

Ventrally based and turned in dermofat pedicled flaps in repair of abdominal wall and thoracic defects

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Defects in the chest and abdominal wall may follow large excisions for malignancy, irradiation necrosis and other lesions. Ventral herniation may be due to an incisional hernia, congenital defects or a divarication. Anatomical reconstitution is possible only with limited defects and large defects have been repaired by the use of alloplastic materials (Jenkins, 1980; Lewis, 1984), free dermal or fascial grafts (Mair, 1945), musculocutaneous flaps (Parkash and Ramakrishnan, 1980), muscle transfers (Ger and Dubois, 1983) and other techniques. The use of dermofat turned in flaps was recommended by Medgyesi (1972) and Lontofte (1984). Ventrally based pedicled dermofat tissue is easily obtainable (Taylor *et al.*, 1983). In this paper we report our experience of closing defects of the abdominal and thoracic walls with a variety of de-epithelialised island dermofat flaps.

Materials and methods

The study includes 21 patients treated over the last 18 months (January 1984 to June 1985) for abdominal or chest wall defects (Table 1). The size of the defects ranged from 15 to 600 cm². The following methods of repair were used and are summarised in Table 2:

1. De-epithelialised turned in pedicled dermofat flap

This was obtained by marking out an appropriate strip of skin and subcutaneous tissue at the

margin of the defect (the size depending on the defect to be strengthened), de-epithelialising it and turning it over. This technique differs from that of Medgyesi (1972) in that the lateral edge of the flap is cut to the full depth of the skin to make it into an island (Fig. 1).

Table 1

Nature of defect	Males		Total No. of cases
	Males	Females	
A. Inguinal hernias			5
Direct	3	0	
Indirect	1	0	
Interstitial	1	0	
B. Ventral hernias			14
(i) Incisional			
Vertical	2	6	
Flanks	1	2	
(ii) Divarication	0	2	
(iii) Para umbilical	0	1	
C. Post excisional defects			2
(i) Abdominal wall (solid granuloma)	0	1	
(ii) Chest wall (rib secondaries)	0	1	
Total	8	13	21

Table 2

Flap (de-epithelialised)	Hernias		Post excisional defect	
	Inguinal	Incisional	Abdomen	Chest wall
1. Dartos based serotal	1	0	0	0
2. Circumflex iliac vessels based	3	1	0	0
3. Superficial epigastric artery based (obtained before making hernia incision)	1 (interstitial)	0	0	0
4. Dermofat turn in	0	8 (vertical)	1 (vertical)	1 (transverse)
5. Two triangles dermofat turn in	0	1	0	0
6. Ventral pedicle (based on deep epigastric vessels and perforators through rectus abdominis)	0	6 (in 5 cases)	0	0

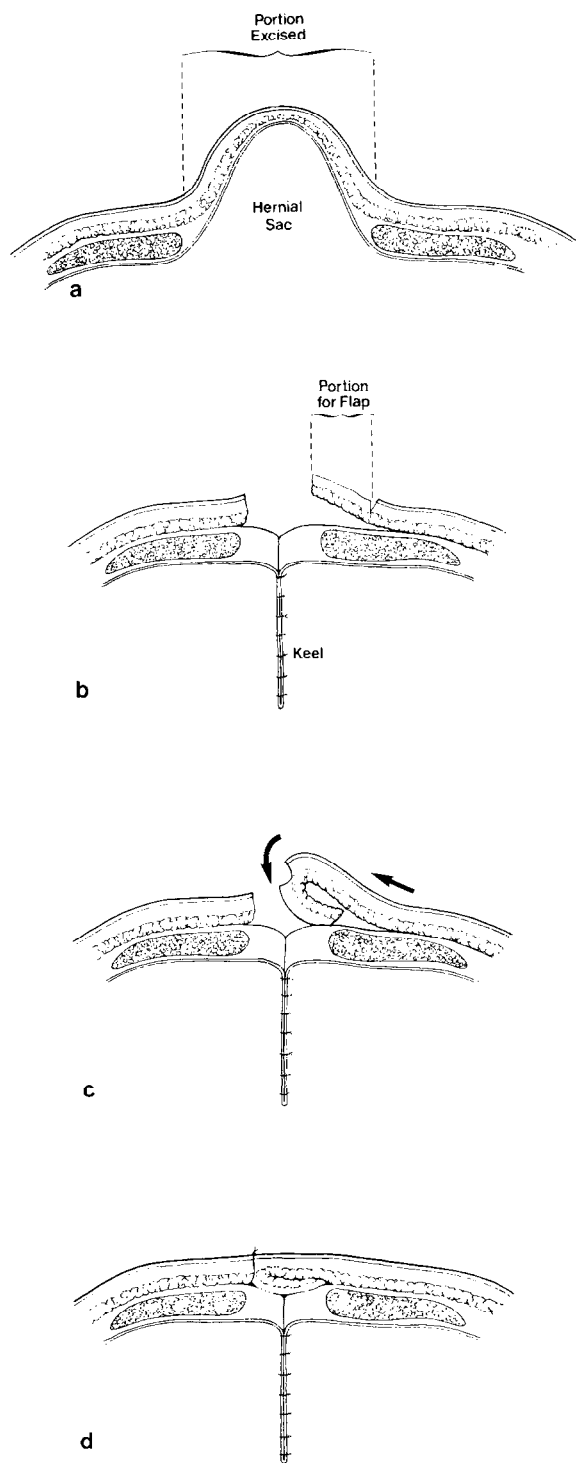


Fig. 1

Figure 1—Principle of dermofat turn in flap.

2. *Two triangles modification of the above technique*
In one patient the above technique was modified to raise two triangular dermofat flaps which were turned in, one on either side of the defect.
3. *(Ventral) rectus abdominis perforator based turn-over dermofat flap*

An oblique, suitable area was marked out as an island. The flap was raised just superficial to the external oblique aponeurosis, carefully dissecting up to the lateral border of the rectus sheath. Where necessary, a part of the rectus abdominis muscle with overlying sheath were divided to provide enough mobility. The island was de-epithelialised and the flap turned up or down depending on the site of the defect (Fig. 2).

In the case of ventral hernia, excision of the thinned out skin and scar tissue was on standard lines, but peritoneum was not opened and the lax tissues were keeled (Maingot, 1980).

Umbilicoplasty based on the Pitanguy (1972) technique was done in most of the cases, which resulted in a normal looking umbilicus. One end of the flap snugly surrounded the umbilical region. When both infra- and supra-umbilical pedicles were used they were stitched to each other around the repaired umbilicus (Fig. 2).

4. *De-epithelialised axial pattern skin flaps*

These are standard skin flaps (Fig. 3) based on superficial circumflex iliac, superficial epigastric or external pudendal vessels and were mainly used for repair of inguinal hernias and incisional hernias in the flanks.

In groin hernias where posterior wall tissues were poor, keeling (Parkash *et al.*, 1983) was supplemented with such a flap brought into the canal through a small opening in the external oblique. The scrotal de-epithelialised flap was introduced through the external inguinal ring. The dermal island was split to enclose the cord and the margins stitched to the surrounding sound tissue, that is to the arched tendinous fibres of transversalis above and to the iliopubic ligament below. In all these cases 60 or 100 size cotton thread was used as the suture material.

Illustrative cases

Case 1

A 50-year-old female presented with a melanoma of the left parotid region and a diffuse swelling, due to secondaries, of the right antero-lateral chest wall involving the

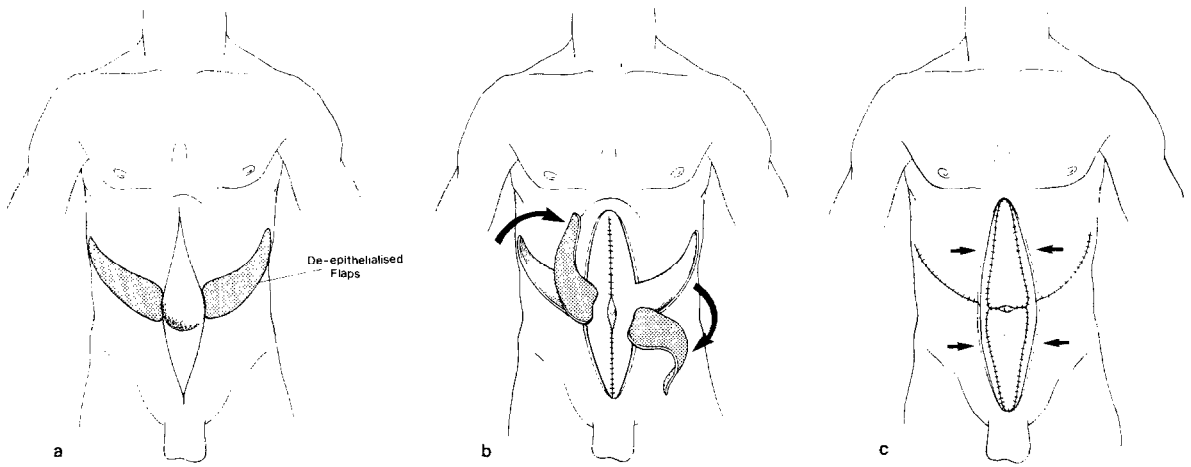


Fig. 2

Figure 2 Ventrally-based de-epithelialised island flaps supplied by branches of inferior epigastric artery through rectus abdominis. The flaps are transposed so that their dermal surface lies deeply, one above and one below the umbilicus, to reinforce the keel repair of the ventral hernia.

5th to 7th ribs. The secondaries were excised including the pleura and the full thickness defect in the chest wall, measuring 120 cm², was covered with a linear turned in pedicle dermo-fat flap (Fig. 4). Healing was good and at the time of discharge there was no paradoxical movement with respiration, of the segment repaired.

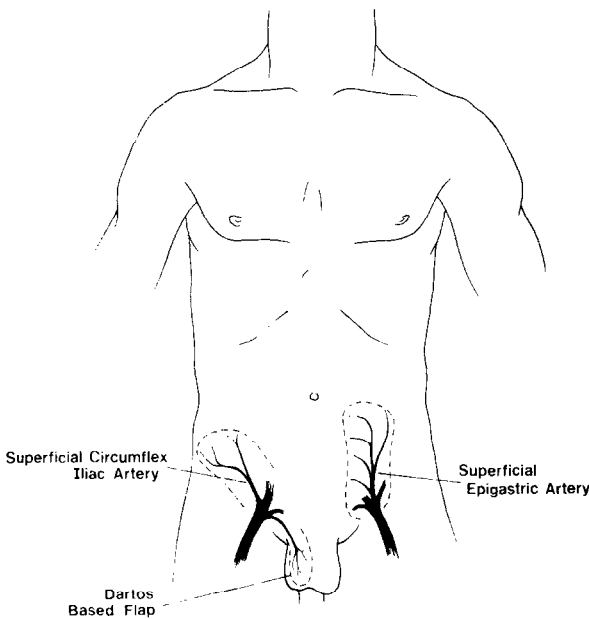


Fig. 3

Figure 3 – Sites for de-epithelialised axial pattern skin flaps.



Fig. 4

Figure 4 Case 1. Demonstrating flap to be turned over after de-epithelialisation. Parts of 5th, 6th and 7th ribs were excised as part of tumour mass.



Fig. 5



Fig. 6

Figure 5—Case 2. Lateral view (lying down) with complete reduction of hernia. Average space between muscles was 6 cm.
Figure 6—Case 2. Repair by turn over flaps. Umbilicus reconstructed by Pitanguy technique.

Case 2

A 34-year-old female had an incisional hernia of 6 months' duration following puerperal sterilisation done 2 years earlier (Fig. 5). The defect, 60 cm², was covered with a vertical turned in pedicled dermofat flap after keeling and umbilicoplasty (Fig. 6). Sound healing with a cosmetically acceptable strong abdominal wall and no recurrence of the lesion were observed at a 6-months follow-up.

Case 3

This patient had a para-umbilical defect and hernia following surgery for umbilical discharge done 10 years

earlier (Fig. 7). At surgery the scar was excised and keeling with imbrication in the umbilical region closed the defect. Saving of the stretched out umbilical skin and scar restored the natural appearance of the umbilicus. The defect was supplemented by two ventrally based pedicled flaps—the right one turned inferiorly and the left superiorly. The adjacent edges were stitched to each other around the narrowed umbilicus (Fig. 8). Results following surgery showed sound healing with good cosmesis (Fig. 9).

Results

These are shown in Table 3.

Table 3 Results

<i>Flap (de-epithelialised)</i>	<i>No. of cases</i>	<i>Sound healing</i>	<i>Minimal infection</i>	<i>Major infection or dehiscence</i>
1. Dartos based scrotal	1	1	0	0
2. Circumflex iliac vessels based	4	3	1	0
3. Superficial epigastric artery based	1	0	1	0
4. Dermofat turn in	10	8	2	0
5. Two triangles dermofat turn in	1	0	0	1
6. Ventral pedicle dermofat	6	6	0	0
Total	23	18	4	1



Fig. 7



Fig. 8



Fig. 9

Figure 7—*Case 4*. Standing position of patient showing gross herniation. Patient had a laparotomy ten years previously followed by discharge for a number of years and herniation. Figure 8—*Case 4*. Keeling supplemented by superior and inferior ventrally based flaps. Immediate post-operative picture. Figure 9—*Case 4*. Results after 1 month. Note the minimal oedema of umbilicus persisting, but tending to settle down.

Sound or satisfactory healing was obtained in all cases except one where there was a technical mis-planning and two triangular flaps were used. Follow-up ranges from 18 months to 6 months in two cases.

Discussion

It used to be our practice to treat ventral hernias

with keeling and supplementation with free dermal graft. Review of 51 cases in 1981 revealed that there were two cases of major dehiscence of the skin wound and nine of minor infection.

Following this review we decided to use pedicled tissue which, with its own blood supply, should be a superior material to free grafts. In this series, apart from one case of technical failure, there was no serious case of infection. Besides, a flap permits

a better filling up of a gap where tissue has been excised.

Use of a dermofat flap does not have the theoretical objection of using a functioning muscle. The tissue is readily available. The character of tissue used is that of dermis, with the added advantage of its being alive with a dependable blood supply. With the use of ventrally based pedicles, it should also be possible to combine the repair with a lipectomy where indicated.

The follow-up in the series is, admittedly, short making this a preliminary report, but it still brings out the basic advantage of the principle involved over other types of repair.

It is fashionable to use alloplastic material but its disadvantages in the way of late rejection and infection are always there (Lewis, 1984), besides the forbidding cost of the material for poor patients in a developing country.

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References

- Ger, R. and Duboys, E.** (1983). Prevention and repair of large abdominal wall defects by muscle transposition: a preliminary communication. *Plastic and Reconstructive Surgery*, **72**, 170.
- Jenkins, T. P. N.** (1980). Incisional hernia repair: a mechanical approach. *British Journal of Surgery*, **67**, 335.
- Lewis, R. T.** (1984). Knitted polypropylene (Marlex) mesh in the repair of incisional hernia. *Canadian Journal of Surgery*, **17**, 155.
- Lontofte, P. J.** (1984). Giant ventral hernias and their repair. *Scandinavian Journal of Plastic and Reconstructive Surgery*, **18**, 209.
- Maingot, R.** (1980). *Management of abdominal operations*. VII Edition. New York: Appleton Century Crofts.
- Mair, G. B.** (1945). The use of whole skin grafts as a substitute for fascial sutures in the treatment of hernias. *American Journal of Surgery*, **69**, 352.
- Medgyesi, S.** (1972). The repair of incisional hernias with pedicled skin flaps. *Scandinavian Journal of Plastic and Reconstructive Surgery*, **6**, 69.
- Parkash, S. and Ramakrishnan, K.** (1980). A myocutaneous island flap in the treatment of chronic irradiation ulcer of abdominal wall. *British Journal of Plastic Surgery*, **33**, 138.
- Parkash, S., Mayoornathan, T. S. and Ananthkrishnan, N.** (1983). Inguinal hernias: a preliminary study on a technique of repair based on keel principle. *Australian and New Zealand Journal of Surgery*, **53**, 3.
- Pitanguy, I.** (1972). Thigh lift and abdominal lipectomy. In *The Unfavourable Results of Plastic Surgery: Avoidance and Treatment*. R. M. Goldwyn (Ed.). Boston: Little Brown & Co.
- Taylor, G. I., Corlett, R. and Boyd, J. B.** (1983). The extended deep inferior epigastric flap: a clinical technique. *Plastic and Reconstructive Surgery*, **72**, 751.

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