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## A COMPARATIVE STUDY OF VERTICAL MATTRESS VS SUB-CUTICULAR STITCHES IN TYPE 1 SURGERY

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### ABSTRACT:

The objective of present study was to compare two skin closure techniques – vertical mattress sutures and subcuticular sutures in clean surgical wounds. This was a hospital based comparative study of 100 Indoor participants. Patients undergoing in different surgeries like hernia repair, appendectomy, suprapubic cystolithotomy, wound closure, excision of swelling and thyroid surgeries were included in the study. Half of randomly chosen Participants' skin approximation was done by vertical mattress suturing by 3-0 polyamide black and half by subcuticular suturing by 3-0 polyglactin 910. The overall number of male patients was 71%. Maximum number of patients (23%) being in age groups 21-30 years. The wound complication is seen more in patients with vertical mattress sutures than with subcuticular sutures. Pus discharge is seen in vertical mattress sutures (4%). Wound dehiscence is seen in subcuticular sutures (4%). Local stitch site oedema/erythema /redness is more in patients with vertical mattress sutures as compared to subcuticular sutures. Cosmetic look of the wound and scar is better with subcuticular sutures (28%) as compared to vertical mattress sutures (10%). Subcuticular suture is technically difficult method of skin closure than vertical mattress technique but with superior cosmetic results and better patient compliance.

**Key words:** vertical mattress sutures, subcuticular sutures, type 1 surgery

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### INTRODUCTION:

The history of sutures begins more than 2,000 years ago. Surgical and suture techniques evolved in the late 1800s with the development of sterilization procedures<sup>(1, 2, 4)</sup>. It has been said that the scar is the "autograph of a surgeon". Every surgeon wants cosmetically acceptable scars along with optimal healing. A basic need of skin closure is good approximation. Apart from cosmetically good scars it is also necessary that the skin closure technique should be technically easy, acceptable, speedy and economical. Good tissue union and cosmetically acceptable scars are vital for ideal surgical practice. Today, wound closure techniques have evolved from early developments in suturing materials to advanced resources that include synthetic sutures, absorbable sutures, staples, tapes, and adhesive compounds. But still traditional sutures are taken by majority of surgeons. Wound closure by suture helps in healing by primary intention thereby decreasing the chance of infection and unnecessary dressing<sup>1, 2, 3, 4</sup>.

The main reason for using vertical mattress suture is to produce greater wound eversion. Vertical mattress also close dead space and provide increased strength across the wound. Advantage of Vertical mattress sutures in elder age group is that the skin in this age group tends to get inverted and it needs to be everted for proper apposition. This technique helps to keep the skin adequately everted without undue tension across suture lines. Disadvantage of vertical mattress suture include difficulty in approximating wound edges and prominent suture marks if the

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sutures are not removed sooner<sup>5</sup>.

Subcuticular technique is an elegant but difficult technique which was first described by Halsted. This technique is valuable when suture are to be kept in place for more than one week, but suture scar must be ignored. Advantage of subcuticular sutures in young patients is as the skin in this age group is comparatively soft and supple and this technique helps in good cosmetic appearance and also good healing tendencies of the people of this age group<sup>6</sup>.

The main aims of skin closure are good tissue approximation, ease of performance, good patient acceptability, less/minimal scar and good cosmetic appearance<sup>2</sup>. This study was aimed to compare two skin closure techniques – vertical mattress sutures and subcuticular sutures in clean surgical wounds

## MATERIALS AND METHODS

**Study type, study setting, study period:** An observational comparative study was done in Surgery Department of C.U.Shah Medical College and Hospital, Surendranagar district, Gujarat state, India from October 2010 to September 2012.

**Study participants, sampling and sample size:** A total 100 patients of undergoing different surgeries like hernia repair, appendectomy, excision biopsy, suprapubic cystolithotomy, primary and secondary closure, thyroid surgeries and trauma were randomly selected. All clean and contaminated wounds are selected in the study. In 50 participants vertical mattress closure was done. In other 50 participants subcuticular closure was done. All attempts have been made to standardize the study by selecting cases with identical age, incision, elective or emergency surgery etc. Medical disorders were not considered while selecting the patients.

**Study procedure:** In all selected patients wound closure was done in layer wise fashion according to wound depth and meticulous care was being taken to ensure proper and adequate haemostasis with good margin approximation. In incised wound subcutaneous wound closure was done and knots were properly buried. In trauma cases minimally contaminated wounds were thoroughly washed and thereafter sutured after taking proper haemostatic measures. In all patients wound size and time taken for closure was noted. Post-operative wound examination was done on 3<sup>rd</sup> day, 7<sup>th</sup> day, 14<sup>th</sup> day and at the end of 1 month. In Fifty patients skin closure was done by vertical mattress stitches in other fifty patients the skin closure was done by subcuticular stitches.

**Vertical Mattress Suture method:** Vertical mattress closure

was done with 3-0 polyamide black (Ethilon) from standard company within expiry date in 50 patients. The needle was initially inserted at a distance from the wound edge, crossing through the dermal tissue and exiting through the skin on the opposite side at an equal distance from the wound edge. This was the far-far portion. The needle was rotated 180 degrees in the needle holder and the direction of the Suture loop is reversed (backhanded). On the return, small bites are taken at the epidermal/dermal edges, which become approximated when the knot was tied. This was near-near portion of the suture, loop closes and everts the edges of the wound<sup>5</sup>.

**Subcuticular suture method:** Subcuticular closure was done with 3-0 polyglactin 910 (vicryl) from standard company within expiry date in 50 patients. It was initiated by placing needle through one wound edge. The opposite edge was everted and the needle was placed horizontally through upper dermis. This was repeated on alternating sides of wound. It was terminated by tying with remnant material over the wound or was looped through the last loop of opposite side. Absorbable sutures were used in children to prevent removal and non-absorbable was used when placed for prolonged periods<sup>6</sup>.

**Post closure care:** Sutures were covered with a protective non-adherent dressing for at least 24 to 48 hours. Sutured wounds were kept clean and gently cleaned. Patients with tissue adhesives in place were advised to avoid bathing and swimming. Patients were instructed to observe the wound for erythema, warmth, swelling and drainage, because this finding may indicate infection.

**Ethical issues:** Present study had been approved by institutional ethical committee and informed consent was taken from each participant before entering in the study.

**Statistical analysis:** Data were cleaned, validated and analyzed on the Microsoft office excel 2007 and Epi info 7.

Categorical variables were expressed as percentage.

## RESULT

Majority of both the sutures (23%) taken in age groups between 21-30 years. Subcuticular sutures were taken more commonly in age group between 0-10(10%) and 11-20 years (18%). A total of 72% of our Vertical mattress sutures were taken more commonly in age group of 51-60(16%) and >60 (24%).

In our study maximum numbers of patients (56%) were having wound length of 1-5 cm. In participants with subcuticular suture 28% had excellent scar, 48% had good scar and 24% had fair cosmetic outcome of scar. In group B 5 patients (10%)

had excellent scar, 23 patients (46%) had good scar and 22 patients (44%) had fair cosmetic outcome of scar.

Table: 1 participants characteristics

	<b>Subcuticular stitches (n=50) No. (%)</b>	<b>Vertical mattress stitches (n=50) No. (%)</b>	<b>Total (n=100) No. (%)</b>
<b>Age (years)</b>			
0-10	5 (10)	2(4)	7 (7)
11-20	9 (18)	2 (4)	11 (11)
21-30	12 (24)	11 (22)	23 (23)
31-40	8 (16)	8 (16)	16 (16)
41-50	8 (16)	7 (14)	15 (15)
51-60	5 (10)	8 (16)	13 (13)
>60	3 (6)	12 (24)	15 (15)
<b>Sex distribution</b>			
Male	33 (66)	39 (78)	72 (72)
Female	17 (34)	11 (22)	28 (28)
<b>Surgeries done among the participants</b>			
Excision biopsy	17 (34)	17 (34)	34 (68)
Hernia repair	16 (32)	16 (32)	32 (32)
Appendectomy	07 (14)	7 (14)	14 (28)
Suprapubic cystolithotomy	04 (08)	04 (08)	08 (16)
Wound closure	05 (10)	05 (10)	10 (20)
Thyroid surgeries	01 (02)	01 (02)	02 (04)
<b>Wound length</b>			
1-5 cm	30 (60)	26 (52)	56 (56)
5-10 cm	19 (38)	20 (40)	39 (39)
>10 cm	01 (02)	04 (08)	05 (05)
<b>Complications on follow up*</b>			
Inflammation	09 (18)	20 (40)	29 (29)
Pain	02 (04)	06 (12)	08 (08)
Serous discharge	02 (04)	03 (06)	05 (05)
Pus discharge	00 (00)	02 (04)	02 (02)
Wound dehiscence	01 (02)	00 (00)	01 (01)
Stitch granuloma	02 (04)	00 (00)	02 (02)
No complication	34 (68)	19 (38)	53 (53)
<b>Cosmetic look of scar between both sutures**</b>			
Fair	12 (24)	22 (44)	34 (34)
Good	24 (48)	23 (46)	47 (47)
Excellent	14 (28)	05 (10)	19 (19)

\* Ever complication occurred on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> or 1 month

\*\* Fair- linear scar with other scar marks (railroading) with margin in apposition, Good -linear scar with other scar marks (railroading), Excellent-linear scar only

**Discussion:** Vertical mattress sutures were taken more frequently in age group >20years (96%) as the skin tends to get inverted; hence, it needs to be everted for proper apposition which is homologous with shah F et al<sup>7</sup>. Subcuticular stitches were taken in 72% of participants > 20 years which in contrast with Shah F et al<sup>7</sup>. This technique helps in cosmesis, which is also helped by good healing tendencies. Rail roading is seen with vertical mattress suture which can be decreased by early removal of sutures. Also timely removal shows better cosmetic appearance as observed in our study. This was also shown by Zuber T. J. et al, 2002 in his study<sup>8</sup>.Cosmetic result is better with subcuticular suturing technique than with vertical mattress suturing technique. This in correlation to the prospective randomized trial by Zwart H. ruiter and et al<sup>9</sup>.

**Conclusion:** It can be concluded that unless the tissues are brought together in precise approximation there can be complications with healing process and can interfere with the desire of cosmetic result. Sub-cuticular suture is technically difficult method of skin closure than vertical mattress technique but with superior cosmetic results and better patient compliance.

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