Subcuticular stitch: a review of various methods

Introduction

Subcuticular stitching was developed by several generations of surgeons (Fisher et al, 1980) and is often used to close the skin of various wounds. It has the advantages of being cosmetic and may not require removal, preventing a postoperative visit and any pain relating to stitch removal. It does not alter the size of the scar (Winn et al, 1977; Alam et al, 2006). In children removal of stitches may be traumatic (Wright, 1975), so subcuticular stitches are preferable. Subcuticular stitches are suitable for closure of various wounds ranging from laparotomy to laparoscopic port site wounds (Buchweitz et al, 2005).

There are two kinds of subcuticular stitches: dissolvable (does not need to be removed) and non-absorbable (has to be removed). Junior doctors often struggle both at the beginning and at the end of performing subcuticular stitching. This article will teach junior surgical and accident and emergency trainees about the subcuticular stitch with special emphasis on how to begin and how to end.

Suture material

One can use monocryl or undyed vicryl or nylon with beads on either end. Monocryl, a monofilament absorbable 3-0 suture, is commonly used. It glides easily while stitching and stays in the wound for 3–4 weeks. Vicryl undyed is braided but probably has slightly higher strength than monocryl. Prolene or nylon are monofilament non-absorbable suture materials and are stronger than dissolvable stitches.

One can use either a straight or a curved cutting needle. A straight needle is useful for long wounds such as laparotomies. Smaller needles are useful to take smaller bites in places where cosmesis is more important. Some authors have used blunt needles to reduce needle stick injury (Miller and Sabharwal, 1994), but the authors prefer cutting needles so that stitching is easy.

Dr Rajaraman Durai *is Specialist Registrar and* **Mr Philip CH Ng** *is Consultant Surgeon in the Department of Surgery, University Hospital Lewisham, London SE13 6LH*

Correspondence to: Dr R Durai

Common principles

The suture should be passed through the dermis by taking small bites from alternate sides (*Figure 1*). Make sure the stitch does not penetrate through the epidermis. Everting the skin with forceps may help to find the dermis. Using the side of the needle to wipe the blood off the dermal layer keeps it clean. Keep redundant suture material well away from the wound to avoid unnecessary knotting. *Table 1* shows the indications for subcuticular stich.

Figure 1. How to insert a subcuticular (dermal) stitch.

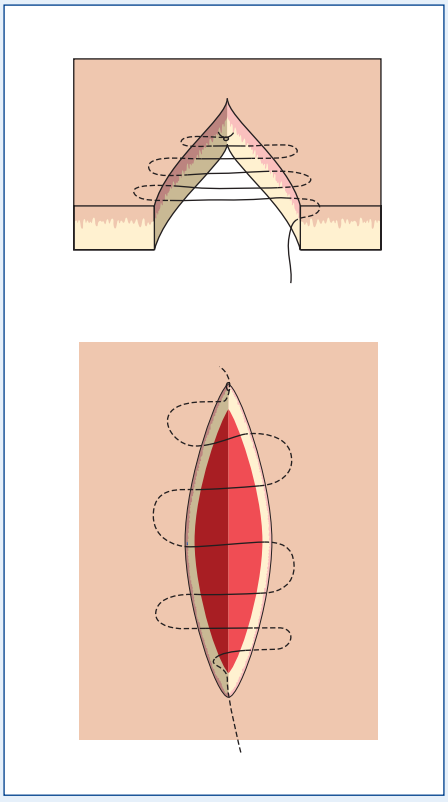


Table 1. Indications for subcuticular stitch

Clean wound
No tension
Cosmesis
Children
Patient preference
Surgeon's preference

Advantages of subcuticular stitch

Subcuticular stitching minimizes tracking and does not pierce the epidermis (Weber and Wulc, 1992). Dissolvable stitches do not require removal, are cosmetically pleasing postoperatively (Taube et al, 1983) and increase patient satisfaction (Sakka et al, 1995). They do not cause inflammation (Austin et al, 1995).

Disadvantages

Subcuticular stitches may take longer to perform than skin staples for an inexperienced trainee. The effect on the incidence of wound infection is unclear (Foster et al, 1977; Onwuanyi and Evbuomwan, 1990; Corder et al, 1991; Serour et al, 1996). In the experience of the first author, monocryl stitching may be painful. Monocryl is not strong and therefore requires additional fat/fascial layer approximation. If the knot is not buried fully, this may cause concern to the patient. The knot can cause

Table 2. Advantages and disadvantages of subcuticular stitch

Advantages	No need to remove
	Cosmetic
	Improved patient satisfaction
	Stitch is not visible
	Less painful
Disadvantages	Takes longer to insert than clips
	If wound gets infected, it may result in gaping
	May not hold if wound is oozing
	May not tolerate stress as not very strong
	Knot may be felt if not buried
	May need steri-strips if the ends are not tied or secured
	Wound may gape if one end is loose
	Good results require practice and skill

stitch abscesses and suture knot extrusion (Du Bois, 1992). *Table 2* shows the advantages and disadvantages of subcuticular stitch.

Techniques for beginning the stitch

Technique 1

Enter the skin at a distance, make a zigzag subcutaneous tunnel and come out via one corner of the wound (*Figure 2a*). This does not involve knotting, and steri-strips are used to close the wound. The redundant suture material should be cut after applying steri-strips.

Technique 2

Take a bite at a corner of the wound, tie the ends and invert this (*Figure 2b*), burying the freely hanging end of the stitch. The patient cannot feel the knot so feels less pain.

Technique 3

Take two stitches at the corner, one from each side, and tie them together (*Figure 2c*). This will approximate the corner of the wound straightaway.

Technique 4

Tie the stitch at one end on one side and proceed (*Figure 2d*). The knot may be visible at the corner.

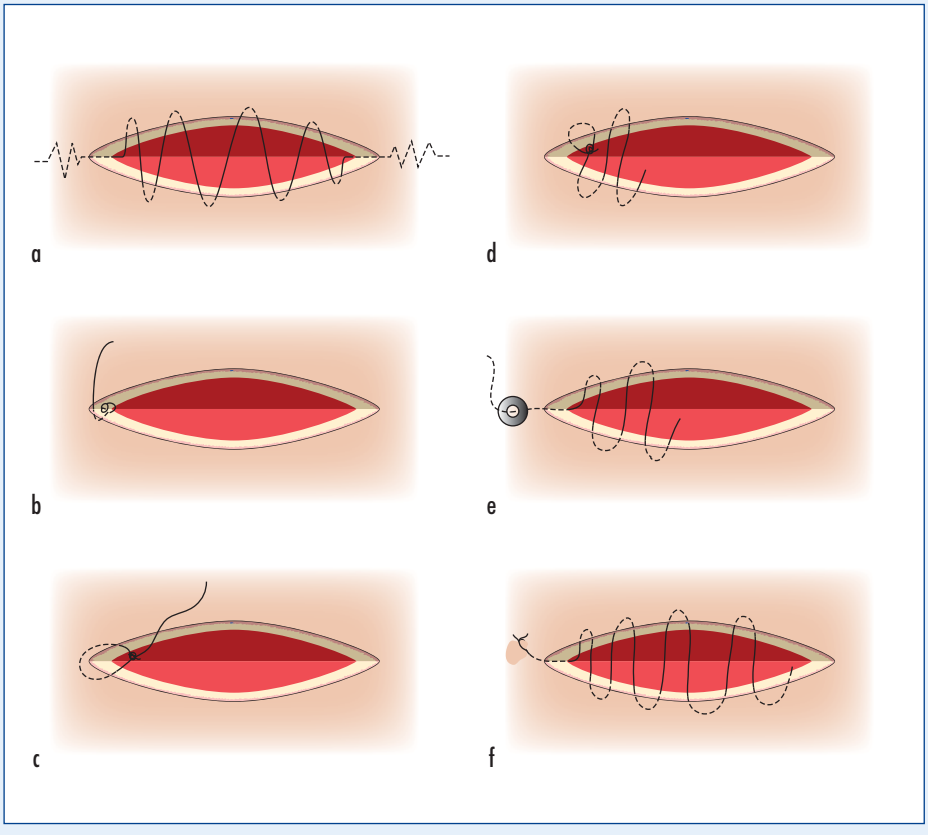
Technique 5

Take a stitch far away from the wound and crush the metal bead which comes with the suture. This will hold the stitch (*Figure 2e*).

Technique 6: L stitch

The entry point is perpendicular to the skin and it may hold the stitch because of the angle. The L stitch may also avoid the development of stitch abscess (Mahabir et al, 2003).

Figure 2. Methods of beginning a subcuticular stitch. a. Zigzag entry and exit to retain the stitch and use steri-strips along with it. b. Inverting angle stitch in which a stitch is inserted at the corner of a wound in the dermis and the needle is passed underneath the stitch so that it will emerge just proximal to it and at the same time invert it. c. Simple corner stitch where the stitch is not inverted. d. The starting point is on one side near the corner and a knot is tied. e. The stitch is passed through the normal skin so that it can emerge at one corner of the wound. It comes with a bead which can be crushed to hold the stitch. f. The stitch is made in healthy skin 1 cm away from the corner and tied, then the remaining suture material and needle is passed subcutaneously to emerge at the corner.



Technique 7

Insert a stitch 2 cm away from the wound and tie a knot (*Figure 2f*). The remaining suture with the needle attached is pulled subcutaneously to emerge at a corner of the wound.

Finishing a subcuticular stitch

Technique 1

This is similar to the entry technique. Make a zigzag subcutaneous tunnel before bringing the needle out through the skin (*Figure 2a*). Steri-strips are used to hold the epidermis while the dermis is held by the subcuticular stitch. The excess suture material is excised at the end of the procedure.

Technique 2

Tie an Aberdeen knot (*Figure 3a*) at the end then pull the needle through the angle of the wound and bury it. The Aberdeen knot is easy to learn – ask your specialist registrar or consultant to show you.

Technique 3

Take a stitch at the end and tie a knot, and then pull the rest of the suture material through the skin (*Figure 3b*).

Technique 4

Take a stitch at one side more towards the corner and then make a u-turn by taking a stitch from the opposite side in the reverse direction and tie them (*Figure 3c*). This technique is useful when there is a gap at the corner.

Technique 5

Crushing the beads at the end is useful when using a non-absorbable stitch. It is used by obstetricians after caesarean sections (*Figure 3d*).

Technique 6

This is the reverse of technique 7 for beginning the subcuticular stitch. The remaining suture material with the needle attached is pulled subcutaneously from a corner of the wound to a point about 2 cm away from the wound. Insert a stitch and tie a knot.

Table 3 shows the advantages and disadvantages of the various beginning techniques and *Table 4* shows the advantages and disadvantages of the various ending techniques.

Conclusions

Subcutaneous stitches are very useful in closing various cutaneous wounds. They are cosmetically acceptable and dissolvable ones do not require removal. BJHM

Conflict of interest: none.

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Figure 3. Methods of finishing a subcuticular stitch. a. An Aberdeen knot is used to finish the subcuticular stitch at the final corner. b. Leave a loop of suture on one side near the finishing corner and take a stitch close to the corner on the opposite side and tie them together. Then pass the needle subcutaneously so that it can emerge just distal to the corner, leaving the knot buried. c. 'U turn stitch' at the corner in which a loop is left at one side of the wound edge and then the needle is passed via the corner towards the proximal direction. The loop is tied with the free end attached to the needle. The knot should be buried before cutting any excess suture material. d. The needle is passed subcutaneously at the finishing corner then via a bead which can be crushed to hold the suture.

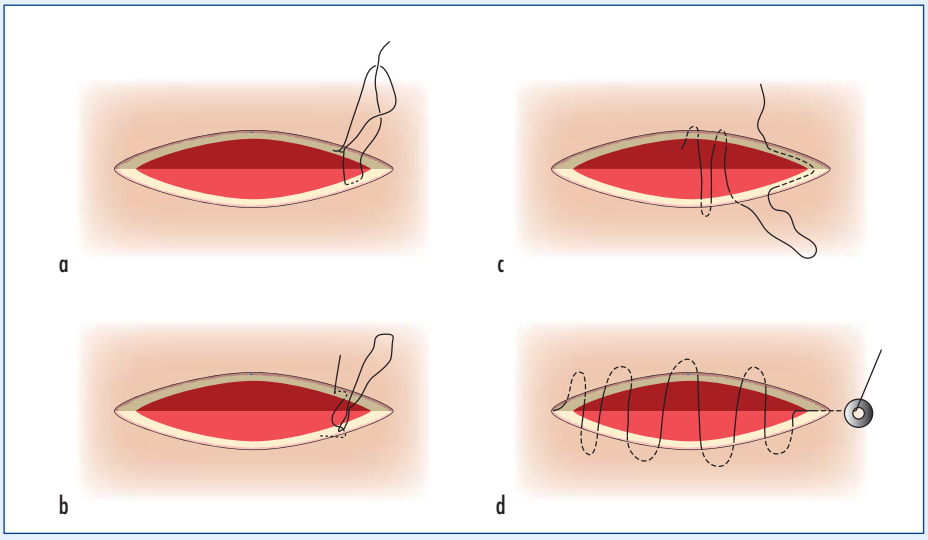

Table 3. Beginning of the stitch

Technique	Advantage	Disadvantage
Zigzag (technique 1)	Ends are secure	Needs steri-strips
Inverting (technique 2)	Knot buried	None
Corner stitch (technique 3)	Easy to insert	Knot visible
One side tie (technique 4)	Easy to insert	Knot visible
Bead (technique 5)	Easy to insert and ends are secure	The stitch has to be removed
L stitch (technique 6)	Ends are secure and less stitch abscess	May need steri-strips
Extra knot away from wound (technique 7)	End is secure	The stitch has to be removed

Table 4. Ending the stitch

Technique	Advantage	Disadvantage
Zigzag (technique 1)	Ends are secure	Needs steri-strips
Aberdeen knot (technique 2)	Ends are secure	None
Corner stitch (technique 3)	Easy to insert	Knot has to be buried
U turn (technique 4)	Will avoid gaping	May distort the wound
Bead (technique 5)	Easy to insert and ends are secure	The stitch has to be removed
L stitch (technique 6)	Ends are secure and less stitch abscess	May need steri-strips

KEY POINTS

- Subcutaneous stitches are cosmetically pleasing.
- When knots are created to retain the stitch, they should be buried.
- An inverting stitch is an excellent way of burying the knot at the beginning.
- Both ends are very important for a subcuticular stitch. Unless they are secured, wound gaping and scarring may occur.