Skin Tissue Healing Induced by Argon Laser on Rats

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Aims
The purposefulness of this search remained to evaluate the consequence of the green (532 nm) (LLLT) for process the skin healing into rats using two different energies. The study demonstrated the effect of low level laser to optimize the process of tissue repair.

Materials and methods
Forty five male ratswere used in this work of age (2-3 months) .The animals were divided into: three groups: Nine rats, without irradiation, considered as a controlgroup. The further thirty six of Rats irradiation by laser, employing green laser light of wavelength 532 nm, output power of 100 mW.Twodifferent dosages(11.4, 5.7) J/cm2) remained engaged on a superficial wound on animal's every day. Wound restorative evaluation was doneafter the 1, 3, and 7th irradiations.

Results and conclusion
The wound samples directed rapid remedial the afterward day next the initial irradiation, aimed at together dosages. An only dosage of passable quantity of dosages is effective in treatment procedures deprived of wound scar creation.

Keywords: wound healing**,** argon laser**,** low level laser**,** rats, irradiations**.**

Introduction
Low level laser therapy (LLLT) covering several laser types. (LLLT) dynamic in diverse of activities and handling processes. Numerous Researchers confirm the benefit of the LLLT in Wounds healing, and tissue remedial. Wounds healing are problematic actions which embrace a sequence of vascular and cellular aberrations actions, like; coagulation inflammation, granulation tissue formation, epithelization, collagen creation, plus tissue repair [1, 2].
Presently, numerous investigators showed that tissue repair is more effective next
handling with low-level laser, which aid wound restorative [3,4, 5, 6, 7]. On the contrary, some repots have shown no benefit in healing with LLLT [8, 9, 10, 11].

Laser therapy works through different mechanisms after skin injury including operating wounds, such as increasing fibroblast proliferation after irradiation. It is well known that fibroblasts play a critical part in healing, which may facilitate fibro genesis causes the formation of epithelialization and granulation tissue through the repair phase, plus thebeginning to synthesize collagen and ground substances [12, 13].Then several properties are probable, owed to changed action parameters, influencing healing developments, and then revealed a variation in results and decisions. These deviations are wound length and area, laser power, wavelength, irradiation time and frequency of irradiation, laser intensity, plus the collimation or divergence of laser beam [14].

Expanding laser spot diameter, reason a spreading of a laser light on wound edges, which can improve improved blood supply through wound edges, and then accelerate healing [15].

Furthermost of the previous Studies on wound restorative broadly employed He-Ne laser matching its beast healing prompt [16, 17].

The purpose of current research remained to assess the argon (532 nm) laser on wound remedial in rats employing using double unlike energies.

Materials and methods

Forty five young rats male, of agfrom two to three months, then weightiness ranged Approximately300) g, existed employed in current research. After general anesthesia and hair shaving, a superficial wound of 1 cm in length was made on one side of rat thigh. The injuries remained non-dressing, so rats retained in prepared mesh birdcage toavoid every contamination or infection. An animal's remained distributed for (3) categories. Nine rats, without irradiation, considered as a control grouping. The further thirty six rats were revealed to laser exposure irradiation, using green laser light (-IIIB, china) of wavelength 532 nm, output power of 100 mW, and a large beam spot area of 2 cm in diameter.The wounds of eighteen rats (first group) were irradiated harmonizing for 3 minutes; which is equal to energy of 18 Joule (or energy per unit area = (18)/ (3.14) = 5.7 J/cm^2). The othereighteen (second group) irradiated for 6 minutes; equal to energy of 36 Joule (energy per unit area = (36) / (3.14) = (11.4) J/cm^2).

The treated wounds were exposed directly to laser irradiation one hour post surgery (before the inflammatory proliferative stage) and then continued daily.

Each group was divided to three subgroups. The wound specimen was reserved at the first, third and seven pole- operational days. This means that the microscopic histopathological investigation remained taking from six rats in each group at the frequency of the first, third and seventh irradiations, or postoperative day. Changes in wound cell morphology were evaluated by light microscope and comparedwiththe control specimen results from 3 rats, at the same relative days.

The histopathological examination evaluates the amount of inflammatory cells, the microscopic characteristics appearance of fibroblast, and epithelial cells for each specimen.

Results

Usually the remark clears out that the low energy green laser aid wound corrective and its properties were related for together applied energies. A certain positive reply was started early bya comparative reduction of the inflammatory cells in treated groups than control. The symbols of wound healing were quicker on the treated groups in similar with control, happening at the next day after operation.

The histopathological examination results showed a quicker epithelization and the presence of fibroblast at the first post-operative day. Positive a complete wound restorative with the repair of the epidermisin treated groups. Although the control slices of the wound at the first post-operative day is still filled with blood clots, and with the sign of a full inflammatory cells, Figure 1. But at the third post-operative day (after the third irradiation) the histopathological examinations confirmed unpleasing effects for the treated groups. The similar effects were gained at the seventh daypost-operative. Figure 2 showed an rise in the fibroblasts, and granulation tissue at the third day after surgery, plusclear formation of scar. The scar formation increased at the seventh day, Figure 3 .The section of the control wounds at the third - seven post-operative dayswere still filled with blood clots, inflammatory cells, with the creation of fibroblasts, and granulation tissues.

The current results indicated out that an only dosage of argon laser of wavelength 532 nmis adequate to whole the remedial of this type wound. Then cumulative the occurrence of exposed to laser irradiations reasons scarring.

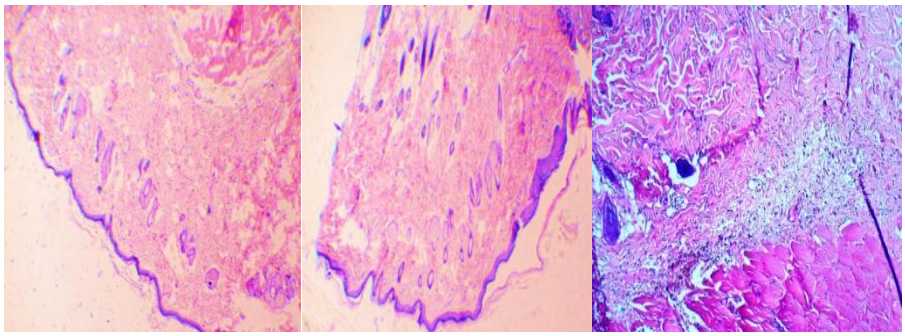

Figure1. The section of wounds at the first post –operative day,(a), and (b) represent the irradiated groups1and2 respectively, Revealed a whole wound remedial thru repair of epidermis. Then control groups(c) is filled with blood clots, and with the indication of inflammatory cells.

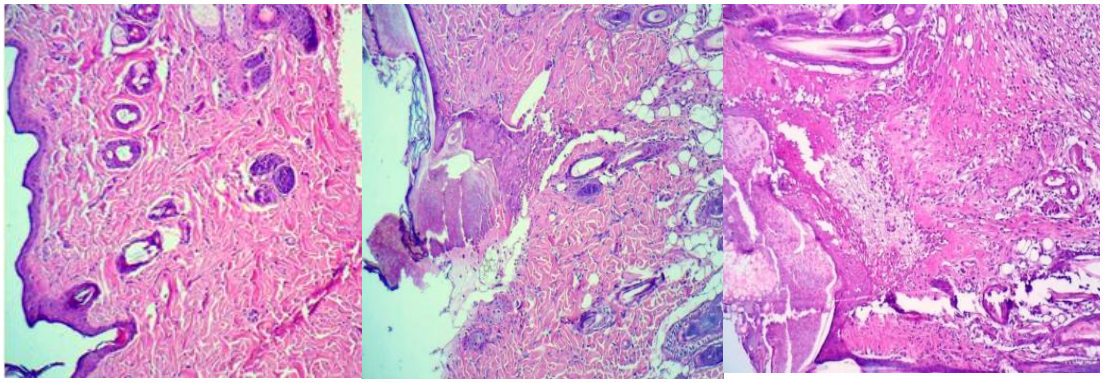

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Figure 2 .The sections of the wounds at the third post-operative day, (a), and (b) for groups 1 and 2 consequently, indicate a complete wound healing and restoration of epidermis, but with the appearance of scars. (c) is filled with blood clot, indication a full of inflammatory cells, and more creation of fibroblasts, and granulation tissue.

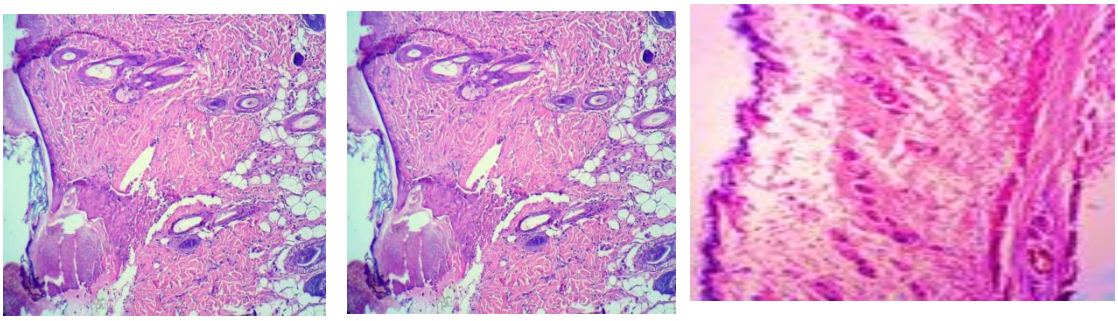

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Figure 3The. section for wounds of the irradiated groups at the seven days illustrated the appearance of scars.

Discussion

The end result revealed a complete wound tissue healing after the initial exposed to irradiation by laser and there existed non-significant dissimilarity in the healing among the two used irradiation energies. Therefore wound healing may be enhanced by a threshold amount of energy which aid to increase blood flow rate, stimulated cellular activity, and control the inflammation.

Accelerating wound healing by laser irradiation is thought to work through different biomodulation mechanisms, but its exact effects are still not understood. In numerous studies, with animal models, indicated that low-level laser adjuvant healing by the generation ofadenosine triphosphate (ATP) for the repair cells, and fibroblast propagation [18, 19].

Furthermore this work results showed that wound healing after the first irradiation was better than the multiple irradiation wounds. Multiple exposures at energy doses of 18, and 36 Joule causes extra stress, which may reduce cell migration, and viability.

Conclusion

Cumulative the exposed to laser irradiation occurrence can cuss further stress, andenhancescar creation. Wounds healed rapidly showing less scar formation. The next day afterward the initial radiation, for together unemployed energies

So (LLLT) greenlaser of wavelength 532 nm accelerates wound remedial after the initial exposed to radiation.

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