

## Introduction

In Europe the overall incidence of peripheral nerve injuries is 1/1000, giving the estimated 300,000 cases /year, although local variation depends upon the preponderance of heavy industry and mechanical agriculture . Most are caused by direct mechanical trauma, resulting in transection, crush injury , traction or avulsion (**Katzman and Bozentka, 1999 ; Bryan *et al* , 1986 ; Dellon , 1981**). Although other significant mechanisms may be the cause of nerve injury such as compression, thermal injury and neurotoxins.

Peripheral nerve trauma is therefore a major cause of morbidity and carries a high cost in healthcare , lost employment and social disruption (**Dagum , 1998** ).

Nerve repair can be classified by technique and timing , and the classification given by Green shows that the primary repairs are those performed within 48 hours of injury , early secondary repairs between 2 days and 6 weeks after injury and late secondary repairs between 6 weeks and 6 months after injury (**Green , 1998** ) .

Nerve is repaired primarily when possible ,however , secondary repair may be elected for wounds caused by high velocity projectiles ; when tissues are significantly devitalized, contaminated, or ischaemic ; in complex reconstruction, and following a diagnostic delay after closed injuries or failed primary repair (**Birch *et al.*, 1998 ; Green, 1998**). Peripheral nerves injuries remain a major cause of functional morbidity since they are common , involves major nerve trunks in 35 % of cases (**Allan , 2000**), and their clinical outcome remains disappointingly poor (**Bruyns *et al.*, 2003 ; Lundborg , 2000**) .

Despite major advances in surgical techniques , outcome has not dramatically improved over the last 25 years (**Lundborg , 2000**), and remains worst in the 11 – 16 % of injuries that are unsuitable for primary neurorrhaphy (**Allan, 2000 ; Vanderhooft, 2000 ; de Medinaceli *et al.*, 1993** ) . Hence there is a need to shift focus away from surgical technique and towards therapeutic modulation of peripheral nerve regeneration. So that researchers try to find new methods to accelerate peripheral nerve regeneration and decrease the complication of delayed repair, and because of the obvious and effective role of ultrasound waves therapy in treatment of many pathological cases in human as well as animal . Although it is not a treatment for every condition as some commercial companies suggest , but it is widely used now (**Internet1**) .

The effect of ultrasonic waves on the tissues appears by their thermal and non thermal effects. The thermal effect includes acceleration of metabolic rate, decrease or control of pain and muscle spasm, increased circulation and increased soft tissue extensibility , while the non thermal effect includes increased intracellular calcium and increased skin mast cell degranulation, increased chemotactic factor and histamine release, increased macrophages responsiveness and increased rate of protein synthesis by fibroblast ( **Internet1**) .

The aim of this study is to find the effect of ultrasonic therapy on immediate and delayed peripheral nerve anastomosis.

## Summary

The effect of ultrasonic therapy to stimulate recent and delayed peripheral nerve anastomosis were studied in sixteen adult local breeds dogs from both sex were used in this study, divided into four groups, group A, B and control group C (C1 & C2).

Sciatic nerve neurectomy was done for all animals and anastomosis was done immediately for group A and control group C1 animals, leaving the nerve without anastomosis for 7 days for group B and control group C2 animals, later reoperated to do nerve anastomosis.

All animals of groups A & B after the anastomosis were exposed to pulsed ultrasonic therapy in a dose  $1 \text{ Watt/cm}^2$  for 10 minutes daily for 7 days.

Clinical observations were followed up for all animals for 30 days and continued for half of them for 60 days. The clinical signs for group B animals treated with ultrasonic therapy showed improvement of animal which started walking and knuckling was intermittent, the ulcers at the dorsal surface of the paw healed as compared with group A and C animals which knuckling was continued and there was slight improvement of the ulcers on the dorsal surface of the paw. Histopathological examination for sections taken after 30 days for half animals and 60 days for the other half, the results of group B which exposed to ultrasonic waves showed accelerated regeneration due to decreased numbers of vacuolated degenerated areas in the nerve fibers and decreased perineural fibrosis.