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معالجة اللشمانيا عن طريق الليزر
Treatment Lishmania Scars by Laser

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الآية

يَٰٓأَيُّهَا ٱلنَّاسُ ضُرِبَ مَثَلٞ فَٱسۡتَمِعُواْ لَهُۥٓۚ إِنَّ ٱلَّذِينَ
تَدۡعُونَ مِن دُونِ ٱللَّهِ لَن يَخۡلُقُواْ ذُبَابٗا وَلَوِ ٱجۡتَمَعُواْ لَهُۥۖ وَإِن
يَسۡلُبۡهُمُ ٱلذُّبَابُ شَيۡـٔٗا لَّا يَسۡتَنقِذُوهُ مِنۡهُۚ ضَعُفَ ٱلطَّالِبُ
وَٱلۡمَطۡلُوبُ ٧٣

سورة الحج

DEDICATION

To our knowledge, our hands, our enlightened by science and knowledge , to encourage us in our journey to excellence and success.

To those who are standing behind.

All of you thanks and appreciation and respect.

ACKNOWLEDGMENT

We thanks anthers appeicalie and thank all those who help in how in presting, especially Dr.Nasr Eldeen.

ABSTRACT

Was studying disease lishmania scars caused by sand fly and single-cell parasite excreted by the type allshmaniat, which is treated with semiconductor laser that generates omega XP. The study was conducted on a group of samples treated with the laser and laser found to first sterilize the wound and then kill parasite, which is transmitted through blood and then works a treat the impact of the parasite the human body, we note that the process of full recovery depends on the body's response to treatment, which vary from person to person depending on the size and extent of the parasite and the duration of the deployment, the number of laser sessions and the duration of treatment as well as the spread of the parasite into the human body, with follow-up meeting have been god's full recovery.

ملخص البحث

تمت دراسة مرض اللشمانيا الذي تسببه الذبابة الرملية التي تفرز طفيل احادي الخلية من نوع اللشمانيات ، والذي يتم علاجه بليزر اشباه الموصلات الذي يولد بجهاز اوميقا XP .

وتمت الدراسة على مجموعة من العينات وعلاجها بالليزر ووجد أن الليزر يقوم أولا بتعقيم الجرح ثم قتل الطفيل الذي ينتقل ع طريق الدم ومن ثم يعمل على علاج الأثر الذي يتركه الطفيل في جسم الإنسان ، ولاحظنا أن عملية الشفاء التام تعتمد على استجابة الجسم للعلاج والتي تختلف من إنسان ل آخر حسب حجم الأثر ومدى انتشار الطفيل ومدة الانتشار، ويتم تحديد عدد جلسات الليزر ومدة العلاج كذلك حسب انتشار الطفيل داخل الجسم ، ومع متابعة الجلسات يتم الشفاء التام .

List of appreciation

GaAlAs	Gallium Aluminum Arsenide lasers
Laser	Light Amplification by stimulated Emission of Radiation
CW laser	Continuous Wave Laser
LED	Light Emitting Diodes

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CHAPTER ONE

INTROUDUION

(1.1)Introduction

Sand fly was know long time ago, but appear in a given season is autumn with rain ad fly go virus single cell which lishmania scars moves through the bloodstream and causing scarring of the skin and is killing the virus and stop its spread using herbs municipality but remain as scars that are causing distortions in the leather, but the old distortions did not know her treatment is removed, but the old treatments did not give the result of a full recovery and do not remove skin deformities.

Because of the prevalence of date was seasonally let it find new treatments not idea addressed, and recently the disease spread further in the off-season, which led to intensive research on the treatment of islanders and fast to eradicate disease and abnormalities of the skin and found that this treatment is a semiconductor laser specifically laser gallium aluminum arsenide is generated by omega XP laser.

Beside this device uses it to treat and cure fully lishmania scars through sessions determined by the prevalence of the disease in the body, where the meeting is divided into periods of each period has a specific wavelength and frequency specified period determined according to the seriousness of the wound.

(1.2) Research objective

This research aims to identify treatment lishmania scars laser.

(1.3) Search questions

Are Gallium Aluminum Arsenide laser that treat lishmania scars?

(1.4)Search problem

Although laser therapy treatment of islanders and effective but needs for along period of time.

Chapter tow

Basic concepts

(2.1) introduction

This chapter focused on the basic principles of laser, semiconductor laser, Lishmania scars and aim of work.

(2.2) principles of laser

(2.2.1) Definition of Laser

"Laser" is stands for the first letters of a sentence:

"Light Amplification by Stimulated Emission of Radiation" and this sentence accurately describes how laser.

There are many types of lasers, each of which has specific features. In the laser the laser medium is exposed to an optical pumping process suitable for atoms in the case raised[1].

(2.2.2) Laser Beam Properties

1. **Monochrome**

   The light output of the laser monochrome, While the white light from the Sun consists of the visible spectrum. Currently, there are types of lasers produce all spectral colors, Visible and non-visible Such as infrared and ultraviolet.

2. **Coherence and cohesion of the x-ray photons**

   Of important characteristics of laser beam coherence and cohesion of its constituent photons , And the light of its elements

, And emit photons with a wavelength of one , Determined by the relative capacity maize that has moved between these photons , Millions of these transitions In millions of atoms raised emit millions of photons and show the unaided eye rays of light and note here that there was a link between the photons emitted , regular scans can be likened to the sounds from millions of sources like and with the same frequency but not issued simultaneously and that they hear and like the noise while it if these sounds at the same time, they become acute, severe impact.

3. Directionality

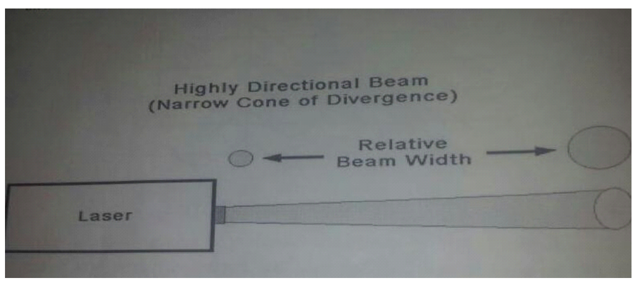


Fig (2.1) Directionality of laser light

A laser beam is a very high optical package having a very small angle of her openness and these rays going in straight lines as close as possible to the parallel rays are not accompanied by the brighten eye glitter very harmful if received directly , While other light sources shines its spotlight in all directions and this means that the laser beam does not lose intensity only very slowly if the rays sent towards the Moon, 400 km from the Earth's surface and the adequate spectrophotometers , They cover the surface of the Moon Illuminated spot of not more than one kilometer in diameter whereas if sent regular light, presumably to Moon the Qatar floodlit patch up to 3,000 kilometers. Lasers can intensify energy traveling great distances, as illustrated in 1969 when scientists rays from the laser to the Boomerang from above the reflectors placed American astronauts in "Apollo" on the Moon .

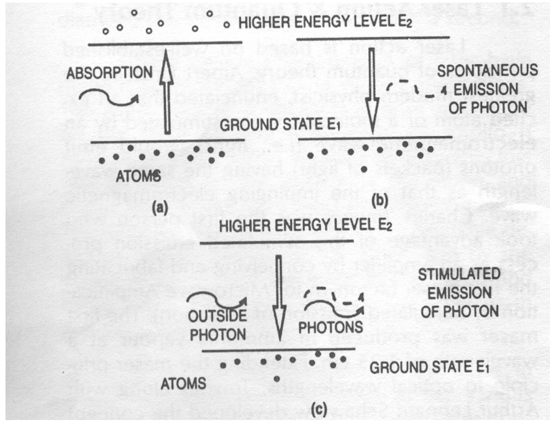
4. **High beam.**

5. **Spectral purity.**

(2.3) Laser Action & Quantum Theory

Laser action is based on well-established principles of quantum theory. Albert Einstein, the greatest modern physicist, enunciated that an excited atom or a molecule, when stimulated by an electromagnetic wave (i.e., light), would emit photons (packets of light) having the same wavelength as that of the impinging electromagnetic wave. Charles Townes was the first person who took advantage of this stimulated emission process as an amplifier by conceiving and fabricating the first maser (acronym for Microwave Amplification by Stimulated Emission of Radiation).

The first maser was produced in ammonia pour at a wavelength of 1.25 cm. extending the maser principle to optical wavelengths; Townes along with Arthur Leonard Schawlow developed the concept of using a laser amplifier and an optical mirror cavity to provide the multiple reflections necessary for rapid growth of light signal into an intense visible beam[2].



Fig(2.2) laser action

Every atom, according to the quantum theory, can have energies only in certain discrete states or energy levels. Normally, the atoms are in the lowest energy state or ground state.

When light from a powerful source like a flash lamp or a mercury arc falls on a substance, the atoms in the ground state can be excited to go to one of the higher levels.

This process is called absorption. After staying in that level for a very short duration (of the order of 10-8 second), the atom returns to its initial ground state, emitting a photon in the process, This process is called spontaneous or a emission[3].

The two processes, namely, absorption and , spontaneous emission, take place in a conventional light source, In case the atom, still in Its urns to excited state, is struck by an outside photon having precisely the energy necessary for spontaneous emission, the outside photon is augmented by the one given up by the excited atom, Moreover, both the Photons are released from the same excited state in the same phase, this process, called stimulated emission, is fundamental for laser action. Thus, the atom is stimulated or induced to give up its photon earlier than it would have done ordinarily under spontaneous emission, The laser is thus analogous to a spring that is wound up and cocked, It needs a key to release it, In this process, the key is the photon having exactly the same wavelength as that of the light to be emitted.

(2.4) Inversion Mechanisms

Population inversion, which gives rise to laser action, is brought about in different media by various mechanisms. In gases, metal vapors, and plasmas, the inversion is brought out by applying a voltage drop across the elongated gain medium thereby producing an electric field that accelerates the electrons. These rapidly moving electrons then collide With gas atoms and excite them to a number of excited energy levels. Some of these levels decay faster than the others, leaving population inversions with some higher levels. If the population in the excited levels is high enough, then the gain may be sufficient to make a laser. Most gas lasers have relatively low gains and therefore require the use of Amplifier lengths of the order of 25 to 100 cm. typical pressures for gas lasers range from 0.0001 to 0.001 atm, although there are some gas lasers that operate at normal atmospheric pressure and above.

In liquids, most of the excited states decay so rapidly due to collisions with surrounding atoms or molecules that it 1s difficult to accumulate enough population in an upper laser level and to achieve significant gain. Fluorescent dyes are the best liquid media for lasers; their excited energy levels are populated either by flash lamps or by lasers; which the energy states are shielded from the surrounding atoms so that the energy levels are narrow.

A flash lamp is used to excite the ions to a large number of upper energy Levels. The excited ions decay quickly to the met stable upper level where they stay for considerable time (of the order of milliseconds) before terminating of the lower energy level, leading to the stimulated mission no flash radiation. Inversions in semiconductors are produced when a p-n junction is created by joining two slightly different semi conducting materials, viz., n- and p-type materials (similar to a transistor). Then-type materials have an excess of electrons whereas the p-type materials have an excess of holes (missing electrons). When they are joined, excess electrons of the n-type materials are pulled over into the p-region causing the electrons and holes in those regions to recombine and emit radiation. If an external electric field is applied in an appropriate direction, by applying a voltage across the junction, more electrons and holes can be pulled together causing them to recombine and emit more radiation producing inversion[4].

(2.5) Amplification & Population Inversion

When favorable conditions are created for the stimulated emission, more an more atoms are forced to give up photons thereby initiating a chain reaction and releasing vast amount of energy, This results in rapid buildup of energy of emitting one particular wavelength (monochromatic light), traveling coherently in a precise, fixed direction. This process is called amplification by stimulated emission.

The number of atoms in any level at a given time is called the population of that level.

Normally, when the material is not excited externally, the population of the lower level or ground state is greater than that of the upper level. When the population of the upper level exceeds that of the lower level, which is a reversal of the normal occupancy, the process is called population inversion. This situation is essential for a laser action. For any stimulated emission, It is necessary that the upper energy level or met stable state should have a long life time, i.e., the atoms should pause at the met stable state for more time than at the lower level. Thus, for laser action, pumping mechanism (exciting with external source) should be from a such, as to maintain a higher population of atoms in the Upper energy level relative to that in the lower level.

(2.6) Designing a Laser

A laser generally requires three components for its operation: (a) an active medium in the form of a laser rod, with energy levels that can be selectively populated; (b) a pumping process to produce population inversion between some of these energy levels; and (c) a resonant cavity containing the active medium which serves to store the emitted radiation and provides feedback to maintain the coherence of the radiation.

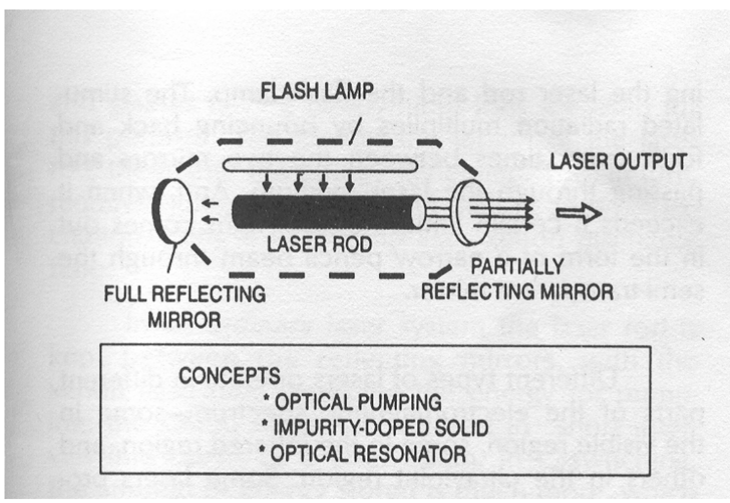


Fig (2.3) designing a laser

The main problem in designing a laser is to involve produces a sufficiently high population of atoms in the excited state. For this, many ingenious ways fully all have been evolved. The most common method of centre excitation is by sending an intense beam of light from a flash lamp or a continuous source of light through the material in the form of a cylindrical rod or a container tube with a suitable gas. Only those materials which can be pumped to achieve population inversion are used to give laser radiation[5].

The existence of states, whose mean life times are relatively long so as to help pile up considerable energy in the excited levels, is necessary. Long life time of a level and the sharpness of the spectrum lines usually go together, and so, the materials that can be best used to give laser radiation are crystals with sharp lines, and gases at low pressure.

An important aspect of the laser operation involves the design of a resonator cavity to maximize the process of stimulated emission. Two carefully aligned mirrors, one having more than 99 percent reflectivity and the other having less reflectivity, are placed at either end of the cavity containing the laser rod and the flash lamp. The stimulated radiation multiplies by bouncing back and forth many times between the two mirrors and passing through the laser medium. And, when it exceeds a certain limit, the laser light comes out citation in the form of a narrow pencil beam through the semi-transparent mirror.

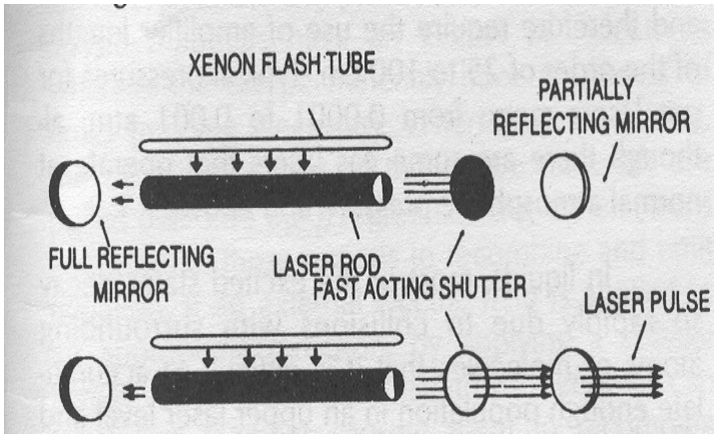
Different types of lasers operate in different xenon f parts of the electromagnetic spectrum-some in the visible region, some in the infrared region, and others in the ultraviolet region. Some lasers produce continuous light beams while others give pulses of light (of less than millisecond duration). Basically, there are two types of lasers-the continuous wave (CW) laser and the pulsed beam allow laser. In the CW laser, the light is emitted as a, steady continuous beam, generally, with less intensity. Gas lasers belong to this category. On the other hand, the pulsed lasers produce powerful bursts of light of short duration. Crystals, glass and liquid types of lasers belong to this category. Normally the solid state lasers operate intermittently, mainly due to the large amount of heat developed in the crystal.

(2.7) Increasing the Laser Power

The power of an ordinary pulsed laser can be Increase enormous by Q-switching or Qspoiling, a technique known to be used for some of its applications in range finding, drilling, and cutting. In such systems, the power of the laser beam ranges from a few million to a few hundred billion watts and usually some rare earth crystals and glasses having neodymium ions are used for back and this purpose. The greater the length of the laser rod, the higher the energy generated. This, in turn, requires hundreds of joules in milliseconds for excitation,- using a flash lamp like xenon discharge tube[6].

In an ordinary laser system the laser rod is kept between the reflecting mirrors, with the xenon flash tube providing the energy for pumping; the stored energy is released in short intervals into bursts of a laser beam. In Q-switching, lasers pro- the amount of energy stored is much more, which is achieved by interposing a fast acting shutter in duration). Between one end of the laser rod and the partially reflecting mirror; the shutter does not allow the laser radiation to be released for a predetermined time. After sufficient energy is stored in the energy level, the shutter is opened for a very short interval of about a nanosecond (one-billionth of a second) and all the stored energy is released as one giant pulse. This technique can be compared to a river dam where the

Lifting of a sluice gate releases water in a gush.



Fig(2.4) Increasing the Laser Power

There are several ways of blocking and unblocking the optical paths between the mirrors.

Different types of Q-switches like rotating prism, polarizing device, and dye solutions are employed. The tremendous energy released in this way can pierce through not only thick metallic plates but also the hardest material like diamond[7].

(2.8) Types of lasers

The first laser action was demonstrated in a ruby crystal by Maiman, in 1960. Since then, a large number of materials in various media have been found to give laser action at wavelengths in the visible, ultraviolet and infrared regions. These include various gases, solids, liquid, glasses, plastics, semiconductors, and dyes. In addition to the ruby crystal, many other crystals doped (introduced as an impurity) with rare earth ions have light been found to give extremely good laser output The crystals are grown in specially designed furnaces with the desired compositions and then cut and polished into cylindrical laser rods with the faces optically flat and parallel to each other. The numerous types and designs of lasers are steadily increasing and can be broadly classified according to their production techniques[8].

1. Optically Pumped Solid-State Lasers.
2. Liquid (Dye) Lasers
3. Gas Lasers.
4. Semiconductor Lasers.
5. Free Electron Lasers.
6. X-ray Lasers.
7. Chemical Lasers.

(2.9) Semiconductor Lasers

Semiconductor lasers are diodes that emit coherent light by stimulated emission. They consist of a p-n junction inside a slab of semiconductor that is typically much less than a millimeter in any dimension. Excitation is provided by current flow through the device, and the cleaved ends of the diode provide the feedback mirrors.

The output characteristics of diode lasers differ from those of other laser types in two important ways. Because of their small size they have large beam divergence angles[9]. The nature of the active medium also allows lasing over a broad wavelength range and produces an output that is far less monochromatic than other laser types. Nevertheless, semiconductor lasers have important application in communications and range finding. Diode lasers are also being developed for medical and industrial applications.

(2.9.1) Energy transfer in semiconductor lasers

Semiconductors are materials that have electrical conductivity intermediate between the high conductivity of metals and the low conductivity of insulators. In a good electrical conductor, such as a metal the conduction of electricity is easy. In an insulating material (for example, common table salt), the electrons are tightly bound to their parent atoms and are not free to move through the material when a voltage is applied to it. Therefore, the electrical conductivity is low. In a semiconductor the outer electrons are usually weakly bound to their parent atoms, but a small fraction of them can migrate through the material, so that there is a small amount of electrical conductivity.

The most commonly known semiconductors are silicon and germanium, which have been used for electronic applications such as rectifiers and transistors. The most common semiconductor material that has been used in lasers is gallium arsenide, which it is atomic number 31 and 33 respectively. Its chemical designation is GaAs.

(2.9.2) Current flow through A semiconductor

Semiconductors such as silicon are characterized by having four electrons in their outer atomic shell.

In the semiconductor crystal each atom forms electron pair bonds with four other atoms. The configuration of atoms in a semiconductor crystal is called a crystalline lattice. Each of these contributes an additional electron, resulting in a total of eight electrons which completely fills the outer atomic shell. By sharing each of its four outer electrons with four neighboring atoms, each atom “fills” its outer shell. This leaves no free electrons for conduction in a pure semiconductor[10]. Some conduction occurs because the outer electrons are not tightly bound to the atoms and may be freed by thermal or electrical energy. Thus pure semiconductors have a high electrical resistance at low temperature and lower resistance at higher temperature.

The electrical conductivity of a semiconductor can be increased by adding doping elements, or small percentages of impurity elements, to the semiconductor. The presence of the small traces of impurity elements can yield extra charge carriers which are free to move through the material.

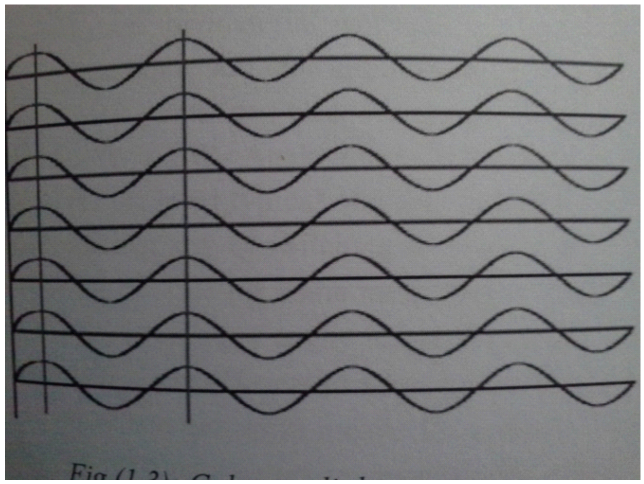
In the compound gallium arsenide, each gallium atom has three electrons in its outermost shell of electrons and each arsenic atom has five. This gives an average of four electrons per atom in the compound. When a trace of an impurity element with two outer electrons, such as zinc, is added to the crystal, the result is the shortage of one electron from one of the pairs. This shortage sets up an imbalance in which there is a place in the crystal for an electron but there is no electron available. This is commonly called a “hole”. This forms the so-called p-type semiconductor in which there is a place in the crystal for electricity is by motion of the hole from one atom to another. Here p stands for positive, because the hole, or lack of an electron, looks like an extra positive charge.

When a trace of an impurity element with six outer electrons, such as selenium, is added to a crystal of GaAs, it provides a mechanism for electrical conductivity. This type called an n-type semiconductor, where n stands for negative charge.

When a trace of an impurity element with six outer electrons, such as selenium, is added to a crystal of GaAs, it provides on additional electron which is not needed for the bonding. This electron can be free to move through the crystal, thus, it provides a mechanism for electron. When p-type and n-type region. On one side of the junction conduction is by electrons, and on the other side it is by positive holes. Such a device is called a diode, and it allows current flow in only one direction.

When a forward voltage is applied to the junction, i.e. the positive side of a battery is connected to the p-side and the negative to the n-side, the density of the carriers, both p-type and n-type, increases around the junction. Electrons move into the junction from the n-type side, and holes move into the junction from the p-type side. The battery applies energy to the electrons and holes, so that they are freed into a higher energy state. Because a hole is essentially the lack of electron in a bond, the hole may be filled with one of the extra electrons. When a reverse voltage is applied to the junction, the charge carries move away from the junction to create a depletion region with no charge carriers. Thus, only a very small current flow when the diode is reverse biased.

(2.9.3) Emission of light by semiconductor diodes



Fig(2.5) coherent light waves

Figure (2.5) shows the energy-level diagram of a GaAs semiconductor diode. In semiconductor materials, electrons may have energy within certain bands. In the figure the lower region is called the valence band and represents the energy states of bound electrons. The upper region is called the conduction band and represents the energy states of free or conduction electrons[11]. The conduction band is drawn above the valence beam because it indicates a higher energy level. Electrons may have energies in either of these bands, but not in the gap between the bands.

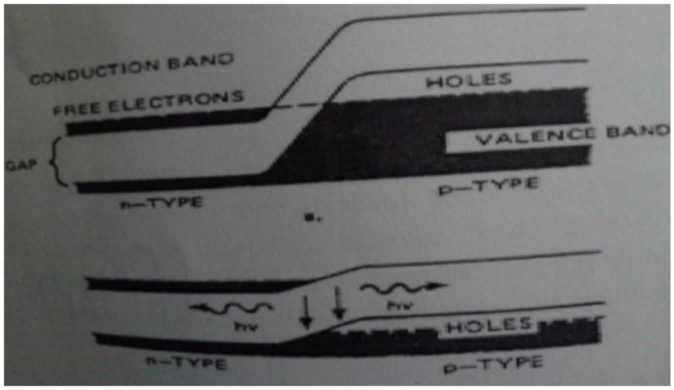


Fig (2.6) the energy-level diagram of GaAs semiconductor diode.

Figure (2.6) shows the relative populations of the energy bands or both sides of a p-n junction with no voltage applied to the diode. The n-type material contains electrons which behave as the current carriers in its conduction band, whereas the p-type material has holes for carriers in its valence band[12]. When a forward voltage is applied to the diode, the energy levels are caused to shift as illustrated in figure 4b. Under these conditions there is a significant increase in the concentration of electrons in the conduction band near the junction on the n-side and the concentration of holes in the valence band near the junction on the p-side. The electrons and holes recombine (conduction band electrons move into empty valence band states) and energy is given off in the form of photons. As the electron recombines with a hole it moves from a higher energy state in the conduction band back to the lower energy state in the valence band . The energy of the photon resulting from this recombination is equal to that associated with the energy gap. That is the difference in energy between the conduction and valence bands as shown by fig 4b. This energy is often in the form of electromagnetic radiation. In light-emitting diodes (LED) this light energy transmitted out through the sides of the junction region. For the LED, all of the light is created by spontaneous emission due to electron and hole recombination[13]. In semiconductor lasers the junction forms the active medium, and the reflective ends of the laser material provide feedback. Because of this feedback in diode lasers, most of the light is created by stimulated emission.

(2.10) Lishmania scars

(2.10.1) sand fly

Fig (2.7) Sand fly

Sand fly insect with thick hair and a dark brown color, about 3 mm in length. Active female sand flies at night and sucks the blood of humans and animals, live maggot flies in wet places and Sandy feeding on dead plant residues and animal materials. Living several hundred types of sand flies in the tropics and the movement of the bacteria that cause serious diseases such as Kala Azar and sand fly fever.

(2.10.2) Lishmania scars

A group of diseases caused by a single-cell parasite of the genus Leishmania where about twenty species of the parasite to cause disease in humans, mostly, with the exception of tropical disease leishmaniasis, diseases of animal origin. The disease is transmitted by biting insects of the family of alfwasd belong to the genus alwaseda in the old world and new world allotzomih sex .

Moving albromastigot, infectious stage of the parasite Leishmania to human skin by the bite of the sand fly. After attacking the parasite Leishmania Phagocytic cells and proliferates.

Red menace appears in place of the bite the fly (often within weeks or even years after the bite). Then, ulcerate scourge has hit by a secondary bacterial infection. In many species of Leishmania parasite, (for example, the parasite Leishmania major) the lesion usually heals spontaneously, but leave atrophic scars. In some species (such as the parasite Leishmania Brazilian) possibly heal the lesion automatically leaving traces of SCAR, but reappears again in another part of the body (especially the lesions caused by the destructive mucocutaneous leishmaniasis). And may heal lesions of other species of Lishmania automatically, and then reappearing again as hazardous attached about where the original lesion, or along the path of the lymphatic drainage.

Cause some types of cutaneous leishmaniasis Leishmania parasite (Leishmania parasite Leishmania parasite and large tropical), while causing some other type of visceral leishmaniasis (Leishmania parasite Leishmania donovani childlike and parasite), although the search result (because of the high prevalence rates of developed Western countries and even tribal people) shows a lack of clear boundaries and between these types .

Chapter three

The experimental part

(3.1) Introduction

This chapter focused on omega XP laser used in treating lishmania scars detailing their frequencies and wave lengths, and sampler that was chosen and work processing steps.

(3.2) Equipments

(3.2.1) Omega XP laser

The omega XP laser system is a type of a semiconductor lasers (Gallium Aluminum Arsenide lasers) (GaAlAs) together with super luminous LEDs in a multi-wavelength probes. Omega's system featured here is classified as 3B lasers. The system specifications are listed in table (3.1). Figure (3.1) shows a photo of this laser system.

Fig (3.1) the omega XP laser system unit.

Table (3.1): technical specifications of omega XP laser system:

Laser diode	Laser type
675nm/30mW,820nm/200Mw,915nm/100mW	Wavelength &output power
Quasi-continuous	Exposure mode
Typically 9x30	Beam divergence
2.5,10,20,73,146,700,1k,5k,10k Hz	**F**requency modulation
Lens-coupled	Method of optical output
Finger switch	Laser trigger
110/230 V;50/60Hz	Mains power supply
Therapy laser class 111b.	Classification
LCD	Display unit
1.6 K	Weight

(3.2.2) Omega system probes

Each probe is designed to emit laser light at specific wavelength (single probes) or set of wavelengths (cluster probes).

In case of single probes there is just one laser diode placed inside the probe, when in case of cluster probes there is 20 to 60 laser diode placed inside the probe head and emit 5 to 6 wavelengths. Fig (3.2), (3.3) and (3.4) shows the types of omega XP probes.

1. **Single probes**

   a. 675nm-15nm/30mW;820nm-15nm/200mW

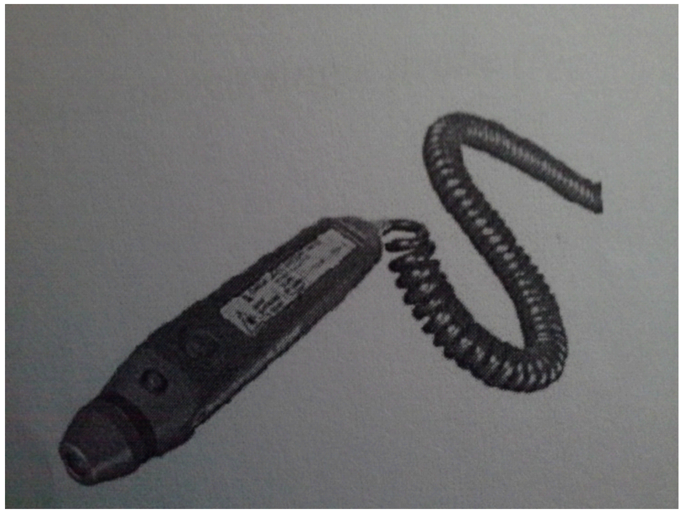


Fig (3.2) omega single probe (a)

   b. 915nm-15nm/100mW

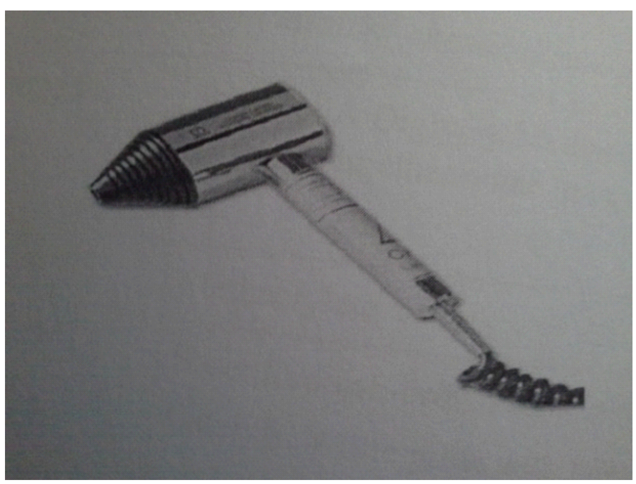


Fig (3.3) omega single probe (b)

2. Cluster probe

46 Diode 660 nm, 875nm, 890nm, 940nm, 950nm

c. 21 x 15mW, 25x25mW ; Laser and LED

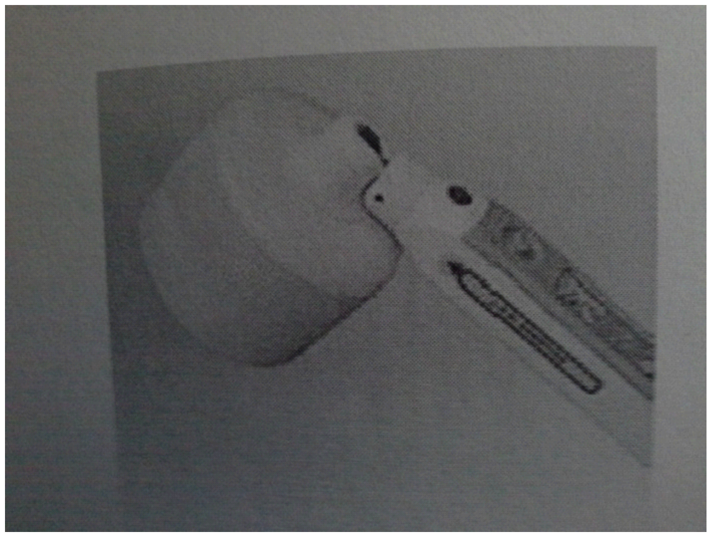


Fig (3.4) omega cluster probe

(3.3) Patients samples

In our sample were a people living by the sand fly, they found two different races, ages and places of residence, and 10 of them with different location and spread of infection in the body and impact.

(3.4) Experimental procedures

The experimental procedure was done as follows:

1. The samples taken for the study, a group of persons infected lishmania scars from various regions and ages ten samples were selected for discussion.

2. The number of sessions is determined in each case by a competent doctor.

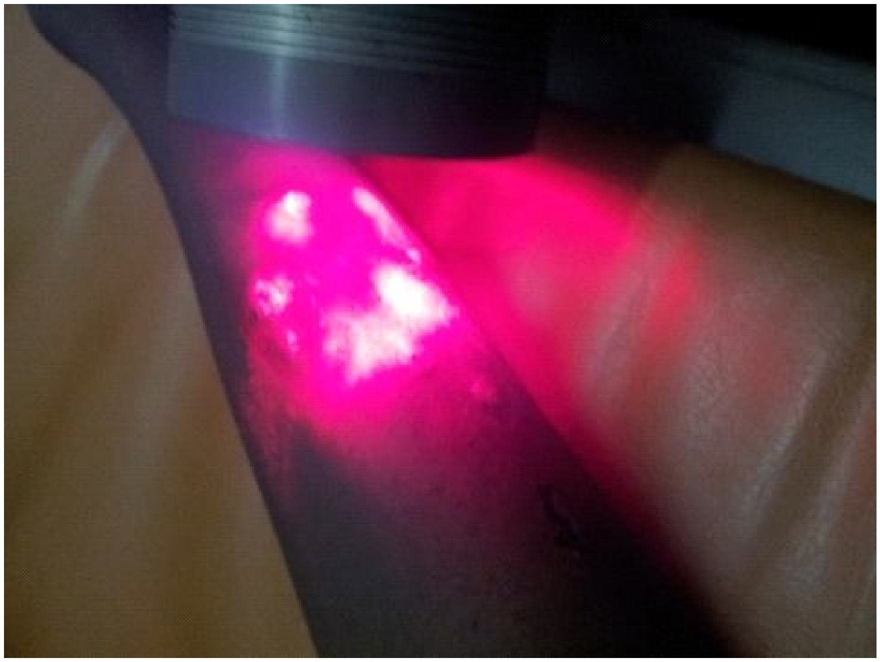
3. The first meeting will begin using three probes if the wound is open, if not open are used only two probes.

4. In the first case, if the wound is open probe is used with a wavelength 675 nm, then the second wavelength probe by 820 nm, finally cluster probe by wavelength (940,950,875,660,890) nm.

5. In the second case the probe is used the second wavelength probe by 820 nm , finally cluster probe by wavelength .

Fig(3.5) : Absorption lishmania scars to omega single probe by wavelength 820 nm.

Fig(3.6) : Absorption lishmania scars to omega single probe by wavelength 675 nm .



Fig(3.6) : Absorption lishmania scars omega cluster probe by wavelength (940,950,875,660,890)nm.

Chapter four
Method and results

(4.1) Introduction

This chapter focused on samples handled by omega XP laser the device and the meetings and results obtained .

(4.2) Samples preparation

Case1

Patient name: Mohamed Alfatih

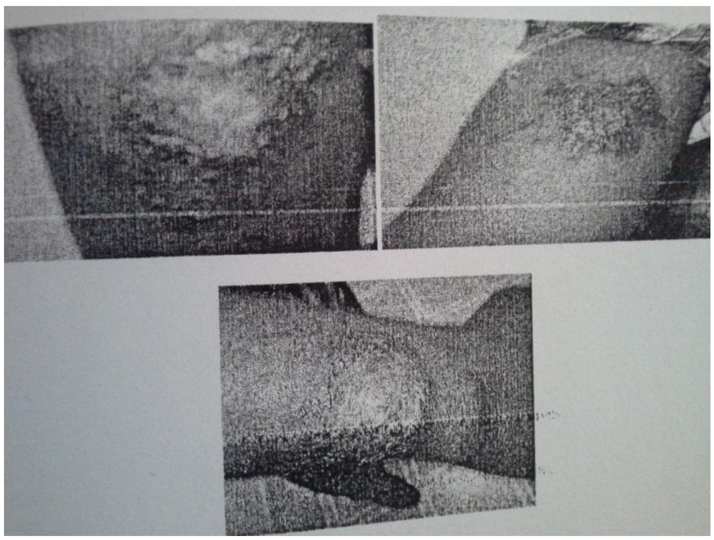
Patient age: 29

Residence: Abokarshoda

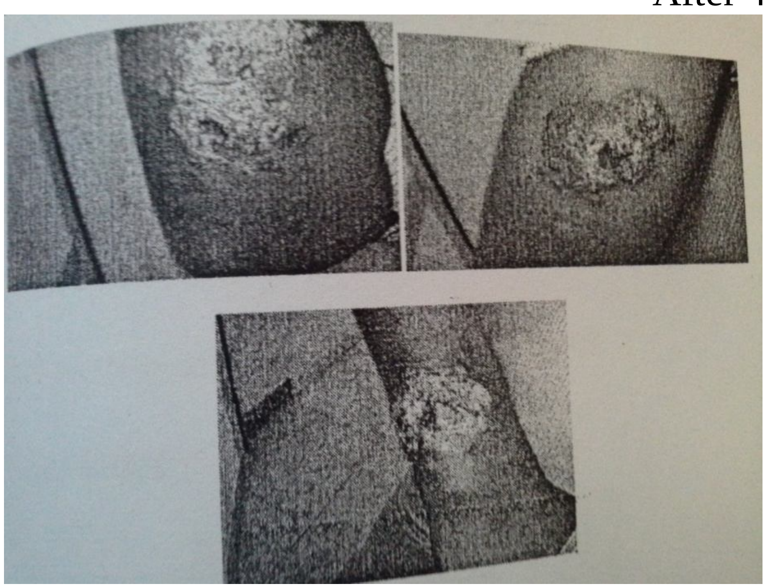
Type of laser: low intensity laser

Number of total sessions: 15 3sessions/week.

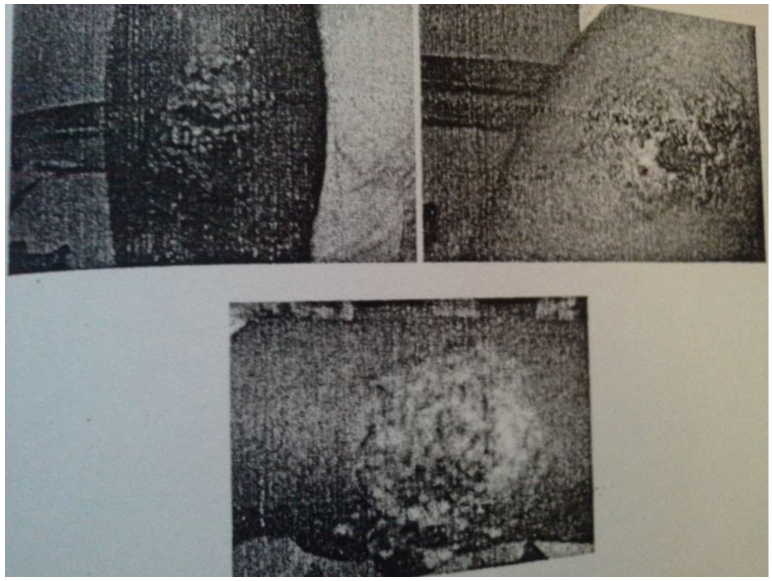
Before first session:



After 4 session:



After 15 session:



Case2

Patient name: Elaf abdalhadi

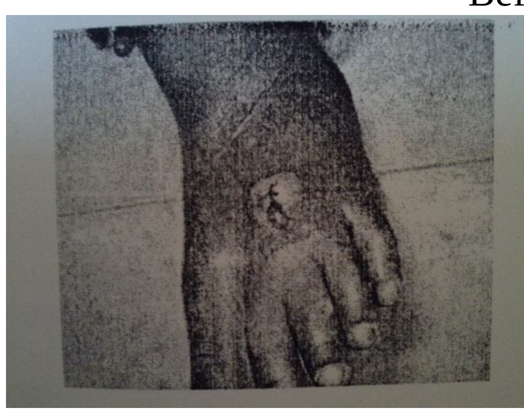
Patient age: 13

Residence: Algazera north-giad

Type of laser: low intensity laser

Number of total sessions: 10   3 sessions/week

Before first session:



After 5 session:

After 10 session:

Case3

Patient name: Mohamed negodi

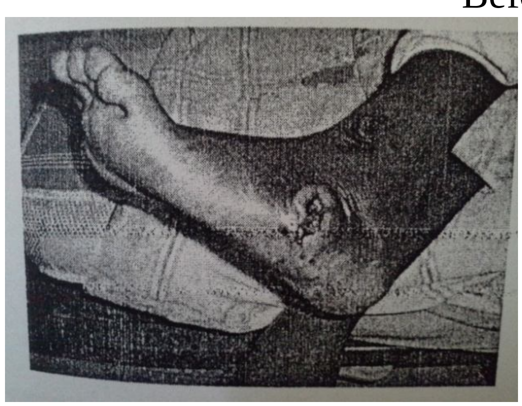
Patient age: 37

Residence: darfour

Type of laser: low intensity laser

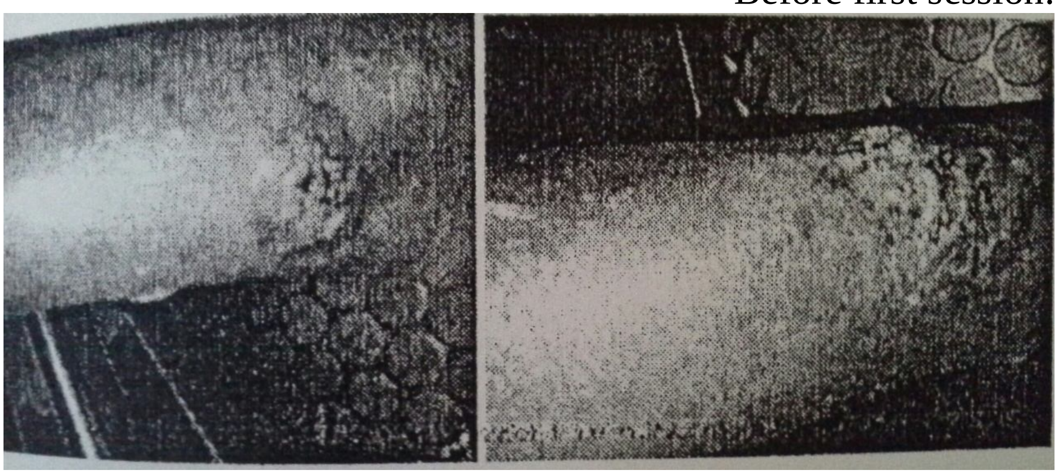
Number of total session: 5 3 sessions/week.

Before first session:

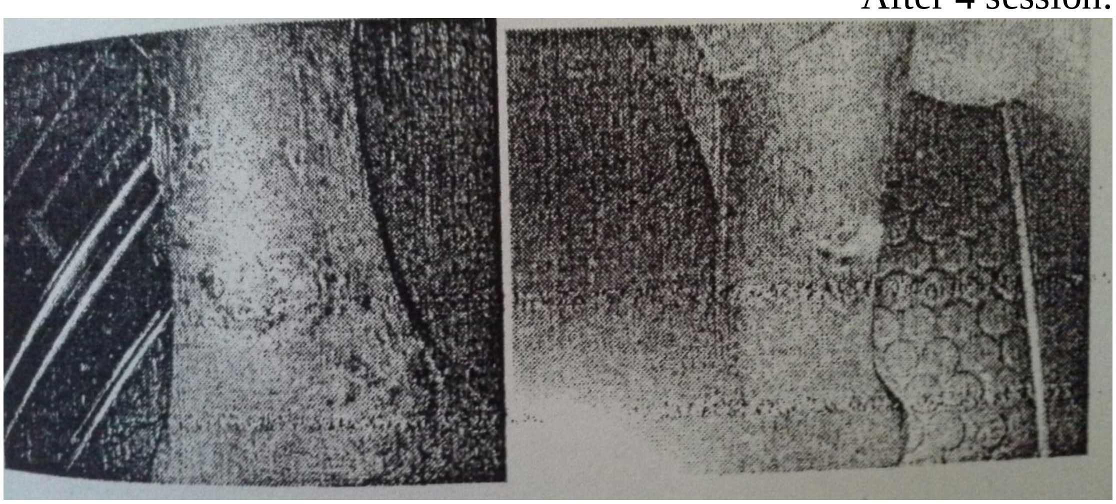


After 5 sessions:

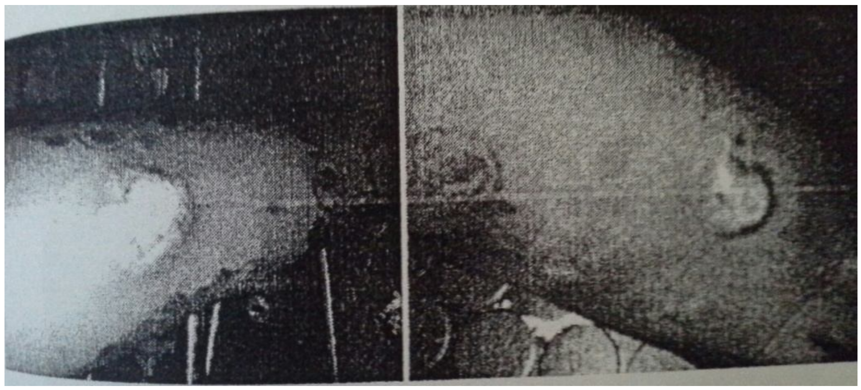
Case4
Patient name: Ibrahim iesaa
Patient age: 17
Residence: ombda
Type of laser: low intensity laser
Number of total sessions: 4 3sessions/week
Before first session:



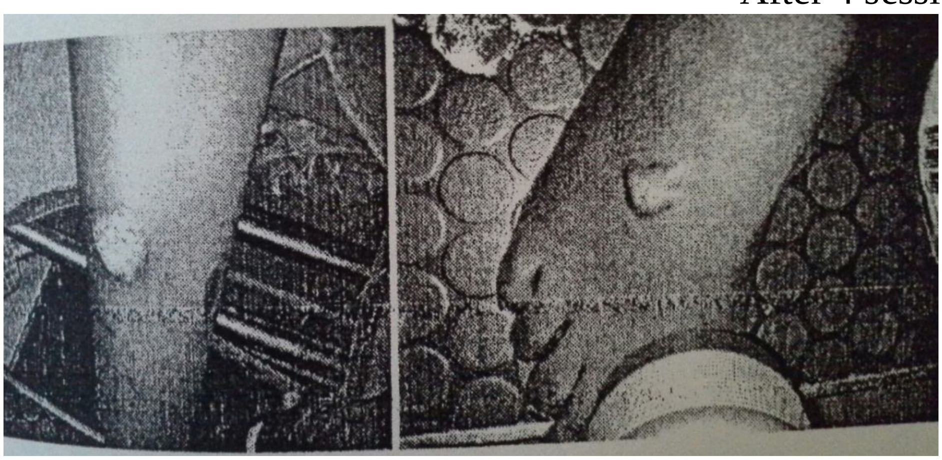
After 4 session:



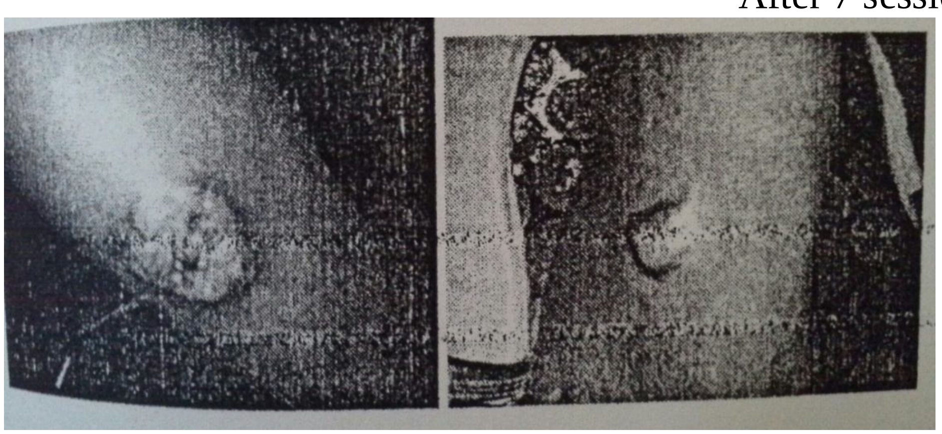
Case5
Patient name: marwa atif
Patient age: 18
Residence: ombda-14
Type of laser: low intensity laser
Number of total sessions: 7 3 sessions/week
Before first session:



After 4 session:



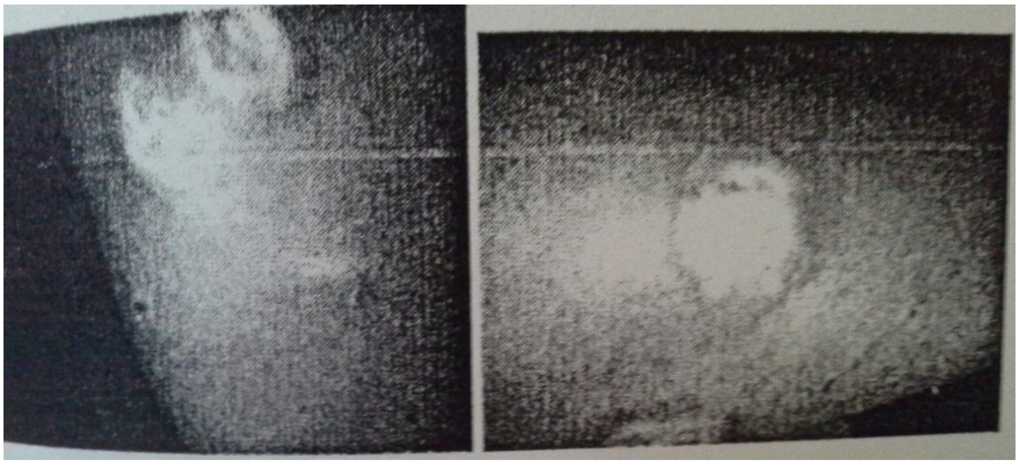
After 7 session:



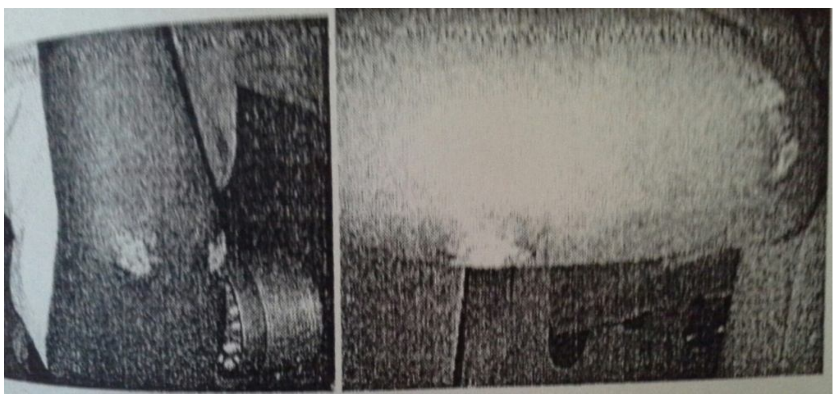
Case6

Patient name: abubakr suliman musa
Patient age: 23
Residence: al-haj yuosif
Type of laser: low intensity laser
Number of total sessions: 7   3 sessions/week

Before first session:



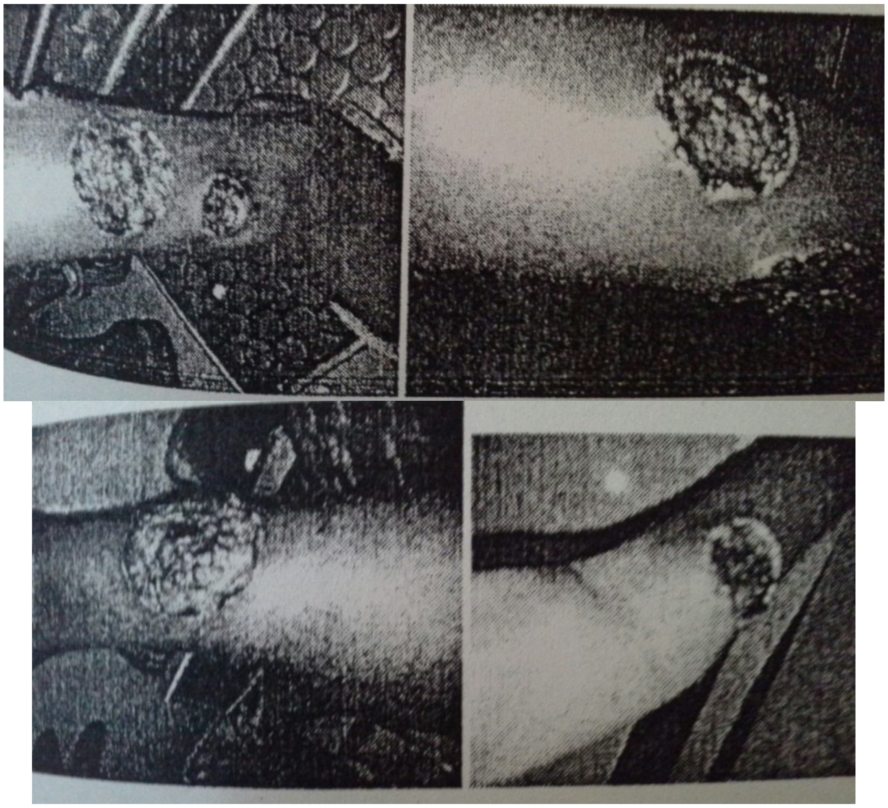
After 4 session:



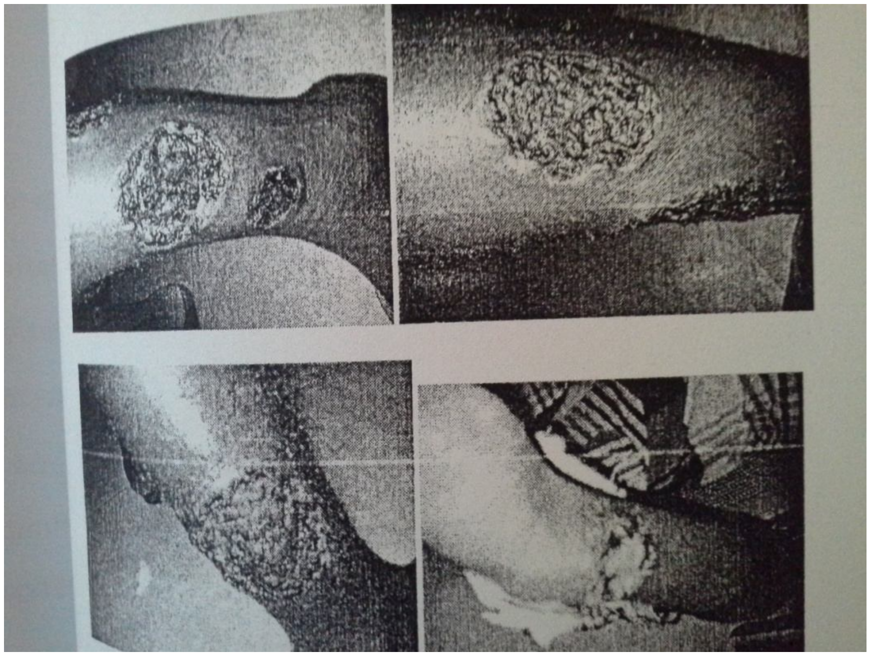
After 7 session:

Case7

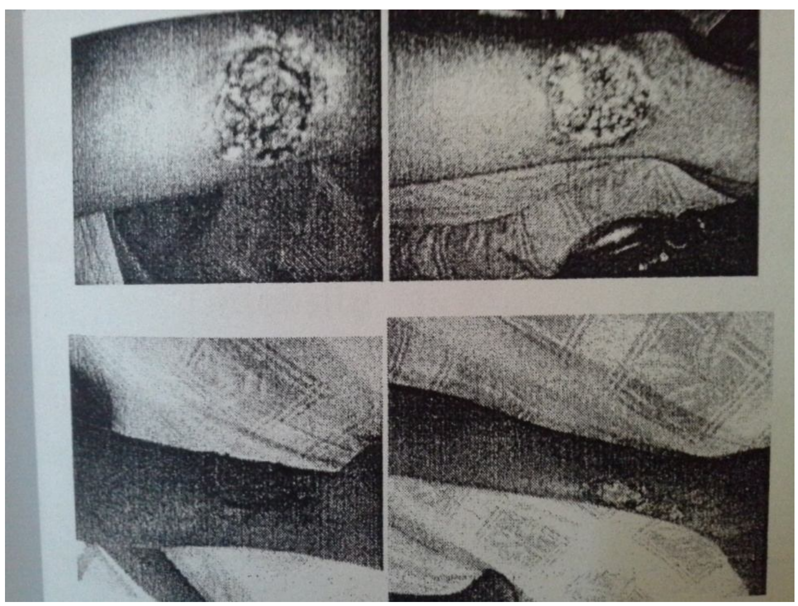
Patient name: Mohamed abdallah
Patient age: 17
Residence: kasala
Type of laser: low intensity laser
Number of total sessions: 10 3 sessions/week
Before first session:



After 4 session:



After 7 session:



(4.3) Results

Table (4.2): Results

Patient age	Residence	Type of laser	Total of sessions	Dosing
29	Abokarshola	Low intensity laser	15	2min/675nm,820nm
13	Algazera north-giad	Low intensity laser	10	2min/675nm,820nm
37	Darfour	Low intensity laser	5	2min/675nm,820nm
17	Oumbda	Low intensity laser	4	2min/675nm,820nm
18	Oumbda -14	Low intensity laser	7	2min/675nm,820nm
23	Alhag-yousf	Low intensity laser	7	2min/675nm,820nm
17	kasala	Low intensity laser	10	2min/675nm,820nm

Chapter five
Discussions

(5.1)Introduction

This chapter contains a discussion of the results obtained from the experience of omega XP to address lishmania scars, also contains recommendations and future work.

(5.2)Discussions

- **Case1**

  The case is coming after 3 months of the bite, and has 10 sessions 3 sessions per week, after the end of the hearings have been specific meeting were not cured after all hearings found that the spread of the virus had completely stopped and healing.

- **Case2**

  The case is coming at first appearance of the disease, and has 10 sessions 3 sessions per week, and after all the meeting that the spread of the virus had completely stopped and healing.

- **Case3**

  The case is coming at the first appearance of the disease, and has 5 sessions 3 sessions per week, and after all the meeting that the spread of the virus had completely stopped and healing.

- **Case4**

  The case is coming after month the onset of the disease, and has 4 sessions of 3 meetings per week, and not a full recovery because of the lack of follow-up on meetings.

- **Case5**

  The case is coming after 2 month set of 7 sessions of 3 sessions per week, and found that the disease spread with the blood in the body, and after the end of the boring was cured and stop the spread of the disease.

- **Case6**

  The case is coming after 4 month set of 7 sessions of 3 sessions per week, and the situation was impressive because the wound was open, and after the end of the meetings has been healing well.

- **Case7**

  The case is coming after 6 month set of 10 sessions of 3 sessions per week, the situation was very impressive as it bites in most parts of the body and was renewed after expiry is healing.

5.3) Conclusion

After research and study of cases infected with disease lishmania we found that the best cure for this virus is a laser Gallium Aluminum Arsenide that is generated by omega XP after succumbing to all meetings.

(5.4) Recommendation

- After examining previous cases we found that most cases do not come for treatment immediately after the onset of the disease, leading to the spread via blood and we hope that awareness of the disease so that the patient is discovered soon after it appears.

- Please provide omega XP machines in hospitals so that patients receive treatment with ease.

- Therapy by Gallium Aluminum Arsenide lasers is the best treatment for a disease that takes lishmania long period we recommend patients meeting and completed until full recovery.

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