

Novel Surgical Approach to Subcutaneous Closure: The Subcutaneous Inverted Cross Mattress Stitch (SICM Stitch)

CYNDI YAG-HOWARD, MD, FAAD*

Placement of subcutaneous stitches minimizes the distance between wound edges, diminishes the tension on the wound when percutaneous or running subcutaneous stitches are placed; and, when placed properly, assists in wound edge eversion¹ Yet certain factors, such as extreme defect width, convexity of skin surface, tissue inelasticity, and low coefficient of friction associated with certain suture material, may make proper placement of typical subcutaneous sutures difficult. To effortlessly and effectively overcome these obstacles, this article describes the utility of the novel subcutaneous inverted cross mattress (SICM) stitch, which, to the author's knowledge, has not yet been described in the literature.

Technique

The SICM stitch is a combination of the pragmatic buried vertical mattress stitch, which Drs. Zitelli and Moy first described in the literature in 1989,² and the buried pulley stitch, attributed to Mühlstädt and colleagues in 2008.³ It uses the buried vertical mattress's ability to evert wound edges for better approximation and advantageously combines it with the buried pulley stitch's ability to decrease tension at the wound edge. The blending of these two features creates a stitch that has become a workhorse stitch in the author's dermatologic surgery practice.

The SICM stitch follows the same principles as a pulley system, whereby a change in direction and point of application of a pulling force leads to a reduction in the total force required to do the same amount of work.⁴ In other words, placement of the SICM stitch, with its side-by-side buried vertical mattress design, shares between two buried vertical mattress stitches the force required to perform the work of overcoming tissue tension so that the free edges of a wound can be effectively approximated.

The SICM stitch differs from a classic pulley stitch in that it is entirely subcutaneous rather than transcutaneous. It differs from the winch stitch, which is based on the pulley system, in that it is not a temporary stitch but a stitch that remains in place until the body's natural degradative processes absorb it.⁵ It also differs from the modified winch stitch in that it does not rely on hemostats to assist in the approximation of wound edges under significant tension.⁶

After lesion excision, the edges of the resulting defect are undermined in the typical fashion to free wound edges in preparation for wound edge approximation. The first step (Step 1) in placement of the SICM stitch is insertion of the needle into the dermis using an infradermal approach, approximately 3 to 5 mm lateral to the wound edge, followed by the ad-

*Advanced Dermatology and Skin Surgery Specialists, PA, Naples, Florida

Disclosure

Dr. Yag-Howard is a consultant and member of the Advisory Board for Ethicon, Inc.

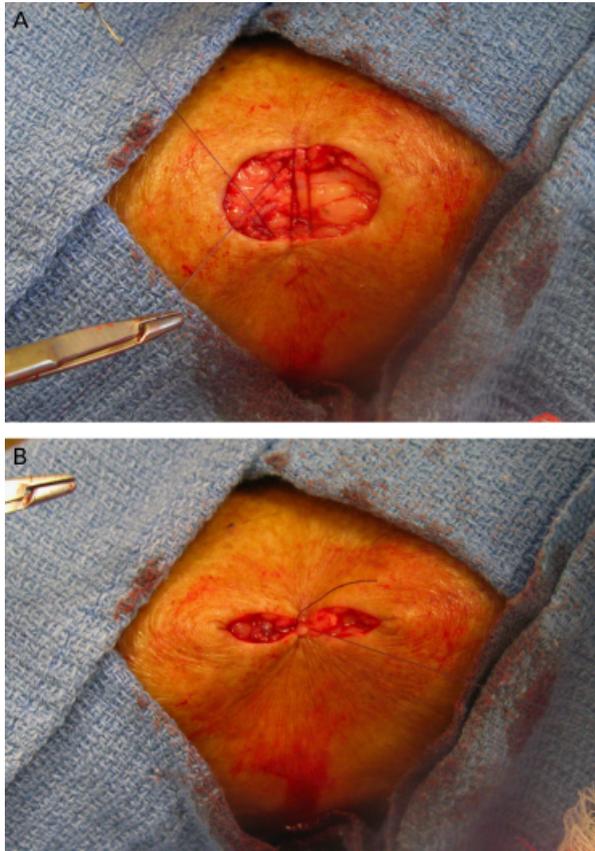


Figure 1. (A) View of subcutaneous inverted cross mattress stitch prior to approximation of wound edges. (B) Advancement of wound edges resulting in complete approximation even before any knot is tied.

vancement of the needle upward into the upper reticular dermis before curving it slightly downward and exiting through the lower reticular dermis. This technique allows for the suture essentially to grab a small amount of the upper reticular dermis in order to evert the edge and thereby create the first half of a buried vertical mattress stitch. Next (Step 2), the needle is inserted into the opposing edge of the defect at the level of the lower reticular dermis and advanced slightly upward into the upper reticular dermis before curving downward and exiting infradermally to create the second half of the initial buried vertical mattress stitch.

Step 3 in the creation of the SICM stitch involves moving the needle back across the field of the defect, inserting the needle into the dermis using an infradermal approach 1 to 2 mm lateral to the initial

needle insertion point, and creating of a second buried vertical mattress stitch as described in Steps 1 and 2 above. In Step 4, gentle pulling of both ends of the suture creates a pulley effect that approximates wound edges with minimal recoil (Figure 1A and B). Finally, Step 5 involves tying the suture in the appropriate surgical knot or square knot fashion to lock the suture in place and the defect edges together, resulting in the formation of a deeply buried knot that remains far from the skin's surface and effectively everts the wound edges without compromising the blood supply to the area. If additional subcutaneous stitches are needed to complete the approximation of defect edges, traditional buried intradermal stitches, buried vertical mattress stitches, or additional SICM stitches can be placed.

Discussion

The author has been using the SICM stitch technique for longer than 2 years. It uses a lateral pulley effect that eases the process of approximating the wound edges, even when the opposing vectors of tissue tension provide what would otherwise be considered a challenge to defect closure. The pulley system seemingly locks the wound edges together, so that a knot can be tied without slipping that often occurs with traditional buried intradermal and buried vertical mattress stitches.

Additionally, when using the SICM stitch, the ease of pulling the edges together, even in wounds that have significant tension, has the added benefit of alleviating the surgeon's need for the active involvement of an assistant. Therefore, the use of the SICM stitch may result in cost savings for the busy dermatologic surgeon.

Another feature of the SICM stitch is that it provides excellent eversion of the wound edges. The eversion is likely due to two factors: the placement of the suture in a buried vertical mattress fashion, whereby the suture essentially grabs a portion of the upper reticular dermis on each side of the defect, creating a

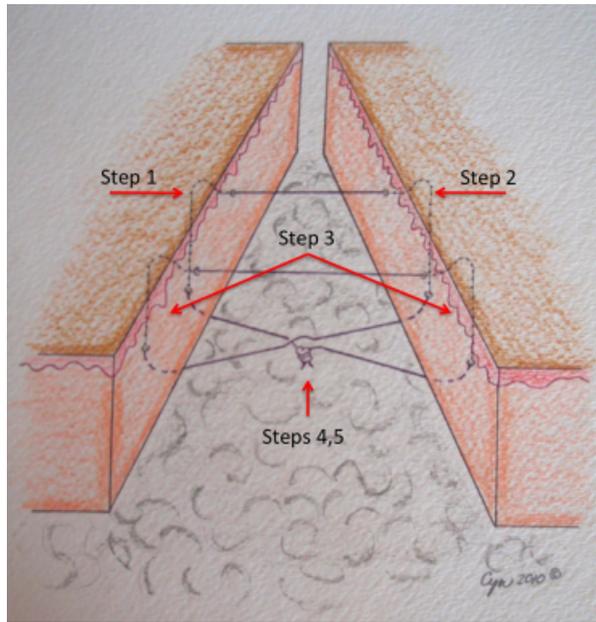


Figure 2. Schematic of subcutaneous inverted cross mattress (SICM) stitch. Edges not approximated to demonstrate features of SICM stitch.

dimpling effect lateral to the defect edge that encourages an element of upward push of tissue when defect edges meet in apposition; and the crossing and knotting of the suture beneath the side-by-side subcutaneous inverted vertical mattress stitches, which has the effect of making the wound edges blossom outward toward the surface (Figure 2). Furthermore, the tissue at the site of the SICM stitch retains an excellent blood supply with a low tendency for necrosis.

It has been the author's experience that use of the SICM stitch provides many benefits over the traditional buried intradermal stitch and the buried vertical mattress stitch. This stitch should be considered in all intermediate and complex closures, as well as in adjacent tissue transfer procedures such as island pedicle flaps, transposition flaps, and unilateral or bilateral advancement flaps, particularly when a high degree of tension exists between wound edges.

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Address correspondence and reprint requests to: Cyndi Yag-Howard, MD, FAAD, President, Advanced Dermatology and Skin Surgery Specialists, PA, 1000 Goodlette Road, Suite 100, Naples, FL 34102, or e-mail: yaghoward@aol.com