Evidence Review

Non-Cosmetic Body Contouring Surgery following massive sustained weight loss.

Questions to be addressed:

What is the evidence of clinical and cost effectiveness of clinically indicated Body Contouring Surgery (BCS), following massive sustained weight loss in adults with a starting BMI of above 40kg/m2; or above 35kg/m2 with co-morbidities AND current BMI of less than 30.0kg/m2 AND weight stability of 12 months who are experiencing significant functional disturbance, in comparison to no surgical treatment?

Reason for review:

NHS Birmingham and Solihull CCG and Sandwell and West Birmingham CCG, requested a rapid evidence review of the clinical and cost effectiveness of clinically indicated Body contouring surgery. The review was requested to support policy development and to define the procedures to be considered within the policy for body contouring.

Options for commissioners:

1. Due to consistent and strong volume of evidence demonstrating that body contouring surgery (BCS) is clinically effective, develop a commissioning policy that details a restricted criterion and defines the exclusions to the policy.
2. Due to the strong evidence identified in the "Body Q" Systematic review develop a policy with criteria that defines the overarching themes: 1) Appearance; 2) Health related Quality of life; and 3) Patient experience.

Summary

Body contouring is a procedure that alters the shape of the human body. It includes procedures that eliminate or reduce excess skin and fat that remains after losing a significant amount of weight, in a variety of places including the torso, upper arms, chest, and thighs. Body contouring may also be requested by women who have excess abdominal skin following pregnancy or to treat excessive 'stretch marks'.

Massive weight loss is defined as loss of 50% or more of body weight [1].

Background

Individuals are increasingly suffering with excess skin after being encouraged to lose weight either through diet and exercise (often supported by community weight loss programs) or as a result of bariatric surgery undertaken either privately or on the NHS. Rapid, marked weight loss often results in large areas of loose skin. Patients have increasing expectations that

removal of this excess skin will be funded by the NHS especially if the bariatric surgery was NHS funded.

These surgical procedures can involve removing fat and excess loose skin and tightening the abdominal muscles. The aim is to remove excess skin that can't be removed through exercise - It is not a quick fix for losing weight.

The interventions

Body contouring covers a variety of requests to remove redundant skin usually following major weight loss, therefore NHS Birmingham and Solihull CCG and Sandwell and West Birmingham CCG have brought the following body contouring procedures together into one policy:

- **Surgery to improve the appearance of the abdomen where clinically indicated:**

There are a number of procedures available, for example, in abdominoplasty it may involve removing excess skin and fat and tightening the abdominal muscles. Panniculectomy / apronectomy is a limited abdominoplasty procedure and is performed to remove the excess skin only. Documented clinical evidence of severe impairment associated to the excess skin and a definition of how far down the excess skin hangs (panniculus) is required.

- **Full abdominoplasty:**

For patients who have significant skin laxity, excess fat and separation of the muscles, a classic tummy tuck is the most common procedure. Performed under general anaesthetic, this operation can require patients to be in hospital for two or three days.

During the operation, an incision is made from hip to hip and around the umbilicus. The excess skin and fat is excised from the umbilicus to just above the pubic hair. The muscles above and below the umbilicus are tightened. The skin is then sewn up to give a circular scar around the umbilicus and a long scar across the lower abdomen. Although this operation leaves a large scar, it does provide the greatest improvement in abdominal shape.

Patients who are thinking about becoming pregnant should not undergo this procedure, and should wait until they are sure they are not having any more children. All the skin and fat below the umbilicus can be removed in a standard abdominoplasty. This results in a scar across the lower abdomen and a scar around the umbilicus.

- **Mini abdominoplasty**

For patients with only a small amount of excess skin, a lesser abdominoplasty might be appropriate. A general anaesthetic is still needed.

During the operating, a wedge of skin and fat is excised from the lower tummy leaving a horizontal scar above the pubic hair. Sometimes the muscles will also be tightened. No scar is

left around the umbilicus, which may be stretched slightly to become a different shape. A mini abdominoplasty will give a smaller effect than a full abdominoplasty.

- **Extended abdominoplasty**

Surplus skin and fat of the loins and back are removed at the same time as the abdomen.

- **Endoscopic abdominoplasty**

Tightens the muscles of the abdominal wall. Skin is not removed but liposuction can be carried out at the same time.

- **Apronectomy (Panniculectomy)**

An Apronectomy is a modified mini-abdominoplasty, mainly for patients who have a large excess of skin and fat hanging down over the pubic area and only the surplus skin and fat is removed. A modification to an abdominoplasty might also be necessary when the patient has problems with scars from previous operations.

A panniculus is excess adipose tissue hanging downward from the abdomen and resembles an "apron of skin" overlying the front of the pelvic girdle. A large panniculus can interfere with normal activities such as walking, and lead to serious medical problems. The heavy overhanging tissue can cause chronic skin inflammation under the flap, and subsequently, skin breakdown and infection.

The panniculus hanging below the symphysis pubis when the individual is standing normally can cause significant functional impairment and other complications such as intertrigo.

Historically, panniculectomy/apronectomy has been considered primarily a cosmetic procedure; however, for some patients, surgery is the only option if a large panniculus causes debilitating symptoms that do not respond to conventional medical therapy.

- **Arm reduction and lift (Brachioplasty):**

Brachioplasty, or upper arm reduction or arm lift is a surgical procedure which removes and tightens loose skin and excess fat in the upper arm. It is usually performed under a general anaesthetic. The surgeon makes a long incision between the elbow and axilla. Segments of skin and fat are removed and the remaining skin and tissue lifted resulting in a tight, smooth look.

- **Buttock and/or Thigh lift (Thighplasty):**

Thighplasty is aesthetic reshaping surgery with the removal of excess skin and fat. Buttock or thigh lift surgery is performed to lift the excess skin to firm and tighten the skin around the buttocks and/or thighs. Liposuction may also be performed during this procedure. Sometimes a buttock lift is combined with this procedure.

- **Liposuction / Liposculpture / Suction Assisted Lipectomy**

Liposuction is also known as liposculpture or suction assisted lipectomy. It is a technique most commonly performed to remove unwanted fat deposits. Liposuction can be performed on other areas of the body, including the neck, arms, tummy, loins, thighs, inner side of the knees and the ankles.

Funding for procedures to remove excess skin from other areas of the body other than the abdomen has been deemed cosmetic with much greater risks than non-surgical procedures.

Other procedures that are not included within the Body Contouring Surgery policy are:

- Mastopexy/ Breast Lift, surgery for gynaecomastia other breast surgery procedures
- Liposuction for Lipoedema and Lymphoedema

Current Management

Weight loss surgery or bariatric surgery is commissioned nationally across England. In adults with a BMI of more than 40kg/m2 (or more than 35kg/m2 with co-morbidities) in whom surgical intervention is considered appropriate, bariatric surgery is recommended as a treatment option in the National Institute for Health and Clinical Excellence (NICE) guidelines [1].

Where body contouring interventions are required solely to improve the appearance, these are regarded as cosmetic surgery and so not normally available on the NHS. There are however, some clinical circumstances in which there is documented evidence of clinical benefit to be attained by undertaking such a procedure.

1 Context

1.1 Introduction

The resultant redundant skin presents new quality of life concerns in a range of areas such as mobility, decreased activity, body image dissatisfaction and depression. The excess skin causing physical discomfort, psychosocial problems, lost work days/productivity and concern about quality of life in general has led to an increasing uptake of body contouring surgery, to manage the complex problems that span multiple parts of the body after massive weight loss.

Research demonstrates significant improvements in patients' physical function, emotional wellbeing, stability in mood, body image satisfaction, identity shifts and identity transformation, sexual vitality, greater wellbeing and quality of life once they have undergone body contouring surgery following massive weight loss [1].

Body contouring surgery has been shown to have positive benefits, especially in relation to improved wellbeing, function and Quality of Life (QoL). However, adjustment to changing

body image following body contouring is both challenging and empowering and seems to be a transitional process [2].

The commissioning guide provides the overview of the types of health conditions that can be prevented if body contouring procedures are carried out after massive weight loss and/or post-bariatric surgery [1]. The purpose of the evidence review is to draw out the benefits of clinically indicated body contouring.

1.2 Existing national policies and guidance

- NICE have not currently issued guidance on this treatment.
- The Royal College of Surgeons in association with the British Association of Plastic Reconstructive and Aesthetic Surgeons (BAPRAS) have recently produced guidance on body contouring using a NICE accredited process. Those guidelines have been taken into account in the review of the evidence to support policy development.

2 Epidemiology

In 2010, 65.1% of all adults aged 16 years and over were overweight or obese. Morbid obesity rates (body mass index (BMI) ≥40kg/m2) increased from 1.2% in 1995 to 2.7% in 2003, and fluctuated between 2.2% and 2.7% between 2008 and 2010 [1].

3 Findings

3.1 Evidence of effectiveness

- The UK Commissioning Guide [1] highlights an expert interpretation of various papers to inform NICE and clinical commissioners in the UK health care sector. All results highlighted of the search strategy are also utilised within the commissioning guide.
- The commissioning guide [1] is a strong example of evidence of Body Contouring in the UK Health Sector.

3.1.1 Clinical effectiveness

3 systematic reviews, 1 economic systematic review and 4 clinical trials & guidance were highlighted from the search that directly informed 'Body Contouring' in reference to the effectiveness measurable by physical, physiological, and/or qualitative patient reported outcomes:

SYSTEMATIC REVIEWS:

1. **Measuring Quality of Life and Patient Satisfaction After Body Contouring [2]:**

ABSTRACT

Evidence-Based Background: In both cosmetic and post bariatric body contouring populations, the primary determinants of success are patient satisfaction and quality of life

(QOL). These patient-reported outcomes (PRO) are ideally measured with specially-designed, procedure- or condition-specific questionnaires.

Objective: The authors identify and appraise all patient-reported outcome (PRO) measures (questionnaires) developed for patients undergoing body contouring surgery.

Methods: MEDLINE, EMBASE, PsychINFO, Ebase, CINAHL, HAPI, Science Citation Index/Social Sciences Citation Index, Ovid Evidence Based Medicine databases were searched from the inception of each database through August 2010. Articles included in the study described the development and/or psychometric evaluation of a PRO measure developed for body contouring patients. Each measure was then appraised for adherence to internationally-recommended guidelines for item generation, item reduction, and psychometric evaluation.

Results: The following five PRO questionnaires were identified by our search: one liposuction (the Freiburg Questionnaire on Aesthetic Dermatology and Cosmetic Surgery, FQAD), one general plastic surgery (Derriford Appearance Scale, DAS-59/24), and three breast reduction measures (the Breast Reduction Assessed Severity Scale Questionnaire, BRASSQ; Breast Related Symptoms questionnaire, BRS; and the BREAST-Q reduction module. Detailed examination of these measures revealed that the FQAD, DAS-59, and BRS are limited by both their content range and psychometric properties. The BRASSQ and BREAST-Q both have strong psychometric properties, and the BREAST-Q is unique in its inclusion of items covering specific postoperative issues such as scarring.

Conclusions: While instruments are available for measuring outcomes in breast reduction patients, reliable, valid, and responsive PRO measures are lacking for the majority of body contouring procedures. To demonstrate the unique outcomes of body contouring surgery, future research to rigorously develop and validate new PRO measures in this population is necessary.

2. **Recommendations on the most suitable quality-of-life measurement instruments for bariatric and body contouring surgery [3]:**

ABSTRACT

Objective: The objective of this study is to systematically assess the quality of existing patient-reported outcome measures developed and/or validated for Quality of Life measurement in bariatric surgery (BS) and body contouring surgery (BCS).

Methods: We conducted a systematic literature search in PubMed, EMBASE, PsycINFO, CINAHL, Cochrane Database Systematic Reviews and CENTRAL identifying studies on measurement properties of BS and BCS Quality of Life instruments. For all eligible studies, we evaluated the methodological quality of the studies by using the COnsensus-based Standards for the selection of health Measurement INstruments checklist and the quality of the

measurement instruments by applying quality criteria. Four degrees of recommendation were assigned to validated instruments (A-D).

Results: Out of 4,354 articles, a total of 26 articles describing 24 instruments were included. No instrument met all requirements (category A). Seven instruments have the potential to be recommended depending on further validation studies (category B). Of these seven, the BODY-Q has the strongest evidence for content validity in BS and BCS. Two instruments had poor quality in at least one required quality criterion (category C). Fifteen instruments were minimally validated (category D).

Conclusion: The BODY-Q, developed for BS and BCS, possessed the strongest evidence for quality of measurement properties and has the potential to be recommended in future clinical trials.

3. **Quality of life among adults following bariatric and body contouring surgery: a systematic review [4]:**

ABSTRACT

Background: Weight loss following bariatric surgery is associated with significant improvements in obesity-related comorbidities, body satisfaction and psychosocial outcomes, at least in the short term. However, in the context of extreme weight loss, body image and appearance may worsen again because the “excess” or “loose” skin can lead to both functional and profound dissatisfaction with appearance. These concerns have led to an increasing uptake of post-bariatric surgery, “body-contouring” procedures but the implications for quality of life (QoL) have not been thoroughly considered.

Objective/purpose: The objective was to identify the best available evidence regarding the QoL outcomes for adults following bariatric and body contouring surgery.

Inclusion criteria - Types of participants: The review considered studies involving people aged 18 years and beyond who underwent bariatric surgery and body contouring surgery.

Types of interventions: The review considered studies that evaluated bariatric surgery as well as body contouring surgery.

Types of studies: The review considered both experimental and epidemiological study designs.

Outcomes: The primary outcomes were QoL as measured by validated tools at less than two years, two to five years and more than five years following body contouring surgery. The secondary outcomes were adverse events, unsatisfactory aesthetic appearance and weight gain.

Search strategy: Six databases were searched, including Cochrane Central, MEDLINE, Embase, Web of Science, PsycINFO and CINAHL. Studies published from 1954 to 2014 were considered.

Additional searches for unpublished studies were undertaken in BIOSIS citation index, Register of Current Controlled Trials and Global Health Observatory.

Methodological quality: The methodological quality of eligible studies was assessed independently by two reviewers using the Joanna Briggs Institute quality assessment tool.

Data extraction: Data extraction from the included studies was undertaken and summarized independently by two reviewers using the standardized Joanna Briggs Institute data extraction tool.

Data synthesis: Studies were too heterogeneous and could not be pooled in statistical meta-analysis. Therefore, the data results are presented as a narrative summary in relation to the outcomes of interest.

Results: Nine quantitative studies (four comparable cohort studies, including two group design and two four-group designs and five descriptive or case-series studies) were included in the review. The included studies reported significant clinical improvements in appearance, wellbeing and QoL. These included primary outcomes pointing to body image satisfaction, improved self-esteem and confidence, improved physical function/pain and improved social function. The secondary outcomes were related to adverse events in the early postoperative period and reported wound healing problems, including seromas, partial necrosis, dehiscence, hematoma and anaemia because of blood loss. Also, some data sets shed light on appearance-related distress and body dysphoria post-surgery associated with visible scars and contour deformities.

Conclusion: Body contouring surgery has been shown to have positive benefits, especially in relation to improved wellbeing, function and QoL. However, adjustment to changing body image following body contouring is both challenging and empowering and seems to be a transitional process.

ECONOMIC SYSTEMATIC REVIEWS:

1. **Diverse approaches to the health economic evaluation of bariatric surgery: a comprehensive systematic review [5]:**

ABSTRACT

Background: Health economic evaluations inform healthcare resource allocation decisions for treatment options for obesity including bariatric/metabolic surgery. As an important advance on existing systematic reviews, we aimed to capture, summarize and synthesize a diverse range of economic evaluations on bariatric surgery.

Methods: Studies were identified by electronic screening of all major biomedical/economic databases. Studies included if they reported any quantified health economic cost and/or consequence with a measure of effect for any type of bariatric surgery from 1995 to

September 2015. Study screening, data extraction and synthesis followed international guidelines for systematic reviews.

Results: Six thousand one hundred eighty-seven studies were initially identified. After two levels of screening, 77 studies representing 17 countries (56% USA) were included. Despite study heterogeneity, common themes emerged, and important gaps were identified. Most studies adopted the healthcare system/third-party payer perspective; reported costs were generally healthcare resource use (inpatient/shorter-term outpatient). Out-of-pocket costs to individuals, family members (travel time, caregiving) and indirect costs due to lost productivity were largely ignored. Costs due to reoperations/complications were not included in one-third of studies. Body-contouring surgery included in only 14%. One study evaluated long-term waitlisted patients. Surgery was cost-effective/cost-saving for severely obese with type 2 diabetes mellitus. Study quality was inconsistent.

Discussion: There is a need for studies that assume a broader societal perspective (including out-of-pocket costs, costs to family and productivity losses) and longer-term costs (capture reoperations/complications, waiting, body contouring), and consequences (health-related quality-of-life). Full economic evaluation underpinned by reporting standards should inform prioritization of patients (e.g. type 2 diabetes mellitus with body mass index 30 to 34.9 kg/m 2 or long-term waitlisted) for surgery.

GUIDANCE & CLINICAL STUDIES:

1. **Body image and quality of life in patients with and without body contouring surgery following bariatric surgery: a comparison of pre- and post-surgery groups [6].**

ABSTRACT

Background: Massive weight loss (MWL) following bariatric surgery frequently results in an excess of overstretched skin causing physical discomfort and negatively affecting quality of life, self-esteem, body image, and physical functioning.

Methods: In this cross-sectional study 3 groups were compared: (1) patients prior to bariatric surgery (n = 79), (2) patients after bariatric surgery who had not undergone body contouring surgery (BCS) (n = 252), and (3) patients after bariatric surgery who underwent subsequent BCS (n = 62). All participants completed self-report questionnaires assessing body image (Multidimensional Body-Self Relations Questionnaire, MBSRQ), quality of life (IWQOL-Lite), symptoms of depression (PHQ-9), and anxiety (GAD-7).

Results: Overall, 62 patients (19.2%) reported having undergone a total of 90 BCS procedures. The most common were abdominoplasties (88.7%), thigh lifts (24.2%), and breast lifts (16.1%). Post-bariatric surgery patients differed significantly in most variables from pre-bariatric surgery patients. Although there were fewer differences between patients with and without BCS, patients after BCS reported better appearance evaluation (AE), body area

satisfaction (BAS), and physical functioning, even after controlling for excess weight loss and time since surgery. No differences were found for symptoms of depression and anxiety, and most other quality of life and body image domains.

Discussion: Our results support the results of longitudinal studies demonstrating significant improvements in different aspects of body image, quality of life, and general psychopathology after bariatric surgery. Also, we found better AE and physical functioning in patients after BCS following bariatric surgery compared to patients with MWL after bariatric surgery who did not undergo BCS. Overall, there appears to be an effect of BCS on certain aspects of body image and quality of life but not on psychological aspects on the whole.

2. **The impact of reconstructive procedures following bariatric surgery on patient well-being and quality of life [7]:**

ABSTRACT

Background: Massive weight loss following bariatric surgery may lead to an excess of lax, overstretched skin, causing physical discomfort which may affect the patient's quality of life. Whereas the functional and aesthetic deformity is an expected result of massive weight loss, the role of the plastic surgeon in the multidisciplinary approach of the morbidly obese is still unclear. The purpose of the current study is to evaluate the results of reconstructive surgery following weight loss surgery, focusing on the impact on the physical and psycho-social well-being and quality of life of the patients.

Methods: Out of a group of 465 patients, 61 patients underwent reconstructive surgery following weight loss surgery. In 43 respondents, the quality of life after reconstructive surgery was measured by the Obesity Psychological State Questionnaire. Patient satisfaction was evaluated.

Results: Reconstructive surgery resulted in a significant improvement in quality of life in patients at a mean interval of 42 months between weight loss and reconstructive surgery. The most frequent procedures were abdominoplasty and breast reconstruction. The relative high complication rate of 27.9% was of no influence on quality of life and the majority of the patients (67%) were satisfied with reconstructive surgery.

Conclusions: This study shows that reconstructive surgery following weight loss after bariatric surgery results in a significant improvement in overall quality of life. Reconstructive surgery should be incorporated in the multidisciplinary care programme following weight loss surgery in the morbidly obese patient.

3. **The BODY-Q: A Patient-Reported Outcome Instrument for Weight Loss and Body Contouring Treatments [8]:**

ABSTRACT

Background: Body contouring performed for cosmetic purposes, or after weight loss, has the potential to improve body image and health-related quality of life (HRQL). The BODY-Q is a new patient-reported outcome (PRO) instrument designed to measure patient perceptions of weight loss and/or body contouring. In this article, we describe the psychometric properties of the BODY-Q scales after an international field-test.

Methods: Weight loss and body contouring patients from Canada, United States, and United Kingdom were recruited between November 2013 and February 2015. Data were collected using an iPad directly into a web-based application or a questionnaire booklet. Rasch measurement theory analysis was used for item reduction and to examine reliability, validity, and ability to detect change.

Results: The sample included 403 weight loss and 331 body contouring patients. Most BODY-Q items had ordered thresholds (134/138) and good item fit. Scale reliability was acceptable, i.e., Person separation index >0.70 for 16 scales, Cronbach α ≥0.90 for 18 of 18 scales, and Test-retest ≥0.87 for 17 of 18 scales. Appearance and HRQL scores were lower in participants with more obesity-related symptoms, higher body mass index, and more excess skin and in those pre- versus postoperative body contouring. The 134 weight loss patients who completed the BODY-Q twice, either 6 weeks (weight loss/nonsurgical body contouring program) or 6 months (bariatric program) later, improved significantly on 7 appearances and 4 HRQL scales.

Conclusion: The BODY-Q is a clinically meaningful and scientifically sound patient-reported outcome instrument that can be used to measure outcomes in patients who undergo weight loss and/or body contouring.

4. **Body-Q User Manual, Royal College of Surgeons [9]:**

The 'BODY-Q' systematic review is strong evidence to support the method in measuring the effectiveness of body contouring from patient-reported outcomes. 'BODY-Q' method is the framework of the BODY-Q scales, is comprised of three overarching themes as follows:

1) Appearance; 2) Health-Related Quality of Life; and 3) Patient Experience.

Under these domains, there are 18 independently functioning scales that measure important Concepts of Interest (COI). In addition to the 18 scales, there is 1 obesity-specific symptom checklist.

5. **Body Image and Quality of Life in Post Massive Weight Loss Body Contouring Patients [10]:**

ABSTRACT

Objective: Because post-bariatric surgery patients undergo massive weight loss, the resulting skin excess can lead to both functional problems and profound dissatisfaction with

appearance. Correcting skin excess could improve all these corollaries, including body image. Presently, few data are available documenting body image and weight-related quality of life in this population.

Research methods and procedures: Eighteen patients who underwent both bariatric surgery and body contouring completed our study. Both established surveys and new surveys designed specifically for the study were used to assess body perception and ideals, quality of life, and mood. Patients were surveyed at the following time-points: pre-body contouring (after massive weight loss) and both 3 and 6-month post-body contouring. Statistical testing was performed using Student's t test and ANOVA.

Results: The mean age of the patients was 46 +/- 10 years (standard deviation). Quality of life improved after obesity surgery and was significantly enhanced after body contouring. Three months after body contouring, subjects ascribed thinner silhouettes to both current appearance and ideal body image. Body image also improved with body contouring surgery. Mood remained stable over 6 months.

Discussion: Body contouring after surgical weight loss improved both quality-of-life measurements and body image. Initial body dissatisfaction did not correlate with mood. Body contouring improved body image but produced dissatisfaction with other parts of the body, suggesting that as patients become closer to their ideal, these ideals may shift. We further developed several new assessment methods that may prove useful in understanding these post-surgical weight loss patients.

3.1.2 Cost effectiveness

Studies were found in a systematic review that appeared to reference QALYs in relation to body contouring. On further review of the literature referenced these were in relation to gastric bypass surgery and similar. No QALYs relevant to body contouring specifically were found.

3.2 Magnitude of Health Improvement Benefit

- All studies [1], [2] and [7] highlight the psychological and physiological improvement post-body contouring surgery. [2] and [7] explore in various tables the score improvement in physical movement and psychological benefit as high as 74% of study population [7].
- The papers also highlight the importance of support during the process and post-body contouring procedure to deal with the transition which resulted in higher QoL from the study population. It is highly suggested a sound support package is beneficial for maximum health outcomes.
- Clinical Outcomes of Body Contouring have been highlighted as achieving statistically significant improvements in conditions such as Neck, Back and Abdominal pain and conditions such as Lymphedema.

Outcome	Pre Body Contouring Score	Post Body Contouring Score	p Value
Neck Pain	2.52	2.02	≤ 0.05
Back Pain	5.63	2.10	≤ 0.0001
Abdominal Pain	5.96	1.43	≤ 0.0001
Lymphedema	3.35	1.65	≤ 0.0001

Table 7 [2]: Wilcoxon-signed rank demonstrating statistical significant improvement in all clinical outcomes above.

- Complications are recognised as a 'relative high complication rate of 27.9%' however this is substantially outweighed by the high patient satisfaction and QoL improvement post-surgery with or without complications [7].
- Reconstructive surgery resulted in a significant improvement in quality of life in patients at a mean interval of 42 months between weight loss and reconstructive surgery. The most frequent procedures were abdominoplasty and breast reconstruction. The relative high complication rate of 27.9% was of no influence on quality of life and the majority of the patients (67%) were satisfied with reconstructive surgery [7].
- QoL of existing health conditions with large reductions in 'Pain during exercise' by 4.34 (P≤0.0001) and 'Lymphedema' by 1.70 (P≤0.0001) and others [4].

3.3 Supports people with existing health problems

- The commissioning guidelines [1] provide a clear narrative on how body contouring can support the QoL for patients with existing health problems.
- The systematic review [4] explores in greater detail with scoring on the improvement of QoL of existing health conditions with large reductions in 'Pain during exercise' by 4.34 (P≤0.0001) and 'Lymphedema' by 1.70 (P≤0.0001) and others - distant indirect health utility benefit.

3.4 Safety

- Complications recognised included post procedure hematomas, abscesses which required secondary intervention; and few complications such as seromas and focal

skin neuroses. It is also highlighted that complications and infections are higher within smokers than non-smokers who receive procedure [1], [2], [7].

- Body contouring surgery (BCS) creates large wounds. The current evidence favours this surgery when patients have 'fully deflated'. Performing BCS at higher BMI's is associated with higher risk of complications [1].
- The following were defined as exceptions to BCS within the Commissioning Guide [1]:
    - Current smoker
    - Active psychiatric or psychological condition that would benefit from diagnosis and treatment prior to referral for body contouring surgery or that would contraindicate surgery including:
        - patients who have had an episode of self-harm within the last two years;
        - patients with a previous diagnosis of body dysmorphic disorder;
        - patients with a disproportionate view of the problem following consultation with a consultant Plastic Surgeon;
        - patients who currently have on going alcohol or drug misuse problems.

  NB: General health, social and lifestyle issues should also be taken into account before offering body contouring surgery to patients.

3.5 Equity issues

- Patients requiring body contouring surgery after bariatric surgery have been described as a new and unique population that is difficult to manage, with 96% of post-bariatric surgery patients developing multiple redundant skin flaps [5].
- Study [11] shows that there exists a postcode lottery for bariplastic surgery in England. The PCTs act independently of each other while drawing up their guidelines for the purposes of rationing. This leads to variability in funding for procedures in different regions within the NHS. The study showed a variation in guidelines across Trusts in the UK, amounting to a “postcode lottery” and stated that it is also evident from our survey that majority (101/106, 95.3%) of PCTs have their own guidelines and individual cut-off points for referrals leading to a postcode lottery for bariplastic surgery.

4. Activity and finance

There are a number of co-morbidities linked to obesity such as Type 2 diabetes, heart disease, some cancers, arthritis etc. The evidence demonstrates that there are statistically significant health improvement benefits to be realised in the overall health economy from Body Contouring Surgery following massive weight loss.

A Statistical report published in England 2018 [12] details the following facts on obesity, physical activity and diet, drawn together from a variety of sources.:

- In 2016/17, there were 617,000 admissions in NHS hospitals where obesity was a factor. This is an increase of 18% from 2015/16.

- In 2016, 26% of adults were classified as obese. This has increased from 15% in 1993 but has remained at a similar level since 2010.
- In 2016, 26% of adults consumed 5 or more portions of fruit and vegetables a day.

5. Summary of findings

- Consistent evidence and high score relates to high confidence the evidence will not change and any change will not be substantial.
- As stated in the justification the method in which to measure the effectiveness clinically is currently investigating & researching under the BODY-Q Method.
- Statistically significant health improvement benefits both in relation to QoL and clinical outcomes of more than 30% improvement
- Body Contouring based on the evidence has the potential to prevent both primary and secondary prevention of future illness such as mobility, QoL concerns, infection, lymphedema and other illnesses.
- A high capacity to improve health and starting with a high baseline health utility.
- No relevant QALYs found
- There is evidence from the systematic review that there is a vulnerable group (post bariatric surgery) that are more in need of body contouring.
- Diabetes was noted as a local and national priority that is linked to reducing obesity

6. Search Strategy

The following databases were routinely searched: NICE Clinical Guidance and full website search; NHS Evidence and NICE CKS; SIGN; Cochrane; York; and the relevant Royal College and any other relevant bespoke sites. A Medline search was undertaken where indicated and a general google search for key terms also undertaken.

Most of the evidence relating to these procedures was non-specific and included in reviews of obesity management. Systematic reviews of quality of outcome measures found that the papers studied did not use robust measures of outcomes and more work was needed but that overall patients appeared satisfied with the outcomes (based on low grade evidence). Studies looking at complications following these procedures found relatively high rates of complications but these were confounded by high rates of comorbidity.

6.1 Clinical criteria & definition:

Age over 16 years. Starting BMI above 40kg/m2 or above 35kg/m2 with co-morbidities AND current BMI of less than 30.0kg/m2 AND weight stability of 12 months AND significant functional disturbance (both physical and psychological). Weight stability allows for a maximum of 5kg increase or a 5kg decrease in weight [1].

6.2 Exceptions to general criteria:

Starting BMI above 40kg/m2 or above 35kg/m2 with co-morbidities and 75% excess body weight lost– should be eligible for apronectomy only - if they are unable to slim down to a

BMI of less than 30.0g/m2. A BMI of up to 40kg/m2 can be considered here. Weight stability of 12 months and significant functional disturbance applies here too.

6.3 PICO parameters:

Population: Those who clinically need 'Body Contouring' due to massive sustained weight loss.
Intervention: 'Body Contouring' (All procedures that are include under 'Body Contouring')
Comparator / Control: No surgery
Outcome: Clinical Benefit, Wider Health Utility, Mental Health

7. Glossary

Term	Meaning
Bariatric Surgery	Surgery to reduce the size of the stomach in order to promote weight loss.
Intertrigo	A dermatitis occurring between juxtaposed folds of skin. The dermatitis is usually caused by retention of sweat, moisture, and warmth which results in an overgrowth of normal skin microorganisms.
The Symphysis Pubis	The area of junction of the pubic bones and lies at the centre-front of the pelvic girdle.

8. References

[1] British Association of Plastic Reconstructive and Aesthetic Surgeons (BAPRAS), Royal College of Surgeons: UK Commissioning Guide: Massive Weight Loss Body Contouring, 2017. http://www.bapras.org.uk/docs/default-source/commissioning-and-policy/2017--draft-for-consultation--body-contouring-surgery-commissioning.pdf?sfvrsn=0

[2] Measuring Quality of Life and Patient Satisfaction After Body Contouring: A Systematic Review of Patient-Reported Outcome Measures, Patrick L. Reavey et al, Aesthetic Surgery Journal September 2011 vol. 31 no. 7 807-813
https://academic.oup.com/asj/article/31/7/807/176334

[3] Recommendations on the most suitable quality-of-life measurement instruments for bariatric and body contouring surgery: a systematic review. C.E.E. de Vries, et al. – https://www.ncbi.nlm.nih.gov/pubmed/29883059

[4] Quality of life among adults following bariatric and body contouring surgery: a systematic review. J. Gilmartin, et al. JBI Database of Systematic Reviews and Implementation Reports November 2016 vol.14 no.11 240-270
https://journals.lww.com/jbisrir/Abstract/2016/11000/Quality_of_life_among_adults_following_bariatric.16.aspx

[5] Diverse approaches to the health economic evaluation of bariatric surgery: a comprehensive systematic review. J.A. Campbel, et al. https://www.ncbi.nlm.nih.gov/pubmed/27383557

[6] Body image and quality of life in patients with and without body contouring surgery following bariatric surgery: a comparison of pre- and post-surgery groups. M. de Zwaan, et al - https://www.frontiersin.org/articles/10.3389/fpsyg.2014.01310/full

[7] The impact of reconstructive procedures following bariatric surgery onpatient well-being and quality of life. Van der Beek ES, et al. - https://www.ncbi.nlm.nih.gov/pubmed/19688408

[8] The BODY-Q: A Patient-Reported Outcome Instrument for Weight Loss and Body Contouring Treatments. A.F. Klassen, et al. - https://www.ncbi.nlm.nih.gov/pubmed/27200241

[9] Body-Q User Manual, Royal College of Surgeons - https://tinyurl.com/y53b9xmn

[10] Body Image and Quality of Life in Post Massive Weight Loss Body Contouring Patients. AY. Song, et al. - https://www.ncbi.nlm.nih.gov/pubmed/17030974

[11] Mukherjee,S.,Kamat,S.,Adegbola,S.,andAgrawal,S.(2014). Funding for post-bariatric body contouring (bariplastic) surgery in England: a post code lottery. Plast.Surg.Int. 2014:153194. doi:10.1155/2014/153194 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3980931/

[12] NHS Digital: Statistics on Obesity, Physical Activity and Diet - England, 2018 [PAS] https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-obesity-physical-activity-and-diet/statistics-on-obesity-physical-activity-and-diet-england-2018