RESPONSE OF THE VAS DEFERENS TO PHYSICAL INTERVENTIONS IN SURGERY

by

Dr. Gulshan Jit Singh

Centre for Biomedical Engineering

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CERTIFICATE

This is to certify that the thesis entitled **"RESPONSE OF THE VAS DEFERENS TO PHYSICAL INTERVENTIONS IN SURGERY"** being submitted by **Dr. Gulshan Jit Singh** to Indian Institute of Technology, New Delhi - India for the award of the degree of Doctor of Philosophy in Biomedical Engineering is a record of bonafide research work carried out by him. He has worked under our guidance and supervision.

To the best of my knowledge the thesis has reached the requisite standard. The results presented in this thesis have not been submitted in part of full to any other university or institution for the award of degree/diploma.

Dr. T.K. Malik
Ex.Director Professor
Deptt. of Surgery
Maulana Azad Medical College &
Lok Nayak Hospital,
New Delhi

Dr. Sujoy K. Guha
Professor
Centre for Biomedical Engineering
Indian Institute of Technology
& All India Institute of
Medical Science, New Delhi

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Gulshan Jit Singh

(Dr. Gulshan Jit Singh)

ABSTRACT

Beyond the use of conventional methods like use of condoms and vasectomy male contraception is now emerging into new dimensions. Experience with vasectomy shows that the method, although quiet effective as a contraceptive measure, has some major limitations. In the domain of contraception, there are on going researches to involve technique which overcome of the limitations of vasectomy. Various types interventions have been tried.

Although peristaltic activity of vas deferens was known to exist in vitro and in vivo, this function was not attributed to have major bearing on reproductive system. More recently, a distinct change in this view is emerging. The functions of the vas deferens in respect of biomechanical, neurological and biochemical activity are all considered important. The present study has been taken up for understanding the effect of various interventions on these parameters so that the procedures are optimised to gain effective fertility restoration. The attention in this study has been directed mainly to biomechanical functions with related neurological association.

Electromyography and impedence plethysmograph done in the studies to measure the biomechanical changes of vas deferens shows that motility better respond after reanastomosis with laser than with suturing.

Using a theoretical model in the present study it has been found that schwann cell migration, nerve growth factors, electrical activity of the autonomic nerves and piezo electric properties of tissue and the extracellular environment all influence the regrowth of the nerves across the anastomotic site. It has been hypothesised that the laser fused tissue provides better pathways for cell migration and spread of electrical potentials them in the sutured zone.

Finally main results of the work done and scoep of the future research has been discussed.

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