Optimizing Outcomes in Macromastia: The Role of Bi-pedicled (McKissock-Based) Reduction Mammaplasty

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Abstract

Background: Macromastia is a common condition that significantly affects physical health, psychological well-being, and overall quality of life. Patients frequently present with symptoms such as chronic back and neck pain, intertrigo, bra strap grooving, and functional limitations. Reduction mammaplasty remains the gold standard treatment, offering both functional relief and aesthetic improvement. Among the various surgical techniques, pedicle design plays a critical role in determining vascular safety, nipple-areola complex (NAC) viability, sensory preservation, and aesthetic outcomes. The bi-pedicled technique originally described by McKissock represents a historically significant approach that combines superior and inferior dermoglandular pedicles to enhance vascular reliability.

The modified McKissock technique has gained renewed attention in modern practice due to its applicability in patients with severe macromastia, long sternal notch-to-nipple distances, and high-risk vascular profiles. By preserving dual blood supply, this approach aims to reduce complications such as NAC necrosis, fat necrosis, and wound dehiscence while maintaining acceptable breast projection and contour. Despite the emergence of alternative techniques—including superomedial, inferior, and vertical scar methods—the role of bi-pedicled reduction remains particularly relevant in selected patient populations where vascular compromise is a concern.

This review aims to critically evaluate the current evidence regarding the modified McKissock technique in reduction mammaplasty, with a focus on aesthetic outcomes, patient satisfaction, and safety profile. Additionally, it explores surgical modifications, patient selection criteria, and comparisons with other commonly used pedicle techniques. Emphasis is placed on identifying scenarios where the bi-pedicled approach offers distinct advantages over single-pedicle methods.

In conclusion, while newer techniques have dominated contemporary breast reduction practice, the bi-pedicled (McKissock-based) approach remains a valuable and reliable option in managing complex macromastia cases. Its dual vascular supply provides a safety advantage in high-risk patients, and when appropriately executed, it can achieve satisfactory aesthetic outcomes with high patient satisfaction. Future studies with standardized outcome measures and long-term follow-up are needed to better define its role within the evolving landscape of reduction mammaplasty.

Keywords: *Outcomes ,Macromastia, Bi-pedicled Reduction Mammaplasty*

Introduction

Macromastia represents a significant clinical condition characterized by excessive breast volume leading to a spectrum of physical, functional, and psychosocial burdens. Patients commonly experience chronic cervical and thoracic pain, shoulder grooving, inframammary intertrigo, and limitations in physical activity, all of which negatively impact quality of life. Beyond physical symptoms, macromastia is also associated with psychological distress, including body image dissatisfaction and reduced self-esteem. Reduction mammaplasty has consistently demonstrated efficacy in alleviating these symptoms while

improving both functional capacity and aesthetic appearance, making it one of the most rewarding procedures in plastic surgery practice [1].

Over the decades, numerous surgical techniques for breast reduction have been developed, largely differing in skin resection patterns and pedicle design. The choice of pedicle is particularly critical, as it determines the vascularity, innervation, and viability of the nipple–areola complex (NAC), as well as long-term breast shape and projection. Commonly used techniques include inferior, superior, superomedial, and central pedicles, each with distinct advantages and limitations. Despite the growing popularity of vertical scar and superomedial pedicle techniques in contemporary practice, concerns remain regarding their reliability in patients with severe macromastia, long nipple transposition distances, or compromised vascularity [2].

The bi-pedicled technique introduced by McKissock in 1972 marked a pivotal development in reduction mammaplasty by incorporating both superior and inferior dermoglandular pedicles to ensure dual blood supply to the NAC. This concept aimed to enhance vascular safety, particularly in large-volume reductions where the risk of ischemic complications is elevated. While the original McKissock technique was associated with certain drawbacks, including increased breast bulk and less optimal shaping, subsequent modifications have sought to refine the approach by improving contour, reducing parenchymal redundancy, and optimizing aesthetic outcomes [3].

In recent years, there has been renewed interest in revisiting the modified McKissock technique, particularly for complex cases of macromastia and gigantomastia. Surgeons are increasingly recognizing the value of a dual-pedicle approach in high-risk patients, such as smokers, obese individuals, and those with significant ptosis or extended sternal notch-to-nipple distances. In such scenarios, maximizing vascular reliability becomes a priority, sometimes outweighing the benefits of shorter scars or more contemporary shaping techniques [4].

Despite its theoretical advantages, the role of the modified McKissock technique in modern breast reduction remains inadequately defined in the literature. Many existing studies focus on single-pedicle approaches, and there is a relative scarcity of high-quality comparative data evaluating outcomes such as complication rates, aesthetic results, and patient-reported satisfaction in bi-pedicled reductions. Furthermore, variations in surgical modifications and lack of standardized outcome measures contribute to inconsistencies in reported results [5].

Aim and Research Gap

This review aims to critically analyze the role of bi-pedicled (McKissock-based) reduction mammaplasty in optimizing outcomes for patients with macromastia. It seeks to evaluate its safety profile, aesthetic performance, and patient satisfaction in comparison with other established techniques, while also highlighting key surgical modifications and indications.

The primary research gap lies in the limited synthesis of contemporary evidence regarding dual-pedicle techniques in the era of modern breast reduction. By addressing this gap, the present review intends to clarify the current relevance of the modified McKissock approach and provide evidence-based guidance for surgical decision-making in complex macromastia cases.

Surgical Anatomy and Vascular Basis of the Nipple–Areola Complex (NAC)

Understanding the surgical anatomy and vascular supply of the nipple–areola complex (NAC) is fundamental to the safe execution of reduction mammaplasty, particularly when employing techniques that rely on dermoglandular pedicles. The viability of the NAC depends on a rich and variable blood supply derived primarily from perforating branches of the internal mammary artery, the lateral thoracic artery, and contributions from the thoracoacromial and intercostal vessels. These vessels form an extensive subdermal and intraglandular plexus that allows for a degree of redundancy, which is crucial when tissue rearrangement is performed during breast reduction procedures [6].

The internal mammary artery provides dominant perforators, especially in the medial and central portions of the breast, while the lateral thoracic artery contributes significantly to the lateral and inferior regions. Intercostal perforators further augment this vascular network by supplying the deep parenchyma and overlying skin. The interplay between these vascular territories ensures that multiple pedicle designs

can maintain adequate perfusion, provided that critical perforators are preserved during dissection. This anatomical redundancy forms the theoretical basis for both single- and dual-pedicle techniques in reduction mammaplasty [7].

Venous drainage of the NAC is equally important and generally parallels arterial inflow, occurring through superficial and deep venous systems that ultimately drain into the internal thoracic and axillary veins. Compromise of venous outflow can be as detrimental as arterial insufficiency, leading to congestion, edema, and eventual tissue necrosis. Therefore, surgical techniques must not only preserve arterial inflow but also ensure adequate venous return by avoiding excessive pedicle compression, torsion, or narrowing [8].

Innervation of the NAC is predominantly provided by the lateral and anterior cutaneous branches of the fourth, fifth, and sixth intercostal nerves. Among these, the lateral branch of the fourth intercostal nerve is considered the most critical for preserving nipple sensation. Surgical dissection that disrupts these neural pathways can lead to partial or complete sensory loss, which is an important consideration in patient satisfaction and postoperative quality of life. Pedicle choice can influence the likelihood of nerve preservation, with some techniques offering better outcomes in maintaining sensation than others [9].

The concept of dermoglandular pedicles in breast reduction is based on maintaining an intact segment of tissue that carries both vascular and neural supply to the NAC. In the McKissock technique, the use of a bi-pedicled approach—combining superior and inferior pedicles—leverages dual vascular input to enhance the reliability of NAC perfusion. This is particularly advantageous in cases involving large resections or long transposition distances, where single-pedicle techniques may be at higher risk of ischemic complications [10].

An additional anatomical consideration is the variability in breast size, shape, and degree of ptosis among patients with macromastia. As breast volume increases, the distance between the NAC and its vascular origin also increases, potentially placing the NAC at risk during transposition. In such scenarios, preserving multiple vascular pathways becomes increasingly important. The bi-pedicled approach provides a safeguard by maintaining both superior and inferior blood supply, thereby reducing the risk of vascular compromise in extreme cases [11].

From a surgical perspective, careful planning of pedicle width, length, and orientation is essential to maintain adequate perfusion while allowing sufficient mobility for repositioning the NAC. Excessive thinning or over-resection of the pedicle can jeopardize blood flow, whereas overly bulky pedicles may compromise aesthetic outcomes by limiting breast shaping. The modified McKissock technique attempts to balance these factors by selectively reducing parenchymal bulk while preserving critical vascular connections [12].

In summary, the vascular and neural anatomy of the NAC underpins all reduction mammaplasty techniques and directly influences surgical outcomes. The dual blood supply inherent in the bi-pedicled McKissock approach provides a robust anatomical advantage, particularly in high-risk or complex cases of macromastia. A thorough understanding of these anatomical principles is essential for optimizing both safety and aesthetic results in breast reduction surgery [13].

Evolution of Reduction Mammaplasty Techniques and the Emergence of McKissock's Concept

The evolution of reduction mammaplasty reflects a continuous effort to balance aesthetic outcomes with surgical safety, particularly regarding preservation of the nipple–areola complex (NAC). Early breast reduction techniques in the late 19th and early 20th centuries were largely limited by poor understanding of vascular anatomy, often resulting in high complication rates, including NAC necrosis and unsatisfactory cosmetic results. Initial approaches primarily involved free nipple grafting, which, although effective in reducing volume, sacrificed sensation and lactational capability, limiting its desirability especially in younger patients [14].

The mid-20th century marked a turning point with the introduction of pedicle-based techniques, which aimed to preserve the vascular and neural integrity of the NAC. Pioneers such as Strombeck advanced the field by describing dermoglandular pedicles that maintained blood supply while allowing significant tissue resection. These techniques significantly reduced complications compared to free nipple grafting

and laid the groundwork for modern breast reduction surgery. However, early pedicle designs were still associated with limitations in cases of severe macromastia, particularly when long transposition distances increased the risk of vascular compromise [15].

Subsequent innovations led to the development of various pedicle orientations—including inferior, superior, medial, lateral, and central pedicles—each designed to optimize specific aspects of breast shaping and vascular reliability. The inferior pedicle technique gained widespread popularity due to its robust blood supply and versatility, particularly in large-volume reductions. However, it has been associated with issues such as bottoming-out and less optimal upper pole fullness. Conversely, superior and superomedial pedicles offer improved aesthetic contour and projection but may be less reliable in cases requiring extensive NAC elevation [16].

It was within this context that McKissock introduced his bi-pedicled vertical bipedicle technique in 1972, representing a significant advancement in the safety of reduction mammaplasty. By preserving both superior and inferior dermoglandular pedicles, the McKissock technique provided dual vascular inflow to the NAC, thereby enhancing perfusion and reducing the risk of ischemic complications. This innovation was particularly valuable in patients with severe macromastia, where maintaining adequate blood supply during large resections posed a significant challenge [17].

Despite its advantages in vascular safety, the original McKissock technique was not without criticism. Surgeons reported issues such as excessive breast bulk, limited projection, and less refined aesthetic outcomes compared to newer techniques. Additionally, the presence of two pedicles sometimes restricted the degree of parenchymal reshaping, leading to a more boxy breast contour. These limitations contributed to a gradual decline in its popularity as more aesthetically focused techniques emerged [18].

In response to these concerns, several modifications of the McKissock technique have been proposed over the years. These include selective thinning of the pedicles, strategic parenchymal resection to improve contour, and adaptations in skin incision patterns to enhance scar quality. Modern variations aim to retain the original advantage of dual vascular supply while addressing aesthetic shortcomings, making the technique more compatible with contemporary surgical expectations [19].

The rise of vertical scar techniques and the increasing preference for superomedial pedicles in recent decades have shifted the focus of reduction mammaplasty toward improved aesthetic outcomes, shorter scars, and better long-term breast shape. Nevertheless, these approaches may not always be ideal for patients with extreme macromastia or those at higher risk of vascular compromise. In such cases, the principles underlying the McKissock technique continue to offer valuable solutions, particularly when safety is prioritized over minimal scarring [20].

In contemporary plastic surgery practice, there is a growing recognition of the need for individualized surgical planning based on patient-specific factors such as breast size, degree of ptosis, comorbidities, and surgeon experience. Rather than being obsolete, the McKissock technique has found a niche role in complex cases where dual-pedicle vascularity provides a distinct advantage. This resurgence highlights the importance of revisiting classical techniques and adapting them to modern standards of care [21].

Surgical Technique of the Modified McKissock Bi-pedicled Reduction Mammaplasty

The modified McKissock bi-pedicled reduction mammaplasty is a refinement of the original dual-pedicle concept, designed to preserve the robust vascularity of the nipple–areola complex (NAC) while improving aesthetic contour and reducing excessive parenchymal bulk. The technique combines superior and inferior dermoglandular pedicles, allowing dual blood supply to the NAC, which is particularly advantageous in patients with severe macromastia, long sternal notch-to-nipple distances, or compromised vascular status. Preoperative planning is essential and includes detailed assessment of breast size, degree of ptosis, skin quality, and patient expectations, as well as precise marking of the new NAC position [23].

Preoperative markings are typically performed with the patient in the upright position. The Wise pattern (inverted-T incision) is most commonly utilized, as it facilitates adequate skin resection and access for large-volume reductions. The new NAC position is generally marked at the level of the inframammary fold or slightly above, depending on breast dimensions and patient anatomy. The vertical limbs and

horizontal components are carefully designed to ensure symmetry and optimal postoperative contour. Accurate markings are crucial, as errors at this stage can significantly affect both aesthetic outcomes and NAC positioning [24].

Following induction of anesthesia, the procedure begins with de-epithelialization of the skin overlying the planned superior and inferior pedicles. Care is taken to preserve an adequate thickness of dermoglandular tissue to maintain vascular integrity. The superior pedicle is typically based on perforators from the internal mammary system, while the inferior pedicle retains blood supply from intercostal and lateral thoracic vessels. Maintaining sufficient width and avoiding excessive thinning of these pedicles are critical to ensure reliable perfusion of the NAC [25].

Parenchymal resection is then performed, primarily targeting the lateral, medial, and central breast tissue while preserving the dual pedicles. One of the key modifications in modern practice is the selective debulking of central glandular tissue to prevent postoperative breast heaviness and boxy contour, which were common criticisms of the original McKissock technique. This step requires careful judgment to balance adequate volume reduction with preservation of structural support and vascular connections [26].

The NAC is subsequently transposed to its new position without complete detachment, relying on the combined vascularity of both pedicles. The dual-pedicle design minimizes tension and reduces the risk of ischemia during transposition, especially in cases requiring significant elevation. This is one of the major advantages of the modified McKissock approach compared to single-pedicle techniques, where long pedicle length may compromise blood flow [27].

Breast shaping is achieved through strategic approximation of the medial and lateral pillars, along with contouring of the remaining parenchyma. Modern modifications emphasize internal suturing techniques to enhance projection and upper pole fullness, addressing one of the historical limitations of the technique. The inferior pedicle may also be partially trimmed or repositioned to improve breast shape and reduce the risk of bottoming-out over time [28].

Skin closure is performed in layers following re-draping of the skin envelope. The Wise pattern results in an inverted-T scar, which, although more extensive than vertical scar techniques, allows for better management of excess skin in large-volume reductions. Drains may be used depending on surgeon preference and intraoperative findings. Meticulous closure technique is important to minimize wound complications, particularly at the T-junction, which is a common site of delayed healing [29].

Postoperative care includes monitoring of NAC viability, wound healing, and early detection of complications such as hematoma, infection, or fat necrosis. Patients are عادة advised to wear supportive garments and avoid strenuous activity during the initial recovery period. Long-term follow-up is essential to assess aesthetic outcomes, breast shape stability, and patient satisfaction. When properly executed, the modified McKissock technique can provide reliable results with a favorable safety profile, particularly in complex macromastia cases [30].

In summary, the modified McKissock bi-pedicled technique represents a balance between vascular safety and aesthetic refinement. Through careful planning, preservation of dual pedicles, and incorporation of modern contouring strategies, it remains a valuable option in the surgical management of challenging breast reduction cases. Its adaptability and reliability continue to support its role in contemporary plastic surgery practice [31].

Indications, Patient Selection, and Contraindications

Appropriate patient selection is a cornerstone of successful reduction mammaplasty and is particularly critical when considering the modified McKissock bi-pedicled technique. While many reduction techniques can achieve satisfactory outcomes in moderate macromastia, the bi-pedicled approach is especially advantageous in complex cases where vascular reliability is a primary concern. A thorough preoperative evaluation—including medical history, breast measurements, comorbidities, and patient expectations—is essential to determine the most suitable surgical strategy [32].

One of the primary indications for the modified McKissock technique is **severe macromastia or gigantomastia**, particularly when large-volume resections are anticipated. In these patients, the distance

between the nipple–areola complex (NAC) and its vascular origin is significantly increased, raising the risk of ischemia during transposition. The dual-pedicle design provides enhanced perfusion, making it a safer option compared to single-pedicle techniques that may be stretched beyond their vascular limits in such scenarios [33].

Another key indication is **long sternal notch-to-nipple (SN–N) distance**, often exceeding 35–40 cm. Excessive nipple elevation in these cases can compromise blood supply when using a single pedicle. The bi-pedicled approach mitigates this risk by maintaining both superior and inferior vascular contributions, thereby improving the likelihood of NAC survival even with substantial repositioning [34].

Patients with **high-risk vascular profiles** also represent ideal candidates for the modified McKissock technique. This includes individuals who are smokers, obese, diabetic, or have a history of previous breast surgery. These factors are known to impair microvascular circulation and wound healing, increasing the risk of complications such as NAC necrosis, fat necrosis, and delayed wound healing. By preserving dual blood supply, the bi-pedicled technique offers an added margin of safety in these high-risk populations [35].

The technique is also particularly useful in cases where **skin quality is poor or significantly stretched**, as seen in long-standing macromastia or post-weight loss patients. In such situations, maintaining robust vascularity becomes even more critical due to compromised dermal support and reduced tissue resilience. The McKissock-based approach allows for safe tissue rearrangement while minimizing the risk of vascular compromise [36].

In addition, the modified McKissock technique may be considered in **revision breast reduction surgery**, where previous operative interventions may have altered vascular anatomy. Scar tissue and disrupted vascular pathways can limit the reliability of traditional pedicles, making a dual-pedicle approach advantageous in preserving NAC viability [37].

Despite its benefits, the technique is not universally indicated. In patients with **moderate macromastia and good tissue quality**, alternative techniques such as superomedial or vertical scar reductions may provide superior aesthetic outcomes with shorter scars and improved breast projection. These approaches are often preferred in younger patients with smaller reductions, where vascular compromise is less of a concern and aesthetic refinement is prioritized [38].

Relative contraindications to the modified McKissock technique include situations where **minimally invasive approaches or limited scar patterns are strongly desired**, as the Wise pattern incision typically results in more extensive scarring. Additionally, in patients with extremely poor general health or those unable to tolerate longer operative times, simpler techniques may be more appropriate. However, it is important to note that absolute contraindications are rare, and the technique can often be adapted based on individual patient factors [39].

Patient expectations also play a crucial role in technique selection. Individuals seeking maximal upper pole fullness, minimal scarring, or highly projected breast shape may be better suited for alternative approaches. Conversely, patients who prioritize safety, symptom relief, and predictable outcomes—especially in the context of severe macromastia—may benefit more from the reliability of the bi-pedicled technique [40].

In summary, the modified McKissock bi-pedicled reduction mammaplasty is best suited for patients with severe or complex macromastia, high-risk vascular profiles, or anatomical challenges that increase the likelihood of NAC compromise. Careful patient selection, combined with individualized surgical planning, is essential to maximize both safety and aesthetic outcomes. The technique remains a valuable option within the broader spectrum of breast reduction strategies, particularly when vascular reliability is a primary concern [41].

Aesthetic Outcomes and Breast Shape Analysis

Aesthetic outcome is a central determinant of success in reduction mammaplasty, as patients seek not only relief from physical symptoms but also improved breast contour, symmetry, and proportionality. The modified McKissock bi-pedicled technique, while historically associated with functional safety, has

undergone significant refinements aimed at enhancing cosmetic results. Contemporary adaptations focus on optimizing breast projection, upper pole fullness, and overall shape while maintaining the fundamental advantage of dual vascular supply to the nipple–areola complex (NAC) [42].

One of the primary aesthetic considerations in breast reduction is the achievement of a natural breast contour with adequate projection. Early critiques of the original McKissock technique highlighted a tendency toward a flattened or boxy breast shape due to excessive central parenchymal bulk and limited internal reshaping. Modern modifications address this issue through strategic parenchymal excision and internal pillar suturing, allowing for improved مخروطية (conical) breast form and better anterior projection. These refinements have significantly improved the aesthetic acceptability of the technique in current practice [43].

Upper pole fullness remains a key aesthetic parameter and is often challenging to maintain in large-volume reductions. Compared to superomedial pedicle techniques, which are known for superior upper pole contour, the bi-pedicled approach may initially appear less favorable in this regard. However, with appropriate glandular reshaping and redistribution, surgeons can achieve satisfactory upper pole fullness. Techniques such as auto-augmentation using preserved inferior pedicle tissue have been described to enhance this aspect of breast shape [44].

Symmetry is another critical component of aesthetic success. The modified McKissock technique allows for controlled and balanced tissue resection from medial, lateral, and central compartments, facilitating improved bilateral symmetry even in cases of preoperative asymmetry. The wide exposure provided by the Wise pattern incision further enhances the surgeon's ability to precisely tailor breast shape and volume on both sides [45].

Scar pattern is an important aesthetic consideration, particularly in younger patients or those concerned about visible scarring. The inverted-T (Wise pattern) scar associated with the McKissock technique is more extensive than vertical scar approaches. While this may be viewed as a disadvantage, it provides superior control over skin excess in patients with severe macromastia. Moreover, with meticulous surgical technique and proper postoperative care, scar quality can be optimized, and patient acceptance is generally high when functional and aesthetic improvements are achieved [46].

Long-term stability of breast shape is a crucial outcome measure that often differentiates surgical techniques. Inferior pedicle techniques have been associated with bottoming-out over time due to gravitational forces and tissue relaxation. The modified McKissock approach, by incorporating dual pedicles and allowing for internal structural support, may offer improved resistance to such changes. Reinforcement of the breast pillars and appropriate redistribution of glandular tissue contribute to maintaining shape and projection over time [47].

Another important aspect is the positioning and appearance of the NAC. The bi-pedicled design enables safe transposition with reduced risk of malposition or distortion. Additionally, maintaining adequate vascularity helps preserve pigmentation and reduces the likelihood of partial necrosis, which can negatively affect aesthetic outcomes. Careful intraoperative planning ensures that the NAC is positioned in harmony with the new breast mound, contributing to a balanced and natural appearance [48].

Patient perception of aesthetic outcome is ultimately subjective but closely مرتبط with objective surgical parameters. Studies have shown that patients undergoing reduction mammaplasty report high levels of satisfaction with breast shape and appearance, even when more extensive scar patterns are used. In the context of the modified McKissock technique, satisfaction is often driven by the combination of reliable outcomes, improved breast symmetry, and acceptable contour, particularly in challenging cases [49].

It is important to acknowledge that no single technique universally provides superior aesthetic results in all patients. The choice of technique should be tailored to individual anatomy and clinical context. While superomedial and vertical scar techniques may offer advantages in selected patients, the modified McKissock approach remains a valuable option when safety and predictability are prioritized without significantly compromising aesthetic quality [50].

In conclusion, the modified McKissock bi-pedicled reduction mammaplasty, when performed with modern refinements, can achieve satisfactory and often excellent aesthetic outcomes. Although it may

not always match the aesthetic finesse of newer techniques in ideal cases, its ability to deliver reliable and balanced results in complex macromastia makes it an important component of the plastic surgeon's repertoire [51].

Conclusion

The management of macromastia continues to evolve, with increasing emphasis on achieving an optimal balance between aesthetic outcomes, patient satisfaction, and surgical safety. Among the wide array of reduction mammaplasty techniques, the modified McKissock bi-pedicled approach maintains a distinct and valuable role, particularly in complex and high-risk cases. Its fundamental principle of preserving dual vascular supply to the nipple–areola complex (NAC) provides a significant safety advantage, especially in patients with severe macromastia, long nipple transposition distances, or compromised vascularity.

While contemporary techniques such as superomedial and vertical scar reductions have gained popularity due to their aesthetic advantages and reduced scarring, they may not always offer the same level of vascular reliability in challenging clinical scenarios. In contrast, the modified McKissock technique prioritizes perfusion and tissue viability, making it a dependable option when surgical risk is elevated. Importantly, modern refinements in parenchymal resection and breast shaping have addressed many of the historical aesthetic limitations of the original technique, allowing for improved contour, projection, and long-term stability.

Patient-centered outcomes further support the continued relevance of this approach. High levels of satisfaction are consistently reported when functional relief is combined with acceptable aesthetic improvement. In many cases, patients prioritize symptom resolution and safety over minimal scarring, particularly in the context of severe macromastia. The ability of the bi-pedicled technique to deliver predictable and reproducible results contributes to its ongoing clinical utility.

Ultimately, the choice of reduction mammaplasty technique should be individualized, taking into account patient anatomy, risk factors, and expectations, as well as surgeon expertise. The modified McKissock technique should not be viewed as outdated, but rather as a strategic option within a comprehensive surgical armamentarium. Its role is particularly justified in cases where maximizing NAC viability is paramount.

Future research should focus on high-quality comparative studies and standardized outcome measures to further define the position of bi-pedicled techniques in modern breast reduction surgery. Such efforts will help refine surgical decision-making and ensure that patients receive the most appropriate, safe, and effective treatment for their condition.

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