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Techniques for Cutaneous Sutured Closures: Variants and Indications

Beth Adams, BA, Jamshaid Anwar, MD, David A. Wrone, MD, and Murad Alam, MD

Many different suture techniques are routinely used by cutaneous surgeons for the closure of surgical wounds. This paper reviews several common suture techniques and their associated subtypes. In particular, for each technique, we discuss the method for placement, generally accepted indications, controversies regarding utility, and objective evidence of efficacy.

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THE ROLE OF SUTURES in primary wound closure is to approximate tissue edges, with the ultimate goal of achieving a functional and cosmetically acceptable scar.¹⁻³ Depending on the technique, sutures may also evert skin edges and close off dead space, both of which contribute to the integrity of closure and the ultimate appearance of the wound site. Many novel sutures and variations of basic sutures are described in the literature for their specific benefit in wound closure. However, few studies have aimed to assess these methods objectively. The impact of suture technique on the outcome of wound closure is usually a subjective observation made by a surgeon based on his or her own experiences. In fact, the suture method itself may not be as important for the outcome as the surgeon's familiarity and expertise with the technique. In clinical practice a surgeon most likely relies on a handful of favorite sutures, and through experience learns to adapt these methods to unique and challenging closures. This review describes suture methods that represent the versatility of basic techniques, including consensus and controversies among authors regarding indications for usage.

From the Department of Dermatology, Feinberg School of Medicine, Northwestern University, Chicago, IL.

Address reprint requests to Murad Alam, MD, Dermatology, 675 N St. Clair, Suite 19-150, Chicago, IL 60611; e-mail: murad@alam.com.

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FUNDAMENTALS OF CUTANEOUS CLOSURES

Layered Closure: Buried and Partially Buried Sutures

To create a layered closure, each layer of the defect is closed progressively to recreate the altered area in 3 dimensions. This method maximizes the functional and aesthetic integrity of the healing wound.³ After accomplishing careful hemostasis, "buried" sutures are first placed in the dermal-subcutaneous tissues. A buried suture is completely enclosed within the dermis or subcutaneous tissue, and both ends of the suture are tied beneath the skin surface. It functions to reapproximate deep tissue edges, reduce the size of the wound, and provide mechanical support.^{3,4} In addition, buried sutures significantly close dead space within the wound and diminish tension on skin edges, which facilitates placement of "partially buried" sutures.^{2,3} A partially buried suture is placed superficially: the suture is looped through epidermis and dermis, and both ends are tied above the skin surface. It is used primarily to appose wound edges, because fine approximation minimizes the width of the scar and creates a more uniform scar appearance. To varying degrees superficial sutures also reduce tension across the wound surface, close off dead space within the dermis, and evert wound edges. Eversion promotes a more even-surfaced scar by counteracting the downward pull of wound edges during the healing process.⁵

Interrupted Versus Running Sutures

Interrupted or noncontinuous sutures contain 1 to 2 loops (depending on the technique) that are subsequently secured at the skin surface. Several interrupted sutures may be required along the length of a defect for closure. This technique is simple to master, and adjustment of individual sutures for tension and eversion of skin edges can be accomplished.⁵⁻⁷ However, interrupted sutures

can be quite time-consuming to place for long defects.¹

A running or continuous suture consists of a series of loops thrown in succession along the length of a wound. It is capable of closing an entire defect with a single suture that is tied off only at the beginning and again at the end of the suture. This method is more rapid for closure than interrupted sutures, and tension tends to be more evenly distributed across the wound.⁶ However, running sutures may achieve less accurate edge approximation compared with interrupted sutures. Final adjustments cannot be made once a running suture is placed, and it can only be removed in its entirety from the skin. For these reasons, running sutures may be most appropriate for two situations: wounds in well-vascularized tissues, and defects where the suture technique has less of an impact on the final cosmetic result.⁶ Interestingly, the strength of wound closure and the likelihood of dehiscence with both interrupted and running sutures appear to be equivalent. However, if a complication was to arise, a running suture would have to be removed entirely resulting in total wound disruption; on the other hand, interrupted sutures can be removed individually as needed.⁶ Basically any interrupted suture can be converted into a running suture by starting a new stitch from the previous one rather than tying it off.

MAJOR SUTURE TECHNIQUES AND VARIATIONS

Simple Superficial Sutures

Interrupted. The simple interrupted suture is a straightforward and relatively rapid way to approximate wound edges and promote eversion.^{1,3,7} It can also be adapted for various clinical situations to achieve the best wound outcome. For example, many authors utilize the "flask configuration" to minimize wound inversion: rather than forming a circle with the path of the suture, a wider bite is taken of the deeper tissues.^{1,7} Although the simple interrupted suture is beneficial for ease and adaptability of wound closure, a major disadvantage is the tendency of this technique to cause "railroad track" or crosshatch scarring.^{2,6,7} Limiting the use of this stitch to wounds that lack considerable tension (eg, by placing bur-

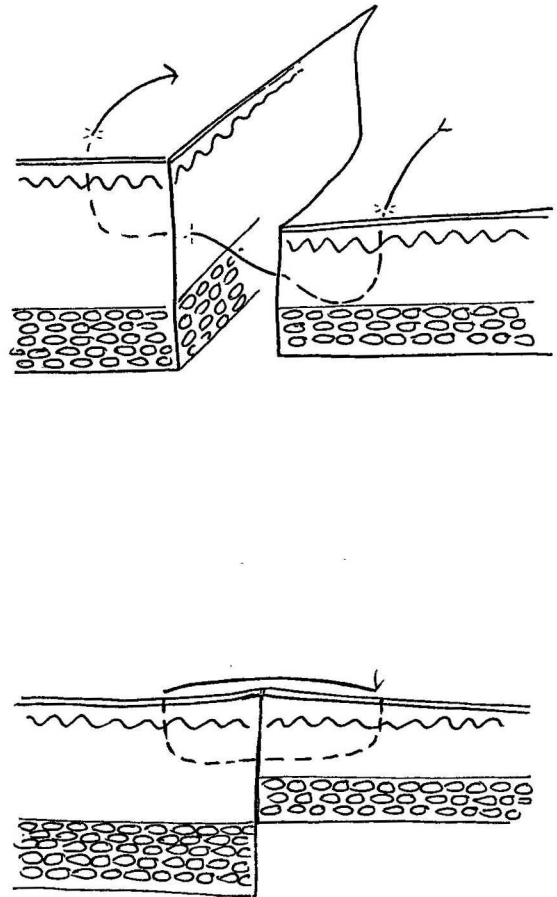


Fig 1. "Leveling" stitch, a variant of the simple interrupted suture.

ied sutures first to reduce tension) may minimize permanent suture marks.^{1,6,7}

When a wound has uneven edges, a simple interrupted suture can achieve a level wound surface. This "leveling stitch" is placed in a modified configuration: it runs within shallow dermis on the high wound edge and deeper dermis on the low edge.^{3,7} When the suture ends are secured, the uneven margins are brought together on the same plane (Fig 1).

The "cross-stitch" is formed by placing 2 throws of a simple suture, then tying the 2 ends diagonally across the external segment to form an "X"-shaped stitch. This "mini-running" suture is more rapid for closure than using 2 interrupted sutures,^{8,9} and it is particularly useful for closing small defects such as punch biopsy wounds.¹⁰

To achieve a layered closure with a single suture, a "figure-eight" suture can be used.⁶ It begins

as a simple interrupted suture, but at the base of the loop it flips and dives to form a subcutaneous stitch. As this deep loop is completed, the suture crosses over itself and continues upward into dermis to complete the superficial loop. It is a rapid method of closure, and after removal there is no remaining suture deep in the wound. The principle disadvantage is the timing of suture removal: if removed too early, the deep portions of the wound may not have adequately healed; conversely, leaving the suture in place for too long may cause permanent scarring. For these reasons, the figure-eight suture is recommended for areas with relatively quick wound healing under little tension, such as the head and neck.⁶

Running. A simple suture is converted to a simple running suture by extending the stitch beyond one throw. Similar to its interrupted counterpart, the continuous method is useful for opposing wound edges that are relatively free of tension and of approximately equal thickness.^{1-3,6,7} Advantages include rapid closure of long wounds and a more equal sharing of tension along the scar length compared to the simple interrupted suture.^{2,6} However, the running suture may also cause crosshatch scarring, especially when pulled too tightly.² It can create uneven wound edges if placed too deeply, and puckering of the wound if the skin is too loose or thick.^{1,2} Unlike the interrupted stitch, it is not possible to remove or adjust individual throws of the running suture. For these reasons, it may be most appropriate when the final cosmetic result of the scar does not rely solely on fine adjustment of wound edges.^{1,6} Examples of locations where the simple running suture has been recommended for closure include the eyelids, ears, dorsa of hands, and supraclavicular neck.^{2,7} It is also useful for fixation of full- or split-thickness skin grafts to wound margins.^{1,3}

A modification of the simple running suture is the "running cross-stitch." This method achieves more even distribution of tension along the length of the wound.^{2,6} First, a simple running suture is placed within the defect. The leading end is then reversed and a second simple running suture is placed starting from the opposite end, with the second stitches crossing the first in a cross-stitch pattern.

The "running locked" suture is another variation of the simple running technique. Before be-

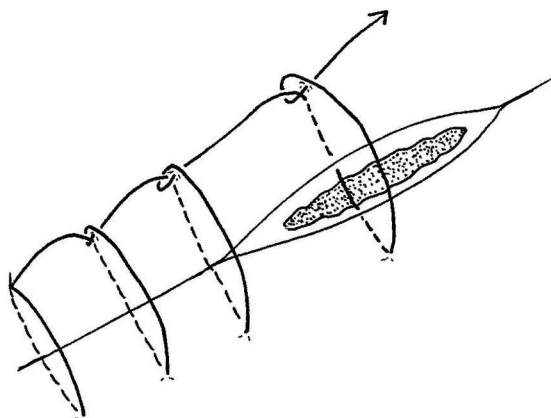


Fig 2. Running locked suture.

ginning each new throw, the needle is looped under the previous external segment of suture crossing the wound (Fig 2). Because the locked loops counteract some tension on the skin edges, this method may help prevent inversion even in wounds closed under a moderate amount of tension.^{1,2} However, the pressure the external loops of suture exert on the skin may cause focal necrosis if blood supply is compromised.^{2,3} Some authors recommend the running locked sutures only for areas of low cosmetic sensitivity, such as postauricular graft donor sites.^{3,6}

Mattress Sutures

Vertical Mattress. The popularity of the vertical mattress suture stems from its ability to finely evert skin edges while simultaneously reducing wound tension, eliminating dead space, and providing a strong closure.^{1-3,6,7} However, because it wraps a relatively large amount of tissue within its loops, it is both strong and potentially strangulating.^{2,3,6} The external segments of the vertical mattress compress the skin adjacent to the defect, which can cause scarring and focal necrosis especially with postoperative edema.^{1,6} In a randomized clinical trial, Trimbo et al¹¹ assert that vertical mattress sutures cause significantly less crosshatch scarring than running sutures for cutaneous laparotomy wounds in Caucasian patients. The study also reports that vertical mattress sutures required an additional 5 minutes for placement compared with the running sutures.¹¹ Despite potential scarring, many authors consider the vertical mattress one of the best methods to close a wound and to evert skin edges. Contro-

versy exists about its utility for facial wounds: some authors claim it is contraindicated because it strangulates and scars the skin,² while others favor its use on the face because it everts and may minimize scarring of the incision line.^{1,7} Vertical mattress sutures can also be combined with simple interrupted sutures for superficial closure, which minimizes the number of mattress loops cutting into the skin surface.^{1-3,6}

The classic vertical mattress suture is also known as the “far-far—near-near” stitch. First, the needle enters the skin at a point “far” from the wound margin, usually 2 to 10 mm depending on the surgeon’s preference and the area affected.^{1-3,6,7} The initial bite includes deep dermal tissue to close dead space at the base of the defect, and it exits at an equal distance from the wound margin on the opposite edge. The second bite begins on the same side of the defect by piercing the epidermis within 1 to 3 mm of the margin. It courses more superficially and exits at an equally “near” point to the defect. When secured, the deep loop contributes mainly to closure strength and the superficial loop exerts an upward push to evert wound edges (Fig 3).

The vertical mattress can be modified to include a bite of deep fibrous tissue at the base of its loop, creating a “deep” vertical mattress suture. This method anchors incision lines more precisely into facial contours, and eliminates additional dead space from wounds.⁶ Another variant is the “pul-

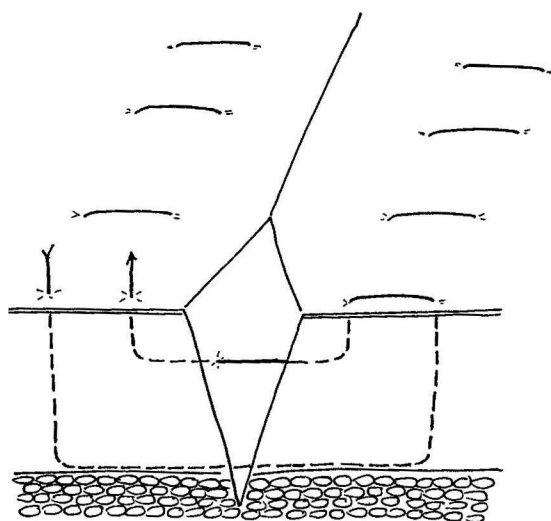


Fig 3. Traditional vertical mattress: “far-far—near-near.”

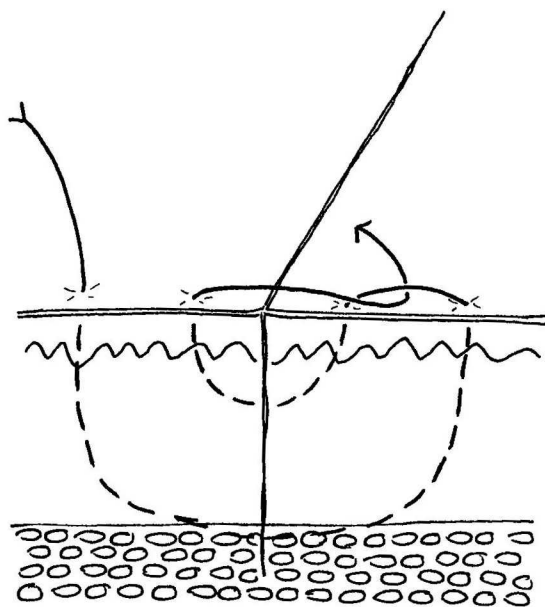


Fig 4. “Loop” or “pulley” vertical mattress.

ley” or “loop” vertical mattress.^{3,12} Before tying a traditional vertical mattress, the leading end is looped under the external segment of suture on the opposite side of the wound (Fig 4). Because this loop functions as a pulley, less tension is placed on either of the suture strands and impingement on the skin surface is lessened. This method may also provide additional strength to wound closure.^{3,12} Arnold¹³ describes a modified vertical mattress known as the “space-obliterating” suture: during the initial deep bite between the 2 far points, an additional loop is placed within the dermis (Fig 5). The buried component of the space-obliterating suture provides a pulley effect to the closure, which distributes tension over a much larger area. These sutures can appose edges of large defects under a moderate degree of tension.¹³

A “shorthand” version of the vertical mattress suture has been proposed that follows a “near-near—far-far” course.^{3,6,14} This method is very similar to the traditional vertical mattress, but the superficial loop between the 2 near points is placed prior to the deep loop between the far points (Fig 6). Although the near-near—far-far suture is potentially more rapid for wound closure, there is controversy about its ability to evert skin edges.^{3,6,14} Snow et al¹⁴ state that the shorthand vertical mattress everts wound edges as well

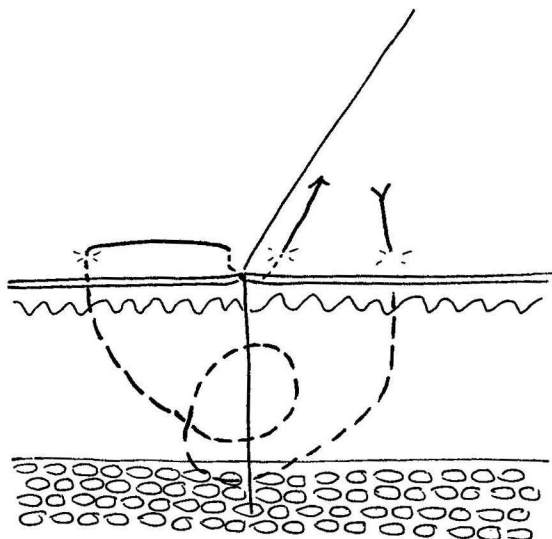


Fig 5. "Space-obliterating" vertical mattress.

as the classic far-far—near-near technique, while others report a tendency to invert edges.⁶ Furthermore, the initial placement of the superficial loop requires the deep loop to be placed blindly, which risks damage to deeper structures.¹⁴

By modifying the sequence of throws of the vertical mattress, new suture techniques are created. One such variant is the "near-far—far-near" stitch in which both loops are thrown in the same direction across the defect.^{3,6} This method results in 2 segments crossing the surface of the wound: one strand connects the two far points and the

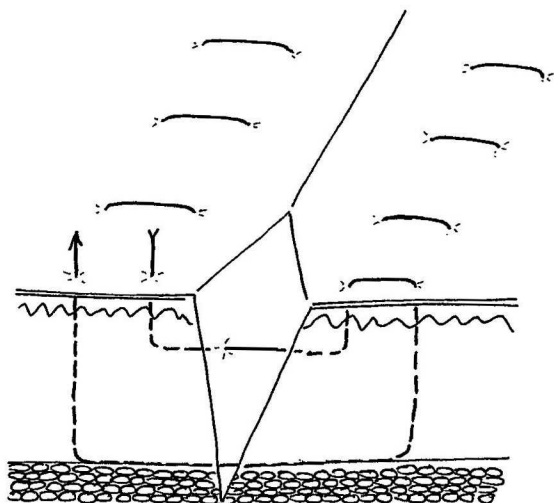


Fig 6. "Near-near—far-far" vertical mattress.

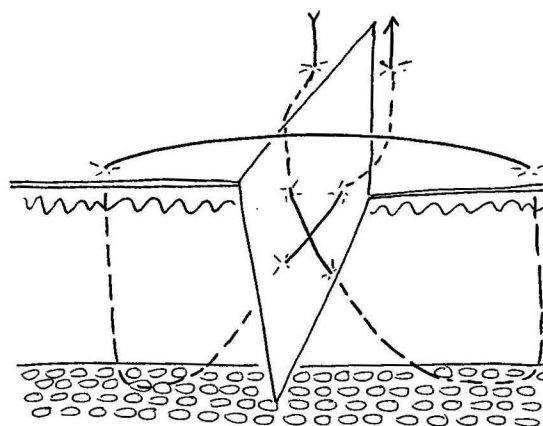


Fig 7. "Near-far—far-near" vertical mattress.

other strand (which contains the knot) courses between the 2 near points (Fig 7). Both loops are placed at approximately equal depth in the dermis, and only a millimeter or two separates them laterally. The near-far—far-near suture is described as a combination of a traditional vertical mattress and a simple interrupted stitch; therefore, it is both strong and capable of careful skin edge approximation.⁶ It is advocated for use where tension exists on thin skin, such as the eyelids and the scalp. The near-far—far-near suture also creates a pulley effect across the wound when it is tied down, which is useful for the initial closure of large wound under significant tension.³ Placing 1 or 2 near-far—far-near stitches near the center of a defect can achieve initial approximation of a large wound under significant tension, which facilitates closure with either buried or additional superficial sutures. A "far-near—near-far" variant also exists; it is essentially identical to the near-far—far-near suture except the knotted suture segment connects the two far points as opposed to the 2 near points.^{3,4,15}

The "near-far—near-far" suture is a similar variant of the vertical mattress.^{1,7} From the skin surface it appears identical to the traditional and shorthand vertical mattress sutures; however, the 2 loops cross each other within the dermis similar to the near-far—far-near suture described above (Fig 8). The near-far—near-far suture is useful for elevating the deep tissues of a wound in addition to promoting skin eversion.^{1,7}

The "half-buried vertical mattress" is placed in the traditional far-far—near-near sequence, but the needle does not pierce the skin surface on the

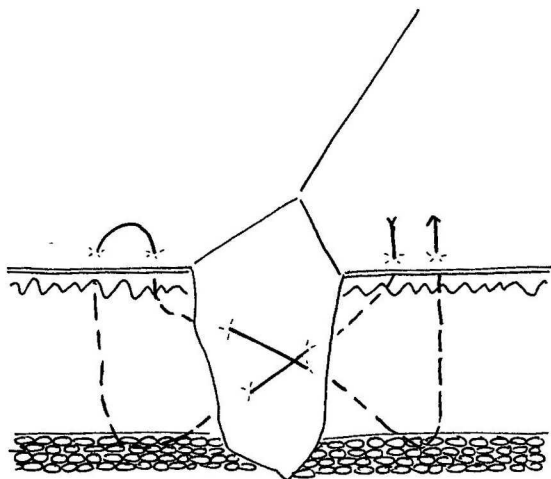


Fig 8. "Near-far—near-far" vertical mattress.

wound edge opposite the starting point for the suture. Instead it loops into superficial dermis and then dives back down into deeper tissue (Fig 9). The principle advantage of this stitch is decreased scarring: there are fewer puncture marks and less suture material to strangulate the skin surface.^{1-3,6,7} Although this variant may not relieve as much wound tension as the standard vertical mattress, it approximates skin edges well.^{1,7} The half-buried vertical mattress is indicated for areas of skin where a strangulating external suture loop is undesirable, such as the lip or eyelid.³ It is also useful along hairlines on the face, where the external loop can be camouflaged by hair.^{1,7}

The "running vertical mattress" suture combines features of an interrupted vertical mattress and a running suture. While it both everts wound edges and is more rapid to place than interrupted vertical mattress sutures, it may cause permanent scarring if left in place for too long. In addition, the running vertical mattress cannot be adjusted for tension and eversion after it is placed. Kolbusz and Bielinski¹⁶ describe one method: at the end of a traditional vertical mattress placed at the apex of the wound, the needle travels from the ending "near" point to re-enter the skin at a "far" point a few millimeters lateral along the incision line. The next vertical mattress in the series is then initiated from this new "far" site, and the process is repeated. Stiff and Snow¹⁷ report a different but similar technique: after completing the first vertical mattress, the needle re-enters the skin adjacent to the "far" site on the same side of the wound, trav-

els obliquely across the wound margin, and pierces the skin at an equidistant "far" site on the opposite side of the wound. The near-near loop is then completed, and the needle re-enters the skin at a point "far" from the wound edge on the same side to initiate the next vertical mattress in the series.

Horizontal Mattress. The horizontal mattress minimizes wound tension and is often described as a method for closing large defects and flaps under significant tension.^{1-3,6,7} First, the needle penetrates the skin 2 to 10 mm from the wound margin and travels as a deep dermal loop to the opposite side. The needle then reenters several millimeters lateral to this point, and travels deeply to the opposite side of the defect. When secured, 2 suture segments lie on the skin surface parallel to the incision line. Because of its horizontal placement within the skin, the horizontal mattress suture is theorized to aid in hemostasis by cinching off dermal vessels.^{1,3,6} It also promotes wound edge eversion and closes dead space.^{1,2} Similar to the vertical mattress, horizontal mattress sutures may cause strangulation of the epidermis because of the pressure exerted by the external segments. Protective bolsters placed beneath these external loops result in variable improvement in wound outcome.^{1-3,6} Horizontal

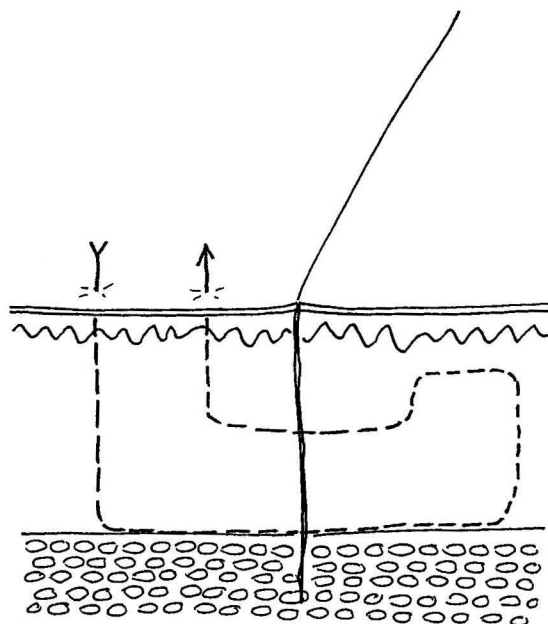


Fig 9. Half-buried vertical mattress.

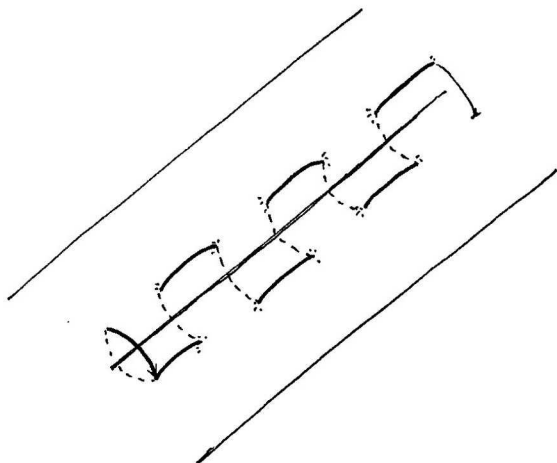


Fig 10. Running horizontal mattress.

mattress sutures can be used sparingly for initial strong closure to minimize these deleterious effects, with final closure accomplished with simple interrupted sutures.² The "running horizontal mattress" is also useful for wounds under moderate tension, especially when a more rapid closure is desired.^{1,6} Rather than securing a completed horizontal mattress stitch, the leading end travels laterally a few millimeters and then reenters to skin to begin the next horizontal mattress in the series (Fig 10).

In locations where it is undesirable to have an external loop of suture, a "half-buried horizontal mattress" can be used.³ It is placed like a classic horizontal mattress, but the suture does not penetrate the surface on the skin edge opposite the starting point of the suture. The half-buried horizontal mattress is a preferred method for securing flap edges: it avoids penetrating flap epidermis with a potentially strangulating loop, and it is more secure than a simple interrupted suture.⁶ The "3-point corner" or "tip" stitch utilizes a half-buried horizontal mattress suture to secure the tip of a triangular flap (Fig 11).^{2,3,6} Kandel and Bennett¹⁸ used laser Doppler imaging to demonstrate increased blood flow to skin flap tips secured with a 3-point corner stitch versus simple interrupted sutures; however, they also report low numbers of necrotic tips with either technique. Therefore, the 3-point corner stitch may not actually increase tip survival compared with a simple stitch placed across the tip.^{3,18} The "4-point corner" stitch is similar to the tip stitch in placement, but it simul-

taneously secures 2 triangular flap tips into a "T"-shaped closure (Fig 12).^{2,3,6} Closure of the remainder of the defect is accomplished with simple interrupted sutures. The corner stitch technique can be utilized for defects where multiple flap points converge; a "6-point corner" stitch can close a triangular defect into a "Y"-shaped scar (Fig 13).⁶

Hoffman and Bielinski¹⁹ describe a "hybrid mattress" suture that combines features of both vertical and horizontal mattress sutures. The first throw is identical to a far-far—near-near stitch. The needle then re-enters the skin a few millimeters lateral to the exit point and also a few millimeters nearer to the wound margin. The second loop travels more superficially within the dermis and exits on the opposite side of the defect at an equally near site (Fig 14). When secured, the ex-

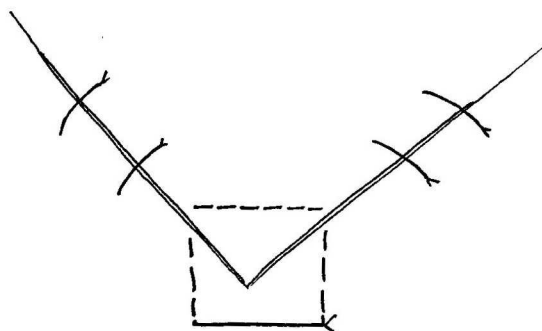
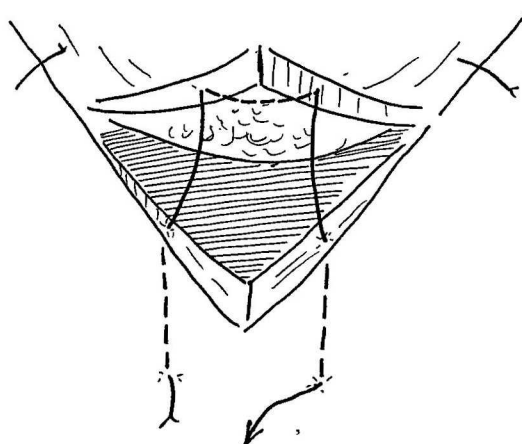


Fig 11. "3-point" corner stitch.

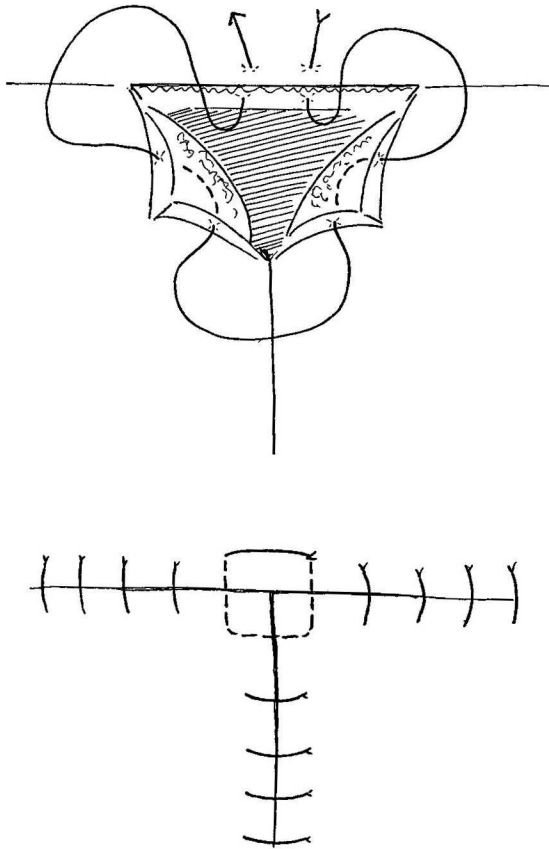


Fig 12. "4-point" corner stitch.

ternal segments lie adjacent but not parallel to the incision line. The benefits of this technique include rapid closure of a wound in three dimensions and eversion of skin edges.¹⁹

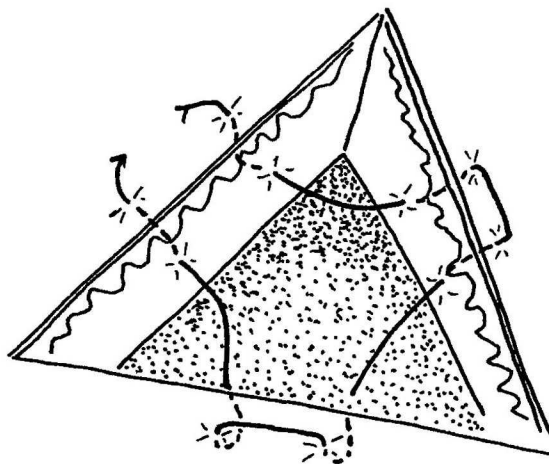


Fig 13. "6-point" corner stitch.

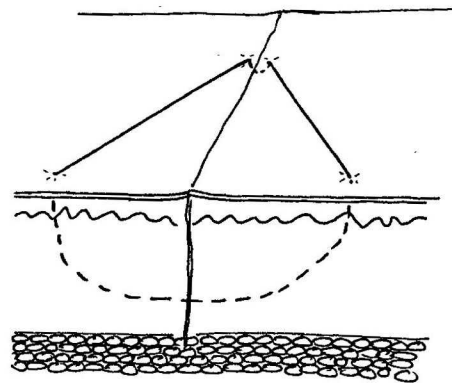
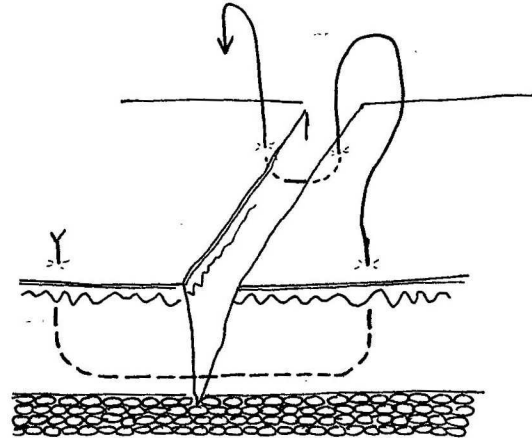


Fig 14. "Hybrid" mattress suture.

Running Subcuticular Suture

The running subcuticular or subdermal suture is useful when the suture is left in longer than 7 days and superior cosmetic results are desired because it does not penetrate the epidermis along the length of the wound.⁷ Classically, it only pierces the skin surface at the beginning and end of the suture; however, many different techniques exist for securing the ends. Fine approximation of wound edges can therefore be achieved with minimal scarring.³ It is appropriate either for wounds that are relatively well approximated with buried sutures or for shallow wounds with minimal tissue loss. Wound tension and dead space should be minimized with buried sutures prior to using the running subcuticular technique.^{1-3,6,7}

By placing a running subcuticular suture around a circular defect, a subcuticular purse-string suture is created (Fig 15).^{3,20,21} The suture ends are pulled tightly and secured to reduce the

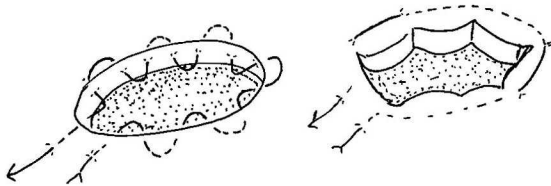


Fig 15. Subcuticular "pursestring" suture.

size of the wound: this maneuver facilitates healing by secondary intention or the placement of a full- or split-thickness skin graft.^{3,20,21} The compression of the defect margin causes a temporary formation of multiple folds in the adjacent skin, and facial skin in particular can be considerably distorted. These redundant folds of skin spontaneously resolve over the course of weeks.²¹ Potential complications of the pursestring technique include wound dehiscence and hypertrophic scarring. The technique is contraindicated on the hairy scalp due to a considerable rate of alopecia if closed under too much tension.²¹

Buried Sutures

The placement of multiple buried subcutaneous sutures along the length of a defect reduces tension across the wound and facilitates the use of simple interrupted or other superficial sutures to close skin edges with relative ease.^{1,2,7} Buried sutures provide wound stability, close dead space, and can even help to evert skin edges if placed properly.^{3,4,7} The proper method begins by entering subcutaneous tissue deep within the wound in order to bury the knot at the base of the defect; this maneuver decreases the risk of the knot "spitting" through the skin surface. Giandoni and Grabski²² describe a "buried pulley" suture that consists of two continuous dermal sutures. It is useful for areas with thicker skin and for large, gaping wounds. A "pexing" suture is a subcutaneous stitch that incorporates deep tissue (usually periosteum of facial bones) at the base of the loop, thus anchoring a wound margin to underlying structures. It prevents distortion of structures adjacent to the defect upon closure, and helps to recreate surface contours.^{3,23}

A "running buried" suture is appropriate when a wound is relatively narrow and lacks significant tension.¹ It rapidly accomplishes deep closure and provides strength to the wound, and is particu-

larly useful in areas with thick and fibrous fatty tissue in which the suture is secured.^{6,24} However, buried running sutures may not appose tissue edges as strongly as interrupted buried sutures.⁶

The "buried vertical mattress" described by Zitelli et al²⁵ combines features of a subcutaneous suture with a traditional vertical mattress. The needle enters subcutaneous tissue at the base of the defect and courses into superficial dermis; it runs closest to the skin surface a few millimeters from the defect margin. As the loop crosses the margin, it dives a little deeper to recreate the superficial loop between the two near points of a vertical mattress suture. A few millimeters away from the margin on the opposite edge, the suture again courses upward close to the skin surface before diving back into subcutaneous tissue where the ends are tied (Fig 16). This suture promotes eversion of wound edges because of its concave arc in the superficial reticular dermis beneath the defect line, much like the classic vertical mattress.²⁵ The buried vertical mattress also has the benefit of lying completely beneath the skin surface, which eliminates scarring caused by external segments digging into the epidermis. Hoehenleutner et al²⁶ report good cosmetic results and low complication rates using buried vertical mattress sutures alone for surgical wound closure. However, their technique differs from the buried ver-

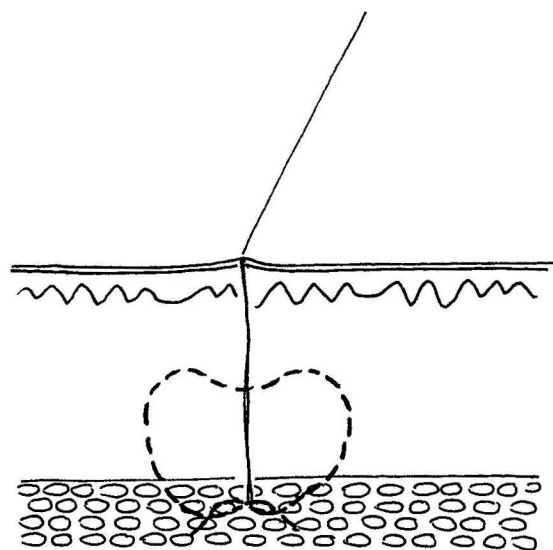


Fig 16. Buried vertical mattress.

tical mattress described by Zitelli et al: the suture maintains a circular course throughout, with the top of the loop coursing very close to the epidermis.²⁶ An alternate method for placing a buried vertical mattress involves a buried deep dermal stitch that pierces the epidermis a few millimeters from the wound margin.²⁷⁻²⁹ The needle is then reintroduced through the same hole, and it arcs as it travels beneath the incision line. On the opposite wound edge the epidermis is pierced again, and the needle reenters through the same hole to complete the stitch. Although this method may be simpler to perform than the original technique described by Zitelli, *et al*, inaccurate re-entry may result in puckering of the skin.²⁷⁻²⁹

The "buried horizontal mattress" or "butterfly" stitch is placed in a horizontal configuration within the dermis.^{30,31} As the needle courses through the first wound edge, it forms an oblique arc by first rising slightly higher within the dermis toward the skin surface and then returning to its original level. The suture then crosses the incision line and enters the opposite wound edge at the same level within the dermis, and the arcing motion is repeated to complete the loop. Benefits of this technique include good approximation and eversion of wound edges that contribute to positive cosmetic outcomes. In particular, the buried horizontal mattress suture is useful for narrow and shallow defects that require deep closure.³⁰⁻¹ Because this pursestring-like suture encloses a large amount of subcutaneous tissue, special attention should be paid to avoid strangulation.³ The "double butterfly" suture consists of 2 buried horizontal mattress sutures connected in a figure-eight configuration.³² After completion of the arcing loop from the first tissue edge, the needle crosses the defect line and enters the dermis at the same level. The needle is then flipped to place a complete second buried horizontal mattress starting on the opposite edge. In the final step, the initial stitch is completed and the double butterfly secured within the dermis.

DISCUSSION

The outcome of wound closure involves several parameters, including strength of closure, perfusion of tissue edges, functional and anatomic integrity of the defect area, and cosmetic appearance of the scar. The suture technique chosen by a surgeon has a direct impact on the final result of a

wound; different methods are described as useful for certain wounds or contraindicated for others. Much of the assessment of different sutures derives from a surgeon's observation of his or her own clinical experiences and outcomes. These results are often qualitative and therefore are difficult to compare with other surgeons' outcomes. In addition, the suturing method chosen by a surgeon will undoubtedly be one he or she believes is superior to other methods. Biases cannot be avoided in such evaluations; however, very few randomized studies exist.

In actuality, there may be no best suture for any given defect. A surgeon's preference for a suture and his or her subsequent finesse with the method may be the most important factor in favorable wound outcome. In other words, successful utilization of a suturing technique may be as unique to a surgeon as a signature, developed by years of experience. As a result of minute procedural differences that are difficult to articulate, surgeons who use ostensibly the same technique may note substantially different consequences.

Thus, it may be challenging to document and evaluate every suture variant that exists. However, because such differences in outcomes may be concrete and observable across a range of surgeons and patients, these methods should be better elucidated. For instance, if a particular suture technique results in beneficial outcomes at a particular anatomic location for a large subset of patients despite minor technical variation among surgeons, this benefit should be confirmed by a double-blinded, randomized controlled trial. The types of outcomes that would merit a noted association with a specific technique include: improved short-term cosmesis, better final scar, hemostasis, diminished inflammation, decreased risk of infection or dehiscence, patient convenience, rapidity of surgery, and diminished cost.

We strongly suspect that the collective insight of surgeons regarding the advantages of specific suture types for certain situations is grounded in truth. However, rigorous outcome studies are required to verify the validity of decades of subjective experience. Finally, some new variations of traditional suture techniques proposed by creative surgeons during the last several decades require evaluation to determine if their widespread adoption is indicated.

Whether further studies simply confirm that

traditional methods are best, or that unique differences among surgeons exceed any previous outcome differences associated with a suture technique, this data nonetheless would be a valued

addition to the literature. Given the millions of patients undergoing cutaneous surgery each year, investigation of surgical wound outcomes is a worthwhile and significant endeavor.

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