ROLE OF
PULSED ELECTROMAGNETIC FIELD
ON THE FRACTURE HEALING

Thesis
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MD Degree in Physical Medicine

By

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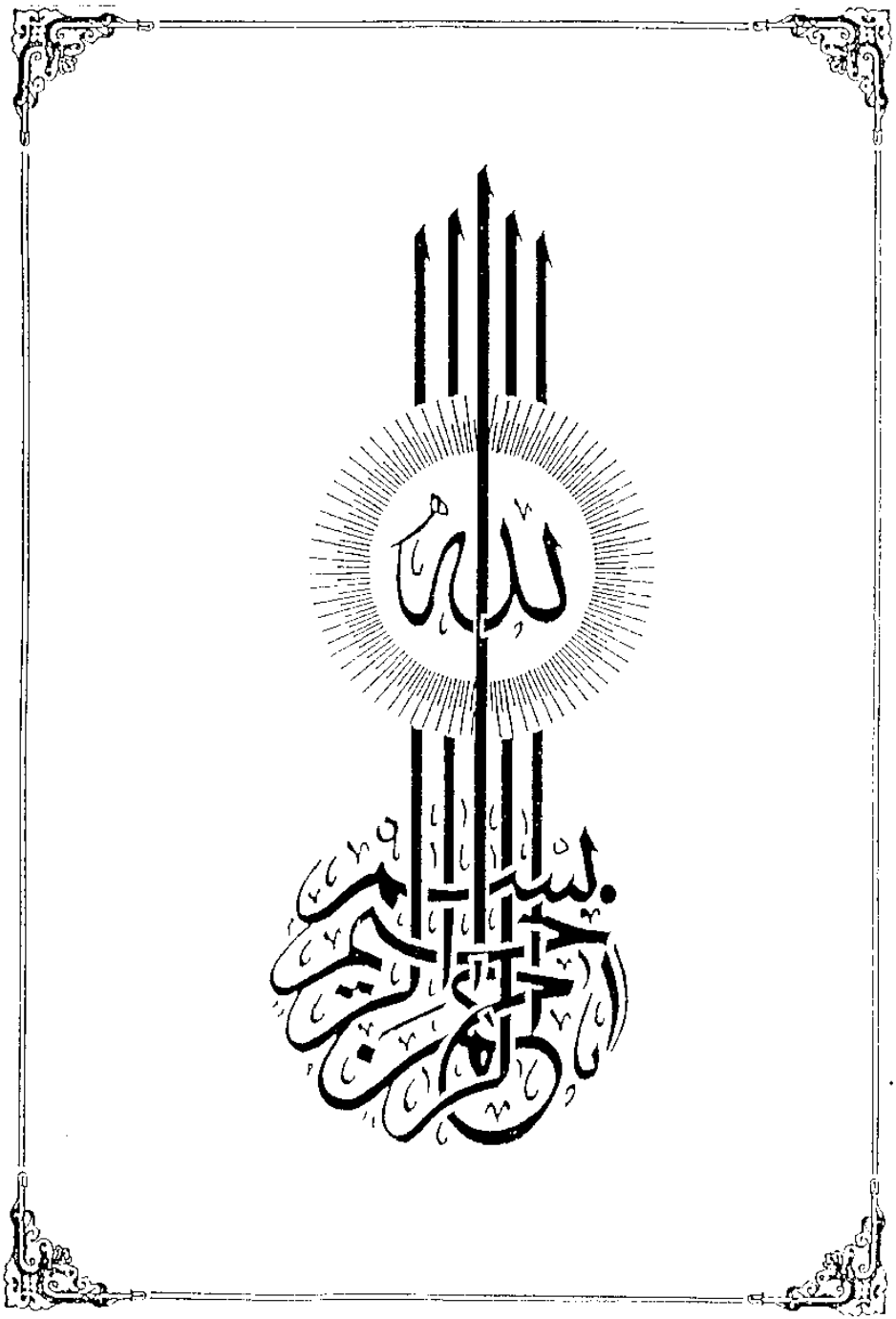

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CONTENTS

ABBREVIATIONS

BMD	=	Bone mineral density
BGP	=	Bone GLA Protein
BSP	=	Bone sialoproteins
DC	=	Direct current
DEXA	=	Dual energy X-ray absorptiometry
DPYr	=	Deoxypyridinoline
GHYL	=	Galactosyl hydroxylysine
GLA	=	Gamma carboxy glutamic acid
HP	=	Hydroxylysyl pyridinoline.
HYP	=	Hydroxyproline.
Lp	=	Lysyl pyridinoline
MGP	=	Matrix GLA Protein
OC	=	Osteocalcin
TRAP	=	Tartrate resistant acid phosphatase
PEMFs	=	Pulsed electromagnetic fields.
PGE2	=	Prostaglandin E2
PICP	=	Procollagen I carboxy terminal
PINP	=	Procollagen I amino terminal
PTH	=	Parathyroid hormone
Pyr	=	Pyridinoline
SGP	=	Stress generated protentials
SPA	=	Single photon absorptiometry
UoH Prol.	=	Urinary hydroxyproline

INTRODUCTION AND AIM OF THE WORK

INTRODUCTION

Healing of fractures is a physiological process, which is affected by many factors. Some factors may delay this process leading to delayed union, or suppress it completely resulting in non-union. The reasons for failure of fractured bone to unite may include a large gap, insufficient immobilization, too short period of immobilization, infection, soft tissue interposition, loss of blood supply, pathological fracture and general causes which include osteoporosis, diabetes and vitamin C deficiency **(Heppenstall et al., 1980).**

One of the most important factors in determining the rate of union is the vitality and vascularity of the fragments. If the blood supply of one fragments is impaired, union is slow. This occurs in fractures at the lower third of the shaft of tibia, the humerus and the ulna where there is no vascular foramina, the bone in these regions depends mainly for its blood supply on the nutrient artery **(Heppenstall et al., 1980).**

Nonunion and delayed union are complex problems that may arise in the management of fracture healing especially in old age. Besides conservative and operative methods for treatment of fractures, electrotherapeutic procedures as direct currents of electricity and electromagnetic fields have been suggested to accelerate bone healing with success rates comparable with those achieved by bone grafting.

Electrical current has been shown to be an agent to stimulate osteogenesis. Pulsed electromagnetic field is noninvasive therapeutic