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Monpellier, V M; de Vries, C E E; Janssen, I M C; van der Beek, E S J; Mink van der Molen, A B; Hoogbergen, M M; van der Lei, B

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The BAPRAS screening tool for reimbursement in a postbariatric population

V.M. Monpellier[a,b,*], C.E.E. de Vries[c,d], I.M.C. Janssen[a,e], E.S.J. van der Beek[f], A.B. Mink van der Molen[g,h], M.M. Hoogbergen[i], B. van der Lei[a,f,j]

[a] *Nederlandse Obesitas Kliniek, Huis ter Heide, the Netherlands*
[b] *Faculty of Psychology and Neuroscience, Maastricht University, the Netherlands*
[c] *Department of Surgery, OLVG West, Amsterdam, the Netherlands*
[d] *Department of Epidemiology and Biostatistics, Amsterdam Public Health Research Institute, VU University Medical Center, Amsterdam, the Netherlands*
[e] *Nederlandse Obesitas Kliniek West, Haaglanden Medical Centre, Den Haag, the Netherlands*
[f] *Department of Plastic Surgery, University Medical Centre of Groningen, the Netherlands*
[g] *Department of Plastic Surgery, University Medical Centre of Utrecht, Utrecht, the Netherlands*
[h] *Department of Plastic Surgery, Sint Antonius Hospital, Nieuwegein, the Netherlands*
[i] *Department of Plastic Surgery, Catharina Hospital, Eindhoven, the Netherlands*
[j] *Bergman Clinics, Hilversum, the Netherlands*

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Summary *Introduction:* Reimbursement of body-contouring surgery (BCS) is a worldwide problem: there is no objective instrument to decide which postbariatric patients should qualify for reimbursement. The British Association of Plastic, Reconstructive and Aesthetic Surgeons (BAPRAS) has developed a screening tool for this purpose. In this study, we used a modified version of this screening tool in a postbariatric population and describe which patients would qualify for reimbursement using this tool.
Methods: In this cross-sectional study postbariatric patients were asked to fill in an online questionnaire based on the BAPRAS screening tool with questions regarding complaints of

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- Poster – World Congress International Federation of Surgery for Obesity 2017.
- Presentation - Conference Dutch Society of Plastic Surgery 2017.
- Presentation - Conference Dutch Society of Metabolic and Bariatric Surgery 2017.
- Presentation - Conference International Society of Plastic Surgery 2018.

* Corresponding author at: Nederlandse Obesitas Kliniek, postbus 601, 3700 AP Zeist, the Netherlands.
E-mail address: vmonpellier@obesitaskliniek.nl (V.M. Monpellier).

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overhanging skin and medical history. Weight loss data were extracted from a prospective database. The BODY-Q was added to assess patient-reported outcomes.
Results: Patients who wanted to undergo BCS ($n = 90$) had higher screening tool scores and lower BODY-Q scores compared to patients who did not want BCS ($n = 24$). In total, 25 patients (26%) qualified for reimbursement, these patients had higher weight loss (33.5% versus 29.2%, $p = 0.008$), lower BMI (27.3 kg/m^2 versus 30.4 kg/m^2, $p = 0.014$) and more medical (4.0 versus 2.0, $p = 0.004$) and psychological complaints (88% versus 61%, $p = 0.009$). There was a significant, negative correlation between the screening tool scores and almost all BODY-Q scales.
Conclusions: Patients with a desire for BCS have more complaints of excess skin, which negatively impacts their well-being. With the modified BAPRAS screening tool, patients with the best weight (loss) and most medical and psychological complaints of excess skin qualified for referral and reimbursement of BCS.

Introduction

Body-contouring surgery (BCS) is the only available treatment for overhanging skin after massive weight loss. Numerous studies have shown that postbariatric patients who undergo BCS have significant improvements in quality of life (QoL), body image, and psychological status.[1–8] In addition, these patients have better long-term weight loss maintenance, thus BCS seems to prolong the effect of bariatric surgery.[9–11] However, reimbursement of BCS is a worldwide issue, because of the absence of an instrument to objectively decide which patients should qualify for reimbursement.[12–15] Ideally, such an instrument would include all aspects of patients' well-being that are affected by the overhanging skin and select patients who would benefit most from a body contouring procedure.

In the Netherlands, BCS is only reimbursed when there is "mutilation" or a "serious impairment of bodily function in daily life."[16] According to the Dutch guidelines, mutilation is defined as grade 3 excess skin on the Pittsburgh Rating Scale (PRS) and impairment of bodily function as a chronic skin condition, or a specific, measured amount of overhanging skin.[17] However, the PRS was created only to visually evaluate excess skin on photographs and it has been proven to be an unreliable tool for this purpose.[18,19] A reliable tool to physically measure and calculate skin excess (in cm^2) instead of photographic evaluations has not been developed so far. This results in inconsistent qualification for reimbursement and unfair decision-making: patients with the most complaints are not always reimbursed. An additional item missing in the current guideline is the evaluation of psychological impact of excess skin.

In Great Britain, decisions regarding reimbursement for BCS were compared to winning a lottery.[20] Therefore, the British Association of Plastic, Reconstructive and Aesthetic Surgeons (BAPRAS) developed a screening tool that includes weight loss, the medical, physical, and psychological problems caused by excess skin, and medical history.[21] In addition, a patient-reported outcome measure (PROM) was added. Development of this tool was a great effort, unfortunately it has never been tested in daily practice, nor really been implemented.[22]

The goal of this study is to use a modified version of the BAPRAS screening tool in a postbariatric population and assess as to who are the patients who would qualify for reimbursement when using the screening tool.

Methods

Standard treatment

All patients were recruited at the Nederlandse Obesitas Kliniek (NOK, Dutch Obesity Clinic). The NOK is the largest, outpatient clinic for the treatment of patients with morbid obesity in the Netherlands. Treatment program consists of bariatric surgery with clearly protocolled pre- and postoperative group counselling of patients, by a multidisciplinary team, up to 1.5 years after bariatric surgery. Starting at 2 years after bariatric surgery, patients have a yearly follow-up with the whole team and up to 5 years after surgery.

Patient selection

The study was started in October 2016, data collection was finalized in March 2017. Patients were informed and recruited at regular 2- and 3-year follow-up visits after bariatric surgery (because of presumed weight stability and Dutch criteria, see below). Patients who could not read Dutch were not invited for participation. If a patient agreed to participate, an electronic invitation with an informed consent form was sent using Qualtrics software (Qualtrics, Provo, UT). Patients who signed this consent form were subsequently included in this study. The study was approved by the Ethical Research Committee of the Radboud University Medical center, Nijmegen the Netherlands (2016–2781).

Participation in this study had no effect on further treatment and/or referral to a plastic surgeon.

Dutch criteria for reimbursement

In the Netherlands, the insurance companies draw up guidelines to decide as to who are the patients who qualify for reimbursement of BCS. First, the bariatric procedure must have been performed more than 18 months ago, the patient has to have a stable weight for at least 12 months, and

the body mass index (BMI) has to be below 30 or 35 kg/m^2, depending on the location of the correction. Second, there should be "mutilation" (defined as PRS grade 3) or a "serious impairment of bodily function in daily life."[16] After consultation, plastic surgeons fill in a standardized form regarding these criteria. This form and standardized photos of the patient are sent to insurance companies. The health insurance company verifies, and sometimes adjusts the criteria, and finally decides whether a patient will get reimbursed.

Body weight

Demographics and weight measurements before and after bariatric surgery were collected from the prospective database of the NOK. BMI and percent total weight loss (%TWL) were calculated.[23] In addition, it was assessed whether a patient would qualify for referral and reimbursement for BCS according to the current Dutch weight criteria: stable weight $\geq$12 months and a BMI $<$35 kg/m^2.

Questionnaires

Body-contouring surgery

Patients were asked if they wanted to have BCS.

Screening tool score

Each patient was asked to fill out a modified version of the BAPRAS questionnaire (Appendix 1). This modification of the questionnaire was performed after a discussion of the questionnaire with the Committee of the Dutch Guideline for postbariatric BCS consisting of healthcare professionals and a patient representative. The BAPRAS questionnaire was modified with regard to the following aspects:

(a) percentage excess weight loss was replaced by%TWL[23,24];
(b) stable weight was defined by current weight +/− 5% instead of 5 kg;
(c) one question was used for evaluating recent life events;
(d) body dysmorphic disorder was not evaluated with schematic drawings.[25]
(e) the PROM component was replaced by the BODY-Q (see below)

A score was calculated for each patient (Appendix 1). The lowest possible score was minus 21 and the highest possible score was plus 15. Similar to the BAPRAS guideline, a score $\geq$8 was defined as a qualification for possible reimbursement and referral to a plastic surgeon.[21]

BODY-Q

The BODY-Q is the best validated questionnaire for evaluating health-related QoL (HRQoL) and appearance in (post-) bariatric patients.[26] The questionnaire consists of 18 scales divided in three domains: HRQoL, appearance, and patient experience.[27] It has shown good validity and reliability (test-retest reliability ICC $\geq$0.87 for 17 of 18 scales; internal consistency, Cronbach α $\geq$0.90 for 18 of 18 scales).[27] For the purpose of this study, we used all scales of the HRQoL domain (body image, physical function, psychological function, sexual function, social function, and obesity-specific physical symptoms). Based on previous research, we choose five scales of the appearance domain (appraisal of excess skin, satisfaction with abdomen, arms, hips, and breasts).[28] Scores for each scale range from 0 to 100; higher scores indicate more positive results.

Statistical analysis

Descriptive statistics were used to summarize baseline characteristics and weight change of the studied patient population. Data are presented as mean $\pm$ standard deviation for normally distributed data and median [interquartile range] for nonnormally distributed data. Included patients were divided into two groups: patients who wanted BCS and patients who did not want BCS. Baseline characteristics, questionnaire scores, and BODY-Q scores were compared between these groups. Subsequently, patients who wanted BCS and qualified for referral (score $\geq$8) were compared to patients who wanted BCS and did not qualify (score $\leq$7). Continuous variables were compared using independent t-tests (normal distribution) or Mann Whitney U test (no normal distribution); for dichotomous data chi-square or Fisher's exact tests were used. Correlations between the BODY-Q and screening tool questions were studied with Spearman's rank correlations. Findings were considered statistically significant if the p-value was $<$0.05. All analyses were performed using SPSS, version 23 (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.).

Results

Study population

Invitations for the study were sent out to 168 patients; 120 patients (71%) responded, signed informed consent, and were included in this study. Age, BMI before bariatric surgery, current BMI,%TWL, and follow-up time did not significantly differ when comparing responders and nonresponders. In the nonresponder group, there were significantly less female patients (73% versus 90%, $p = 0.011$).

Mean age of the included population was 46 years $\pm$8.9; 90% ($n = 108$) was female patients. Patients had a mean BMI of 44.2 kg/m^2 (range: from 27.1 to 65.6 kg/m^2) before bariatric surgery. Most patients underwent a primary Roux-en-y Gastric Bypass (83.3%). Follow-up was two years in 86 patients and three years in 34 patients. Mean current BMI was 30.8 kg/m^2 and current TWL was 29.9%; 78 patients (65.0%) met the Dutch weight criteria (stable weight and BMI $<$35 kg/m^2).

Body-contouring surgery

A total of 96 patients (80%) wanted BCS and 24 patients did not want BCS (20%). Patients who wanted BCS were significantly younger (mean age 44.9 years versus 50.1 years, $p = 0.031$, Table 1). There was no significant difference between the groups regarding gender, type of bariatric procedure, BMI before bariatric surgery, current BMI,%TWL,

Table 1 Demographics of the group that wanted body contouring surgery ($n = 96$) and the group that did not want BCS ($n = 24$), presented as mean ± standard deviation, median [interquartile range], or percentage (n).

Parameter	Want BCS	Does not want BCS	*p-value*
Age, years	44.9 ± 8.2	50.1 ± 10.6	*0.031*
Female gender	90% (86)	92% (22)	*0.761*
RYGB	95% (91)	92% (22)	*0.559*
Baseline BMI, kg/m^2	42.7 [40.2-46.7]	43.3 [40.7-50.1]	*0.235*
Current BMI, kg/m^2	29.7 [26.5-33.9]	30.5 [28.6-32.3]	*0.491*
BMI change, kg/m^2	12.9 [10.5-15.8]	14.9 [11.0-17.2]	*0.118*
Current%TWL	30.1 [24.5-35.2]	31.4 [26.0-37.8]	*0.338*
Current%EWL	72.2 ± 25.0	72.0 ± 18.5	*0.982*
Stable weight >12 months	79% (76)	83% (20)	*0.648*
BMI < 35 kg/m^2	77% (74)	79% (19)	*0.827*
Qualification*	60% (58)	71% (17)	*0.324*

RYGB = Roux-en-Y gastric bypass; BMI = Body Mass Index; Baseline BMI = BMI before bariatric surgery; TWL = total weight loss; EWL= Excess weight loss.

* Defined as a stable weight >12 months and BMI <35 kg/m^2.

Table 2 Comparison of BODY-Q scores for patients who wanted BCS ($n = 95$) and patients who did not want BCS ($n = 24$), presented as mean ± standard deviation or median [interquartile range].

BODY-Q	Want BCS	Does not want BCS	*p-value*
Quality of life domain			
Body image	35.0 [17.0-47.0]	57.0 [38.8-72.8]	<0.001
Physical function	76.0 [55.0-100.0]	90.0 [68.5-100.0]	0.057
Psychological function	59.2 ± 17.9	67.4 ± 20.3	0.053
Sexual function	35.0 [26.0-51.0]	56.0 [35.0-81.5]	0.008
Social function	60.0 [48.0-74.0]	78.0 [54.5-90.5]	0.012
Physical symptoms	34.0 [31.0-38.0]	37.5 [35.3-40.0]	0.022
Appearance domain			
Appraisal of excess skin	35.0 [19.0-47.0]	64.0 [54.8-97.5]	<0.001
Satisfaction with abdomen	19.0 [0.0-43.0]	50.5 [33.8-73.0]	<0.001
Satisfaction with arms	35.0 [0.0-59.0]	56.5 [32.8-64.0]	0.007
Satisfaction with hips and outer thighs	39.0 [17.0-65.0]	55.0 [39.0-65.0]	0.041
Satisfaction with breasts	35.0 [17.0-46.0]	48.0 [41.0-65.3]	*< 0.001*

and the percentage of patients who met the Dutch weight criteria.

BODY-Q

The BODY-Q results of 119 patients were available, one patient did not complete the questionnaire. Patients who wanted BCS scored lower on all BODY-Q scales (Table 2). In the HRQoL domain differences were significant for body image: median score 35.0 [17.0-47.0] in patients who want BCS and 57.0 [38.8-72.8] in patients with no interest in BCS ($p < 0.001$). Median scores were also significantly lower for sexual functioning (35.0 versus 56.0, $p = 0.008$) and social functioning (60.0 versus 78.0, $p = 0.012$). For the appearance domain, patients who wanted BCS scored significantly lower on all scales. The highest difference was on the satisfaction with abdomen scale: patients who wanted BCS had a median score of 19.0 [0.0-43.0], while the patients who were not interested in BCS scored 50.5 [33.8-73.0] ($p < 0.001$).

Screening tool score

In the total population, median score on the modified BAPRAS questionnaire was 5.0 [3.0-7.0]. Patients who wanted BCS scored significantly higher (median 6.0, range: from −5 to 12) compared to the group, which did not want BCS (median 4.0, range: from −2 to 9, $p = 0.004$). Patients who wanted BCS had higher median scores on medical complaints compared to patients who did not desire BCS (2.0 versus 1.0, $p < 0.001$). In the group that wanted BCS, 67.7% of the patients ($n = 65$) experienced psychological issues because of excess skin, this was 25.0% ($n = 6$) in the group that did not want BCS ($p < 0.001$). Functional issues, for example with physical activity, were present in 87.5% ($n = 84$) of the patients who wanted BCS and in 41.7% ($n = 10$) of the patients who did not.

BODY-Q & screening tool score

There was a significant, negative correlation between the screening tool scores and the BODY-Q scales (Table 3). For

Table 3 Correlations between BODY-Q scales and screening tool scores in the total population.

BODY-Q scale	Total score	Medical score	Psychological issues	Functional issues
Body image	−0.138	−0.365**	−0.317**	−0.297**
Physical function	−0.143	−0.343**	−0.178	−0.287**
Psychological function	−0.128	−0.147	−0.310**	−0.217*
Sexual function	−0.162	−0.193*	−0.354**	−0.388**
Social function	−0.136	−0.213*	−0.257**	−0.258**
Physical symptoms	−0.138	−0.365**	−0.317**	−0.297**
Excess skin	−0.358**	−0.531**	−0.527**	−0.536**

** significant correlation $p < 0.01$.
* significant correlation $p < 0.05$.

Table 4 Comparison of screening tool total score and separate items of the patients who wanted BCS and qualify for referral and reimbursement ($n = 25$) and the patients who want BCS and do not qualify ($n = 71$), presented as median [interquartile range] or percentage (n).

Parameter	Qualify	Does not qualify	*p-value*
Total score	9.0 [8.5-9.5]	5.0 [3.0-6.0]	<0.001
Current%TWL	33.5 [29.9-39.9]	29.2 [22.7-34.8]	0.008
Current BMI, kg/m^2	27.3 [25.2-30.5]	30.4 [27.4-34.6]	0.014
Stable weight >12 months	100% (25)	72% (51)	0.011
Medical score	4.0 [2.0-5.0]	2.0 [1.0-3.0]	0.004
Psychological issues	88% (22)	61% (43)	0.009
Functional issues	96% (24)	85% (60)	0.123

TWL = total weight loss; BMI = body mass index.

the total screening tool, the highest correlation was with the appraisal of excess skin scale of the BODY-Q ($r = -0.358$, $p < 0.01$). For the medical score of the screening tool, the highest correlation was also with the appraisal of excess skin scale ($r = -0.531$, $p < 0.001$). For the psychological issues and the physical issues, the highest correlations were also with the appraisal of excess skin scale.

Qualification for reimbursement

In the group of patients who wanted BCS, 25 patients (26%) had a score ≥8, and thus qualified for referral and reimbursement. Age, gender, BMI before bariatric surgery, and the type of bariatric surgery were not significantly different when comparing the patients who qualified for BCS ($n = 25$) with the patients who did not qualify ($n = 71$).

Patients who qualified for reimbursement had a median TWL of 33.5% [29.9-39.9], whereas patients who did not qualify for reimbursement had a median TWL of 29.2% [22.7-34.8] ($p = 0.008$, Table 4). Median BMI was also lower: 27.3 kg/m^2 [25.2-30.5] versus 30.4 kg/m^2 [27.4-34.6] ($p = 0.014$). Twenty-one patients who qualified also met the Dutch weight criteria; patients who did not meet the criteria, all had a BMI >35 kg/m^2. Scores on the modified BAPRAS questionnaire ranged from 9 to 10 points in this group. BMI before bariatric surgery ranged from 49.8 kg/m^2 to 65.6 kg/m^2.

Median score for skin conditions (medical score) was 34.0 [2.0-5.0] in patients who qualified and 2.0 [1.0-3.0] in patients who did not ($p = 0.004$). In addition, 88% of the patients who qualified for BCS experienced psychological complaints because of the excess skin, compared to 61% in patients with a score ≤7 ($p = 0.009$).

In the group with a score ≥8, one patient was an active smoker and none of the patients had a recent life event. There were two patients with current psychological issues in the group with a score ≥8.

Qualification and BODY-Q

Patients who qualified scored lower on all BODY-Q scales. There was a significant difference in the appraisal of excess skin scale: mean score was 24.0 [12.0-39.5] in patients who qualified and 38.0 [24.0-47.0] in the patients who did not ($p = 0.048$).

Discussion

Reimbursement of body contouring procedures is a worldwide issue, because there is no instrument available to objectively select as to who are the patients who should qualify for reimbursement. Therefore, the goal of this study was to assess which postbariatric patients would qualify for reimbursement when using a modified version of the BAPRAS screening tool in clinical practice.

Our study clearly demonstrated that the screening tool score was significantly higher and the BODY-Q scores significantly lower in the group of patients who wanted BCS, compared to patients who did not want BCS. This was a very interesting finding, as there were no differences between these groups at baseline. The patients who desired BCS and

qualified according to the screening tool score had a stable weight, higher weight loss (%TWL), lower current BMI, and more medical and psychological complaints compared to patients who did not qualify for referral. The screening tool scores significantly correlated with almost all BODY-Q scales, showing that these "simple" questions reflect the impact of complaints on patients.

Despite similar gender and weight (change) after bariatric surgery, there were several differences between the group that wanted BCS and the group that did not want BCS. Patients with a desire for BCS reported more medical issues, functional complaints, and psychological issues compared to patients without a desire. These patients also had lower scores on the BODY-Q questionnaire compared to patients without a desire. This demonstrates that overhanging skin significantly, negatively influences patients' well-being. The fact that the excess skin impacts several aspects of the patient's life makes it even more important to include all these aspects (medical, physical, and psychological) in a screening tool for BCS reimbursement. However, it could be that those patients desiring BCS had the same amount of excess skin, but are more focused on appearance and, therefore, perceive (the same amount of) skin excess more negatively.[28,29]

This study is the first step in providing patients, healthcare providers, and insurance companies with objective criteria for reimbursement of BCS. Ultimately, we aim to develop an objective screening tool that can be used by bariatric teams to select those postbariatric patients who will benefit most from BCS. To detect patients with the greatest benefit from BCS, the study would need to follow these patients post BCS to appreciate if a high BAPRAS score is predictive of greatest change in HRQoL post BCS. Our study group is currently setting up a head to head comparison of the score with the current Dutch system, which will also include a longitudinal assessment of outcome.

A (pre) selection will also limit the amount of nonindicated BCS consultations at the outpatient plastic surgical clinic. Finally, clear contraindications will result in better information for both pre- and postbariatric patients.

In our opinion the modified BAPRAS questionnaire can be combined with the Dutch weight criteria, thereby creating the final version of the tool: the Dutch ReBoc tool (Referral and Reimbursement for Body Contouring tool, Appendix 2). In the Dutch Reboc tool patients who do not have a stable weight cannot be referred; in the BAPRAS guideline, these patients could still apply for reimbursement. Weight fluctuations can negatively impact complication rates, and all of the patients who qualified had a stable weight before surgery.[30] A recent pregnancy or planning to have children in the future is also an exclusion criterion for referral, because this will negatively influence the postoperative result. Last but not the least, all patients with a recent life event, a history of psychological issues and/or addiction, should be evaluated by the psychologist (of the bariatric team) to decide whether these issues can be seen as a contraindication for BCS. This psychologist should also evaluate other aspects, such as body dysmorphic disorder symptoms.

The BODY-Q is the most suitable instrument to objectively evaluate the impact of overhanging skin on patients' well-being.[26] We think that the measurement of patient-reported outcome is an essential part of treatment evaluation. Therefore, more research focused on the prediction of BODY-Q scoring on the outcome after BCS should be conducted.

Similar to the BAPRAS guideline, patients with a very high initial BMI ($>50\,kg/m^2$) who want a functional panniculectomy are an exception in the criteria according to the Dutch Reboc tool. In the study population, four patients qualified for referral, but had a BMI $>35\,kg/m^2$. Before bariatric surgery, these four patients all had a BMI $\geq 50\,kg/m^2$, which implicates that they will never be able to reach a BMI $<35\,kg/m^2$ after bariatric surgery.[31] A panniculectomy will bring these patients to another level of exercise freedom, which will subsequently lead to further lowering of their BMI. Therefore, patients with a starting BMI $\geq 50\,kg/m^2$ should be evaluated separately with regard to an abdominal debulking (panniculectomy) procedure.

A limitation of the current study is that all questionnaires were filled out at home by the patients. Therefore, we were not able to examine the patients and objectify the complaints like skin conditions and physical limitations. However, because all patients were informed that the questionnaires were anonymous and that the answers did not have any effect on possible BCS, we think this potential bias has been low. Moreover, although we did discuss the modifications in our committee, we did not contact the developers of the original tool to discuss these modifications.

Our ultimate goal is to develop an objective selection system in which funding for BCS is spent on the patients who need BCS the most. We demonstrated that with the modified version of the BAPRAS screening tool, postbariatric patients with the best weight (loss) and most complaints of excess skin are selected for BCS reimbursement. Future research will focus on using this tool in a population of patients who consult the plastic surgeon and study whether the patients who are selected with this tool are also patients who benefit most from BCS. In addition, an objective measurement instrument for excess skin should be developed and included.

Declaration of Competing Interest

- V.M. Monpellier works as an MD and researcher at the Nederlandse Obesitas Kliniek
- C.E.E. de Vries has no conflict of interest
- I.M.C. Janssen is the medical director of the Nederlandse Obesitas Kliniek
- E.S.J. van der Beek has no conflict of interest
- A.B. Mink van der Molen has no conflict of interest
- M.M. Hoogbergen has no conflict of interest
- Prof. dr. B. van der Lei works as a plastic surgeon at the Nederlandse Obesitas Kliniek

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2020.02.002.

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