Double-Loop Dermal Suture: A Technique for High-Tension Wound Closure

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Direct closure of gaping wounds, which is common in body contouring surgery, is challenging for all surgeons regardless of their level of experience. Although multilayer suture techniques may help achieve even distribution of tension, the initial stitches often require considerable technical effort. Modified suturing techniques, such as the buried pulley technique that combines 2 or more crossing stitches, facilitate high-tension wound closure.1,2 These suture techniques utilize multiple crossing stitches to distribute tension throughout a large area, making wound closure easier. However, the multiple stitches and large amount of suture material inside the wound increase the risk of infection and suture spitting.3 Moreover, these modified techniques produce an extended area of undue tension in the wound margins, which may negatively impact the wound-healing process.4 Although traditional manual knot tying is effective for closing wounds that require high tension, it wastes a large amount of suture material, which is problematic economically. Techniques in which a surgical assistant secures the initial knot with a needle holder, and the tie is completed without tension on the suture tails, may be useful but require assistance from another person.

The double-loop dermal (DLD) stitch has the benefits of traditional hand tying but does not require multiple crossing stitches, unnecessary waste of suture material, or assistance from others. The DLD technique is demonstrated in Figure 1 and a supplemental video (available at www.aestheticsurgeryjournal.com). This technique is especially useful for creating initial stitches under high tension, and therefore could be applied to many types of direct wound closure. The technique was developed by the senior author (G.M.H) and has been utilized in more than 150 body contouring procedures in the last year at the General Hospital in Linz, Austria. As shown in the figure and video, the DLD technique is a hybrid of the deep dermal stitch and hand-tied knot. Looping of the suture around the middle finger and needle holder leads to constant tension on the suture, and results in a lock of the first knot. With subsequent grasping of the suture tail, the tension is redistributed, which keeps the knot firmly in place and prevents it from untwisting even under high tension. The DLD technique requires minimal practice and is easily reproducible, and thus is appropriate for novice as well as experienced surgeons.

STEP-BY-STEP DESCRIPTION

The long tail of the classical deep dermal suture is pulled parallel to the wound edges (Figure 1A). The middle finger is applied to maintain tension on the knot (Figure 1B,C). Next, the long end of the suture is looped around the...
Figure 1. Step-by-step tutorial of the double-loop dermal suture technique, performed in a 46-year-old woman who underwent abdominoplasty combined with mastopexy. Arrows indicate the direction of movement. (A) Begin with a classical deep dermal suture. (B, C) Pull the long end of the suture parallel to the wound edges, and apply the middle finger to the knot to maintain tension on it. (D, E) Loop the suture around the needle holder, and move the middle finger to the front to create another loop and grasp the suture. (F, G) While the middle finger exerts tension to lock the knot, grasp the short end of the suture with the needle holder and hold it tight. (H) Tension is redistributed to the short end of the suture to lock the knot again, which permits completion of the knot by pulling the long end of the suture.
needle holder, and the middle finger is simultaneously moved to the front to create another loop and grasp the suture (Figure 1D,E). During this continuous movement, the tension must be passed smoothly from the needle holder to the finger. While the middle finger is exerting tension to lock the knot, the short tail of the suture is grasped with the needle holder and is held tight (Figure 1F,G). Tension can then be redistributed to the short end of the suture to lock the knot again, which permits completion of the knot by pulling the long suture tail (Figure 1H).

PRACTICABILITY TESTING

To investigate the practicability of the DLD technique, we compared it with classical hand tying. The DLD technique was performed by 3 authors, each having a different level of expertise: a medical student (M.M.A.), a junior resident (D.D.), and a senior resident (M.S.P.). Only the senior resident had experience with this technique. Each author created 10 knots with each technique, and the mean usage of suture material and the time per knot were measured. Although the mean usage of suture material per knot was significantly lower for DLD procedures (6.1 cm vs 15.3 cm for traditional tying; \( P < .05 \)), the amount of time required was similar (33.5 seconds for DLD vs 36.0 seconds for traditional tying; \( P > .05 \)). Based on the current per-suture cost of $4.77 (Vicryl 3-0; Ethicon, Somerville, NJ), the average cost per knot would be $0.41 for the DLD technique and $1.04 for classical hand tying. This would translate to cost savings of approximately $5 to $6 for a traditional mastopexy or abdominoplasty.

CONCLUSIONS

The DLD suture technique is easily reproducible and combines the advantages of the deep dermal stitch and the hand-tied knot. DLD suturing is especially beneficial for closing wounds under high tension, such as those in body contouring surgery, yet also can be applied to other types of wounds. The reduced usage of suture material, without the need for additional time, makes this technique a viable option even for highly experienced surgeons.

Supplementary Material

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