap). Data for the subsequent scales, including the new eating-related scales, were primarily collected using online options, including REDCap, Castor EDC, and crowd-working platforms, including Prolific Academic and Inspired Opinions. You may use the paper and pencil format or create an online version for ease of administration in non-profit academic research (e.g., REDCap) and in clinical care (e.g., hospital EMR such as Epic). If you plan to have an ePRO company capture and manage BODY-Q data collection, the ePRO company may need a license. If you have had or plan to have an ePRO company convert BODY-Q scales into an electronic format, e-conversion review and certification is required, please email qportfolioteam@gmail.com.

5. Scoring the BODY-Q

There is no overall or total BODY-Q score. Instead, the BODY-Q is composed of 29 independently functioning scales and a physical symptoms checklist.

To score a BODY-Q scale, the raw scores for the set of items in a scale are added together to produce a total raw score. If missing data is less than 50% of the scale's items, the within person mean for the completed items can be imputed for the missing items prior to computing a total raw score. For example, if there is a 10-item scale and someone has not responded to all the items, but has responded to ≥ 5 items, all other items for that person can be imputed with a within-person mean (rounded to the nearest integer), and a summed score can be calculated. Alternatively, for a 10-item scale, if someone has responded to ≤ 4 items, the summed score for this person cannot be computed and is classified as missing data. Importantly, the Conversion Tables are only valid with complete data (i.e., when a person has $\geq 50\%$ completed responses). Once a total raw score for the scale is computed, the Conversion Table can be used to convert the raw score into a score that ranges from 0 (worst) to 100 (best). The conversion, which linearizes the scores, is based on the findings from the Rasch analysis.

For 26 of the 29 scales, higher scores reflect a better outcome. The exceptions include the two Expectations scales and the Appearance Distress scale. In these cases, higher scores are indicative of expectations that are high (unrealistic) and more distress. To ensure for all other scales that higher scores represent a better outcome, the raw data

need to be scored as shown in the box below. The Conversion Tables for changing raw scores into 0 to 100 scores are available after a licensing agreement is signed.

To score the physical symptoms checklist, the raw scores for the items in a checklist can be used to identify problems experienced by a patient or a sample. The checklist does not have a Rasch Conversion Table because the set of items did not work together statistically (i.e., the item set did not map out a clinical hierarchy for the concept of interest). Even though there is no Conversion Table based on Rasch analysis, the checklist can provide clinically important information about obesity-related symptoms.

RAW SCORES FOR SCALE ITEMS

For scales that measure satisfaction, the raw data needs to be scored as follows: “Very dissatisfied” = 1; “Somewhat dissatisfied” = 2; “Somewhat satisfied” = 3; “Very satisfied” = 4. This includes the following scales: Abdomen, Upper Arms, Back, Body, Buttocks, Chest, Hips & Outer Thighs, Inner Thighs, and Nipples.

The one exception is Information, where items 3, 6, 7, 10 are scored as follows: “Very Dissatisfied” = 1; “Somewhat Dissatisfied” = 1; “Somewhat Satisfied” = 2; “Very Satisfied” = 3. Remaining items are scored as 1, 2, 3, 4.

For scales that measure bothered by their appearance, the raw data needs to be scored as follows: “Extremely” = 1; “Moderately” = 2; “A little” = 3; “Not at all” = 4. This includes the following scales: Cellulite, Body Contouring Scars, Excess Skin, and Stretch Marks.

For scales that measure agree/disagree, the raw data needs to be scored as follows: “Definitely disagree” = 1, “Somewhat disagree” = 2; “Somewhat agree” = 3; “Definitely agree” = 4. This includes the following scales: Appearance-Related Distress, Body Image, Expectations: Cosmetic, Doctor, Medical Team, Office Staff, Psychological, Sexual, Social, and Work Life.

For scales that measure amount of time, the raw data needs to be scored as follows: “All of the time/Always” = 1; “Often” = 2; “Sometimes” = 3; “Never” = 4. This includes the following scales: Physical Function, Eating-Related Distress, and Eating-Related Symptoms.

The one exception is Eating Behavior, which needs to be scored as follows: “Never” = 1; “Sometimes” = 2; “Often” = 3; Always” = 4.

For the scale that measures how likely, the raw data needs to be scored as follows: “Very likely” = 3; “Somewhat likely” = 2; “Unlikely” = 1. This includes the following scale: Expectations: Weight Loss.

6. Conditions of Use

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<https://qteam.mcmaster.ca/surveys/?s=9X73E834MCH4LPY3>

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- **You will not modify, adapt, or create another derivative work from the BODY-Q**
- **You will not sell, sublicense, rent, loan, or transfer the BODY-Q to anyone**
- **You will not reproduce any BODY-Q scales in publications or other materials**
- **You will not translate the BODY-Q without permission from our team**

For questions regarding study design and optimal use of BODY-Q scales, contact:

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7. Frequently Asked Questions

Do I have to use all of the BODY-Q scales?

Each scale functions independently, therefore patients can be asked to complete one or all of the BODY-Q scales. It is not necessary for a patient to complete all of the scales as there is no overall or total BODY-Q score. A researcher or clinician may therefore select a subset of scales depending on the particular purpose of the study or use.

Can I delete or add or change any items or response options of the BODY-Q?

You cannot delete or add or change the wording of any items or response options of the BODY-Q. Any modification to the content of the BODY-Q is prohibited under copyright laws. Also, making any changes to BODY-Q scales would invalidate their psychometric properties.

Can I reproduce BODY-Q scales in a publication or other public document (e.g., PhD thesis)?

According to the licensing agreement, you cannot reproduce the content of BODY-Q scales verbatim in a publication. However, it is possible to show shortened versions of items. The short forms of items that can be used in a publication are shown in Table 2 below.

Can I translate BODY-Q scales into a new language?

Yes, with permission, you can translate the BODY-Q into different languages. Before starting a translation, check our translations list on www.qportfolio.org to see if there is a translation in the language you need. If there is not a translation in the language you need, you will need to obtain permission from our team, sign a translation licensing agreement, and receive information on the method you need to follow. Email us at qportfolioteam@gmail.com for more information. Please note that the developers of the BODY-Q own the copyright of all translations of the BODY-Q.

Are there specific time points when patients complete the scales?

A researcher or clinician can decide the time points they would like to administer the scales.

Does it cost money to use the BODY-Q?

Use of BODY-Q scales is free to non-profit users, including use by hospitals. For-profit users need to pay a licensing fee through Memorial Sloan-Kettering Cancer Center (see conditions of use above).

8. Acknowledgements

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Qualitative Phase: Pusic A, Cano S, Klassen A. Development and validation of a new patient-reported outcome measure for body contouring patients. National Endowment for Plastic Surgery, Sept 2009 – Oct 2010.

Quantitative Phase: Klassen, A, Cano S, Pusic A, Taylor V, Thoma A. Developing a patient-reported outcome measure for bariatric and body contouring surgery patients: The BODY-Q©. Canadian Institutes of Health Research, 2012 Oct – Mar 2016.

Table 2: Shortened items for BODY-Q scales/checklist to use in a publication

APPEARANCE	when naked	wide	skin	WORK LIFE	EXPERIENCE
ABDOMEN	CHEST	dress to hide	look undressed	accepted at work	DOCTOR
clothes fit	loose t-shirt	the length	PHYSICAL FUNCTION	people listen	professional
size	lie on back	the location	get up from bed	treated the same	easy to understand
from side	stand up	how old	bend side to side	stand up for self	answered questions
shape	masculine	how noticeable	walk or move around	same opportunities	respectful
in swimsuit	when active	the amount	bend over	feel confident	feel comfortable
toned	snug t-shirt	people seeing	moderate exercise	eat around others	involved decisions
when naked	shape	look up close	up down stairs	confident at events	understood
ARMS	bend over	HRQOL	stand a long time	comfortable weight	what's best
size	profile	APPEARANCE DISTRS	PHYSICAL SYMPTOMS	great about weight	available concerns
smooth	mirror	feel unhappy	tired during day	EATING CONCERNS	spent enough time
shape	HIPS/THIGHS	feel stressed	back pain	EATING BEHAVIOUR	INFORMATION
skin looks	size	feel down	Joint pain	feel satisfied	questions answered
toned	shape	feel anxious	leg pain discomfort	eat healthy food	written information
lifted up	skin looks	worry look normal	feeling off balance	show self-control	activities to avoid
not covered	smooth	worry I am ugly	feeling weak	feel in control	how surgery done
BACK	from behind	avoid people	short of breath	chew thoroughly	recovery time
smooth	INNER THIGHS	interest doing things	swollen feet	eat right amount	surgery options
different angles	smooth	BODY IMAGE	skin rash infection	eat at right speed	complications
toned	skin looks	positive toward body	perspiration	unhealthy foods	others experience
when naked	toned	not perfect but like it	PSYCHOLOGICAL	stop before full	feel yourself
BODY	when naked	happy with body	believe in myself	EATING DISTRESS	recovery pain
dressed	NIPPLES	proud of body	proud of myself	embarrassed	MEDICAL TEAM
clothes fit	shape	think body attractive	happy	out of control	protected privacy
size	size	feel good naked	like myself	unhappy	friendly
shape	flat	have body I want	emotionally strong	ashamed	respectful
photos	snug t-shirt	EXPECT: COSMETIC	in control of my life	failure	answered questions
behind	without shirt	look fantastic	confident	discouraged	easy to talk to
from side	SCARS	tell me I look great	accept myself	disappointed	attentive
summer clothes	dress to hide	people will be proud	comfortable	guilty	thorough
swimsuit	wide	will be transformed	feel great	frustrated	worked as team
unclothed	location	good things happen	SEXUAL FUNCTION	willpower	knowledgeable
BUTTOCKS	length	will feel like I fit in	fulfilling	EATING SYMPTOMS	available
size	noticeable	close relationships	undress	vomiting	OFFICE STAFF
from side	color	new people	satisfied sex life	rapid heart rate	respectful
shape	thick	EXPECT: WLOSS	lights on	regurgitation	comfortable
smooth	crooked	feel better	attractive naked	dizziness	knowledgeable
skin looks	people seeing	energy	SOCIAL	low blood sugar	attentive
CELLULITE	not covered	looks	with people I know	food getting stuck	thorough
deep	SKIN	exercise	people listen	heartburn upright	worked as team
dress to hide	look bigger	happier	accepted by people	food taste	welcomed
certain clothes	dress to hide	confident	included	heartburn laying	caring
lumpy	certain clothes	goal weight	first impression	pain	answered questions
noticeable	hangs	control of life	take part in life	perspiration	available concerns
dimpling	amount	new person	make new friends	nausea	
amount	people seeing	self-control	group situations	diarrhea	
skin	when naked	meeting people	people I don't know	constipation	
people seeing	STRETCH MARKS	sex life	walk into a room	bloating	
up close	certain clothes	social life			

9. Publications Related to BODY-Q Development and Validation

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