

Horizontal Running Mattress Suture Modified with Intermittent Simple Loops

Using the combination of a horizontal running mattress suture with intermittent loops achieves both good eversion with the horizontal running mattress plus the ease of removal of the simple loops. This combination technique also avoids the characteristic railroad track marks that result from prolonged non-absorbable suture retention. The unique feature of our technique is the incorporation of one simple running suture after every two runs of the horizontal running mattress suture. To demonstrate its utility, we used the suturing technique on several patients and analyzed the cosmetic outcome with post-operative photographs in comparison to other suturing techniques. In summary, the combination of running horizontal mattress suture with simple intermittent loops demonstrates functional and cosmetic benefits that can be readily taught, comprehended, and employed, leading to desirable aesthetic results and wound edge eversion.

KEYWORDS: Dermatologic surgery, horizontal mattress, simple running, suturing techniques

INTRODUCTION

The horizontal running mattress and the simple running suturing techniques are two of the most common skin closure methods. In a prospective survey of members of the Association of Academic Dermatologic Surgeons, the majority relied on less complicated repairs, often using simple interrupted and simple running sutures to close epidermal layers.^[1] The horizontal running mattress suture can be of use in regions that are cosmetically sensitive for wound approximation, good hemostasis, and superior eversion to produce smoother, flatter scars than simple running sutures.^[2] In a similar examination of vertical mattress and simple running sutures, this combination was found to save the surgeon's time while incorporating the benefits of good wound eversion and a cosmetically appealing scar after wound contraction.^[3] However, there are many disadvantages concerning the vertical mattress

suture including excess tension and scarring associated with excess pull on the knot, necrosis of the skin due to over-tightening, and railroad marks on the skin's surface resulting from wound inflammation and scar retraction, which limits its use in cosmetically sensitive areas, such as the face.^[3]

The unique feature of our technique is the incorporation of one simple running suture after every two runs of the horizontal running mattress suture [Figure 1]. Using the combination of a horizontal running mattress suture with intermittent loops attains both good eversion and hemostasis with the horizontal running mattress plus the ease of removal from the simple loops. This combination technique also achieves fewer characteristic railroad track marks associated with the horizontal mattress that result from prolonged non-absorbable suture retention. Without the intermittent simple loops, suture removal is quite challenging as the suture becomes buried and difficult to retrieve and remove. The horizontal running mattress sutures have minimal contact with the epidermis and do not crossover the incision line until the intermittent simple loops are inserted across the incision. This allows easy removal of the stitch, which avoids a major drawback of the standard

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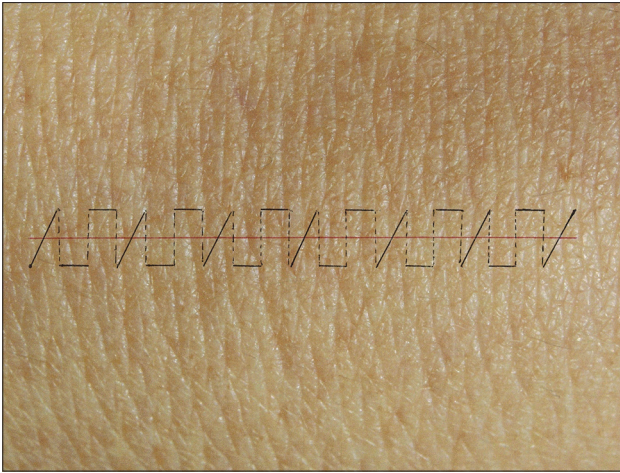


Figure 1: Schematic diagram showing the modified running horizontal running mattress suture with intermittent simple loops. The solid line represents visible sutures on the epidermal surface and the dotted line represents subcutaneous sutures underneath

horizontal technique. To demonstrate its utility, we used the suturing technique on several patients and analyzed the cosmetic outcome with post-operative photographs in comparison to other suturing techniques [Figure 2].

TECHNIQUE

We present a simple modified technique for the running horizontal running mattress suture that facilitates suture removal when approximating wound edges using non-absorbable nylon or prolene sutures. Our technique can be accomplished by placing one intermittent simple loop after every two running horizontal running mattress sutures and continuing this pattern throughout the incision line, finishing with an instrument tie. A non-absorbable nylon or prolene suture is inserted at one end of the wound and two horizontal running mattress sutures are consecutively placed in the dermis and then an intermittent simple loop is placed from one side of the epidermis to the other. The sequence is then repeated until the incision line has been closed.

At the time of suture removal, simply cut the visible suture from the intermittent simple loops and then pull from the free ends of the horizontal running mattress throws of the suture, which become more visible after cutting the simple loops. This technique makes stitch removal more comfortable for the patient and can be performed more quickly by the medical staff due to relatively easy access of the simple loops. Thus, the incorporation of simple loops inevitably avoids unnecessary trauma during suture removal, especially in patients those who have poor wound healing and those that scar easily.



Figure 2: Post-operative result demonstrating the difficulty in visualizing the suture with a standard horizontal running mattress suture in the right half versus our technique, a combination of a horizontal running mattress suture modified with intermittent simple loops, in the left half of the sutured wound. Post-operative result immediately after combination stitch: Wound edge eversion and good hemostasis are achieved

CONCLUSION

This suture technique approximates the wound edges successfully and its incorporation of the horizontal running mattress method is very applicable for wounds that have low-tension or areas that fear dehiscence at suture removal.^[2] The Victory stitch consists of an alternating v-shaped modification of the running horizontal running mattress method.^[4] In a study comparing the cosmetic outcomes of 10 wounds with this technique, the Victory stitch used on half of a wound resulted in better wound edge eversion, less erythema, and finer scars than a simple running technique on the other half of the wound at a 2-weeks follow-up on all patients.^[4] In a similar variation of the running horizontal running mattress technique, Wang and Goldberg found that incorporating one to two simple running sutures after every 4 runs of horizontal running mattress sutures provided minimal swelling or inflammation, better cosmetic scarring, and easier suture removal of the sutures lying across the incision line as opposed to parallel.^[5]

We find this to be especially useful for improved cosmesis in sensitive areas, such as the face, and for better, effortless wound eversion, adequate wound healing, and minimal swelling and inflammation to create a thinner scar compared to the running horizontal running mattress and simple running sutures alone. This suturing technique has predominantly been used in all cases for primary closure after Mohs micrographic surgery in our out-patient dermatologic surgery clinic. Although, this variation is ideal for any wound incision, we emphasize the need to avoid over-tightening the

suture to minimize the risk of necrosis and tissue strangulation and to facilitate stitch removal. This technique can cover a large area of the wound and can be performed more rapidly than the horizontal mattress method since there is no need to tie off each interrupted stitch, thus, facilitating suture removal.

In summary, the combination of horizontal running mattress suture with simple intermittent loops demonstrates functional and cosmetic benefits that can be readily taught, comprehended, and employed, ultimately leading to desirable aesthetic results and successful wound edge eversion. It is recommended for all surgical skin sutures especially, cosmetically sensitive areas, such as the face. This technique can also be useful in areas of high-tension, wounds at high-risk of dehiscence, or places when the suture can be buried and difficult to retrieve. It may also be used to close large wounds and when time is of the essence.

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