

Article Type: SHORT REPORT

Title: Psychological Change Following Aesthetic Plastic Surgery: A Prospective Controlled
Outcome Study

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Abstract

Aesthetic plastic surgery has been long practiced for primarily psychological rather than physical benefit to patients. However, evaluation of the psychological impact of aesthetic plastic surgery has often been of limited methodological rigor in both study design, and appropriate measurement. This study is intended to evaluate the psychological impact of aesthetic surgery on patients seeking such intervention in regard to concerns about breasts, nose or upper limbs using standardised psychometric instruments. Participants were recruited through the Plastic Surgery Unit (Patients) and general surgery, ENT surgery and Maxillo-facial surgery (Comparisons) at a UK General Hospital. Outcome measures included the Crown-Crisp Experiential Inventory anxiety scale, Beck Depression Inventory, and Derriford Appearance Scale-24, a valid and reliable measure of distress and dysfunction in relation to self-consciousness of appearance. Data were collected pre-operatively (T1) and three months post-operatively (T2) for both groups. Longitudinal appearance adjustment for the plastic surgery group was also assessed at 12 months (T3). Both groups were less depressed and anxious post-operatively. The improvement in anxiety was significantly greater in the plastics group. Body site specific appearance distress was significantly improved for the plastics group only, and the level of improvement was related to the body site affected.

KEY WORDS: appearance, plastic surgery, surgical outcome, prospective controlled trial

PSYCHOLOGICAL CHANGE FOLLOWING AESTHETIC PLASTIC SURGERY: A
PROSPECTIVE, CONTROLLED OUTCOME STUDY

The evidence base relating to the psychological impact of plastic surgery is not strong. Cook, Rosser and Salmon (2006) identified 22 studies in a systematic review on psychological outcomes in plastic surgery. These were characterised by poor methodological quality, making it difficult to draw conclusions about the effectiveness of this treatment. Given the demand for these procedures, and anecdotal reports from clinicians as to the benefits of their work (Rankin, Borah, Perry & Wey, 1998), Cook, Rosser and Salmon conclude, (consistent with earlier reviews e.g., Sarwer, Wadden, Pertschuk, & Whitaker, 1998) that the absence of appropriate evidence places commissioning bodies and practitioners in an unenviable position. In the United Kingdom, funding for aesthetic surgery is typically not provided through the state, in part due to value laden judgments of the perceived benefit as superficial.

It is clear that the weight of evidence addressing the psychological impact of plastic surgery on appearance concerns has been flawed through methodological issues. These include the problem of retrospective reporting, leading to possibly inflated measures of benefit through cognitive dissonance, demand effects, and the Hawthorne effect. For example, cognitive dissonance may operate when a patient uses the fact that they have had surgery as the basis for an evaluative judgment of the value of such surgery. In these circumstances, they would tend to provide a positive outcome evaluation to justify their own behaviour. Furthermore, there is a dearth of meaningful comparison groups. Without a surgical comparison group, outcome investigations leave themselves open to “third variable” explanation. For example, a reduction

in anxiety post operatively may be simply relief from pre-operative anxiety, rather than reflecting anxiety about the condition itself. Previous work has also conflated measures of patient satisfaction with surgery with measures of distress and well-being resulting from surgery (e.g., Honigman, Phillips, & Castle, 2004). Hypothetically, it is quite feasible that patients may be satisfied with surgery *per se*, but still unhappy with their appearance, with a significant impact on quality of life, mood and behaviour - particularly if they have low expectations of surgery. However, even in relevant large scale studies this notion has not been tested (e.g., Perrogon, 2003).

The day to day experience of patients seeking aesthetic plastic surgery can be one of great emotional distress and behavioural disruption. Reports of high levels of fear of negative evaluation, shame, anxiety accompanied by an avoidance of social situations and more intimate relationships (cf. Moss, 1998).

Our aim in this study was to address these methodological issues in patients having aesthetic plastic surgery, using a prospective design, and including a comparison condition of patients undergoing surgery which was not appearance altering. We hypothesised that aesthetic plastic surgery would provide psychological benefits in relation to appearance self-consciousness which would not be observed in the non-aesthetic surgery group.

METHOD

Design

The study was a prospective, controlled, quasi-experimental design comparing plastic surgery patients at three time periods (T1 (pre-operative), T2, (3 months post-operative), T3 (12 months post-operative)) with a comparison surgical group (CSG), measured at two time points

(T1 and T2). Three time points were included for the PSG as appearance changes continue over this period through the healing process.

Participants

Participants were English speaking adults. Fifty-one patients (67% female) in the plastic surgery group (PSG) were receiving aesthetic surgical treatment to one of three locations (18 nose, 18 breasts, 15 upper limb) with the primary function of changing appearance, and none with the primary aim of functional change. Breast operations were mainly breast reductions; upper limbs were mainly tattoo excision/grafting. Of these, four provided data at T1 only, 10 at T1 and T2, eight at T1 and T3, and 29 at T1, T2, and T3. The mean age of PSG was 29 years (sd 9). No participants declined to take part in the study in this condition. The CSG comprised 105 participants (58% female) admitted for non-appearance altering surgery (though general surgery, ENT, and maxillofacial surgery clinics), of whom 61 provided data at T1, and 44 at both T1 and T2. The mean age of the CSG was 37 years (sd 10). Approximately 15% participants declined to take part in the study in this condition. Age and gender were not differentially represented across condition or body sites. To make appropriate appearance comparisons, the CSG were randomly allocated “nose”, “breasts”, or “upper limb” to consider when they completed their measures. Attrition rates did not systematically vary according to diagnostic category, age or sex, and drop-outs were not systematically different from those who were retained.

Measures

Affective psychological functioning

To measure anxiety, the Crown-Crisp Experiential Inventory (Crown and Crisp, 1979) Anxiety subscale was used. This was chosen as it measures non-somatic anxiety, to avoid confounding this measure with physical symptomatology associated with the cause of surgery in either participant group. Depression was assessed with the Beck Depression Inventory (Beck, Ward and Mendleson, 1961). Both of these measures report strong psychometric properties, including good test-retest reliability and good internal validity. Criterion validity with other measures and clinical observation is high.

Emotional and Behavioural Consequences of Appearance Self-Consciousness

This was assessed using the Derriford Appearance Scale 24 (Carr, Moss & Harris, 2005). This 24 item measure examines frequency of avoidant/maladaptive behaviours and distress related to concern about appearance. It has strong psychometric properties, including Cronbach's $\alpha = 0.92$, test-retest correlation of $r = 0.68$ (6 months), and moderate correlations ($r = 0.5$) with negative affect, social anxiety and shame, indicating appropriate criterion construct validity.

Procedure

Participants were administered the psychological measures at routine scheduled outpatient appointments – pre-operatively, three months post-operatively, and for the PSG, 12 months post-operatively.

RESULTS

Data were initially tested through a three-way ANOVA with three independent variables - time (T1 vs T2), group (PSG versus CSG) and location for each of the three dependent variables. Missing data were handled by pairwise deletion.

Anxiety was higher in the plastic surgery patients than the controls preoperatively ($m=7.4$, $sd=4.2$ compared to $m=5.8$, $sd=3.8$), and lower post-operatively ($m=4.9$, $sd=3.8$ compared to $m=5.4$, $sd=4.1$); this two-way interaction was significant ($F(1,75)=6.2$, $p=0.015$), indicating a significant anxiety reduction in plastic surgery patients ($t(38) = 4.4$, $p<0.005$), and no significant decrease than the comparison group.

For depression, a main effect of time (T1 versus T2) was observed ($F(1,77)=4.4$, $p=0.04$), indicating a reduction in depression post-operatively from a mean of 7.6 ($sd=7.2$) to 5.9 ($sd=8.5$). There were no significant interactions, indicating changes were unrelated to experimental group or body site.

In the PSG data were also collected at T3. There were no significant differences between T2 and T3 for anxiety (T2 $m = 4.3$, $sd = 3.4$, T3 $m= 4.6$, $sd = 3.6$) or depression (T2 $m = 4.6$, $sd = 6.2$, T3 $m= 4.1$, $sd = 4.0$), indicating that initial improvements in anxiety and depression were maintained.

For the DAS24 appearance concern specific measure, more complex findings emerged. There was a significant three way interaction ($F(2,77)=10.2$, $p<0.005$) between time (T1 versus T2), group (PSG versus comparisons) and body site (nose, upper limb, breast).

A post-hoc analysis of the mean scores (with appropriate bonferroni corrections) demonstrated that PSG DAS24 scores were significantly improved post-surgery, unlike the CSG ($F(1,77)=69.8$, $p<0.005$). However, at T2, this was only the case for the rhinoplasty and breast operations amongst the PSG, and not the upper limb operations ($F(2,23)=7.1$, $p<0.005$).

An additional analysis, on the PSG at T3, demonstrated that the improvement in DAS24 scores for breast and rhinoplasty operations was maintained at T3. Furthermore, at this stage, there was also a significant improvement in upper limb patients (see figure 1). Improved DAS24 scores were comparable to norm scores for the general population (Moss, Carr and Harris, 2004), indicating the clinical significance of this change. There were no significant differences between T2 and T3 for anxiety or depression, indicating that initial improvements in anxiety and depression were maintained.

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DISCUSSION

The findings of this study demonstrate that in comparison to patients who undergo non-appearance altering surgery, aesthetic plastic surgery patients demonstrate clear improvements in

emotional and behavioural difficulties related to appearance concerns, as measured by the DAS24. Both groups were less depressed post-operatively, and although significant in both groups, improvements in anxiety were greater in the PSG. Furthermore, the improvements in appearance adjustment were related to healing time; rhinoplasty and breast surgery appearance improvements are apparent in the first three months, whereas typically, upper limb surgery does not objectively improve appearance until a later stage in healing. The improved DAS24 scores at three months for rhinoplasty and breast surgery, but only at 12 months for upper limb surgery provide evidence that objective improvements in appearance were in this case related to psychological appearance adjustment, and that psychological benefits of the surgery were beyond the amelioration of pre-operative anxiety. The size of the DAS24 changes indicates clear clinical, as well as statistical significance. This also provides evidence that appearance adjustment as measured by the DAS24 may be body-site specific in this context – that is, that the improvements in psychological well being related to distress and behavioural avoidance in relation to concern about specific body parts, rather than general appearance.

This study is more methodologically improved upon others investigating this evidence base (Cook, Rosser and Salmon, 2006). However, some weaknesses must be addressed. Including a CSG was a relative strength of the study. However, the resulting quasi-experimental design is open to the possibility of confounding factors. Whilst every effort was made to ensure that the CSG was equivalent, unknown “third variable” explanations cannot be eliminated.

A second limitation is the range of plastic surgical procedures used. Although there is no evidence of a variation in adjustment pattern by treatment type in the published literature (cf. Moss, 1997), it is feasible that other surgical procedures may have a different pattern of impact. Finally, the group numbers do reduce analytical power. Although attrition in this study was not

dependent on diagnostic or demographic characteristics of patients, and as such, the greatest impact is likely to have been on reduction in statistical power rather than to distort findings, it is possible that some non-significant findings in this study represent real differences with small effect sizes. However, given that clinical significance is of perhaps greater importance than statistical significance, this is an issue which remains moot. Finally, it is worth noting that patient gender is likely to interact with processes involved in post operative adjustment for appearance concerns. This study was not able to directly address this, and so future investigation tackling this would be of benefit. Further study should also address the role of cognitive dissonance in surgical success. It was suggested above that this phenomenon may play a part in positive reports of surgical success – that is, that patients would report positive views of surgery in part as an unconscious justification for having had it. If this were the case, it would be likely that the three measures used would follow a similar pattern to each other. As it was, the results demonstrated greater sensitivity for the appearance specific measure. Nevertheless, an investigation of the role of cognitive dissonance following cosmetic surgery remains a worthwhile enterprise.

Further work in this area should be directed to these issues – of greater numbers, and a more diverse plastic surgery population. We would also argue strongly that it is crucial to use appearance specific measures, rather than rely simply on general measures of mental health or social function. In this study, only the DAS24 was sensitive and specific enough to this population's concerns to identify differentiate them from the comparison surgery group. There is a danger that audit and more systematic exploration of plastic surgery benefits will miss real

effects unless appropriate measures are more widely used. Furthermore, it would be beneficial to examine stability and change over a longer time period than was possible in this study.

Given that subjective appearance evaluation is more predictive of appearance adjustment than objective, expert evaluation, (Moss, 2005) it is clear that there is unlikely to be a simple relationship between surgical outcome and appearance adjustment. Consequently, in order to both predict and facilitate future positive adjustment in plastic surgery patients, the psychological characteristics of those who benefit most compared to those who benefit less need to be addressed through collaboration of surgical and psychological expertise.

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Figure captions

Figure one: Mean scores and 95% confidence intervals of appearance adjustment (DAS24) by time and body site in the PSG