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To Evaluate the Action of Low Level Laser Mixing (LLL) on Submandibular Salivary Gland of Mice Inoculated with Bacteria

Aedah Z. Al-Kaisy

(B.Sc., M.Sc., Ph.D in Medical Physics)
Department of Physiology, College of Medicine, University of Baghdad, Baghdad, Iraq

Abstract: ***The purpose of this research is to evaluate the histological variations on the salivary gland in unhealthy mice that immunized with stupors in the oral cavity, 24 white mice were isolated and arranged to 4sets each of 6mice. The mice were sacrificed after 15 days of nonstopexposed with diode laser of mixing two wave length (635, and 910 nm) type Gallium –Arsenide with power of 100mW.The radiated and irradiated gland wereset in paraffin and examined under microscope.The outcomedisplayed a clear significant growing of the excretion of the gland acini of the mice compared with the control group. The gland diameter was enlarged for group A (irradiated) with interval 1hr twice a day, and 3 time a day, after fifteen days and comparing with the control it was found that the left submandibular gland was wisely dissected intact, for histological studies; and after placing the gland in 10% buffered formalin and in paraffin sections were examined and evaluated using light microscope. The diameter of both acini and control groups was measured using calibrated ocular lens, for each case and the statistical analysis was assessed using t-test.***

Keywords: Low Level Laser, in medicine, Salivary gland, Laser for treatment

1. Introduction

The tissue of salivary glands secreted its product into oral cavity, its function are to moisturize the gastric membrane of the area for severalpurposealike controlling the bacteria in the mouth [(1)]. The fluid volume of saliva volume was about 1000-1500ml/day [(2, 3)], and the secretion of each gland is parotid 26%, sublingual gland 5% and submandibular gland 69%[(4)].

Atrophy of acini was found in the main salivary gland of degrees that provide liquid food [(4)]. The laser effects on this gland were stimulating the saliva secretion. [(5, 6)]

Staphylococcus aureus is considered as round shaped and a gram-positive bacterium with a Formicated member, which normally originated inside the respiratory pathways, on skin, inside nose and food poisoning as well it can grow without the need for oxygen.[(11)]Pathogenic strains frequentlyendorse contaminations and infections due to generating protein toxins, and the appearance of a cell-surface protein that connected and bind and deactivatesantibodies[(11)].

2. Material and Method

The twenty fourth mice in the lab were weighted (150± 2 g) were divided into 4 groups (A, B, C and D), each group consist of 6 mice, group A was considered as control while the other 3 groups were injectedwith*S. aureus*in the oral cavity and 2days later a positivepresence of sore in gums and tongue. The groups (B, C, and D) irradiated by LLL Gallium –Arsenide of 910 and GaAlAs of 635nm of Ga-Ar of 910 nm for 15 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 (A)

Diameter of acini	0.220-0.230∓2 mm

Table 2: Diameter of acini for group B

Diameter of acini	0.220-0.270∓2 mm

Table 3: The acini diameter for group C

Diameter of acini	0.290∓0.20 − 0.30 mm

Table 4: The acini diameter for group D

Diameter of acini	0.3700.∓10 − 0.20 mm

Laser light for 15 days irradiated all the groups B, C and D continuously twice times daily as follows:
Group A kept as control not irradiated with laser.
Group B irradiated for 35 Mints twice times daily with time interval one hour.
Group C irradiated 35 Mints twice times daily with time interval two hours.
Group Dirradiated 35 Mints twice time daily with time interval three hours.

Fifteen days laterthe four groups of mice were examined and the mandibular salivary gland were taken for histopathologyassessment. The diameter of every acini and other structures to all groups were determined by means of calibrated ocular lenses, immediately after prepared in paraffin.The measurements were repeated three times and then the average were taken.A statistical evaluation wascompleted among the trial and the control groups.

3. Results

The three experimental groups (B, C and D) turn out to be supplementary healthy during the trial period, opposing group (A) (the control group). The histological appearance from submandibular gland of the mice that exposed to laser was varies than the control group (not exposed to laser).

Tables 1, 2, 3 and 4 where measured and concluded from the experiments, The mucous acini look like a 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 comparing with the control (Table 1)

4. Discussion

Several ideas have been assumed about the mechanism of inaction for low-level laser (LLL) particularly regarding the precise mechanism of inaction and the physiological variationshappening to the cellular level[8].The growing in the size of diseased mice that swapped with Staphylococcus aureusis a consequence of laser; its beam transfers electromagnetic oscillations of certainincidence. Once it touches the tissue of the salivary gland, it slowly "swing and excite "single cells, which ultimately strengthen the bionomical development that eventuallynormalize the act of several vital organs, consequently effect the cell itself and start to emit light alike to the rays of the laser which lead to motivate the salivary gland secretion. [7, 8]

The tissue of salivary glands has many plasma cells and lymphocytes that plasma cells secrete, IgA, which form a composite with secretory constituentcreated by the serous acinar, the IgA-rich secretory compound end into the saliva is hardy to enzymatic digestion and creates an immunologic protection mechanism against pathogens in the oral cavity. The laser beam duty was to originthe activation in the cell which in turn leads to increase the bionomical process [2, 3], that's why the Arnat-Schulz law is significant to low power laser application, itsays that weak stimuli excite physiological action and abstemiouslywhile strong errand it and retard it but the very strong laser irradiation (that has light energy photons) were absorbed by enzymes which react to light within the cell. Infrared laser that used in this study absorbed at the cell membrane, which changed the membrane permeability which increased the ATP levels and the DNA production. [8, 9], it increase the activity of the ATP-dependent Na/K pump, due to the cell metabolism which influenced by Na/K transfer in the membrane, which eventually increase the gradient that affect the flow of ions and hence the general metabolism of the cell[10].From Tables B, C, and, D it appear very clearly the increasing in the diameter of the icine precisely in Table 4 due to the time interval increases of the constant irradiation of the icin by laser which let the immune cells found in the saliva as immunoglobulin which is one of the saliva component (Amelize enzyme) that attack the bacteria founded in the oral cavity, extra to feed the esophagus with saliva that moisturizes it and the not let the growth of bacteria's laser her play arule of motivate the secretion of saliva, and the rulings of bacterial growth although itgrow the curative process[6].

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