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THE ACTION OF SOFT LASER ON SUBMANDIBULAR SALIVARY GLAND OF MICE

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ABSTRACT

The aim of this study was to calculate the histological changes on the salivary gland in diseased mice that inoculated with inoculated with Candeda in the oral cavity, twenty four white mice were divided into three groups each of six mice and the six remain taken as control. The mice were sacrificed after 15 days of continuous irradiated with soft type Gallium –Arsenide of 812 nm wave length and power 100wa. The gland were prepared in paraffin and analyzed with light microscop. the result showed astatically significant increasing of the secretion of the gland acini of the mice when it compared with the control group that not radiated. The diameter of the gland was increased from 2.01mm to 3.02mm for group A that irradiated with time interval 2hr for twice daily and be 2.3mm for group that irradiated three time daily, at the end of the experiment (20) days control and at the experimental mice were sacrificed by either application the left submandibular gland was carefully dissected intact ,for histological studies; the glands were placed in 10% buffered formalin and processed by conventional methods for embedded in paraffin sections were obtained and eosin (H&E) for light microscopy evaluation. The diameter of acini and other structure of both control and experimental groups were measured by using calibrated ocular lens, for each case there are two observation measurements of the diameter of acini then we take the mean of these two measurements. The same procedure were applied for the control, then statistical analysis significance was evaluated by t-test.

KEYWORDS: Low Level Laser, in medicine, Salivary gland, Laser for treatment.

INTRODUCTION

Salivary glands contains tissue that secreted its product into oral cavity and its function are for moisten the digestive membrane of the tract for many function like control the bacterial flora of the mouth.[1] The fluid of saliva secreted by special membrane and the secreted volume was about 1000-1500ml/day.[2,3] and the secretion of each gland as follow submandibular gland 69%, parotid 26%, sublingual gland 5% or less.[4]

It was found atrophy of acini in the major salivary gland of rates that fed with liquid food. The effects of laser on this gland was that stimulate the secretion of the saliva.[5,6]

MATERIAL AND METHOD

Twenty four lab mice of weight (25±2) g were inoculated by candida in the oral cavity and after 2 days of successful appearance of ulcer in tong and pacal, divided into three groups each of six mice and the six remain where taken as control. All the groups irradiated by LLL of Ga-Ar of 808nm for 12 days continuously the distance between the target (animal mandibular salivary gland) and the laser source was 1cm, laser power density was 100mw/cm^2

Table 1: The acini diameter for control group.

Diameter of acini	0.32-0.33 $\mp$2 mm

Table 2: Diameter of acini for group A.

Diameter of acini	0.33-0.35 $\mp$2 mm

Table 3: The acini diameter for group B.

Diameter of acini	0.35 $\mp 0.2 - 0.3$ mm

Table 4: The acini diameter for group C.

Diameter of acini	0.37 $0.\mp 1 - 0.2$ mm

Laser light for 12 days irradiated all the groups A, B and C continuously three times daily as follows:

Group A irradiated three times daily with time interval one hour.
Group B irradiated three times daily with time interval two hours.
Group C irradiated three time with time interval three hours.

After 12 days all the mice of the three groups were sacrificed and the mandibular salivary gland were taken for histopath exam after prepared in parafine, the control

were scarified and the mandibular salivary gland were taken for histopath after prepared in paraffin. The diameter of each acini and other structures of both control and experimental groups were measured using calibrated ocular lenses three measurement were taken and then the mean were taken for each. A comparison were done statistically between the experimental and control groups for the measurement of salivary diameter.

RESULTS

The mice of experimental groups appeared to become healthy during the experimental period, on the contrary of the control group. The histological appearance from submandibular gland of the mice that treated with laser differs than the gland that not treated with laser (control). The mucous acini appears as rounded and shape of mucous cell is pyramid of flattened basal nucleus, the histological appearance for the submandibular gland from mice that irradiated not similar to that not irradiated (control) the acini and mucous seems to be large in diameter (Table 1 & Table 2), Table-1- show the mean diameter of acini of the control group suffer from atrophy. Table-2- describes the mean diameter of acini, there was a significant increasing in the diameter. Table-3- reveals the difference in the diameters between the control group and the two groups

DISCUSSION

Many theories have been postulated about the mechanism of action for low-level laser specially about the exact mechanism of action and the physiological changes occurring at the cellular level.

The increasing in the diameter of diseased mice that swapped with candida is a result of laser that laser beam carries electromagnetic oscillations of definite frequency. When it reaches the tissue of the salivary gland that treated with laser, the electromagnetic oscillations gradually "swing and excite "single cells, this thought to eventually intensify the bionomical process that ultimately regulate the performance of various vital organs and then the cell itself begins to emit light similar to the rays of the laser and that let to stimulate the salivary gland secretion.[7,8]

The salivary glands connective tissue contains many plasma cells and lymphocytes that plasma cells secrete, IgA, which form a complex with secretory component synthesized by the serous acinar, the IgA-rich secretory complex released into the saliva is resistant to enzymatic digestion and constitutes an immunologic defense mechanism against pathogens in the oral cavity, so the laser beam main job was to cause activation in the cell which in turn leads to an intensification of the bionomical process. It is within this context that the Arnat-Schulz law becomes important with respect to low power laser application. This biological law states that weak stimuli excite physiological activity and moderately strong ones favor it, strong ones retard it and very strong ones arrest it from all laser irradiation of tissue show that units of light energy (photons) are absorbed by enzymes which react to light within the cell. Infrared light that used in this study absorbed at the cell membrane, this results in a change in membrane permeability, increased ATP levels and increased DNA production.[9,10]

The photons picked up by the cell membrane result in improved membrane stability and increased activity of the ATP-dependent Na/K pump, because cell metabolism is influenced by Na/K movement across the membrane, increasing the gradient will affect the flow of ions and hence the overall metabolism of the cell.

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