Evaluation of Microarterial grafts versus Microvenous grafts in bridging of arterial defects, an experimental study in Rats

Thesis

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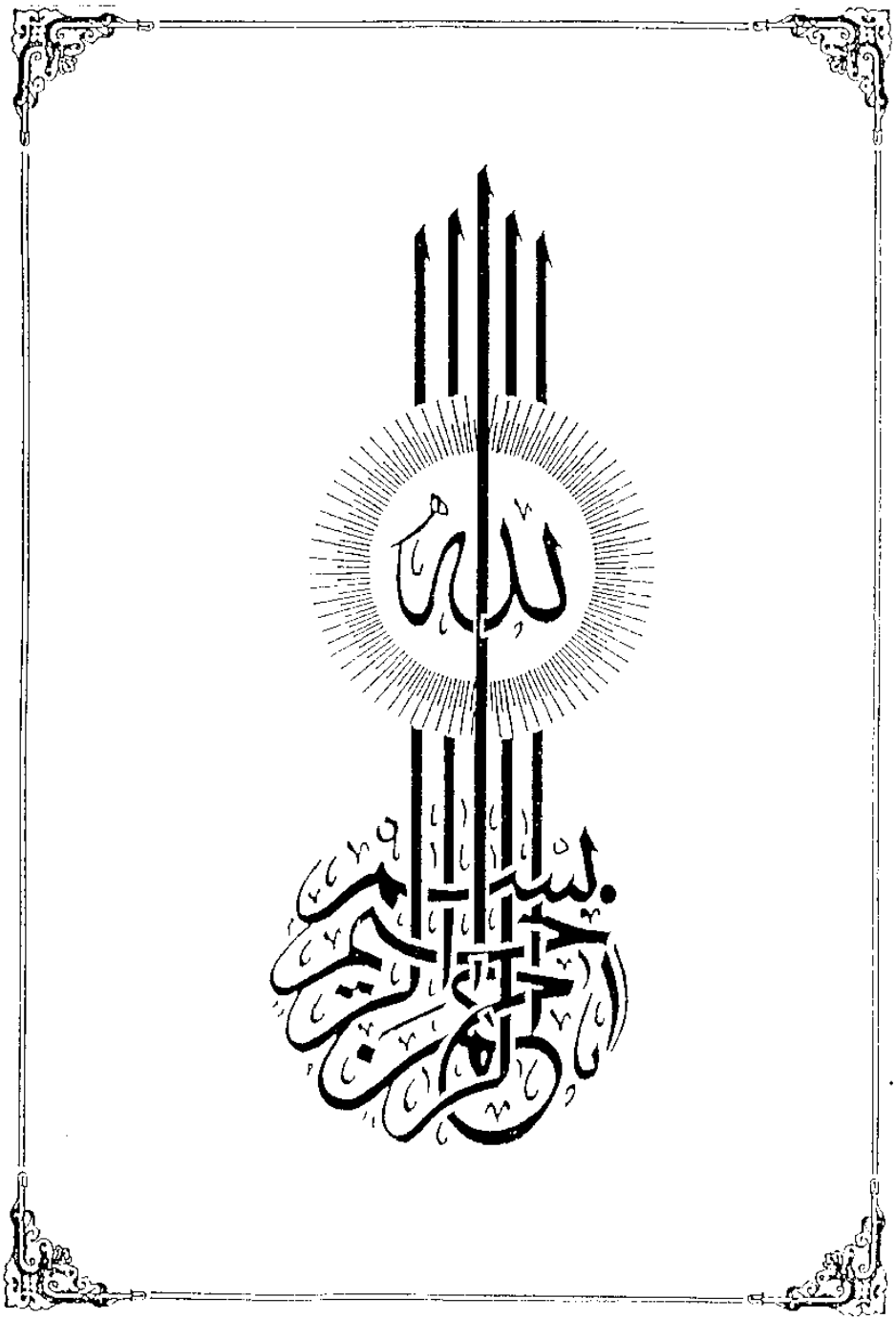

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INTRODUCTION

Introduction

With the continued development of clinical microvascular surgery techniques, free flaps, digital and limb replantation has become common.

One of the problems facing the microvascular surgeon is vessel deficiencies, they occur particularly in replantation surgery of the digits and occasionally in microvascular free flaps and toe to hand transfers. The vessel deficiency may involve varying lengths of either arteries or veins.

In replantation surgeries the management of defects created by debridement of damaged artery ends is done by one of 3 methods:

1- Interpositional vessel grafting.

2- Bone shortening.

3- Rotation of a neurovascular or vascular pedicle from an adjacent digit.

The most common clinical method of correcting an arterial deficiency is to use a vein graft because veins are accessible and dispensable, a well-controlled experimental study of microvenous grafting has demonstrated the reliability of its clinical application (Zhang F., *et al*, 1994).

Bone shortening, although is the usual method of choice in amputations with small vascular gaps, is limited to about 1 cm. and is functionally not satisfactory for severe crushing wounds and avulsions where the defect between good vascular ends may be 3 or more cms. It is also undesirable in revascularization where the skeletal structures may be entirely intact. (Gould *et al* 1979)

The rotational vascular pedicle may not be feasible where multiple digits are involved, and potentially compromises the donor digit; but it does have a particular application when the proximal flow can not be established in the damaged digit. (Gould *et al* 1979)

Sometimes a small segment of a dispensable artery can serve as the donor for reconstruction of a vein, but preferably for venous deficiency a vein graft should be obtained. The handling of a small segment of an artery is technically easier than that of a similar-sized vein. (O'Brien *et al*, 1979).

Arterial grafts taken from non replantable digits or from the opposite side of the digit in bilateral damage may give better long-term patency in bridging arterial defects (O'Brien *et al*, 1979, Zhi-Fu Xiu *et al*, 1994).

Only a few reports of experimental grafting at the 1 mm vessel level, have been published (*Overton and Owen, 1970; Fujikawa and*

O'Brien, 1975; Hayhurst and O'Brien, 1975; O'Brien, Browning , and Rosen, 1979; O'Brien et al, 1979).

In his experimental study Melka *et al (1979)* tested the patency of micro-arterial grafts in rats but compared microvenous grafts versus microarterial grafts only on rabbits.

In this study we will conduct an experimental comparative evaluation of patency rates of the microarterial grafts versus the microvenous grafts in bridging the defects created in the femoral artery of Sprague Dawely rats, which when weighing over 250gms will usually have femoral vessels of aproximately 0.6 to 0.9mm in external diameter (*Serafin, D., Georgiade, N. G., Morris, R. L., Mullen, R. Y., 1982).*

AIM OF THE WORK