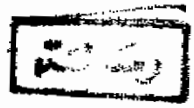
THE BLOOD SUPPLY OF ILIAC CREST
&
ITS APPLICATIONS IN MICROSURGICAL TRANSPLANTATION



THESIS

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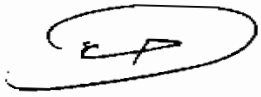

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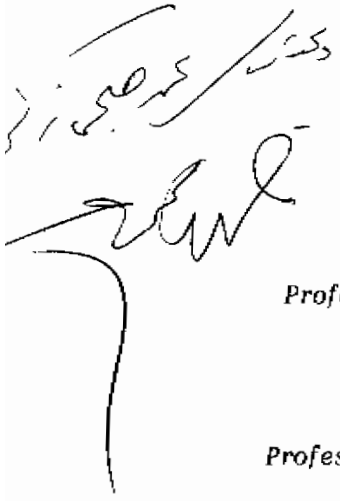

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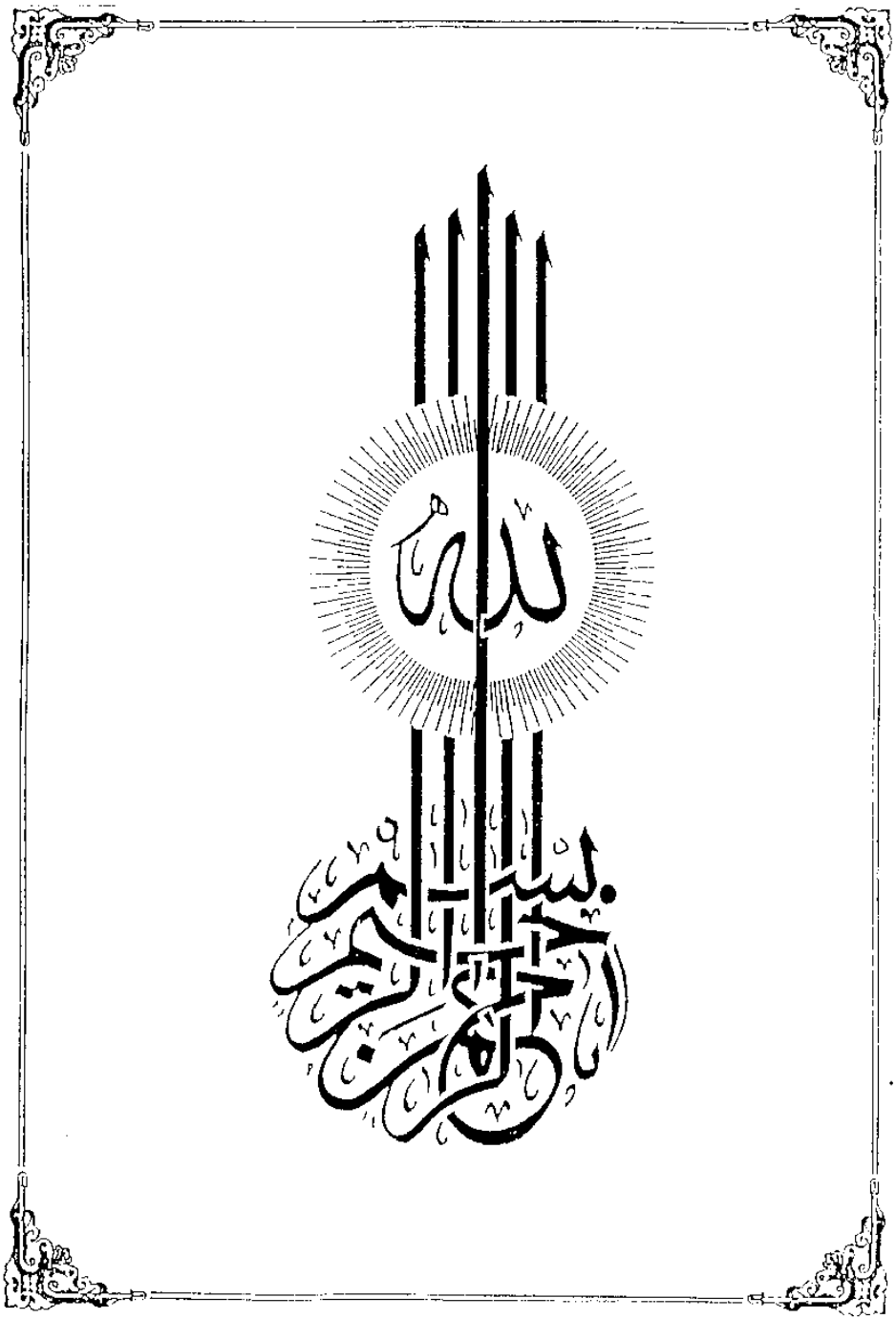

T O M Y M O T H E R

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1. Introduction.

INTRODUCTION

One of the most difficult problems the reconstructive surgeon encounters is the reconstruction of the mandible. For such reconstruction the surgeon is to provide both function and contour.

Also, the treatment of established non union of the infected tibial fractures is a complex problem frequently requiring several surgical interventions.

Many procedures have been developed for reconstruction of bone defects utilizing synthetic or biologically inert materials. Despite the ready availability of these materials, many feel that reconstruction with autogenous bone remains the method of choice in treating bony defects.

Until the early 1970 s, treatment consisted primarily of free non vascularised bone grafts. Many problems, however were encountered in this type of reconstruction e.g. conventional bone grafts may require prolonged immobilization for as long as 2 years and are prone to non union, infection and sequestrum formation.

The iliac crest was prefered to be used as a don-

or site for maxillo-facial region because of the shape and relative bulk of this bone and it is generally accepted as the most favourable source of graft.

The development and introduction of microsurgical vessel anastomosis has made possible completely new concepts of reconstructive surgery. Vascularized bone grafts were transferred either as a part of a composite pedicled flap or as a free bone graft by microvascular anastomosis.

This offers both mechanical strength of compact cortical bone and the physiologic advantage of transferring viable tissue which is particulary useful in irradiated recipient sites.

Experimental studies have confirmed that a bone graft transferred to its recipient site with an intact pedicle of blood supply remains viable, and unites directly with the recipient bone without having to be revascularised and replaced by creeping substitution as in conventional bone grafts. It also provides a live bone defect, and it is a ready source of vascular osteogenic tissue which sprouts new outgrowths to vascularise avascular recipient bone.

The free composite groin flap, containing part of the iliac crest, is currently finding wide application both in mandibular reconstruction and in reconstruction of compound lower extremity defects (Daniel, 1979).

Hence, the need to study the vascular supply of the iliac crest in order to select the best approach to obtain a vascularized iliac crest graft. This will be the subject of this study.

2. Anatomy :

THE ANATOMY

The hip or innominate bone is large, irregulary shaped bone constricted in the middle and expanded above and below. Each bone consists of three parts named: 1) The ilium. 2) The ischium and 3) The pubis.

The union of the three parts takes place in the "Y" shaped epiphysis at the hip joint socket. The ilium includes the upper part of the acetabulum and the expanded, flattened area of bone above it.

THE ILIUM

The ilium, so named because it supports the flank, posses two extremities and three surfaces. The lower extremity is the smaller and forms rather less than the upper twofifths of the articular surface of the acetabulum, the upper extremity is greatly expanded to form the iliac crest. The surfaces are the gluteal, sacropelvic and the iliac fossa. The gluteal surface is the outer surface and directed backwards and laterally. The sacropelvic surface is placed on the medial aspect of

the bone. The iliac fossa is smooth and gently hollowed out and occupies the anterior and upper part of the medial aspect of the ilium.

The iliac crest has anterior and posterior extremities which project a little beyond the bone below and are termed respectively the anterior and the posterior superior iliac spines.

The Anterior superior spine lies at the lateral end of the fold of the groin and is easily felt in the living, the posterior superior spine cannot be felt, but its position may be indicated by a dimple, about 4 cm lateral to the second spinous tubercle of the sacrum above the medial part of the buttock.

Above the acetabulum the ilium rises wedge-shaped along an anterior border to the anterior superior spine. The upper part of the anterior border is rounded and concave forwards; its lower part presents a roughened projection, the anterior inferior iliac spine, which lies immediately above the anterior part of the acetabulum.

The posterior border of the ilium is irregularly

curved. It commences at the posterior superior spine and runs at first downwards and forwards, with a backward concavity, forming a small notch. At the lower end of the notch the bone presents a wide, low projection, the posterior inferior iliac spine, where the posterior border makes a sharp bend. It then runs almost horizontally forwards for about 3 cm and finally turns downward and backwards to become continuous with the posterior border of the ischium. As a result the posterior border shows a deep greater sciatic notch, which is bounded above by the ilium and below by the ilium and ischium.

The medial border of the ilium separates the iliac fossa from the sacropelvic surface. Indistinct near the crest, it is roughened in its upper part, then sharp and clear-cut where it bounds the articular surface for the sacrum, and finally smooth and rounded. The latter portion forms the arcuate line, at its inferior end it reaches the posterior part of the iliopubic (Iliopectineal) eminence, which marks the union of ilium and pubis.

The Iliac crest:

It is the upper border of the ilium. It is convex upwards, but sinously curved, being concave inwards in front and concave outwards behind.

Morphologically the crest consists of a long ventral and a shorter dorsal segment. The ventral segment forms more than the anterior two-thirds of the crest and is associated with alterations in the form of the ilium which was necessitated by the adoption of the erect attitude, the dorsal segment forms less than the posterior thrid of the crest.

The venteral segment of the crest is bounded by outer and inner lips, enclosing a rough intermediate zone, which is narrowest at its middle and becomes wider both in front and behind.

A prominent projection of the outer lip about 5 cm (2 inches) or more behind and above the anterior superior spine is called the tubercle of the crest.

The dorsal segment presents two sloping surfaces separated by a well marked ridge, which terminates in

the posterior superior spine. The highest point of the crest, which is a little behind its mid point, is on the same level as the interval between the spines of the third and fourth lumbar vertebrae.

The iliac crest corresponds to the lower limit of the waist and provides attachment for the lateral muscles of the abdominal wall, fasciae and muscles of the lower limb and fasciae of the back. The outer lip of the ventral segment gives attachment to the fascia lata, in front of the tubercle of the crest the tensor fasciae latae arises. The anterior two-thirds of the outer lip provides insertion for the lower fibres of the external oblique. Just behind the highest point of the crest the lowest fibres of the latissimus dorsi arise. An interval of variable size intervenes between the posterior limit of the external oblique and the anterior limit of the latissimus dorsi which forms the base of the lumbar triangle. The intermediate line gives origin to the internal oblique. The inner lip in its anterior two-thirds provides attachment for the transversus abdominis, and behind to the lumbodorsal fascia and the quadratus lumborum.

The dorsal segment of the iliac crest gives origin