

## USE OF LIMBERG'S TRANSPOSITION FLAP IN RECONSTRUCTIVE SURGERY

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### Introduction :

Most of the small skin defects can be reconstructed by using local flaps. Basically these flaps are based on the transposition or rotation flap principle or both. Among the various modification of these flaps, we have found Limberg's transposition flap to be very versatile. It can be used in almost in any situation.

### Design of Limberg's Flap :

Limberg's flap is somewhat similar to Douformental flap and is suitable for rhomboid defects and square defects. We have used this flap in all cases for a square defect.

### Steps in Construction :

1. The defect is converted into a square or diamond. Most lesions which need excision can be easily converted into a square without sacrificing much of normal skin.
2. Any of the two diagonals of the square is extended in one direction for a distance equal to the diagonal. ( $AC = CE$  in Fig. 1)
3. From the end of this line another line is drawn parallel to and equal in length to one side of the square ( $EF = CD = AB = BC = AD$  in (Fig. 1.)

### DESIGN OF LIMBERG FLAP

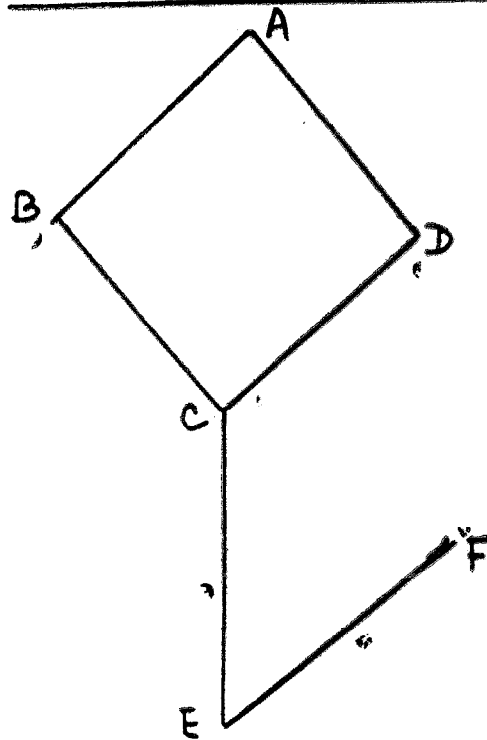


Fig. 1

4. The flap is raised and undermined in the direction away from the defect.
5. The raised flap is now moved towards the defect and rotated through  $90^\circ$  to fit squarely into the defect, in the process, completely closing the donor wound. There is dog ear formation at the turning point.

**Variations in Design :**

The squaring of the skin defect can be made in any direction and for each square, there are 8 possible Limberg's flaps. Hence, this flap can be designed in any direction in the arc of a circle ( Fig. 2 ).

VARIATIONS IN DESIGN - LIMBERG FLAP :

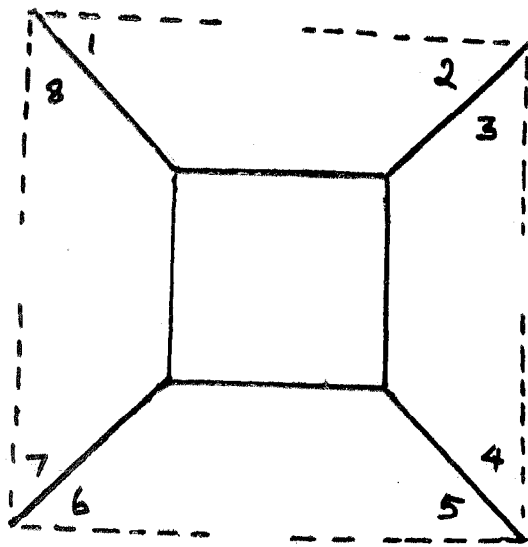


Fig. 2

**Advantages over other Local Flaps :**

1. Minimum sacrifice of normal skin while creating the defect.
2. Flap construction can be done in any direction in the arc of a circle.
3. No residual defect needing a free graft.
4. Flap survival good, being of 1 : 1 ratio.
5. Flap of any size can be used.
6. Cosmetic result good.
7. Base in planning and execution.
8. Delay is rarely if ever needed.

**Example:**

Various sites where Limberg's flap has been used are indicated in table 1. These flaps have varied in size from about 3 mm square to 12 cm square.

**Table 1.**

**Limberg flap. Sites of use.**

Forehead	2
Occipital area	1
Mastoid area	1
Medial canthus	4
Cheek	5
Neck	1
Nose (4 mm)	1
Axilla (12 cm)	3
Abdominal wall	1
Finger (3 mm)	1

20

**Results:**

There was only one failure. Limberg flap was used for an infected wart in mastoid area. There was dehiscence and partial loss of flap due to infection. All other flaps were successful. There was no flap necrosis; no infection and final cosmetic result was satisfactory. There was temporary edema in many cases; but all of them settled down in a matter of 3—6 months.

**Discussion:**

After Limberg described the basis of his transposition flap for 4 sided defects in 1966, it has been used widely in many situations. It has been used in almost all anatomical situations. Wm. Jervis et al (1974) in a review of 35 Limberg and Douformental flaps did have

five complications and one case in the scalp needed a secondary skin graft. Hoehn et al (1977) used this flap in many instances of small decubitus ulcers with very good results. They used 50 Limberg flaps in 31 patients. In one case, due to surrounding scars they resorted to a surgical delay. The planning of a Limberg's flap in any situation has been well described by Borges (1978) taking into consideration the line of maximum extensibility (LME). All these authors have used 60° rhomboid defects. But in our case, we have used, initially by accident and subsequently by the successful results, square

defects and similar planning of transposition flap. We are so satisfied with the result that after we started using the Limberg flap, we have not used any other local flap for reconstruction of small defect (fig. 3, 4, 5 and 6).

### Summary:

Experience with the use of a Limberg's transposition flap on 20 occasions is described. The defects reconstructed have all been square in shape unlike 60° rhomboid as originally described by Limberg.



Fig. 3



Fig. 4



Fig. 5

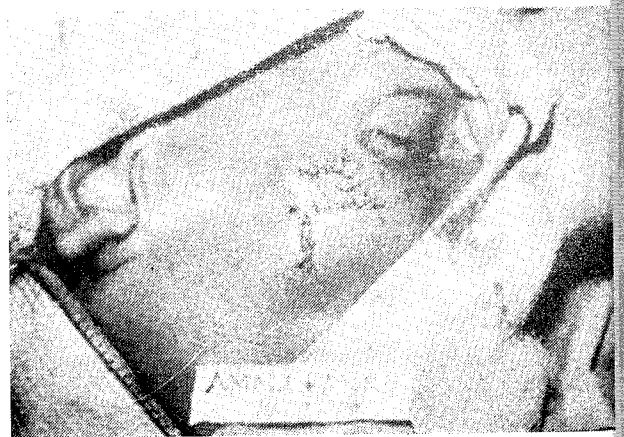


Fig. 6

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