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ABSTRACT

Background: **Reduction mammoplasty is a well-established procedure that alleviates both physical and psychological symptoms associated with macromastia. Despite its medical benefits, some insurance providers classify the procedure as primarily cosmetic or impose arbitrary weight criteria for reimbursement. This review explores the relationship between excised tissue weight and symptomatic relief in patients undergoing reduction mammoplasty.**

Objectives: **To provide a comprehensive narrative synthesis of the literature regarding symptom improvement following reduction mammoplasty, regardless of excision weight.**

Methods: **A literature review was conducted using PubMed and Google Scholar to identify relevant studies on reduction mammoplasty and its impact on symptoms. Key studies were analyzed thematically to assess patterns and findings regarding symptom relief and its correlation with tissue resection weight.**

Results: **Across multiple studies, patients reported significant relief from macromastia-related symptoms, including pain, postural discomfort, and psychosocial distress, irrespective of the volume of breast tissue removed. Some studies suggested a correlation between larger resections and symptom relief, but the majority of the literature indicates that even smaller reductions can yield meaningful improvements. Additionally, factors such as body mass index (BMI) and preoperative symptom severity play a role in determining outcomes.**

Conclusion: **Given the consistent evidence of symptom relief independent of tissue resection weight, insurance providers should reconsider rigid weight-based criteria for coverage. Further research should focus on patient-reported outcomes and functional improvement as primary measures for determining the necessity of reduction mammoplasty.**

INTRODUCTION

Macromastia, or breast hypertrophy, is a condition characterized by excessive breast tissue growth disproportionate to body size (1). When the removal of 1,000 to 2,000 grams of breast tissue per breast is required, the condition is often referred to as gigantomastia (2,3). This condition significantly affects both the physical and psychological well-being of affected women. Physically, it can cause persistent pain in the shoulders, neck, and back, as well as intertriginous rashes in the inframammary folds, kyphosis, and other neuropathies (2,4). Psychologically, women with macromastia may experience social stigma, difficulty participating in sports, and challenges finding properly fitting clothing. These factors often contribute to depression, anxiety, and low self-esteem, ultimately diminishing their overall quality of life (5).

The use of conservative therapies for treating patients with macromastia has proven ineffective in alleviating their symptoms, and there are no published studies endorsing this treatment approach (6). Various research studies have demonstrated that reduction mammoplasty can reduce physical symptoms and enhance the quality of life for those affected (6). Research shows that breast reduction surgery leads to increased physical activity levels, weight loss, and improvements in eating habits (7). The removal of the functional restrictions caused by macromastia

enhances a woman's self-esteem and psychological health (7,8). Most women with macromastia choose to undergo reduction mammoplasty due to the associated health benefits of the procedure. Various techniques can be employed for breast reduction surgery, including liposuction, free nipple grafting, and several designs for pedicles and skin resections (8).

Despite the proven benefits of reduction mammoplasty, insurance companies frequently impose minimum weight thresholds (e.g., 500 grams per breast) as a requirement for coverage, arguing that smaller reductions do not provide sufficient medical benefit (9,10). However, many patients report substantial symptomatic relief even when excised tissue volume is below this arbitrary threshold (11). This review examines the literature to determine whether a direct correlation exists between resection weight and symptom improvement.

LITERATURE REVIEW

This narrative review was conducted by searching PubMed and Google Scholar for relevant literature on reduction mammoplasty and its impact on symptom relief. The search strategy included terms such as "reduction mammaplasty," "breast reduction surgery," "tissue weight," "mass removed," "symptom improvement," "pain relief," and "quality of life." Studies were selected based on their relevance to the research question, with no restrictions on publication date or language.

Inclusion criteria focused on studies that evaluated postoperative symptom relief in relation to the amount of breast tissue resected. Both prospective and retrospective cohort studies were considered. Review articles, case reports, and non-English studies were excluded. Extracted data included sample size, average resected weight, patient BMI, proportion of symptomatic improvement, and follow-up duration. Findings were synthesized thematically rather than statistically, following a qualitative approach characteristic of narrative reviews.

Symptom Relief Following Reduction Mammoplasty

Numerous studies have demonstrated that reduction mammoplasty leads to significant improvements in physical and psychological well-being. Following a study of 100 patients with macromastia by Marcia Freire *et al*. in 2007 and a study by Chao *et al*. in 2002, it was evident that breast hypertrophy caused neck and lower back pain (2,4). The pain assessment of the patients was evaluated before and six months after reduction mammoplasty and the mean intensity drop was calculated for the neck and lower back pain. For the lower back, the mean pain intensity dropped from 5.7 - 1.3 while that of the neck dropped from 5.2 - 0.9. It was therefore concluded that reduction mammoplasty is effective in getting rid of neck and lower back pain (2).

Pruritus in the inframammary fold, which is another of the physical symptoms of macromastia, is also alleviated following reduction mammoplasty. Jason A Spector *et al*. in 2008 showed alleviation in intertrigo after reduction mammoplasty (9). Another study comprising 124 patients reported marked symptoms relief, including pruritus, following reduction mammoplasty with a higher overall satisfaction rate (12). The improvement in inframammary intertrigo appears to be independent of age, body mass index and postoperative time to follow-up (13,14).

Psychological benefits have also been well documented, with patients reporting improved self-esteem and body image postoperatively. Many individuals find greater ease in participating in physical activities, contributing to long-term health benefits beyond immediate pain relief (11,15).

Interestingly, beneficial effects of reduction mammoplasty are reportedly sustained over a long period of time. For instance, a study by Goulart Jr *et al*., 2013 found that reduction mammoplasty improved body posture and reduced pain in the upper limbs and spine at 60- and 90-days post-surgery (6). Moreover, Nuzzi and colleagues report the improvements in physical wellbeing up to 5years postoperatively while Bai and colleagues found that the symptoms of macromastia were still significantly reduced 15 years post-surgery (12,16).

The Role of Excision Weight in Symptom Improvement

The effectiveness of reduction mammoplasty in alleviating macromastia-related symptoms is well-established. However, the relationship between excised tissue weight and the degree of symptom improvement has been explored with varied findings. While some studies support the notion that larger resections yield greater relief, others challenge the significance of tissue weight as a determining factor in postoperative outcomes. A third group of studies, despite not conducting formal correlation analyses, has documented substantial symptom improvement even at lower resection weights, suggesting that additional factors may influence patient outcomes.

Several studies have found a positive correlation between excised tissue weight and symptom relief. Bruhlmann and Tschopp (1998) reported that patients who underwent larger resections experienced greater reductions in macromastia-associated symptoms. Similarly, Bilgen Can (2021) observed a comparable

trend but focused specifically on headache relief rather than overall pain reduction, noting that patients with greater tissue removal reported more significant reductions in headache frequency and intensity (17,18). These findings reinforce the widely held assumption that a greater reduction in breast volume translates to greater symptom alleviation.

Conversely, other studies have found no direct correlation between the amount of tissue removed and symptom improvement. For instance, Spector *et al*. (2008) demonstrated that although patients reported significant relief from macromastia-related symptoms postoperatively, symptom reduction was comparable across all four groups stratified by resection weight (9). Similarly, Strong *et al*. (2015), in a study of 410 patients undergoing reduction mammoplasty for back and neck pain, found substantial symptom relief across all patient groups. While those who underwent larger resections exhibited improvements, patients with smaller resection volumes (<251 g) also experienced marked reductions in their symptoms (14). Additionally, an earlier study reported significant symptom improvement even with resections of less than 500 g of breast tissue (4). More recently, a study categorizing patients based on excision weight found no significant difference in postoperative physical and psychological symptom relief across groups, with sustained improvements at multiple follow-up time points (19). These findings challenge the assumption that larger resections necessarily yield better outcomes and suggest that factors beyond tissue weight may influence postoperative recovery.

Even in studies that did not conduct formal correlation analyses, significant symptom relief has been observed at lower resection weights, further questioning the assumption that larger excisions amount to better outcomes. Blomqvist *et al*. (2000) reported substantial improvement in symptoms with as little as 158 g of tissue removed, while Makki and Ghanem (1998) found similar benefits with resections as low as 243 g. Likewise, Harbo *et al*. (2003) noted that all patients in their study experienced relief from neck and shoulder discomfort with excisions as small as 372 g (15,20,21). These findings suggest that symptom improvement may be influenced by a combination of factors beyond tissue weight alone, including individual body frame, breast tissue distribution, and the severity of preoperative symptoms.

Collectively, the evidence indicates that while some studies support a weight-dependent relationship, others highlight substantial symptom relief regardless of resection weight. This underscores the need for a more nuanced approach to patient renumeration—one that considers individual patient characteristics rather than relying solely on excision weight as a predictor of postoperative success.

Influence of BMI on Surgical Outcomes

Body mass index (BMI) has emerged as a key factor influencing both the extent of tissue resection and patient outcomes. Studies have shown that individuals with higher BMI often undergo larger resections. For example, Goulart *et al*. (2013) and Sood *et al*. (2003) reported that patients with BMI above 30 kg / m² tended to have resections exceeding 1800 grams, while those with lower BMI had smaller reductions but still experienced significant symptom relief (6,22). Importantly, Atterhem and colleagues reported a positive correlation between excision weight and BMI (23). However, BMI has been shown to not affect the relief of symptoms or occurrence of complications following breast reduction surgery (24). This highlights the importance of considering patient-specific factors rather than relying solely on excision weight for insurance reimbursement.

Conflicting Findings and the Need for Further Research

While most studies indicate that symptom relief is independent on weight removed, a few have found conflicting results. For instance, Bruhlmann and Tschopp (1998) and Bilgen Can (2021) suggested that larger resections correlate with better outcomes (17,18). However, these studies had longer follow-up periods and specific inclusion criteria that may have influenced their findings. Additionally, studies with shorter follow-up times (e.g., Harbo *et al*., 2003) reported 100% symptom relief despite varying resection weights, suggesting that long-term symptom recurrence may play a role in differing conclusions (15).

A key consideration when interpreting these conflicting findings is the variability in surgical techniques, symptom assessment tools, and follow-up durations used across studies. Different studies employed various surgical approaches, including the inferior pedicle, superior pedicle, medial pedicle, and free nipple graft techniques, each of which may influence postoperative symptom relief differently. Additionally, the tools used to assess symptoms varied, with some studies relying on validated pain scales such as the Visual Analogue Scale (VAS), while others used custom patient questionnaires, leading to potential discrepancies in reported symptom improvement. Furthermore, follow-up durations ranged widely between studies, from a few weeks to several years, which may have impacted the extent of recorded symptom relief. Shorter follow-up periods may not capture long-term improvements or late-onset complications, while longer follow-ups may introduce recall bias or loss to follow-up. These methodological differences likely contributed

to the variation in study outcomes, underscoring the need for standardized assessment methods in future research.

Despite the valuable insights provided by these studies, there are still research gaps. Further investigations could explore the influence of other factors, such as body mass index (BMI), age, and specific surgical techniques, on the relationship between excision weight and symptom improvement. Additionally, long-term studies assessing the durability of symptom improvement in relation to excision weight would be beneficial. A more standardized approach to measuring and reporting symptom improvement and excision weight could also facilitate comparisons across different studies.

Implications for Insurance Coverage Policies

The reliance on arbitrary weight thresholds for coverage is problematic as it may exclude patients who would benefit from surgery but do not meet the resection requirements. Several studies highlight that women with smaller frames often have less breast tissue available for removal but still suffer from the same physical and psychological burdens as those with larger breasts.

Given this, some researchers advocate for insurance policies to be guided by functional impairment rather than tissue weight. Assessing patient-reported outcomes through standardized quality-of-life measures may provide a more equitable basis for coverage decisions.

CONCLUSION

The current body of literature overwhelmingly supports the effectiveness of reduction mammoplasty in alleviating the symptoms of macromastia, irrespective of the weight of excised tissue. While larger resections may provide enhanced relief in some cases, smaller reductions are still beneficial and should not be dismissed by insurance providers. BMI and other patient-specific factors also play a crucial role in determining outcomes.

Thus, third-party payers should reconsider rigid weight-based criteria and instead focus on patient-reported functional improvements when evaluating the medical necessity of reduction mammoplasty. Future research should continue to explore long-term outcomes and refine insurance guidelines to ensure equitable access to care for all patients experiencing macromastia-related symptoms.

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