Gillies Memorial Oration 1975

IT is indeed a unique honour that you have done me, by nominating me to deliver the Gillies memorial oration this year. I find myself unequal to this task. I was not trained with Sir Harold, but during my training period and later, we came to know each other and became great friends. Since the inception of the Gillies Memorial Oration under this August body, you have learnt everything about the life of the great mastero. A repetition of the same would be futile.

My surgical training began during the post war years. The literature like the British Journal of Surgery, Surgery Gynaecology and Obstetrics, and Surgical Clinics of North America, were full of articles on War Surgery. I was deeply impressed by what the surgeons were achieving by doing reconstructive surgery to rehabilitate the disabled. This disturbed the peace of my mind, because I realised that there was so much to do in the field of reconstructive and rehabilitative surgery in a vast country like ours, even though it was not much affected by the ravages of war. I was led, therefore, to fossick in the scrap heap of surgery, and was thrilled to reconstruct the first nose after the Gillies method of implanting chondrocutaneous grafts from the ears in the forehead (Fig. 1). Thus encouraged, I managed to attach a few direct flaps from the abdomen to the forehand and to the hand. They however, looked clumsy in the end, but proved useful.

To my good fortune, in 1949, I was selected to be trained with Professor T. Pomfret Kilner, as a Government of India Scholar. Professor Kilner was one of the first four Plastic surgeons in Britain to develop a unit of his own. Unlike Gillies's unorthodoxy in approach, Kilner was conservative but methodical and meticulous in his work.

Fig. 1

My first encounter with Gillies took place in Edinburgh in 1950, at what was to be the very first International meeting of Plastic Surgeons. On the last night, after dinner the young Plastic Surgeons gathered in the lounge for a cup of coffee. Lo and behold ! Gillies appeared and joined us in singing, seating himself at the piano he

coaxed and charmed all the foreigners and persuaded them to sing in their own languages, and I was no exception.

I met Sir Harold on many occasions. During the meetings of the British Association of Plastic Surgeons, he would always engage me in discussing the reconstructive problems prevailing in India. In the evenings, however, he would invariably turn into a jovial mood. He would not mind playing pranks. One could always expect him to have something up his sleeve when he would rise to deliver an after dinner speech. I remember at one of these dinners he took out a nice silver snuff box from his pocket and having partaken he passed some of it to all of us sitting around him. He taught me how to put it on my anatomical snuff box and sniff it in hard. On the next morning at the Coffee break he came towards me enquiring as to how I was feeling. Seeing my eyes and nose still pouring he burst out into peals of laughter and gave me a big pat on my shoulders.

This episode of Harold Delf Gillies, is related to impress on you that even with advancing age, he possessed faculties of an alert scientist, and a practical plastic surgeon. He did not allow the adventurous spirit of a young man to die or fritter away within himself. Retired as he was, later, he retained his capacity of being the centre of a controversy; for example his advocacy of an Abbe's lip switch flap for repairing bilateral clefts in infants where the prolabium was short, and that too, without jaw fixation.

During the first world war Gillies advocated the use of local flaps for the first time, and discussed their limitations. There is no mention in his earlier writings of considerations of the vascular axis of these flaps. Gillies, in 1918 and Filatov in 1917, perhaps, simultaneously got the idea of tubing flaps with the intention of increasing their longitudinal blood supply. Once this was established, he put the pedicle flap through a full variation of use which is well documentated in his book 'The Principles and art of Plastic Surgery.'

Likewise, we started using the conventional abdominal and arm flaps and tubes for the reconstruction of distant defects not knowing their exact vascular pattern. Tables 1, 2 & 3 show the number of abdominal and arm flaps and tubes used in various types of defects with their results. These two varieties of flaps and tubes were later discarded by us due to various reasons as mentioned by me in my earlier papers (Sharma 1962, 1968). The most important factor being the time consumed at one time to a maximum of 180 days. Hence the trend shifted towards the use of direct flaps on known vascular pedicles which gave a better colour match when used in the region of the face and neck.

Credit goes to Esser for the first description of island flaps based on known vascular pedicles in 1917. These were later developed by Littler (1960) Tubiana and Duparc (1961), Converse, Smith, and Millard (1963). Table 4 shows the number and varieties of island flaps used by us with their results.

Webster (1937) described perhaps the longest thoraco-epigastric flap based on the

superficial epigastric and superficial circumflex arteries below, and the lateral and superior thoracic arteries above with their concomittant veins lying in-between the two layers of the deep fascia. Gillies later advocated his lymphatic wick with such large flaps in cases of Lymphoedema of arm and also in the reconstruction of the breast from the region of the umbilicus.

Shaw and Payne (1946) described flaps from lower abdomen planned in a vertical fashion based on superficial epigastric and circumflex iliac vessels. Dr. S. D. Pandey our Hand Surgeon has redeveloped this flap (Semilunar flap) to cover the extensive defects on the dorsum of the hand (Fig. 2).

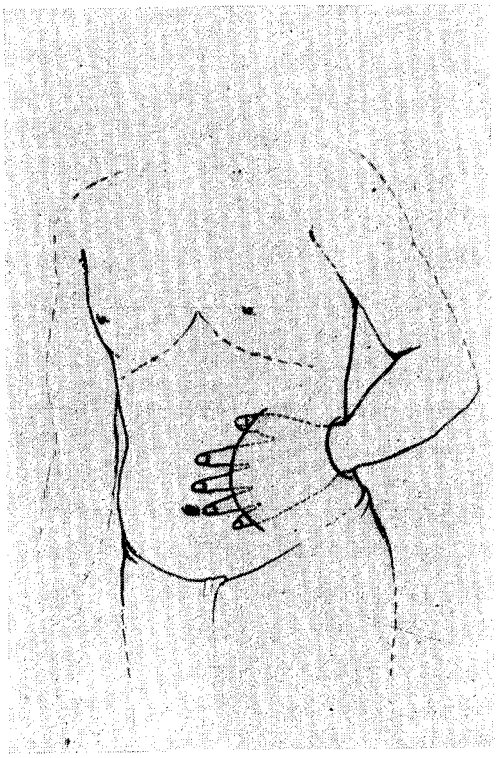

Fig. 2

He has reported to have repaired six contractures of the dorsum of the hand with excellent results. It was in 1970 that McGregor and Jackson described a groin flap which could be lifted in one stage. This flap was based on the superficial circumflex iliac arteriovenous system. We have so far used groin flaps in 4 patients as a single stage procedure.

David F. Furnas and Herbert Conway (1963) advocated the superiority of the acromio-pectoral flaps because of the generous net work of vessels over the anterior aspect of the shoulder and adjacent chest wall. Most of the acromiopectoral flaps that were used by us in the beginning were laterally based. Muir et al. in 1968 showed a striking pressure gradient from the sternal end of this tube pedicle towards its deltoid attachment. Influenced further by publications of Bakamjian (1965) and McGregor (1970) we started using medially based flaps, and reduced the total time for repair of facial defects to 8 to 12 weeks. We have raised medially based Deltopectoral flaps in one stage, excepting in those cases where the lateral limit was to be extended beyond the acromian process. Table 5 shows the number of these flaps used with their results.

Of the other direct flaps that have been recommended from the shoulder, neck and scalp regions, Zovickian (1957) recommended the use of a large shoulder flap based superiorly between the mastoid and occipital regions. He did not clearly mention the vascular pattern involved. It is presumed that it was based on descending branches of occipital and posterior auricular arteries and transverse cervical branch of the thyrocervical trunk. A modification of this flap named as

cervicoscapular flap has been devised and used successfully in three contractures of neck by our colleague Dr. Ramesh Chandra (Fig. 3). In addition to the descending branch of the posterior occipital, perhaps the Ist three posterior intercostal vessels also form the axis of this flap.

We have also devised transverse neck tubes for reconstruction of face and nose defects based on anastomosis between the posterior branch of the superficial temporal with posterior occipital and auricular vessels (Sharma, 1971). Table 6 Shows the number of patients repaired with modified subnuchal (cervicoscapular), transverse neck tubes, and shoulder (Deltoid) flaps.

We have further, used various types of scalp and composite flaps on facial defects on known vascular pedicles (Sharma 1967, 1971). Table 7 shows their numbers and results.

Our department perhaps has the largest series of nose reconstructions. Having given up the arm and abdominal tubes we switched on to forehead flaps. Since 1955 we have invariably used the median forehead flaps. Their advantages have already been discussed by me elsewhere (Sharma 1962, 67, 71). Table 8 shows the number of noses reconstructed by forehead flaps and their results.

In 1967, Straunch and Murray directly transferred skin and subcutaneous tissues in animal experiments by anastomosing the vascular pedicle. I had the good fortune of seeing this procedure being demonstrated on colour television during the 1971 International Confederation at Melbourne. Later Antia (1971) reported his case of partial success in human beings.

Realising the potentialities of micro-vascular surgery and the knowledge of vascular pattern flaps, we discussed it amongst our colleagues in our department in the beginning of 1972. We came to the conclusion that before equipping ourselves, we might as well undertake a detailed study of the vascular pattern of some of the flaps that were frequently being used, till such time that a team of younger surgeons was trained in this field.

My younger colleague Dr. Ramesh

Fig. 3

Chandra showed a keen interest in this work and this subject was alloted to one of our post-graduates Dr. Tatsat Misra. They first undertook this study on cadavers in consultation with our colleagues of the Department of Anatomy, but it was given up due to technical reasons. It was then decided to concentrate on living subjects and undertake contrast radiological studies.

A preliminary report is being presented today consisting of a study of 21 vascular patterns in 20 patients. A simple method was devised to canulate the vessles under local, or general anaesthesia with polythene tubing sized O.D. 0.61, 0.81 mm and I.D. 0.30 and 0.40 mm, depending on the size of the vessel. At one end of this tube was attached a well fitting hypodermic needle on an adapter carrying a blind latex tube bulb (Fig. 4).

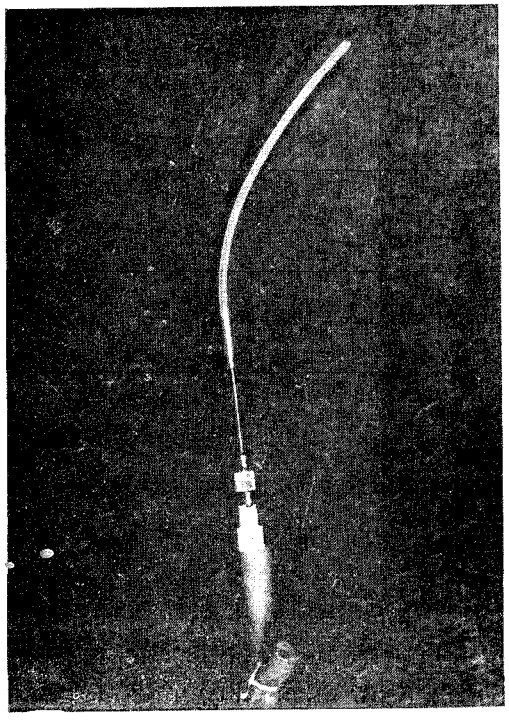

Fig. 4

After cannulating the desired vessel, the latex tubing and the needle was filled with 4000 units per cc. of heparinised saline, so as to maintain the patency of the needle. The patient could then be taken to the radiology department for injecting the dye (Conray 280) and immediate post injection skiagrams. Anatomical landmarks were marked with radio-opaque markers of lead wires, in order to fix the relative positions of vessels under study.

The cases were divided into three groups. Wherever possible the venous drainage was also studied.

Group A : Groin Flap (Six cases) .

Groin flaps were studied to find out the vascular territory of the superficial circumflex iliac vessels (Fig. 5, 6 & 7).

Group B : Deltopectoral Flap (Two cases) :

Internal mammary artery, and the anterior perforating vessels were studied to have an idea of the vascular pattern of this flap (Fig. 8).

Group C : Head and Neck Flaps (Twelve cases) :

In this series the vascular territory of the following vessels were studied :

1. Common carotid artery (one case, Fig. 9).
2. Facial artery (four cases, Fig. 10).
3. Vein in the median forehead flap (one case, Fig. 11 & 12).
4. Supra-orbital artery (one case, Fig. 13).

5. Superficial temporal artery (four cases, Fig. 14).
6. Occipital artery (one case).

Group A : The Groin Flap

Our studies of the groin flap in the living

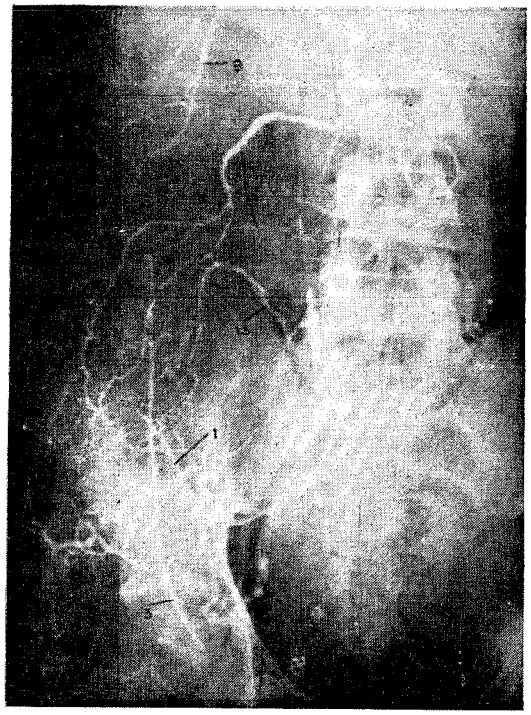

Fig. 5—Unilateral arteriogram done in 3 patients showed a constant pattern. The superficial circumflex iliac artery was seen running towards anterior superior iliac spine (3). It divided into two branches, medial anastomosing with branches of superficial epigastric (9), and the lateral, anastomosing with ascending branch of the circumflex femoral, superior gluteal, in the region of anterior superior iliac spine. One ascending branch from lateral division was seen ascending up to subcostal region and anastomosing with lumbar, subcostal and lower posterior intercostal arteries in the region of the side wall of the abdomen (8 & 9). Superficial epigastric artery was also well visualised ascending up in front of abdomen upto the level of the umbilicus as shown by marker. It divided into a medial and a lateral branch. Cross connections of both these branches were also present.

subjects provides support to the anatomical basis of this flap described by Smith *et al.* The additional information obtained during our study of these vessels is :

(i) That there is a presence of a rich anastomosis between the superficial circumflex vessels and prominent lumber, subcostal, and posterior intercostal vessels. This rich anastomosis probably would suggest that the groin flap can be based posteriorly wherever necessary (Fig. 5).

(ii) It has been shown that the medial branch of the superficial circumflex artery which runs almost vertically upwards anastomoses with branches of the superficial epigastric artery. The vertical or semilunar vertical flaps as redesigned by Dr. S.D. Pandey for covering the defects on the hand are therefore quite sound and feasible.

From the study of facial vessels and supraorbital artery one can easily arrive at the following conclusions :

(i) The position of the lateral nasal branch of the facial artery is constant. Because of its communications with the branches of Infraorbital, dorsal nasal and the transverse facial branch of the superficial temporal, one can easily raise both superiorly and inferiorly based nasolobial island or pedicle flaps. This artery with its concommitant vein is also suitable for microvascular surgery.

(ii) All median forehead flaps are basically supplied on both sides by the continuation of lateral nasal branch of the facial artery, which in turn anastomoses with the dorsal nasal branch at its termination. Converse has stated that the median forehead flap is also based on supratrochlea-

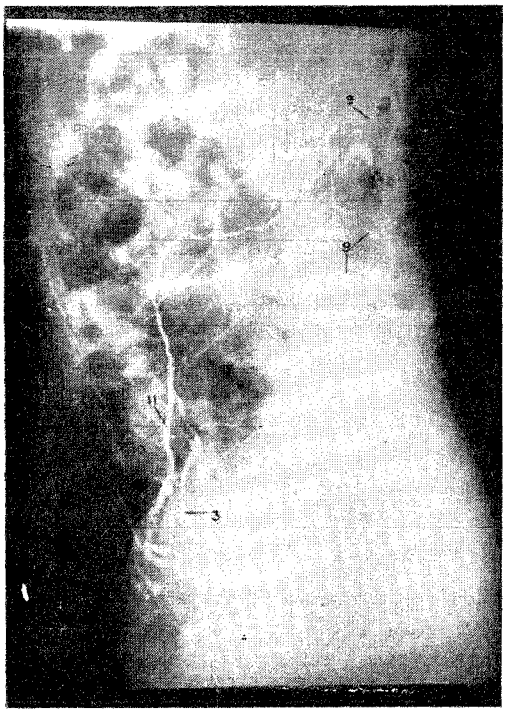

Fig. 6—The relevant feature in the lateral view of this case showed an important finding ; i.e. the ascending branch of the superficial circumflex artery was going up to the intercostal level (11 & 9).

artery. But in practice it is rarely so wide so as to include the main artery which may invariably be divided, and even then this flap survives.

(iii) Due to this rich anastomosis the median forehead flap can deviate to one side or even run parallel to the eyebrow to take skin from the side of the temple for the partial reconstruction of ala as described by Schmid.

(iv) Big forehead flaps, and island flaps if necessary can be planned for local rotation and transposition based on these vessels

The study of superificial temporal artery has shown :

(i) That the point of division of the superficial temporal artery into its anterior and posterior branches usually lies an inch above the tragus, well within the hair line.

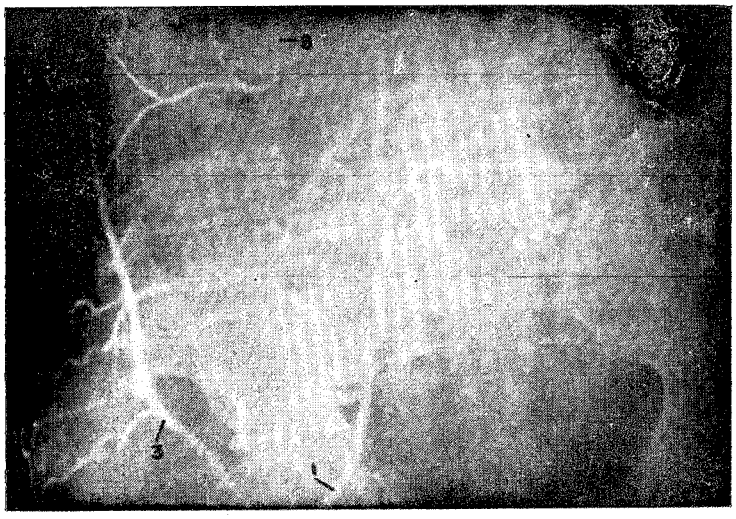

Fig. 7—In the 2nd case superficial epigastric and superficial circumflex iliac veins were markedly prominent (1 & 3). Its ascending branch showed connections with a prominent lumbar and subcostal vein (8). Superficial epigastric vein was reaching upto L 3 and dividing into two branches at the level of L 4 (1).

(ii) But, as stated by Narayanan (1970) the non hairy and even the hairy parts of the bilobed flaps utilised to repair cheek defects cannot always be anatomically based on its anterior and posterior branches, because of their variable positions in different individuals.

(iii) We feel that these branches being quite superifical and easily palpable can help in selection and devising flaps based on them.

(iv) The survival of the non hairy flap may not merely depend upon the inclusion of the anterior branch in it. The length of the non hairy flap need not depend on cross anastomosis with its counterpart as we have been able to demonstrate that it does not occur in every case. The viability depends on richness of other communicating channels.

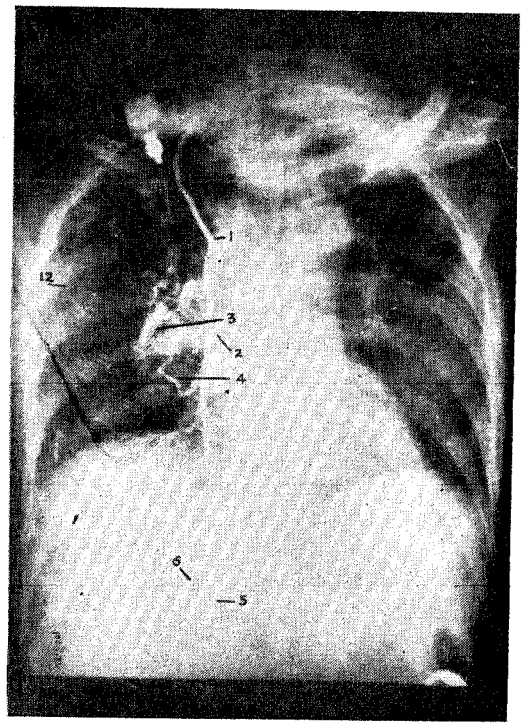

Fig. 8—In this patient an artery in the divided end of the medially based deltopectoral pedicle, probably the 2nd or 3rd anterior perforating branch was cannulated The angiogram showed the main vessel and its branches. Similarly the venous drainage was visualised by cannulating a vein in the divided stump which showed tortuous veins cross communicating with the opposite side.

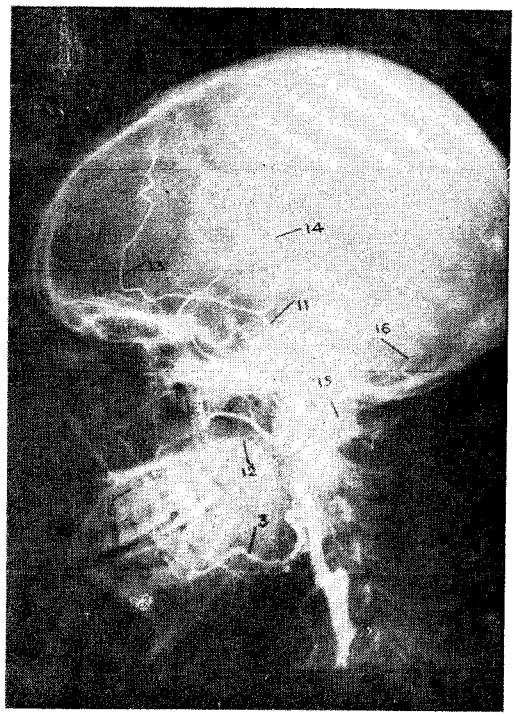

Fig. 9—Opportunity was availed in a neurosurgical patient with intraarterial block of the internal carotid artery, to visualise the arteries of the neck, face, and scalp, by injecting the dye percutaneously into the common carotid artery. The lateral view clearly demonstrates its main branches.

Complications of cannalisation

Immediate post injection discolouration followed by necrosis, occured in three out of 20 flaps studied in our series. Two of these healed themselves but one had to be skin grafted.

The preliminary study ended in July

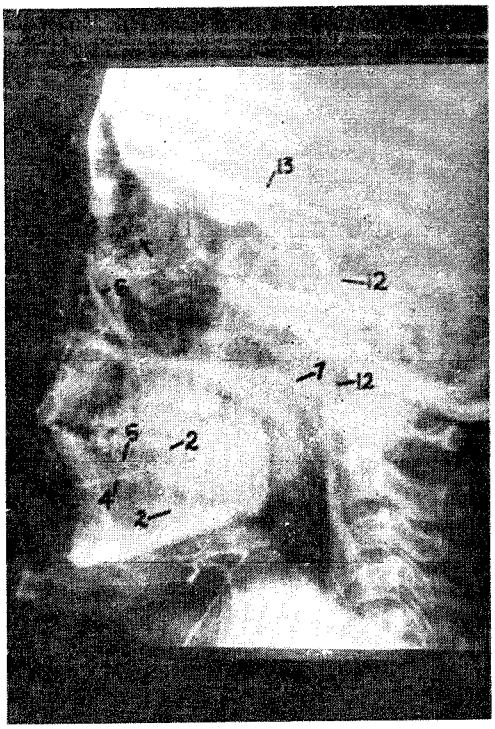

Fig. 10—The last patient was a case of repaired cut nose. The main lateral nasal branch is seen to be going up just along the medial margin of the orbit as the terminal branch of the facial artery (6). The most interesting finding in this case was, that because of the division of the medially based pedicle of the repaired cut nose the dye instead of flowing up is seen filling the transverse facial, and the superficial temporal artery of the same side (7, 12 & 13).

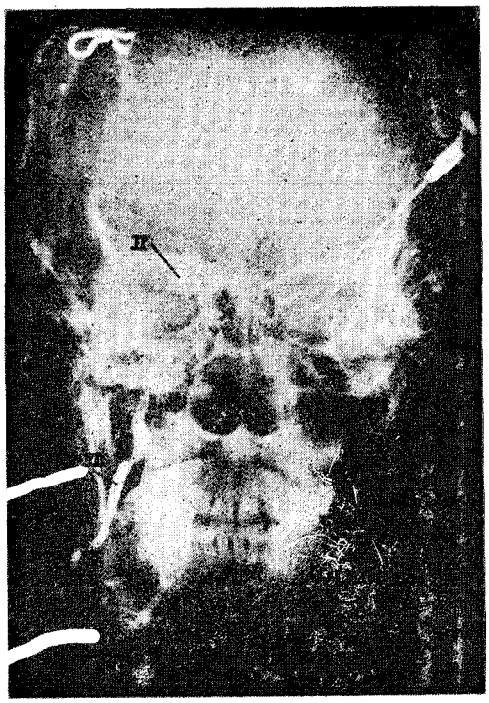

Fig. 11

Fig. 12

It was found difficult to cannulate the artery but the polythene tube went easily into one of the veins. Thus a retrograde venogram showed a very good venous drainage into the cavernous sinus through supperior opthalmic vein and the main facial vein was also well visualised (II, I & III).

1973. This work will prove really useful when our younger colleagues will practice micro-vascular surgery. Meanwhile this knowledge will help in better planning of direct vascular flaps.

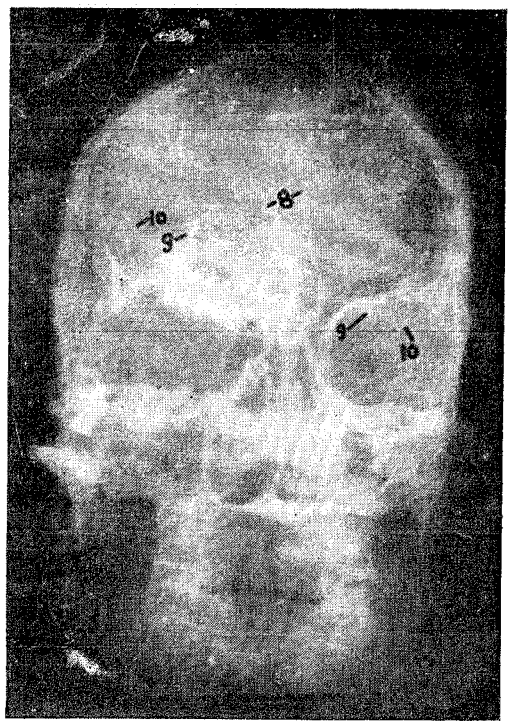

Fig. 13

Visualisation of the Supraorbital artery shows communication with the anterior branch of the superficial temporal artery of the side, thus establishing a communication with the opposite filling its own counterpart on the contralateral side (10). It also visualises the supratrochlear artery of both sides and the terminal branches of the lateral nasal arteries communicating with the dorsal nasal arteries (9 & 8). On the opposite side the supraorbital and the supratrochlear arteries have been filled into the orbit upto the main stem of the Ophthalmic artery.

I have spoken at length of our experiences and of a new approach on a subject which perhaps Gillies would have appreciated and criticised if he was amongst us today. I missed him at the inaugural chapter of our Association held at Nagpur in 1957, when I was enrolled as a member in absentia. But then, I had the good fortune of meeting him again in 1959, at the Annual surgeons conference. After I had presented a paper on my new approach for the repair of cleft lip which has since been redevised and rediscovered by various workers, he was the first one to remark on the exhibition of my slides, and said "Typical Tommy Kilner Like". After the session he took me round the corner and said "Millard's repair is the answer my boy, to all such clefts." I quietly disagreed with him but it was not easy to convince him.

Those of you who knew Gillies, will agree with me that we, the Plastic Surgeons of India owe him a debt because it was he, who was responsible for convincing a number of Government Organisations and others who mattered, that it was high time that a country like ours had Plastic Surgery Units. He involved himself directly in helping a few of us to stand on our feet.

Acknowledgements

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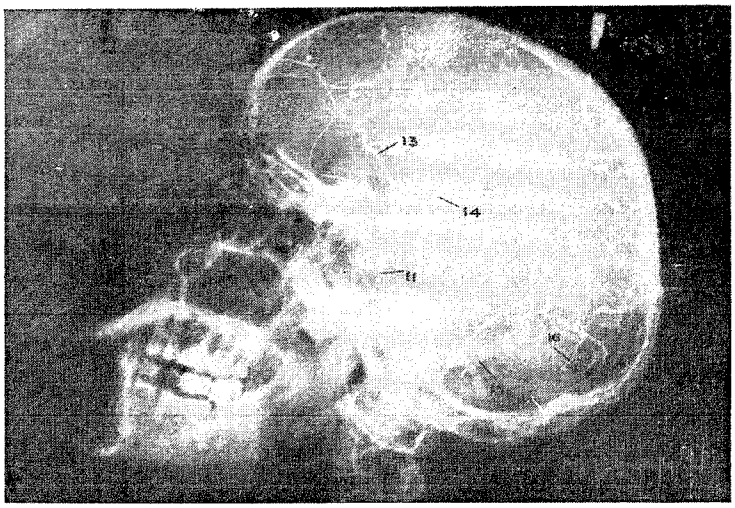

Fig. 14—In the third case the anterior branch is well above the marker placed on the hair line (13). The posterior branch is seen freely communicating with the posterior auricular and the occipital arteries (14, 15 & 16). The dye even fills the descending branch or the occipital artery (clear on the skiagram but not so well visualised in the point.

RECONSTRUCTION WITH RANDOM DIRECT FLAPS

Table 1

	Procedure	Defects	Number	Remarks
1.	Local : Advancement Transposition & Rotation Flaps	Bed Sores Ectopia-Vesicae.	8 2	Result Good.
2.	Abdominal Flaps.	Reconstruction Finger. Contractures Hand.	23	Bad colour match. Bulky. Dull sensation.
3.	Supraclavicular Flaps.	Subglottic Stenosis.	2	Good Result.
4.	Deltopectoral Flaps or Tubes.	Reconstruction Finger.	12	As in 2.
5.	Oblique Neck Tubes.	Defect Ear.	2	Partial necrosis. In one.

6.	Apron Flaps.	Defect in Giant Cell Epulis jaw.	1	Good Result.
7.	Cross Finger Flap.	Defect finger.	2	Sensation good.
8.	Cross Leg Flaps.	Amputation stumps. & Radiation necrosis	6	One flap necrosed due to bad plaster.
9.	Dorsum of Hand Flap.	Nose defect.	2	Bad colour match.
10.	Dorsal and Retroscapular Flaps.	Contracture neck Cheek & lip defects.	5	Result Good. Terminal necrosis in one Sandwitch flap due to faulty technique
11.	Gluteal Flaps	Heel defects	5	Result Good

Total Flaps—70

RECONSTRUCTION WITH DISTANT FLAPS

Table 2

Procedures	Defects	Number	Remarks
Abdominal Tubes & Flaps	Nose	9	Multi staged procedure & time consuming 90—180 days.
	Face & Neck		Bad colour match in darker subjects. Flaps may be bulky & dissimilarity in texture.
	Contractures	21	Congestion & necrosis at distant corners of flaps due to imperfect moulding.
			May require multiple Z plasties later. Also used lined flaps. Disadvantage of shortnes.

			with growth in children. Hair & Pilonidal Sinus in lining in one case. Also used Marsupial Flaps.

Total Flaps—30

RECONSTRUCTION WITH DISTANT FLAPS

Table 3

Procedure	Defects	Number	Remarks
Arm Tubes & Flaps.	Nose alar Columellar & lip Defects	30	Bad colour match in dark subjects. May require thinning later.
	Cancrum oris	3	
	Ear lobule concha & part of helix.	3	Multistaged procedure & time consuming.

Total Flaps—36

RECONSTRUCTION WITH DIRECT FLAPS OF KNOWN VASCULARITY

Table 4

Procedure	Defects	Number	Remarks
Island Flap.			
1. Temporal Island Flaps.	Eyebrow defect	1	Result Good.
2. Frontal Island Flap	Surface defect near medial canthus of eye	1	Result Good.
3. Island Flap Palate	To Lengthen palate in cleft palate.	14	Result Good.

Total Flaps—16

RECONSTRUCTION WITH DIRECT FLAPS OF KNOWN VASCULARITY

Table 5

	Procedure	Defect	Number	Remarks
1.	Acromiopectoral Flaps & Tubes laterally based	Lip & cheek defects Cancrum oris.	24	Results Good lower half of the flap necrosed in one case.
2.	Deltopectoral Flap Medialy based	Lip, Cheek Lower jaw defects	5	Result Good.

Total Flaps – 29

RECONSTRUCTION WITH DIRECT FLAPS OF KNOWN VASCULARITY

Table 6

	Procedure	Defect	Number	Remarks
1.	Modified Cervicoscapular Flap.	Contracture Neck	3	Result Good. Easy to transfer Good colour match.
2.	Transverse Neck Tubes & Flaps.	Nose & Upper Lip.	14	Nose Reconstruction not good.
		Cancrum oris		Necrosis in centre in 50% of tubes, & flaps in those that were extended beyond midline
		Traumatic Laryngeal Stenosis.		
3.	Deltoid Flaps.	Nose Cheek, Upper Lip & Anterior Plate.	2	Result Good.

Total Flaps – 19

RECONSTRUCTION WITH FLAPS OF SCALP & FACE OF KNOWN VASCULARITY

Table 7

	Procedure	Defect	Number	Remarks
Local Flaps				
1.	Abbe's	Lip & Eye	5	Results Good. No failures.

2.	Estlanders	Lip.	15	Advantage of hair bearing & non hair
3.	Nasolabial	Ala Nose	1	bearing skin flaps.
4.	Bigger Rotation, Transposition.	Head Neck, & Face	31	

Total Flaps—52

RECONSTRUCTION WITH FLAPS OF SCALP & FACE OF KNOWN VASCULARITY

Table 8

	Type of	Defect	Number	Remarks
	Forehead Flaps			
1.	Up & Down Gillies Flap.	Nose Defect.	2	Flat Noses.
2.	Lateral Temporal Flap. New's Sickle flap	Subtotal & Partial Loss of Nose.	8	Scar on forehead not pleasing. Long flap needs support to overcome constant drag due to gravity.
3.	Scalping.	Subtotal & Partial Loss of Nose	7	Strangulation of lining due to its excess in one case.
4.	Midline Lateral Oblique Flaps.	,,	7	Big area of defect on forehead, covered by split thickness graft.
5.	Horizonal Lateral Oblique Flap	,,	1	Result Good. Done for trial on Schmid's method
6.	Median Forehead Flap.	Total, Subtotal & Partial Losses of Nose	153	Gives best results. Forehead scar are also good. Easy to migrate. Avoids immobilisation of arm and heads. Cartilage support not

				essential. Limitation of use in narrow foreheads.
7.	Bipedicled Forehead Flap.	Nose Defect & Lip Defects.	1	Result Good.

Total Flaps—179

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