THE POSTERIOR AURICULAR FLAPS.

Thesis Submitted for Partial Fulfilment of

Master's Degree in General Surgry.

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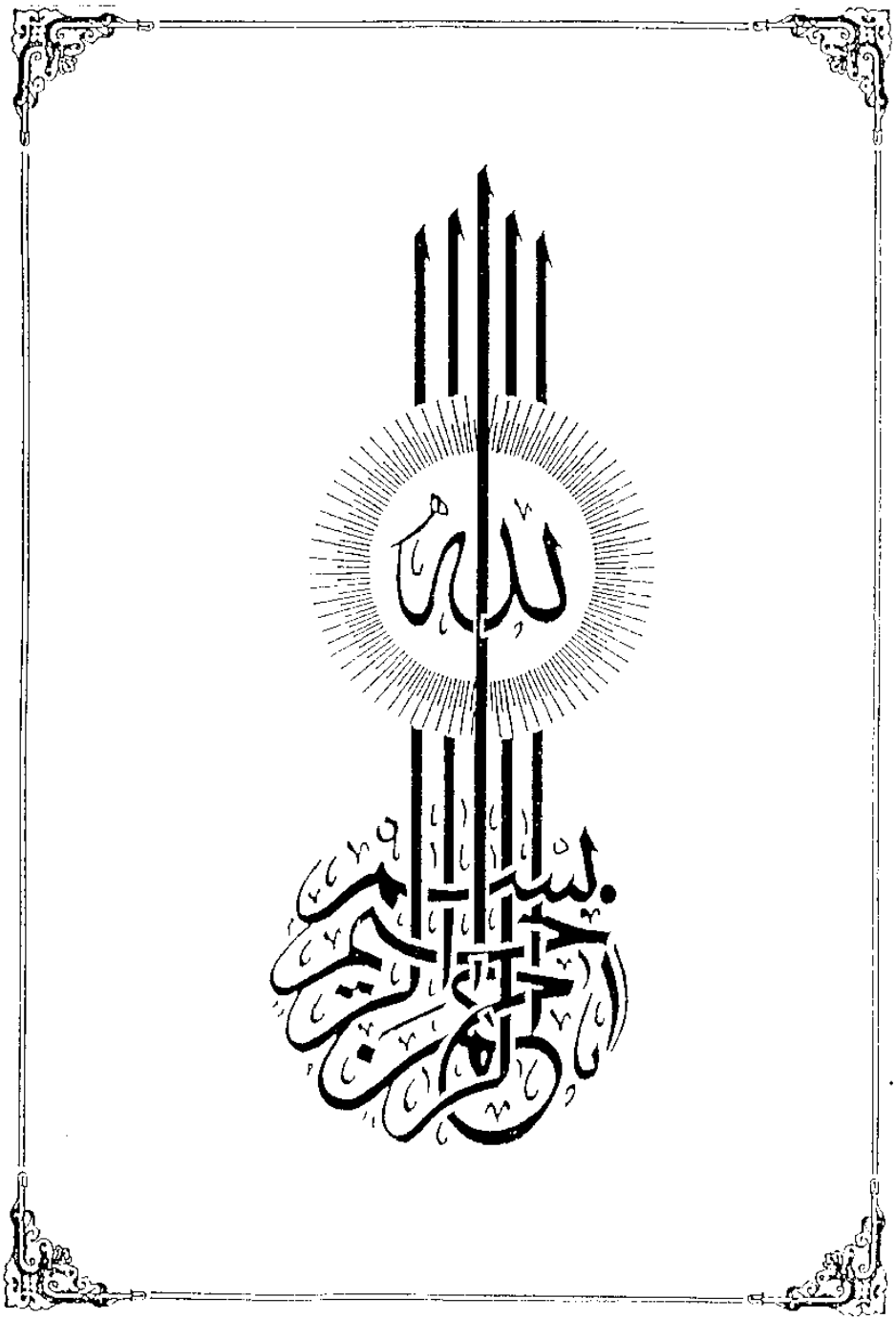
AIN SHAMS UNIVERSTY.

1988.

To My Parents



AKNOWLEGEMENT

I would like to express my deepest gratitude and appreciation to Professor Doctor MOHAMED MAMDOUH NAFEH, Head of the Plastic and Reconstructive Surgery Department, for his invaluable supervision of this work.

I would also like to thank Doctor MOSTAFA MOHAMED HEMEDA, Assistant Professor of the Plastic and Reconstructive Surgery Department, for his close supervision, and tolerance.

Also I wish to thank Professor Doctor Hassan Adel Badran, Professor of the Plastic and Reconstructive Surgery Department, for his precious contribution of two cases and his valuable comments.

A word of deep appreciation to Doctor ELHAM IBRAHIM SAFE, Assistant Professor of the Pathology Department, for her comments on the histopathological slides.

My immense gratitude also goes to Doctor MAGDI SHERRIF and Doctor AYMAN ABUL MAKAREM for their guidance in the cadaveric dissections and for contributing the rest of the clinical cases.

Last but not least, to all the members of the Plastic and Reconstructive Surgery Department for their friendly attention and thoughtful comments.

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Cutaneous defects of the face may need a new skin coverage either as a graft or a flap. In superficial defects, split thickness skin grafts are rarely used and a better alternative is a full thickness skin graft from the retrauricular region. However if the loss of the substance exceeds 2 cm one is usually obliged to use a local or a distant skin flap. The most commonly used local flaps are the forehead flaps which was first introduced by *Carpu (1816)*, and the nasolabial flaps which are either conventionally pedicled *(Esser, 1917)*, or subcutaneously peducled *(Pers, 1967)*. Another useful local flap is the *Linberg* flap which was first introduced by *Linberg* in 1966. The proximity of all these local flaps to the defect gives a perfect skin match for both colour and texture. Their major disadvantage is the creation of new facial scarring.

Distant flaps present major difficulties for both the surgeon and patient. They usually require several stages and their esthetic results are rarely comparable to local facial flaps they give poor colour match and they are usually bulky thus masking the facial expression.

To avoid the disadvantages of skin grafts and flaps either local or distant in facial reconstruction, the head and neck region was explored for new areas. One of these areas is behind the ear, over the mastoid and extending down to the neck.

This retrauricular area gives excellent colour and texture match to the face and the secondary scarring is well concealed behind the ear. *Washio (1969)*, was the first author to introduce the use of flap taken from this area for reconstruction of central facial defects. However, this flap is a difficult flap to raise and soon becomes congested in the post operative period. In this work we will study the detailed anatomy of the posterior auricular flap hoping to overcome these difficulties.

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REVIEW OF LITERATURE

ANATOMY OF THE POSTERIOR AURICULAR FLAP

Last (1981) defined the scalp as the area extending from the top of the neck muscles at the back of the head, to the forehead and eyebrows at the front and extending down over the temples, to the ears and zygomatic arches. This includes the retro-auricular area. A flap derived from this area can thus be considered as all scalp flaps. Scalp flaps consist of their known five layers, skin, superficial fascia, galea aponeurotica, subepicranium and pericranium.

1. Skin

The posterior auricular skin is the hairless area behind the ear and over the mastoid process.

2. Superficial Fascia

This layer binds the skin to the underlying galea by means of dense strands of fibrous tissue. It contains in its deepest half adenexal tissue, nerves, lymphatcs and the vessels of the scalp.

3. Galea Aponeurotica

It is a musculofascial layer which connects the paired occipital and frontal muscles. It extends from the radix of the nose along the supraorbital margins. Laterally, it passes across the temporal area to the superior auriculocephalic angle where it fades out by blending with the superficial temporal fascia just above the zygomatic arch. It then extends posteriorly and slightly downward along the inferior nuchal line to the spinous process of the seventh cervical vertebra.

The previous three layers can be considered as a single layer as they are firmly connected to each other.

The retro-auricular flap when raised usually comprises the first three layers but it may also include the conchal cartilage and the mastoid bone.

4. Subepicranium or Loose Avascular C.T.

In a recent anatomic study by *Casanova et al. (1986)*, this fascia has been identified as a distinct layer named the "innominate fascia". It extends in the cephalic direction as the periosteum of the frontoparietal region.

5. Pericranuim or Periosteum of Skull Bones

THE TEMPORAL FASCIA

In the temporal region additional layers separate the superficial temporal fascia from the skull and the temporalis muscle with its investing fascia, the deep temporal fascia.

I. The deep temporal fascia (temporalis fascia, investing fascia of temporalis) is a strong, fibrous investment which covers the temporalis muscle. It is attached firmly to the periosteum around the temporalis muscle at the superior temporal line and below to the zygomatic arch *(Last, 1981)*. It is covered laterally by the auricularis anterior and superior, the galea aponeurtica and part of the orbicularis occuli. The superficial temporal vessels and the auriculo temporal nerve cross it upwards. The deep temporal fascia is supplied by the middle temporal artery *(Warwick and Williams, 1973)*.

II. The superficial temporal fascia (temporo-parietal fascia) is a firm, fibro fatty layer, intimately adeherent to the skin and to the underlying occipito frontalis muscle, and its aponeurosis. Behind it is continuous with the superficial fascia at the back of the neck. Laterally, it is prolonged into the temporal region, where it is looser in texture *(Warwick and Williams, 1973)*. It is seperated from the underlying investing temporalis muscle by loose areolar connective tissue.

This superficial fascia itself is the superior, cephalic extension of the superficial musculo-aponeurotic system (SMAS). Above the temporal crest, it becomes continuous with the galea. Below, it attaches to the zygomatic arch, whereas the deep temporal fascia continues down with the temporalis muscle to the coronoid process of the mandible, which is medial and deep to the arch *(Brent et al., 1985)*.

Just above the zygomatic arch this fascia is attached to the subdermal layer loosely. As the layers are followed towards the vertex they become progressively attached more firmly *(Upton et al, 1986)*. This attachment is not only formed by fibres which connect the two layers, but also by numerous small blood vessels which pass from the superficial fascia to the subdermal layer.

The superficial temporal fascia is richly supplied by the superficial temporal artery and vein which lie at slightly different levels. The artery and its branches lie within the thickness of the fascia while the vein and its tributaries lie on its outer surface immediately deep to the hair follicles *(Abul Hassan et al., 1986)*.

The superficial temporal fascia is about 2 to 3 mm. in thickness *(Byrd, 1980)*. It varies with the age ranging from 1.4 to 3.8 mm in children and from 2.2 to 4.2 mm in adults *(Upton et al., 1986)*.

BLOOD SUPPLY OF THE POSTERIOR AURICULAR FLAP

The sclap is richly supplied by the superficial temporal artery. Arteriographic studies carried out by *Conway et al., (1952),* using umbrathor (thorium dioxide) injected into the common cartoid artery of cadavers, demonstrated that the superficial temporal artery contributes to most of the blood supply of the soft tissues of the head. However, other arteries which richly supply the scalp are the posterior auricular, the occipital, the superorbital and the supratrochlear arteries.

The postauricular area is normally supplied by the posterior auricular artery which is a branch of the external carotid. *(Washio (1969),* in his clinical as well as his cadaveric studies demonstrated that the superficial temporal artery and the posterior auricular artery form ample anastomosis between their branches in the temple about 8 to 10 cm above the anterior end of the helix. Thus the postauricular area can be also supplied by the superficial temporal artery (Fig. 1).

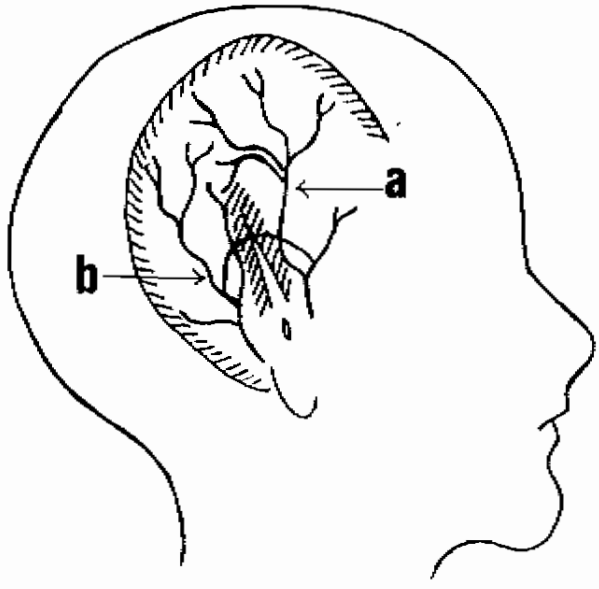

Fig (1): Design of the posterior auricular flap showing the anastomosis between the posterior branch of the superficial temporal artery and the posterioraurícular artery in the temple region.
a. Posterior branch of the superficial temporal artery.
b. Posterior auricular artery.

(After *Washio, 1969*)