

No-Drain Abdominoplasty with Progressive Tension Sutures

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KEYWORDS

- Abdominoplasty • Complication • Seroma • Treatment
- Progressive tension sutures • Quilting sutures

Seroma is one of, if not the most frustrating problem that plagues abdominoplasty. Many theories have been proposed as to the cause of seroma, and various techniques have been suggested to control this complication. These techniques range from operative variations, such as limitation of undermining, elimination of concurrent liposuction and tissue glues; to postoperative practices such as extended bed rest, limitation on upright posture, and use of compressive garments. All of these methods have their limitations and none have eliminated seromas.

The authors first described the concept of progressive tension sutures (PTS), an advancement of the abdominal flap that affixes the superficial fascia to the deep fascia in an advanced position.¹ This technique permits the elimination of postoperative drains, increases patient mobility, and permits early resumption of an erect posture while preventing seromas and reducing other local complications. The technique has been refined for abdominoplasty and extended to various procedures (browlift, facelift, latissimus donor site) that use an advancement flap.^{2–5}

The use of sutures to coapt 2 tissue surfaces and close the intervening dead space is not a new concept. Mladick⁶ noted in a commentary that Georgiade, in his textbook, described the use of “tacking sutures” to advance the flap and prevent fluid collection in abdominoplasty. Mladick has said “that this is an important step that should be used in every abdominoplasty.” Baroudi and Ferreira⁷ reported the use of “quilting sutures”

to close dead space in the prevention and treatment of seromas in abdominoplasty. The authors acknowledge the similarity of tacking, quilting, and PTS as variations on a theme, and the significant contribution of Baroudi, Georgiade, and other investigators in the evolution of this concept. In the authors’ experience, PTS is a simple and efficient adjunct procedure that can be easily integrated into most current abdominoplasty techniques to reduce local complications. In addition, the logic of PTS is easily understood and patients have enthusiastically accepted the elimination of postoperative suction drains.

In this article, the concept of PTS and the theories behind their effectiveness is reviewed, the technique is elucidated, and the related literature is reviewed. The authors share their practices and clinical data supporting the use of PTS.

CONCEPT AND FUNCTION OF PTS

A PTS procedure is not an operation, but simply an adjunct to the abdominoplasty procedure that can be used with most current techniques. As the abdominal flap is advanced, it is secured in an advanced position by sutures placed between the superficial and the deep fascia. As each suture is placed in succession, tension is transferred distally and the flap is advanced (**Fig. 1**). Tension is placed on the superficial fascial system and not on the skin and its underlying subdermal plexus. The tension is distributed not only at the

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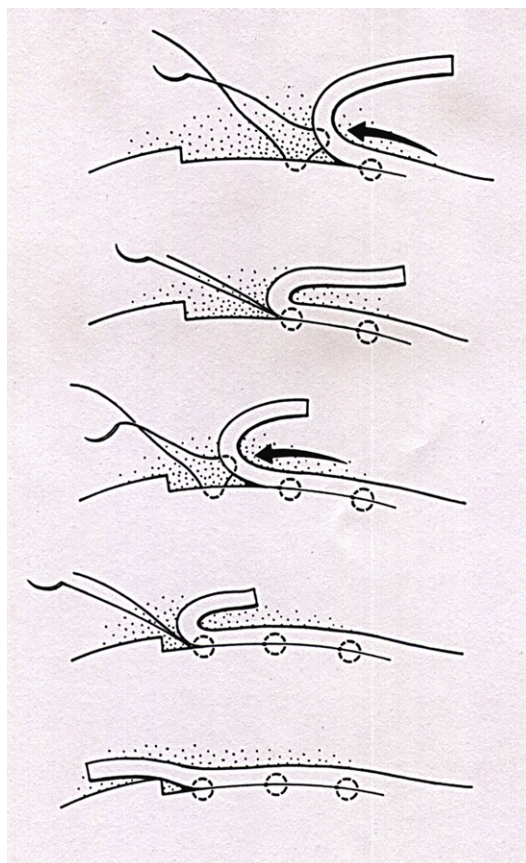


Fig. 1. Series (from top to bottom) demonstrating advancement of flap with PTS. Note that the suture includes the superficial fascia.

vulnerable distal flap but over the broad area of the flap.

The concept of PTS is simply an adaptation of basic surgical principles, which include reduction of dead space and the facilitation of wound healing by minimizing tension, and secure fixation of the wound surfaces. The methods by which PTS may act to control complications can be understood by examining the various aspects (dead space, flap tension, and shearing forces) in relation to the abdominoplasty procedure.

Dead Space

Dead space is often considered as the root cause of seroma formation in abdominoplasty. The large cavity that is created in abdominoplasty and other procedures that use advancement flaps plays a definite role in seroma formation. The placement of PTS divides this dead space into smaller areas or compartments and limits fluid accumulation

(**Fig. 2**). Several recent studies using ultrasonography demonstrate this compartmentalization.^{8,9}

Tension

In the standard abdominoplasty approach, the tension of advancement is placed on the distal portion of the flap, which is most vulnerable to circulatory compromise. PTS secure the superficial fascia with the deep fascia, distributing the tension over a broad surface area and transferring the tension to these 2 strong layers. The important subdermal plexus is superficial to the level at which tension is applied and thus, the circulation to the distal flap is theoretically protected. That there is excellent dermal bleeding and therefore clearly adequate circulation is apparent to the surgeon when the excess skin is excised following advancement with PTS. The observation that distal circulation is protected by PTS warrants further study. Further, minimizing tension on the skin incision potentially improves the quality of

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