ISLAND DORSALIS PEDIS FLAP

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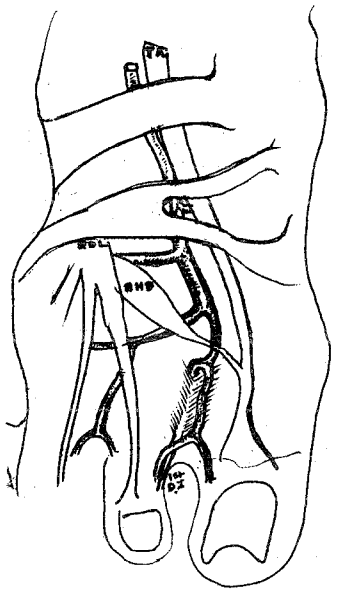
KEY WOARDS :
Full thickness defects,
one stage

ABSTRACT

The Island Dorsalis pedis Flap is used for reconstruction of defects near the lower end of tibia and area adjacent to ankle joint. The flap is dissected as an island which aid greatly in increasing its arc of rotation and in improving its manouverability. The results are satisfactory functionally with acceptable donar site morbidity.

INTRODUCTION :

The use of Island Dorsalis pedis Flap for resurfacing full thickness defects near lower end of tibia and area adjacent to ankle joint were studied during the period from February, 1988 to March 1990. In 7 cases the defects were due to road traffic accident and in one case the injury occured while working in coal mine. The flap was evaluated in various clinical situations with a view to find out its reliability.



Sketch Showing

(i) Relationship of Dorsalis pedis artery and its course

TECHNIQUE OF FLAP DISSECTION :

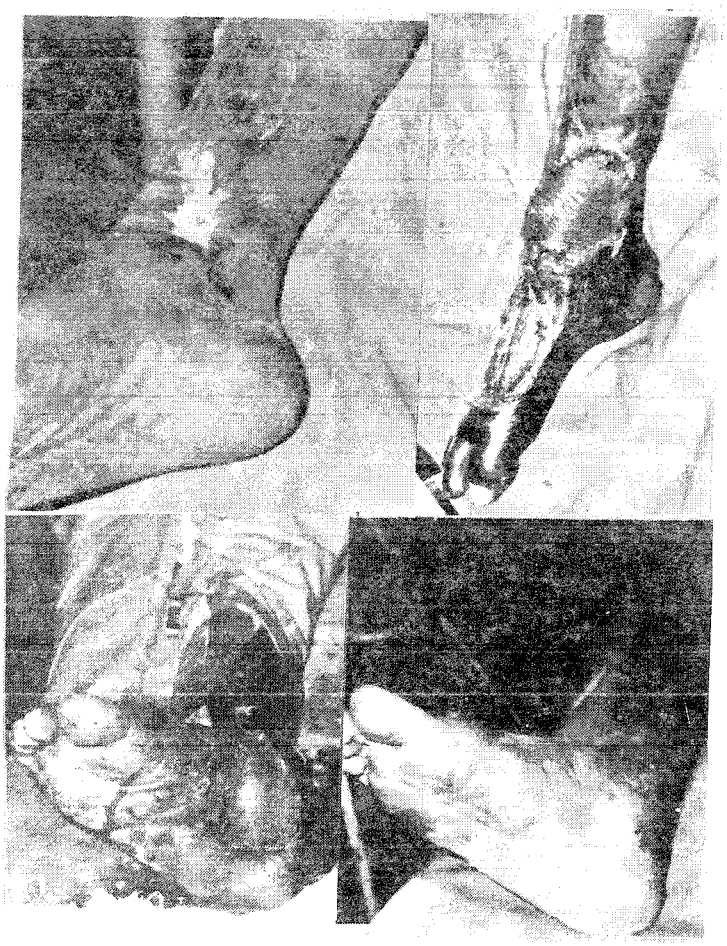
Preoperatively the course of Dorsalis Pedis artery is outlined as the artery is palpable distally to a point just beyond where its deep branch contributes to planter arch. In this series all the operations were performed, using a Eschmark's bandage.

An incision is made along the medial border of Ist metatarsal bone upto the metatarsophalangeal joint. The incision is extended laterally just above the M.P. joint and then upward along the medial border of the 5th metatarsal bone. The upper incision is completed along a line about one inch below a line joining the two malleoli. The incision is deepened and the skin flap along with the subcutaneous tissue is raised. The tributaries of short and long saphenous vein are ligated. The branches of arcuate artery supplying lateral three metatarsal spaces are ligated under vision. The branches of tarsal arteries are ligated and cut. The flap along the first metatarsal space is raised from below upwards taking the two heads of Ist dorsal interosseous muscle with the flap. This is very important as to avoid damage to the Ist dorsal metatarsal artery and the axis of dorsalis pedis artery.

The deep branch going to sole is ligated carefully otherwise troublesome haemorrhage occurs. The tendon of extensor hallusis brevis is detached from its insertion as the artery passes beneath the tendon. The flap is raised preserving the paratenon over the tendons on the axis of dorsalis pedis artery and venae commitants accompanying the artery. Now the flap is ready to be transferred to the defect site either by tunnelling the bridge of tissue or cutting and resuturing the tissue. The donar site is split skin grafted. Major Mc Craw in his series delayed the larger flaps entending up to webspaces of toes, but no delay has been done in this series as no flap was so long.

OBSERVATION

In this series, altogether 8 cases of island dorsalis pedis flap have been done in the Dept. of Plastic Surgery, PMCH, Patna. All cases were male, seven of them had road traffic accident, however one case had injury while working in coal mine. The defects in three cases were adjacent to heel while in 5 cases at the lower end of tibia. The underlying bone in 4 cases was non-united and adherent scar was present over the area and further surgery was impossible without a full thickness cover.



Photograph Showing

(i) Pre-op. foot with adherent and unstable scar.
(ii) Puckered scar over lower end of tibia.
(iii) Post-op. D.P.I. flap before removal of sutures.
(iv) Post-op. well settled D.P.I. flap with healed donar site.

All the flaps survived except marginal superficial loss in three cases, out of which two healed by repeated dressings and one by skin grafting.

DISCUSSION :

Many types of flaps in the head and neck area were developed during early part of this century. Such flaps having a functionally self-contained vascular system have also been defined in the trunk and upper extremity. Major John B.Mc Craw etal (1984) used the dorsalis pedis flap in 11 cases with fairly good results.

Branches of dorsalis pedis artery remify in deep fascia and the flap is to a large extent fasciocutaneous (Cormack etal 1987). Roy Chaudhary etal (1988) published their experience of resurfacing great toe with reversed dorsalis island fasciocutaneous flap. Collin Roy etal (1980) have also presented four cases of defects of great

TABLE - I

S.N.	A/S	Site of Defect	Under Lying Bone	Donar Site	Complications
1.	22 M	Medial side of foot near heel.	Exposed	Skin grafted Healed Well.	Infection
2.	50 M	–"–	Discharging sinuses with adherent Scar.	–"–	Marginal Superficial necrosis.
3.	33 M	Lower end of tibia.	Non-union adherent Scar.	Skin grafting twice.	–"–
4.	25 M	–"–	–"–	Skin grafting once.	–"–
5.	50 M		Loss of bone Adherent Scar.	–"–	Marginal Superficial loss infections
6.	35 M	–"–	Exposed	–"–	Infection
7.	26 M	Back of heel over tendon-achiles.	Normal	–"–	
8.	18 M	Medial Malleolus	Nonhealing ulcer with exposed bone.	–"–	Superficial marginal necrosis required skin grafting.

toe covered with reversed dorsalis pedis with good results. However the use of free dorsalis pedis flap has been also reported for head and neck repairs by Franklin I.D. (1979) and its use as microvascular osteocutaneous transfer with 2nd metatarsal was done by O' Brien et al (1979).

When there is need for local flap coverage in the region of lower end of tibia and adjacent ankle joint area, the dorsalis pedis flap provide similar skin without cross leg immobilization. Reverse dermis flap has its limitation to be used for narrow defects. Faciocutaneous flaps in this area are not feasible enough as the fascial plane is not well developed.

As the muscles in this region became tendinous, so myocutaneous flaps are not suitable. However, free flap is ideal. The donar defect is acceptable. However reverse fasciocutaneous flap has been advocated by J. Amrante et al (1986), J.K. Sinha etal (1989), S.P. Lagvankar (1980), Gumener (1991) etal to cover the soft tissue defect around the ankle and lower third of leg. Either medial or lateral reverse fasciocutaneous flap can be used. Grany L. Baker et al (1990) used fasciocutaneous island flap based on the medial planter artery for reconstruction of soft tissue defects over the planter forefoot, planter heel, tendocalcaneous and lower leg.

CONCLUSION :

The dorsalis pedis flap is quite dependable in our population and in our working condition to cover the fairly common defect site' the lower end of tibia and area adjacent to ankle joint' resulting usually due to injury.

REFERENCES :

1. Amrante J et al : **New distally based fasciocutaneous flap of the leg** British Journal of Plastic Surgery (1986) 39, 338-340.
2. Cormack GC. Lamberty BGH **fasciocutaneous flaps :** Advances in plastic & Reconstructive Surg. Vol.-3, Edited by Haval M.B. Year Book Medical Publishers inc. Chicago, London 1987, 14-39.
3. Franklin I.D. etal **Use of free dorsalis pedis flap in head & neck repairs.** Plastic & Reconstructive Surgery 63, 175, 1979.
4. Gumener R et al, **The Reversed Fasciocutaneous flaps in the leg.** Plastic & Reconstructive Surgery Dec. 1991, Vol.-88 No. 6, 1034-1043.
5. Lagvankar SP **Distally based random fasciocutaneous flaps for multi-staged reconstruction of defects in the lower third of leg, ankle & heel.** British J.P.S. 1990, 43, 536-540.
6. MC Craw J.B. Ferlow L.T. **The dorsalis pedis arterialized flap; A clinical study** P.R.S. 1975, 55: 177.
7. O' BRIEN et al **Microvascular osteocuteneous transfer using the dorsalis pedis vessels and 2nd Metatarsal,** B.J.P.S., 32, 188, 206, 1979.
8. Roy Collin et al **fasciocutaneous flaps : A versatile technique to resufface leg and foot.** I.J.P.S. 23 (2), 88-98, 1990.
9. Roy Chaudhary et al **Resurfacing the great toe by an island flap** Ind J.P.S. 1988, 2, 44.
10. Sinha J.K. et al (1989), **Medial & Lateral retrograde fasciocutaneous flaps in the distal third of leg and adjacent foot defects.** I.J.P. Oct/Nov. 1989, 413-420.

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