*DOI:*
10.1007/s00192-013-2297-2

*Document Version*
Peer reviewed version

# Psychosexual outcome after labiaplasty: a prospective case comparison study

- David Veale, Institute of Psychiatry, King's College London & Centre for Anxiety Disorders and Trauma, The Maudsley Hospital, 99 Denmark Hill, London, SE5 8AZ, UK. Email: David.Veale@kcl.ac.uk

- Iona Naismith, Institute of Psychiatry, King's College London & Centre for Anxiety Disorders and Trauma, The Maudsley Hospital, 99 Denmark Hill, London, SE5 8AZ, UK.

- Ertiniss Eshkevari, Institute of Psychiatry, King's College London & Centre for Anxiety Disorders and Trauma, The Maudsley Hospital, 99 Denmark Hill, London, SE5 8AZ, UK.

- Nell Ellison, Institute of Psychiatry, King's College London & Centre for Anxiety Disorders and Trauma, The Maudsley Hospital, 99 Denmark Hill, London, SE5 8AZ, UK.

- Ana Costa, Institute of Psychiatry, King's College London & Centre for Anxiety Disorders and Trauma, The Maudsley Hospital, 99 Denmark Hill, London, SE5 8AZ, UK.

- Dudley Robinson, King's College Hospital, Denmark Hill, London, SE5 9RS

- Lanka Abeywickrama, King's College Hospital, Denmark Hill, London, SE5 9RS

- Angelica Kavouni, Cosmetic Solutions, 129 Harley Street, London, W1G 6BA

- Linda Cardozo, Department of Urogynaceology, King's College Hospital, Denmark Hill, London, SE5 9RS

**ACCEPTED VERSION**
*International Journal of Uro-gynaecology*
http://dx.doi.org/10.1007/s00192-013-2297-2

**Disclosure of interests**

We declare no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work other than Angelica Kavouni has received fees for services for private patients in the study.

Words: 3987 (not including abstract, acknowledgements, or references)

## Abstract

**Introduction and Hypothesis:** To determine psychosexual outcome after labiaplasty in the long-term with specific measures of genital body image and sexual dysfunction. **Design:** A prospective study with a matched comparison group of women not wanting labiaplasty. **Method:** Forty-nine women were compared against a group of 39 women matched on age, sexual orientation, ethnicity and marital status. The labiaplasty group was assessed before surgery, 3 months after labiaplasty, and in the long term (between 11 and 42 months) after surgery. The comparison group was assessed at two time-points (3 months apart) to control for the passage of time. The primary outcome measure was the Genital Appearance Satisfaction (GAS) scale. **Results:** Of the 49 women receiving labiaplasty, 19 (38.8%) were lost to follow up but were reassessed clinically. Twenty-four out of 25 (96%) women in the labiaplasty group showed a reliable and clinically significant improvement on the GAS scale 3 months after the procedure; and 21/23 (91.3%) showed an improvement at the long-term follow-up. A large effect size was found for improvements on the GAS scale in the labiaplasty group. Small effect sizes were found for improvements in sexual functioning. Nine women obtaining labiaplasty met diagnostic criteria for Body Dysmorphic Disorder before the operation; 8 had lost their diagnosis at the 3-month follow-up. 26% reported minor side effects. **Conclusions:** Labiaplasty is effective in improving genital appearance and sexual satisfaction but larger studies are required to determine the prevalence of potential side effects.



Keywords: labiaplasty; labioplasty; body dysmorphic disorder; labia; female genital cosmetic surgery.



Brief Summary: Labiaplasty is effective in improving genital appearance at long term follow up.

## Introduction

Labiaplasty or labia minora reduction is a surgical procedure in women that usually reduces the degree of protrusion of the labia minora. The incidence of labiaplasty in the National Health Service was 1726 in the year 2010-2011. [1] The number of labiaplasties conducted in the private sector is probably greater than in the NHS. Braun [2] and Liao, Michala [3] identified up to 18 publications covering 937 case reports or series of labiaplasty worldwide up to March 2009.

The motivation for seeking labiaplasty falls into three main categories. [2, 4, 5]. Women desire the procedure for (i) Aesthetic reasons: for example to reduce self-consciousness in public situations and feelings of ugliness and abnormality, (ii) Functional reasons: for example to reduce discomfort, irritation or pain during (non-sexual) activities, and (iii) Sexual reasons: for example to reduce dyspareunia or fears of negative evaluation by a sexual partner or self-consciousness during intimacy. About a third of women seeking labiaplasty have been teased or had negative comments made about their genital appearance [6].

Some women seeking labiaplasty may have Body Dysmorphic Disorder (BDD). This is characterised by a preoccupation with a perceived defect that is not observable or appears slight to others while the person's concern is markedly excessive. Crouch, Deans [7] have described the size of the labia of women seeking labiaplasty to be within normal published limits. To fulfill the diagnostic criteria for BDD, however, the perceived defect must be either significantly distressing or cause

impairment in social, occupational or other important areas of functioning. The most common preoccupations in BDD are the facial skin, nose, eyes, eyelids, mouth and chin - or just being ugly in general. [8, 9] In other areas of the body, a cosmetic procedure and the diagnosis of BDD may be associated with a poor outcome [10-12].

Surgical complication rates reported for labiaplasty are less than 5% [13] or 10.8% for side effects [14]. There is only one prospective pilot study of 14 women undergoing labiaplasty, [15] and no controlled studies on psychosexual outcomes of labiaplasty. All other retrospective case series claim a high level of patient satisfaction and anecdotes pertaining to success in the short term. None of these studies have utilized standardized outcome measures of sexual function or genital body image done independent of the surgeon (although one has used a general body image measure).

The lack of evidence regarding psychosexual outcome of labiaplasty especially in the long term has led to significant criticism [7, 16]. The objectives of this study were therefore to determine the outcome after labiaplasty with a comparison group especially in the long-term. The hypotheses were that women receiving labiaplasty would improve on specific measures of genital appearance satisfaction and sexual function.

## Materials and methods

Ethics Permission was granted by the Joint South London and Maudsley Trust and Institute of Psychiatry NHS Research Ethics Committee (09/H0807/33). We recruited 88 women who were categorised into two groups, those having labiaplasty and those not desiring labiaplasty (the comparison group). A STROBE diagram is provided for women receiving labiaplasty in Figure 1.

**Participants:**

(1) Women having labiaplasty

We recruited 49 women seeking labiaplasty from the following sources: (a) 35 (71% of the study sample) from a private cosmetic clinic. These were recruited from a total of 77 women who had labiaplasty in the recruitment period after being given information about the study. (b) 14 (29% of study sample) from an NHS gynaecology clinic. These were drawn from a total of 35 women who had a labiaplasty and were given information about the study.

(2) Comparison group

We recruited 39 women for the comparison group who completed a baseline and 3 month follow up questionnaires. They were characterised by not wanting labiaplasty. Comparison participants were recruited from MindSearch, a King's College London database containing email addresses of members of the public willing to be contacted for research participation.

Inclusion criteria: all women were required to be aged between 18 and 60 years of age. Mann-Whitney and Chi Squared tests were used to check whether groups were matched; no significant differences were found between the two groups in age, sexual orientation, marital status, education, ethnicity, whether or not they had children and in symptoms of anxiety or depression (Table 1).

**Procedure:**

Women in both groups were recruited contemporaneously between Jan 2010 and May 2012. At pre-labiaplasty, participants signed informed consent and completed all the questionnaires below, either online (78% of 49 participants) or on paper. This process was repeated at 3-month follow-up. The long-term follow-up consisted of three of the outcome questionnaires (the GAS, PISQ, and the COPS-L), with 91% of 23 participants completing this online. Qualitative data were collected

regarding any adverse effects as a result of the procedure between 11 and 42 months post-operatively. At both follow-up stages, all participants were contacted first via email, then by post with a weblink and paper versions of the questionnaires. If no response had been obtained, participants were contacted by telephone.

The comparison group signed informed consent and completed the full set of questionnaires at two time points, 3 months apart, in order to control for the effects of time on these measures. At the first time-point, questionnaires were completed online by 91% of participants; at follow-up they were completed online by 92% of participants (the remainder being completed on paper). All were thanked with a £20 high street voucher at each stage of the study.

Labia measurements were taken for women undergoing labiaplasty at the time of the procedure. The surgeon measured the degree of protrusion of the labia minora and width of each labium with a disposable tape measure. All measurements were made in the lithotomy position with minimal stretching of the labia. The width was measured anterior-posteriorly from the clitoral hood and the lower aspect of the labia minora. We took the average of left and right measurements. Patients at King's College Hospital all had labial trimming using cutting diathermy following which the edges are sewn over with Vicryl 3/0 Rapide. Private patients had a range of techniques – labial trimming (15), central wedge reduction (9), de-epitheliasation technique (3) and superior pedicle flap reconstruction (2).

**Measures**

Participants completed the following self-report questionnaires:

**(1) Genital Appearance Satisfaction (GAS) scale** [17, 18]. The GAS scale was our primary outcome measure. It contains 11 statements and total scores range from 0 to 33. Higher scores represent greater dissatisfaction with the genitalia. For calculation

of reliable and significant change, we used a mean of 23.2 and standard deviation of 5.1 for a clinical sample, and mean of 4.75 and SD of 5.6 in a comparison group and a Cronbach's alpha of 0.91 (16).

**(2) Hospital Anxiety and Depression Scale (HADS)** [19].

The HADS is a self-report instrument used to examine the severity of anxiety and depressive symptoms in two separate subscales with a range from 0 to 21.

**(3) The Prolapse–Urinary Incontinence Sexual Function Questionnaire (PISQ)** [20]. The PISQ covers a broad measure of sexual function in women (range 0-125). Higher scores represent increasing sexual function.

**(4) Body Image Quality of Life Inventory (BIQLI)** [21]. The BIQLI is a self-report assessment scale that measures the impact of general body image concerns on a broad range of life domains. A more negative score reflects a more negative body image affecting the quality of life.

**(5) Cosmetic Procedure Screening for BDD in labiaplasty (COPS-L)** [18] This is a modification of the original COPS questionnaire [22] which focuses on concerns about the appearance of the labia rather than general appearance. The domains follow the diagnostic criteria for BDD. Participants who scored more than the cut-off score of 45 on the COPS-L were interviewed using a module for DSM-IV disorders [23].

**Statistical Analysis**

Data were analysed using SPSS v21. Data were not normally distributed so Mann-Whitney and Chi Squared tests were used to compare the clinical and comparison groups at the initial time-point and at the 3-month follow-up. Wilcoxon signed-rank tests were used to compare differences within both groups at initial time point and at 3-month follow-up, and within the labiaplasty group to compare the initial time-point with the long-term follow-up using case deletion. The GAS scale

was used to identify the number of women who displayed reliable and clinically significant change following labiaplasty. The method summarises changes at the level of the individual in the context of observed changes for the whole sample[24, 25]. Two questions are addressed:

1) Has the patient changed sufficiently to be confident that the change is beyond that which could be attributed to measurement error? This is termed 'reliable change' and is measured by the Reliable Change Index (RCI). It is calculated from the standard error of the difference (before and after treatment) and takes into account the reliability of the instrument (Cronbach's alpha).

2) How does the end state of the patient compare with the scores observed in socially and clinically meaningful comparison groups? This is termed 'clinically significant change'. Since the distributions of GAS scores for clinical and comparison populations were not over-lapping, we chose to use criterion "b" which examines whether the woman moves to within 2 standard deviations of a normative sample mean. This is the most stringent but credible criterion when the aim is to determine whether a patient returns to a 'normal' population. We used an Excel spread sheet, the Leeds Reliable Change Indicator to prepare figures (available to download).[26]

## Results

Data were not normally distributed so medians and inter-quartile ranges are reported throughout and non-parametric tests were used for analyses.

### Group characteristics prior to intervention

Table 1 reports the demographics and questionnaire scores for the clinical and comparison groups prior to the clinical group receiving labiaplasty procedures. Pre labiaplasty, there were no significant differences in the severity of symptoms of

anxiety or depression, body image quality of life nor sexual function. As expected, the labiaplasty group had significantly higher dissatisfaction towards the appearance of their genital area compared with the comparison group as evident on the GAS and the COPS-L total scores.

**Sample attrition**

Twenty-six participants in the labiaplasty group completed the 3-month follow up and 23 completed the long term follow up (Figure 1). However 4 from the long term follow up had not completed the 3 month follow up, so in total 30 of the 49 were followed up on at least one occasion. Those lost to follow-up was a result of non-response to our invitation, although one woman stated they found the questions too intrusive. The 19 women in the labiaplasty group who were lost to follow up after completing the initial questionnaires were not significantly different to the 26 who completed either the 3-month or long term follow up, in terms of age ($U$ =232.50, $Z$ =-.868, $p$ = .386), sexual orientation ($\chi^2$ =2.711, df =2, $p$=.*258*), marital status ($\chi^2$ =4.861, df =3 , $p$=.*182*), ), education ($\chi^2$ = .091, df =1 , $p$=.*755*), ethnicity ($\chi^2$ =2.820, df = 2, $p$=.244) and whether or not they had children ($\chi^2$ =.377, df = 1, $p$=.539); nor in terms of severity on GAS at baseline ($U$ = 243.50, $Z$ = -.883, $p$ =.377), HADS depression ($U$ = 270.00, $Z$ = -.108 , $p$ =.914), HADS anxiety ($U$ = 251.00, $Z$ = .514, $p$ =.607), COPS-L ($U$ = 273.00 , $Z$ = .521, $p$ =.602), PISQ ($U$ = 225.50, $Z$ = .816, $p$ =.414) or BIQL *(*$U$ = 274.50, $Z$ =.011 , $p$ =.991).

All but one of the 19 women lost to the research follow up were re-assessed clinically by the surgeon and reported that they were satisfied with the procedure and did not report any adverse side effects. We therefore used case wise deletion for missing data in analyses and 3 month and long term follow up.

**Comparisons to a matched-comparison sample**

Table 2 reports the differences between the two groups on the standardised measures at 3-month follow up. There were no significant differences between the groups on the GAS, COPS-L, BIQLI, HADS-anxiety or HADS-depression. The women in the labiaplasty group scored significantly higher on the PISQ than did comparison participants, indicating significantly higher overall sexual function at 3 months.

**Longitudinal comparisons for labiaplasty group**

Table 3 reports before and after scores on standardised measures for women in the labiaplasty group at two time points, pre-labiaplasty versus 3-month follow-up. At 3-month follow-up, the women scored significantly lower on the GAS and the COPS-L (with very large effect sizes), implying improved satisfaction and less impairment concerning the appearance of their genitalia. They also had lower levels of anxiety, as indicated by a significant change on the HADS, and higher overall sexual function as indicated by a significant change on the PISQ (moderate effect sizes).

The scores on the COPS-L and the GAS remained significantly lower at long-term follow-up with large effect sizes. The GAS had a median score of 7 (IQR of 2,12) at long term follow up which remained significant improvement compared to pre-labiaplasty ($Z$ = -4.202, $p$ < .0005, $d$ = 2.93); the COPS –L had a median score of 11 (IQR of 4,18) which was also a significant improvement ($Z$ = -4.199, $p$ < .0005, d= 2.24). The median score on the PISQ was 100 (IQR 89, 104), which was no longer significantly different compared to pre-labiaplasty ($Z$ = -1.787, $p$ = .074, $d$ = -0.18).

**Longitudinal comparisons for comparison group**

Significant changes were observed over 3 months for the comparison group on several measures. At three months scores on the GAS had decreased with the median moving from 7 to 2 ($Z$ = -3.508, $p$ < .0005, $d$ =0.72), scores on the PISQ deteriorated

with the median changing from 100 to 97 ($Z$ = -2.049, $p$ = .041, $d$ = 0.22). Effect sizes were, however, smaller than for the labiaplasty group over time. There were no significant changes on the 4 other measures over time.

*Reliable and clinically significant change on the GAS*

Figure 2 is a visual display of the outcome data at 3 months on 25 labiaplasty women who completed a GAS questionnaire at this time-point. (Twenty-six women had provided data at 3 months but one questionnaire was incomplete). Each point is a patient, the x-axis is the pre-labiaplasty GAS score, and the y-axis is the post-labiaplasty GAS score. The diagonal line indicates the cut-off for reliable change, with points falling within the tramlines as representing non-reliable change. The horizontal and vertical marker lines show criterion b. This examines whether a participant moves to within 2 standard deviations of a normative sample mean and indicates clinically significant change from assessment to follow up. At 3 months, there are 24 patients (96%) who achieve reliable and clinically significant change on the GAS score. There is 1 patient (4%) who had reliable improvement but this was not clinically significant. Overall the Reliable Change Index is 7.58, Standard Error of the Mean is 1.53 and the Standard Error of the Difference is 2.16.

Figure 3 is a visual display of the outcome data at long-term follow-up on the 23 labiaplasty patients who provided data at this time-point. Participants are assigned the same number on Figures 2 and 3. All 23 patients again lie below the diagonal line indicating reliable improvement. There are 21 (91%) patients who achieve reliable and clinically significant change. There are 2 patients (9%) whose change data is reliable but who do not show clinically significant change, one of whom (point 23) was in this category at 3 month follow-up. Neither of these patients had BDD. Overall

the Reliable Change Index for long-term follow up is 6.57, Standard Error of the Mean is 1.53 and the Standard Error of the Difference is 2.16.

**Changes in diagnosis**

We were especially interested in 9 women who were identified as having a diagnosis of BDD at interview pre-labiaplasty. All of these women had labia minora within normal range according to the surgeon's measures, thus fulfilling one criterion for BDD. The preoccupation was specific to the genitalia (either exclusively or their primary feature of concern in 8 women, and was a secondary concern in 1 woman). Seven were treated privately and 2 on the NHS. Three months after labiaplasty, only one woman retained the diagnosis of BDD.

Six out of the eight women with BDD made reliable and clinically significant improvements on the GAS scale at 3-months (with two missing data). We were only able to follow up 4 out of the 8 women with BDD in the long term. These 4 continued without a diagnosis of BDD and made reliable and clinically significant changes on the GAS. One woman followed up did not lose her diagnosis of BDD. Her preoccupation was now focussed on her nose and not on her genitalia. Her concern regarding her nose was present pre-labiaplasty but her concerns about her genitalia were the primary concern pre-operatively. Of note is that she made reliable and significant change on the GAS from 32 to 13 and was pleased with her labiaplasty.

**Ratings of cosmetic and functional success**

Women were asked to rate the functional success on a Likert scale. Eight (31%) said the procedure had very much improved functioning, 6 (23%) much improved, 5 (19%) moderately improved, 4 (15%) slightly improved and 3 (12%) no change.

**Side effects/complications**

The 23 women followed up in the long-term were asked whether they had experienced any long-term adverse effects following the procedure. Seventeen said they had no adverse side effects whilst 6 (26%) mentioned one or more side effects with (i) urination (for example sometimes spraying) (n=3), (ii) aesthetic concerns - noticeable scarring or the labia being jagged (n=2), (iii) slight aching on one side of vaginal entrance (1), (iv) reduced sexual arousal (n=2), (v) some discomfort while wearing tight clothes (n=1). Only one mentioned regret about having the procedure performed.

**Labia measurements**

Comparisons of the average width of the labia minora of the private patients (M = 28.09mm, SD = 6.04, n = 23, range 17-41.5) and the NHS patients (M = 40.27mm, SD = 6.99, n = 11, range 30-52.5) in a non-parametric independent samples comparison test demonstrated that the NHS patients appeared to have significantly greater labia minora width than the private patients ($U = 20.50$, $Z = -3.91$, $p < .001$). However all the women were in the normal range for the general population. For example, Lloyd, Crouch [27] found that women had a mean width of 21.8mm (SD = 9.4, n = 50, range 7-50).

## Discussion

We have conducted the first prospective study of women undergoing labiaplasty in both the NHS and private sector with a comparison group. We used validated questionnaires of genital body image and sexual function, which were conducted independent of the surgeons. Ninety-six percent of the women showed reliable and clinically significant change on our primary outcome measure (GAS) at a 3-month follow-up, and 91% fell into this group at long-term follow-up. As a group, women who underwent labiaplasty showed very large effect sizes at 3 months in

genital body image and had enhanced sexual functioning compared to the comparison group. At long-term follow up, they maintained the improvements in genital body image but no longer experienced improved sexual functioning. There were minor adverse effects reported in about a quarter of our sample but this had not deterred the women with only one reporting that she regretted her decision to have the procedure. Our study suggested a higher rate of minor side effects (26%) compared to Alter [14] although our study collected any reported side-effects.

The main weakness of the study is that we were only able to recruit 43% of consecutive patients who underwent labiaplasty and we do not therefore know whether our sample is representative. This recruitment or attrition rate is comparative to that of the only other prospective study of labiaplasty[15], and may reflect characteristics of the clinical population (for example, reluctance to discuss anxieties about their genitalia, or general avoidant tendencies). Another possible weaknesses is that we did not take labia measurements for our comparison group; however given that our clinical group has measurements within the normal range (see Results), this would not seem critical.

The main strengths of the study are that we used validated questionnaires and that the assessments were undertaken independent of the surgeons and conducted in the long term in the labiaplasty group. However this may also contribute to a weakness in that it was more difficult to capture the data when patients attended for their 3-month follow up appointment. Another weakness is that we were unable to follow up 19/49 (38.8%) of the women we recruited. However the women lost to follow up were no different in the baseline measures to the women who were followed up. Furthermore all but one of the women was followed up clinically and reported satisfaction to the surgeon. The study has relatively small numbers and

therefore we cannot comment on the prevalence of adverse events. Previous case series suggest minor side effects occur in about 10% and a very large case series would be required to provide an accurate estimate of prevalence of side effects. However it is challenging to recruit consecutive cases especially in the private sector to participate in such research and there is no incentive to participate after the surgery is completed.

Women with BDD did surprisingly well at 3 month follow up in that 8 out of 9 lost their diagnosis. This is a small sample and thus must be interpreted cautiously but it suggests that a diagnosis of BDD is not a contra-indication to labiaplasty in the short term. It was not possible to interpret data in the long term since we were only able to follow up 50% of the women with BDD. It suggests that the risk in BDD is relatively low in the short term for a procedure in which there is an obvious desired change (e.g. reduction of labia minora or breast augmentation) compared to a procedure where the change may be ambiguous (e.g. rhinoplasty) and if the symptoms of the BDD are in the mild range without excessive distress and shame. However in BDD, if another body feature is also of significant concern then the preoccupation may still transfer to a different feature or a new preoccupation may emerge in the long term. Further prospective studies are required to clarify this.

Crouch, Deans [7] and Michala, Liao [16] recommend providing reassurance about the diversity of normal vulval appearance and counseling to explore issues leading to a request for surgery. We agree that it would be desirable to evaluate a psychological intervention especially in those women seeking labiaplasty who have been teased or received comments about the appearance of their genitals. [6] However at present no data are available on the psychosexual outcome or genital satisfaction of either reassurance by a surgeon or subsequent counseling. Whilst there is evidence of

benefit from cognitive behaviour therapy (CBT) for body image problems or body dysmorphic disorder, [28, 29] CBT is not a generic intervention and has not yet been developed for this population. A strategy of reassurance may be similar to informing a woman seeking breast augmentation that her breast size is within normal limits and does not therefore require surgery. Equally counseling may be difficult in those with medically unexplained symptoms. The first step would therefore be to evaluate the role of reassurance or a psychological intervention on a standardised scale in a consecutive case series in order to estimate an effect size for a future randomised controlled trial of labiaplasty -v- a psychological intervention.

**Conclusion**

We provide an initial benchmark for the psychosexual improvements that occur after labiaplasty. We recommend that specific measures of genital body image, sexual function and side-effects be used in outcome studies of labiaplasty or of any psychological interventions for women dissatisfied with their genitalia. As a minimum we would recommend the use of the GAS, COPS-L and either the PISQ or the Female Sexual Functioning Index (FSFI) [30] for future audit and outcome studies including psychological interventions.

**Acknowledgements**

DV, NE, AC and IN would like to acknowledge salary support from the National Institute for Health Research (NIHR) Biomedical Research Centre for Mental Health at South London and Maudsley NHS Foundation Trust and the Institute of Psychiatry, King's College London. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.

**Funding**

None.

**References**

1. The Health and Social Care Information Centre. *HESOnline*. 2012 4th April 2012]; Available from: www.hesonline.nhs.uk.
2. Braun, V., *Female genital cosmetic surgery: a critical review of current knowledge and contemporary debates.* J Womens Health, 2010. **19**(7): p. 1393-1407.
3. Liao, L.M., L. Michala, and S.M. Creighton, *Labial surgery for well women: a review of the literature.* BJOG - Int J Obstet Gy, 2010. **117**(1): p. 20-25.
4. Veale, D., et al., *Characteristics and motivation of women seeking labiaplasty.* Psychol Med, (in press) doi:10.1017/S0033291713001025
5. Miklos, J.R. and R.D. Moore, *Labiaplasty of the labia minora: patients' indications for pursuing surgery.* J Sex Med, 2008. **5**(6): p. 1492-5.
6. Veale, D., et al., A comparison of risk factors for women seeking labiaplasty compared to those not seeking labiaplasty. Body Image *(in press)* doi:10.1016/j.bodyim.2013.10.003
7. Crouch, N.S., et al., *Clinical characteristics of well women seeking labial reduction surgery: a prospective study.* C St Gyn Ob, 2011. **118**(12): p. 1507-1510.
8. Phillips, K.A. and S.F. Diaz, *Gender differences in body dysmorphic disorder.* J Nerv Ment Dis, 1997. **185**(9): p. 570-577.
9. Veale, D., et al., *Body dysmorphic disorder. A survey of fifty cases.* Brit J Psychiat, 1996. **169**(2): p. 196-201.
10. Crerand, C.E., W. Menard, and K.A. Phillips, *Surgical and minimally invasive cosmetic procedures among persons with body dysmorphic disorder.* Ann Plas Surg, 2010. **65**(1): p. 11-6.
11. Tignol, J., et al., *Body dysmorphic disorder and cosmetic surgery: Evolution of 24 subjects with a minimal defect in appearance 5 years after their request for cosmetic surgery.* Eur Psychiat, 2007. **22**(8): p. 520-524.

12. Veale, D., L. De Haro, and C. Lambrou, *Cosmetic rhinoplasty in body dysmorphic disorder.* Brit J Plast Surg, 2003. **56**(6): p. 546-551.
13. Goodman, M.P., *Female Genital Cosmetic and Plastic Surgery: A Review.* J Sex Med, 2011. **8**(6): p. 1813-1825.
14. Alter, G., *Aesthetic Labia minora and Clitoral Hood Reduction using Extended Wedge Resection.* Plast Reconstr Surg, 2008. **122**(6): p. 1780-1789.
15. Goodman, M., et al., *The sexual, psychological and body image health of women undergoing elective vulvovaginal plastic/cosmetic procedures: A pilot study.* American Journal of Cosmetic Surgery, 2011. **28**(4): p. 219-226.
16. Michala, L., L.-M. Liao, and S.M. Creighton, *Female genital cosmetic surgery: how can clinicians act in women's best interests?* The Obstetrician & Gynaecologist, 2012. **14**(3): p. 203-206.
17. Bramwell, R. and C. Morland, *Genital appearance satisfaction in women: the development of a questionnaire and exploration of correlates.* J Reprod Infant Psyc, 2009. **27**(1): p. 15-27.
18. Veale, D., et al., *Validation of Genital Appearance Satisfaction scale and the Cosmetic Procedure Screening Scale for women seeking labiaplasty.* J Psychosom Obst Gyn, 2013. **34**(1): p. 46-52.
19. Zigmond, A. and R.P. Snaith, *The hospital depression and anxiety scale.* Acta Psychiat Scand, 1983. **67**: p. 361-370.
20. Rogers, R.G., et al., *A new instrument to measure sexual function in women with urinary incontinence or pelvic organ prolapse.* Am J Obstet Gynecol, 2001. **184**(4): p. 552-8.
21. Cash, T.F. and E.C. Fleming, *The impact of body-image experiences: Development of the Body Image Quality of Life Inventory.* Int J Eat Disorder, 2002. **31**(4): p. 455-460.
22. Veale, D., et al., *Development of a cosmetic procedure screening questionnaire (COPS) for body dysmorphic disorder.* J Plast Reconstr Aes, 2011. **65**(4): p. 530-532.
23. First, M.B., et al., *Structured Clinical Interview for DSM-IV Axis I disorders*1995, New York: Biometric Research Department.
24. Evans, C., F. Margison, and M. Barkham, *The contribution of reliable and clinically significant change methods to evidence-based mental health.* Evidence Based Mental Health 1998. **1**: p. 70-72.
25. Jacobson, N.S. and P. Truax, *Clinical Significance: A Statistical Approach to Defining Meaningful Change in Psychotherapy Research.* Journal of Consulting and Clinical Psychology, 1991. **59**(1): p. 12-19.
26. Agostinis, A., S.J. Morley, and C.N. Dowzer, *The Leeds Reliable Change Index Calculator (v. 1)*, in *Excel*2008: http://www.leeds.ac.uk/lihs/psychiatry/dclin/rcic.html.
27. Lloyd, J., et al., *Female genital appearance: 'normality' unfolds.* BJOG - Int J Obstet Gy, 2005. **112**(5): p. 643-646.
28. Veale, D., et al., *Body dysmorphic disorder: A cognitive behavioural model and pilot randomised controlled trial.* Behav Res Ther, 1996. **34**(9): p. 717-729.
29. Grant, J.R. and T.F. Cash, *Cognitive-behavioral body-image therapy - Comparative efficacy of group and modest-contact treatments.* Behavior Therapy, 1995. **26**(1): p. 69-84.

30. Rosen, C., et al., *The Female Sexual Function Index (FSFI): A Multidimensional Self-Report Instrument for the Assessment of Female Sexual Function.* J Sex Marital Ther, 2000. **26**(2): p. 191-208.

**Table 1.** Participant demographics and baseline for labiaplasty and comparison group

| | **Labiaplasty** (n= 49) MDN (IQR) | **Control** (n =39) MDN (IQR) | **Comparison & effect size** |
|---|---|---|---|
| **Age** | 34 (25-43) | 28 (25-34) | $U$ = 728.00, $Z$ = -1.637, $p$ = .102 |
| **Sexual orientation:** | | | |
| Only opposite sex | 39 (80%) | 28 (72%) | |
| Mainly opposite sex | 8 (16%) | 6 (15%) | |
| Equally both sexes | 1 (2%) | 5 (13%) | $\chi^2$ (2) = 3.869, |
| Mainly same sex | 0 | 0 | $p$ = .145 |
| Only same sex | 0 | 0 | |
| **Marital status: *n (%)*** | | | |
| Single | 25 (51%) | 22 (56%) | |
| Separated/Divorced | 8 (16%) | 3 (8%) | $\chi^2$ (3) = 2.393, |
| Married/Cohabiting | 15 (31%) | 14 (36%) | $p$ = .495 |
| Widowed | 1 (2%) | 0 (%) | |
| **Children: *n (%)*** | 17 (35%) | 8 (21%) | $\chi^2$ (1) = 2.147, $p$ = .143 |
| **Ethnicity: *n (%)*** | | | |
| White | 44 (90%) | 32 (84%) | |
| Black/Black British | 0 | 2 (5%) | $\chi^2$ (3) = 4.324, |
| Mixed | 1 (2%) | 3 (8%) | $p$ = .229 |
| Other | 2 (4%) | 1 (3%) | |
| Missing | 2 (4%) | 1 (3%) | |
| **HADS Anxiety** | 9 (5,12) | 6 (4,12) | $U$ = 838.00, $Z$ = -.683, $p$ = .495, $d$ = -0.12 |
| **HADS Depression** | 2 (1,6) | 3 (1,6) | $U$ = 887.00, $Z$ = -.258, $p$ = .796, $d$ = 0.13 |
| **BIQLI** | 0.4 (-0.9, 1.1) | 0.7 (-0.6, .8) | $U$ = 759.50, $Z$ = -1.362, $p$ = .173, $d$ = 0.28 |
| **GAS** | 23.5 (20, 27) | 7 (6, 8) | $U$ = 12.50, $Z$ = -7.897, $p$ < .0005, $d$ = -3.68 |
| **COPS-L** | 43.9 (30.3, 53.5) | 3 (2, 6) | $U$ = 17.00, $Z$ = -7.891, $p$ < .0005, $d$ = -3.17 |
| **PISQ** | 98.5 (85.8, 104.1) | 100.1 (89, 107.1) | $U$ = 752.50, $Z$ = -1.092, $p$ = .275, $d$ = 0.23 |

MDN = median, IQR = interquartile range, HADS = Hospital Anxiety and Depression Scale, BIQLI = Body Image Quality of Life Index, GAS = Genital Appearance Satisfaction, COPS-L = Cosmetic Procedures Scale – Labia, PISQ = Pelvic Organ Prolapse– Urinary Incontinence Sexual Function Questionnaire

**Table 2.** Comparisons of the labiaplasty and control groups: scores on standardised questionnaires at 3-month follow up

MDN = median, IQR = interquartile range, HADS = Hospital Anxiety and Depression Scale, BIQLI = Body Image Quality of Life Index, GAS = Genital Appearance Satisfaction, COPS-L = Cosmetic Procedures Scale – Labia, PISQ = Pelvic Organ Prolapse– Urinary Incontinence Sexual Function Questionnaire

| | **Labiaplasty (N=26) MDN (IQR)** | **Control (N = 39) MDN (IQR)** | **Comparison** | **Effect size** |
|---|---|---|---|---|
| **HADS anxiety** | 6 (3.5, 7) | 5 (3, 11) | $U$ = 448.00, $Z$ = -0.029, $p$ = .976 | $d$ = 0.26 |
| **HADS depression** | 2 (0.5, 7) | 2.5 (1, 5.8) | $U$ = 437.00, $Z$ = -0.193, $p$ = .847 | $d$ = 0.15 |
| **BIQLI** | 0.5 (-0.3, 1.9) | 0.0 (-0.6, 1.7) | $U$ = 375.00, $Z$ = -0.937, $p$ = .349 | $d$ = -0.29 |
| **GAS** | 4 (1, 11.5) | 2 (0, 6) | $U$ = 323.50, $Z$ = -1.728, $p$= .084 | $d$ = -0.46 |
| **COPS-L** | 4.8 (1, 14.3) | 3 (1.3, 6.3) | $U$ = 405.5, $Z$ = -0.896, $p$ = 0.37 | $d$ = -0.43 |
| **PISQ** | 103.7 (95.9, 108.3) | 97 (88.9, 103.2) | $U$ = 222.50, $Z$ = -2.415, $p$ = .016 | $d$ = -0.46 |

**Table 3.** Comparisons of the labiaplasty group from pre-labiaplasty to 3-month follow-up on standardised questionnaires (data deleted case-wise, N = 26)

| | **Pre-labiaplasty MDN (IQR)** | **3-month follow-up MDN (IQR)** | **Comparison** | **Effect size** |
|---|---|---|---|---|
| **HADS anxiety** | 9 (5, 11.5) | 6 (3.5, 7) | $Z$ = - 2.79, $p$ = .005 | $d$ =0.68 |
| **HADS depression** | 2 (1, 6) | 2 (0.5, 7) | Z = - .13, $p$ = .895 | $d$ = -0.01 |
| **BIQLI** | -.06 (-1.1, 1.6) | 0.5 (-0.3, 1.9) | $Z$ = - 1.84, $p$ = .066 | $d$ = -0.41 |
| **GAS** | 24.5 (20, 29) | 4 (1, 11.5) | $Z$ = -4.38, $p$ < .0005 | $d$ = 3.35 |
| **COPS-L** | 44 (31.9, 53.5) | 4.8 (1, 14.3) | $Z$ = -4.46, $p$ < .0005 | $d$ = 3.04 |
| **PISQ** | 98 (84.0, 103) | 103.7 (95.9, 108.3) | $Z$ = - 3.30, $p$ = .001 | $d$ = -0.66 |

MDN = median, IQR = interquartile range. HADS = Hospital Anxiety and Depression Scale, BIQLI = Body Image Quality of Life Index, GAS = Genital Appearance Satisfaction, COPS-L = Cosmetic Procedures Scale – Labia, PISQ = Pelvic Organ Prolapse– Urinary Incontinence Sexual Function Questionnaire

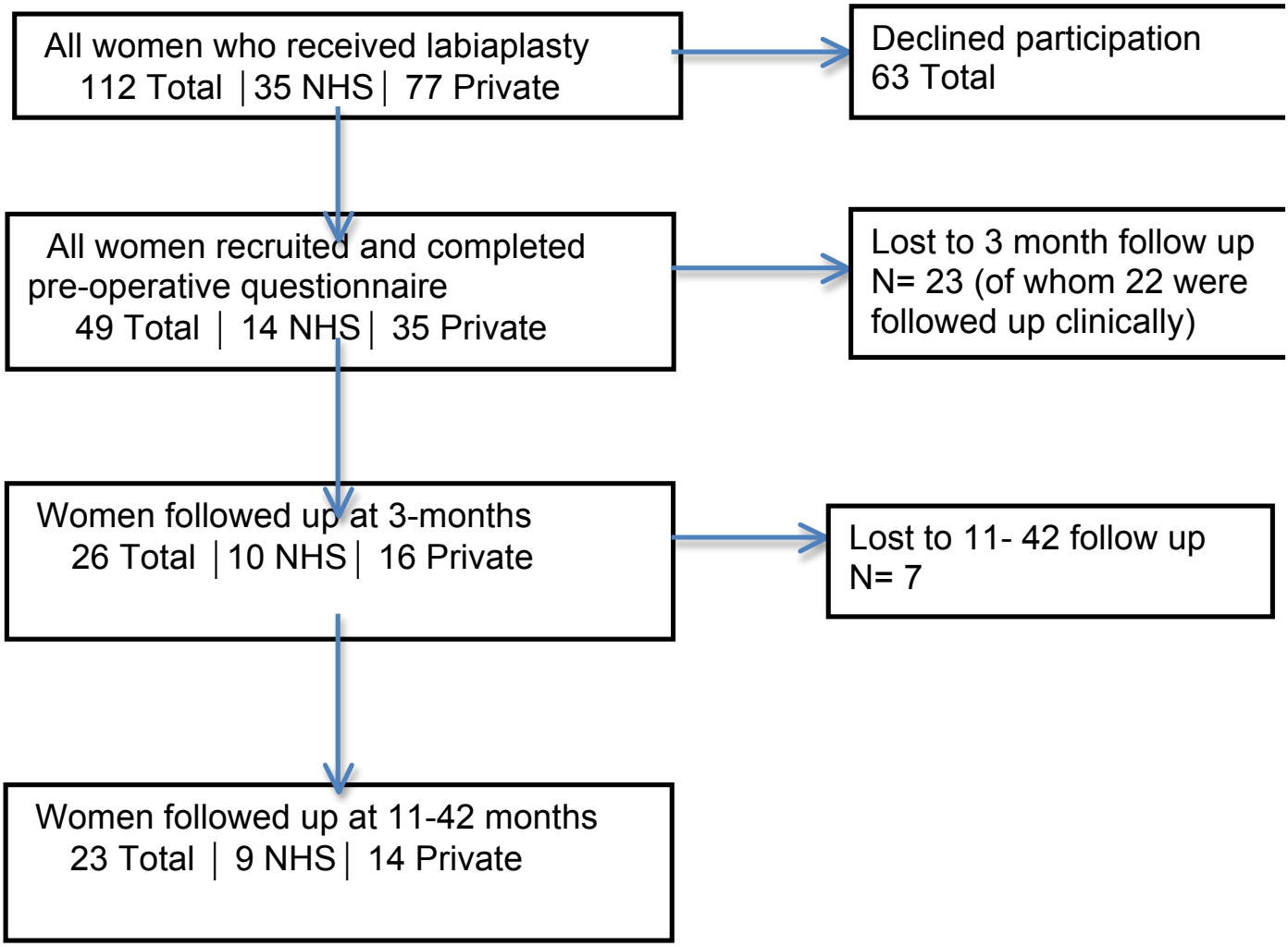


Figure 1: Flow chart for women receiving labiaplasty

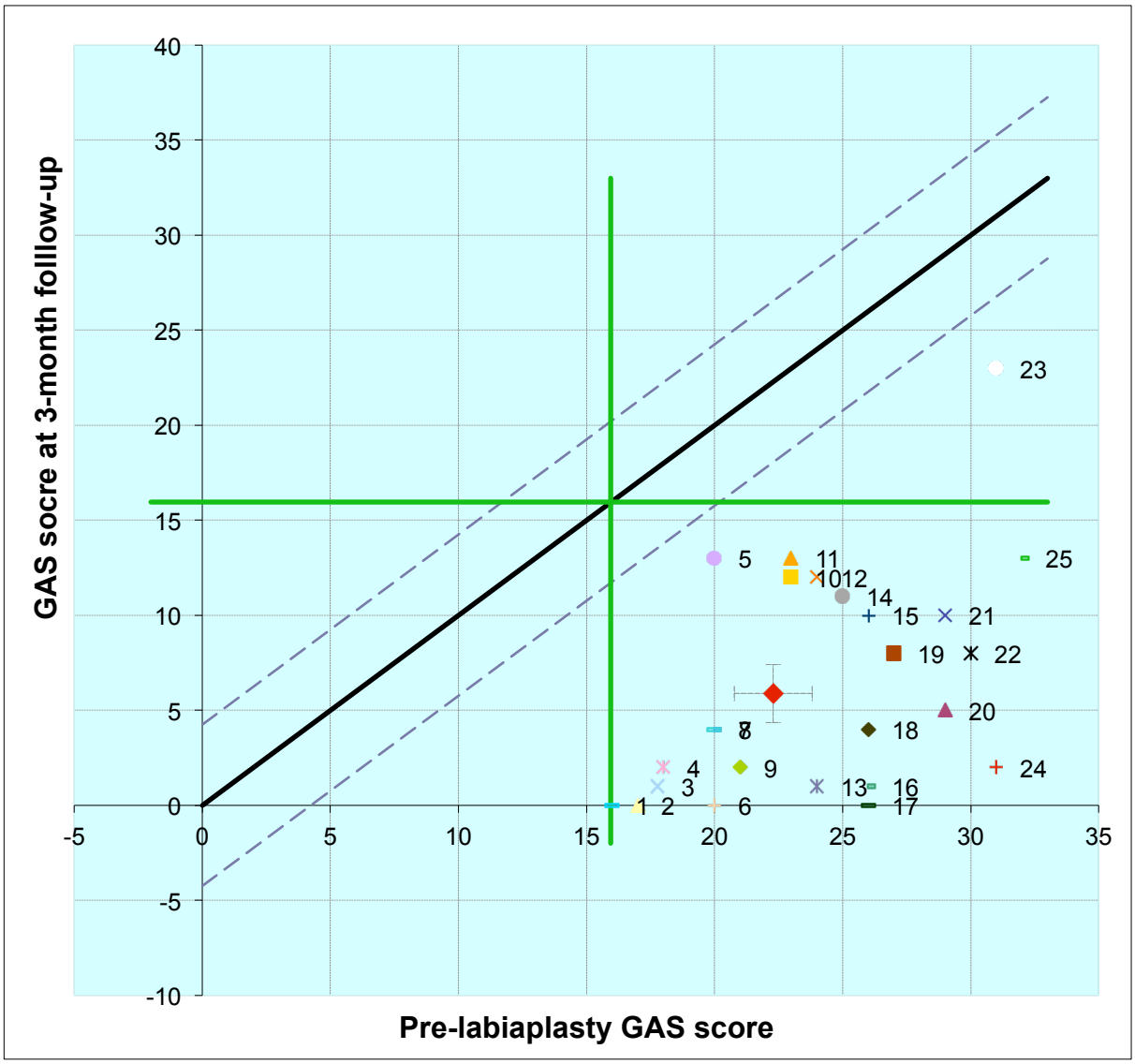


**Figure 2:** Reliable and clinically significant change on the GAS for labiaplasty group at 3-month follow-up (n = 25)

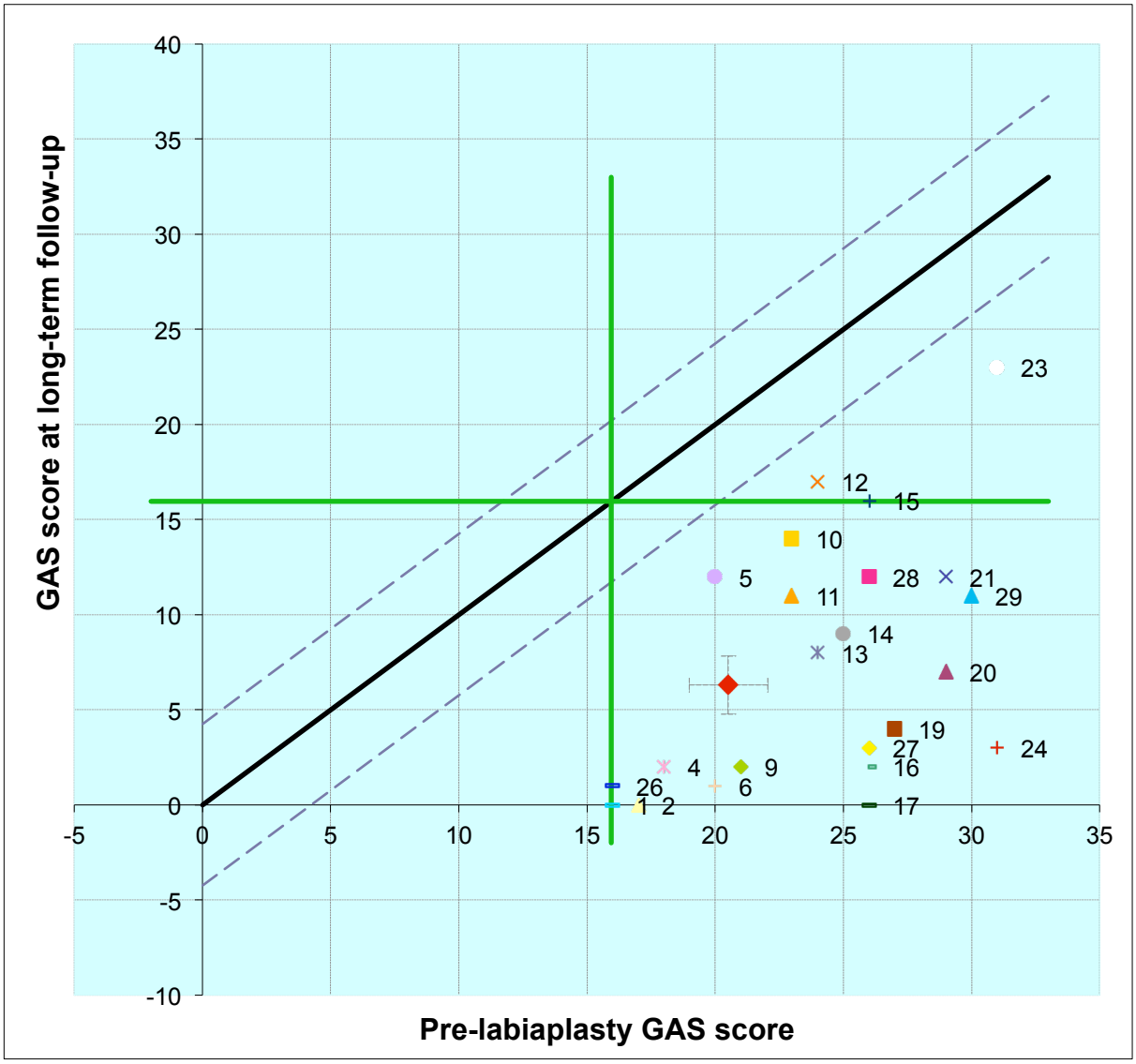


**Figure 3:** Reliable and clinically significant change on the GAS for labiaplasty group at long-term follow-up (n = 23)