

Safety Considerations in Aesthetic Rib Surgery: A Review of Risks and Technical Refinements

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ABSTRACT

Background: Aesthetic rib surgery, including rib resection and rib remodeling, has recently emerged as a niche procedure for body contouring and waistline refinement. Despite increasing demand, its safety profile remains poorly defined.

Methods: A focused narrative review was conducted, synthesizing recent systematic reviews, anatomical studies, and clinical series published between 2015 and 2025. Outcomes analyzed included intraoperative and postoperative complications, pain, respiratory function, and patient satisfaction across traditional rib resection and minimally invasive remodeling techniques.

Results: Traditional rib resection is associated with pneumothorax, hemothorax, chronic pain, infection, and contour asymmetry. Pneumothorax and hemothorax, though infrequent, are the most severe due to pleural proximity. Intercostal nerve trauma may lead to chronic pain or paresthesia. Minimally invasive remodeling methods—such as rib shaving, in situ splitting, and greenstick fractures—demonstrate significantly fewer complications, lower pain scores, and faster recovery times. Anatomical studies confirm that harvesting costal cartilage from the ninth and tenth ribs minimizes pneumothorax risk due to muscular protection by the transversus abdominis.

Conclusions: The safety of aesthetic rib surgery is highly dependent on technique. Rib remodeling without complete resection offers a favorable risk–benefit ratio, minimizing major complications and preserving thoracic stability. Careful patient selection, precise dissection, and comprehensive preoperative counseling are essential to optimize outcomes and ensure ethical application.

KEYWORDS: Rib remodeling; Rib resection; Aesthetic surgery; Body contouring; Complications; Pneumothorax; Pain.

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INTRODUCTION

Aesthetic rib surgery has evolved from thoracic and reconstructive origins into a specialized body contouring procedure aimed at refining the waistline and enhancing torso definition. Techniques range from complete rib resection to less invasive remodeling strategies such as rib shaving or in situ splitting. Interest in these approaches has grown among aesthetic surgeons, particularly for waist reduction, gender-affirming surgery, and body feminization.

However, the unique anatomical context of the ribs—surrounding vital structures such as the pleura, intercostal vessels, and nerves—introduces distinct risks. Early reports emphasized complications such as pneumothorax, hemothorax, and chronic postoperative pain. Modern minimally invasive methods claim reduced morbidity, yet evidence remains fragmented and largely anecdotal. This

review consolidates current data to evaluate the safety, risk profile, and technical considerations associated with aesthetic rib procedures.



Figure 1. Before rib remodeling.



Figure 2. After rib remodeling + lipoabdominoplasty

DISCUSSION

Complications of Traditional Rib Resection

Conventional rib resection involves the excision of one or more floating ribs—typically the 11th and 12th—to achieve a narrowed waistline. The primary safety concerns include pneumothorax, hemothorax, infection, chronic pain, and functional respiratory impairment. Pneumothorax and hemothorax result from pleural injury or disruption of intercostal vessels; although the incidence is low, they represent the most severe complications requiring chest tube drainage or reoperation [1,2] .

Chronic neuropathic pain and sensory loss are linked to intercostal nerve injury during rib dissection or retraction [1,3] . Infection and wound-related issues such as skin necrosis, asymmetry, and delayed healing are uncommon but documented. Ferreira et al. (2025) concluded that while rib resection can achieve aesthetic goals, its risk profile exceeds that of modern remodeling methods [1] .

Furthermore, long-term data on pulmonary function and musculoskeletal integrity after rib resection remain scarce. Some authors have raised concerns regarding possible

thoracic instability or altered biomechanics following multi-rib excision.

Advantages of Minimally Invasive Rib Remodeling

Rib remodeling techniques—including rib shaving, greenstick fracture remodeling, and in situ splitting—have emerged as safer alternatives that maintain rib continuity while achieving contour modification. These techniques preserve periosteal and muscular layers, minimizing pleural disruption and intercostal nerve injury.

In a 2025 meta-analysis, Milani-Reis et al. reported that rib remodeling procedures significantly reduced the rates of pneumothorax, hemothorax, and chronic pain while improving patient satisfaction and shortening recovery time [2] .

Similarly, Zhang et al. demonstrated that in situ splitting provides comparable contour outcomes with substantially less morbidity than whole-rib harvesting [3] .

From an anatomical perspective, Yeo et al. confirmed that costal cartilage harvest from the ninth and tenth ribs carries minimal risk of pleural breach, given the protective barrier of the transversus abdominis muscle. Nonetheless, excessive dissection may compromise the abdominal cavity [4] .

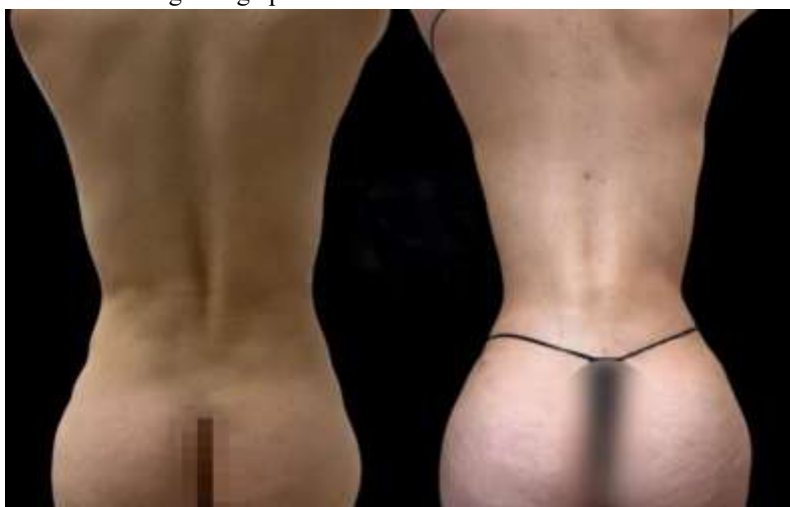


Figure 3. Before and after ribxcar + lipo (as a complement)

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Secondary and Functional Considerations

Additional safety concerns include contour irregularity, asymmetry, and hypertrophic scarring, particularly following extensive resection or uneven remodeling [1–3]. Del Frari

et al. emphasized that lessons from pectus correction surgery underscore the importance of gradual postoperative mobilization to prevent atelectasis and maintain respiratory function [8].



Figure 4. 3D CT of rib cage with cartilaginous window (Determine rib number and verify if rib 10 is floating) Anterior view



Figure 5. lateral view

In the context of costal cartilage harvest for reconstructive procedures, systematic reviews show that donor-site complications such as infection, resorption, and pain are infrequent but relevant [6-9]. These findings reinforce the necessity of meticulous technique, limited dissection, and adequate analgesia.

Finally, the lack of randomized controlled trials and long-term follow-up limits definitive conclusions regarding the overall safety and functional outcomes of aesthetic rib surgery. Standardization of technique and data collection remains a key priority.

Conclusion

Aesthetic rib surgery represents an evolving intersection between reconstructive and aesthetic disciplines. While traditional rib resection achieves pronounced contour changes, it carries a higher incidence of serious complications, particularly pneumothorax, hemothorax, and chronic neuropathic pain. Conversely, minimally invasive rib remodeling offers an improved safety profile, reduced

postoperative discomfort, and greater preservation of thoracic function.

Ultimately, the safety of aesthetic rib surgery is technique-dependent. Success relies on careful patient selection, comprehensive informed consent, and precise anatomical dissection. Surgeons must balance aesthetic aspirations with functional preservation, adopting evidence-based practices to ensure optimal and ethical patient outcomes.

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