

CHAPTER 2

OBJECTIVES & SCOPE OF THE STUDY

2.1. Objectives

To find out the effect of various dosage of low level laser irradiation on motor nerve conduction velocity (MNCV) and sensory nerve conduction velocity (SNCV) of experimentally induced diabetic neuropathy in wistar rats.

2.2. Relevance and scope of the study

Eliasson et al (1964) found that the induction of experimental diabetes in rats by pancreatectomy or alloxan administration resulted in impaired sciatic motor and sensory nerve conduction velocities within 2 week. However, Eliasson et al (1964) was unable to prevent the development of impaired nerve conduction velocities by insulin treatment, or to affect it by the addition of insulin to the isolated nerve in vitro. Although there have been two reports that impaired nerve conduction velocity in rats with experimental diabetes can be improved by insulin treatment it has not been possible to prevent its development. Sharma and Thomas(1975) concluded that "the influence of insulin on conduction velocity in diabetic animals is so far uncertain" .

Rockind et al (1997) studied using direct 632.8nm HeNe laser irradiation to determine the effect of focused laser beams on aggregates of rat fetal brain cells and rat adult brain. The direct He-Ne laser irradiation 3.6J/cm² caused a significant amount of sprouting of cellular processes outgrowth in aggregates, compared to small amounts produced by non irradiated controls. This observation suggests that low power laser irradiation applied to the area of an experimentally injured nerve may induce axonal processes sprouting, thereby improving nerve tissue recovery. The mechanism of low power laser on nerve

tissue is not completely understood, but reference studies explain the photochemical effect of laser irradiation on the biological system which involves affecting the Cytochromes are affected, thereby stimulating Redox activity in the cellular respiratory chain, thereby causing increases in ATP production which activates Na⁺, K⁺, ATPase and other ion carriers, thereby increasing cell activation.

Anders et al (1993) studied on neuro regenerative and neuro protective effects of low level laser and concluded that there is massive axonal sprouting and increase in various molecules such as growth associated protein-43 (GAP-43), calcitonin gene related (CGRP) and transforming growth factors beta. They concluded that laser irradiation stimulates the proliferation of the Schwann cells which are key factors for successful nerve recovery.

From extensive research conducted by various researchers with low level laser irradiation on its physiological and therapeutic effects on biological tissues and nerve regenerating effects , This study aims to analyse the effect of low level laser irradiation in regenerating peripheral neuropathy induced due to experimental diabetes