

Review Article about the Use of Lasers in Ophthalmology

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Abstract:

It has now been more than twenty-five years since the invention of the laser using a ruby crystal as a laser medium. During that time, the laser was not limited to just being used in our daily conversation, but rather it began to develop from a scientific curiosity of limited use until it became one of the most important inventions of our time. The laser is now an important tool in various fields such as industry and medicine, and represents the basic tool in communications and holographic systems, as well as the solid basis for many scientific measurements and research programs. . In any case, everyone uses laser as a general term for different types of lasers with different characteristics. Lasers emit radiation that has special characteristics, which helps in their use in a wide range of applications other than ordinary light sources. In light of the wide applications of lasers, it is clear that non-physicist users need to acquire new information about lasers so that they can understand the specific applications that interest them, as well as realize the advantages of this knowledge, which will of course enable them to make a rational choice of lasers, auxiliary compounds, and the limitations of laser use. others that they wish to purchase. The list of users includes mechanical engineers, electronics specialists, civil engineers, communications engineers, chemists, surgical life scientists, military personnel, artists, and others. Tasks: The la Bseecrauhsaesoe nitsteprreodpemtiaens, yitacraenabseoufsleifdeabseactaouolsfeorlamsaenry rpaeyosplaere ordinary light rays. The laser is a double- edged weapon used in peace as well as in war. It is electromagnetic with a known energy and a selective ability directed to specific targets. The uses of lasers cover various aspects of life, so the laser today is one of the most important and most widely used tools of modern life. There is no doubt that the great development in laser surgery has brought about a qualitative leap in the treatment of many medical problems, such as eye surgery and the treatment of various skin disorders. Laser belts have replaced the surgical scalpel in some operations because of their high accuracy in cutting tissue and reducing postoperative bleeding.

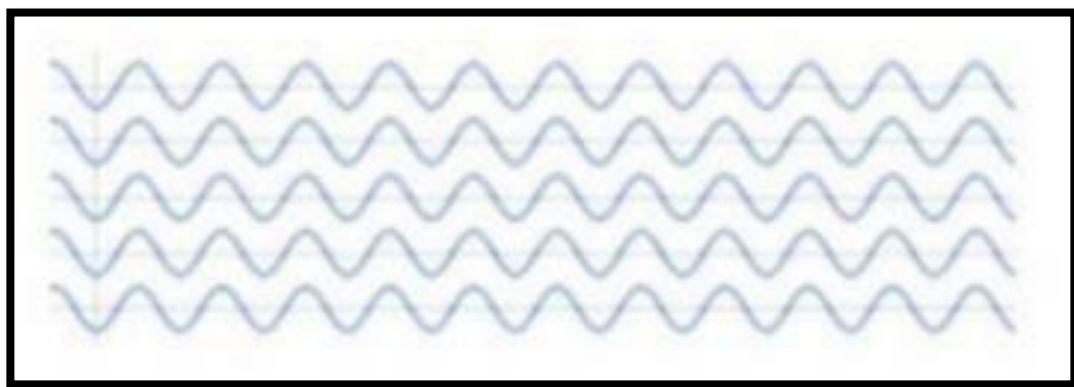
Introduction

It has now been more than twenty-five years since the invention of the laser using a ruby crystal: As a laser medium. Since that time, the laser has not only been limited to its use in our daily speech, but rather one of the most important inventions has begun to develop from a scientific curiosity of limited use until it has become in our time. Lasers are now an important tool in various fields such as industry and medicine, and represent the basic tool in communications and holographic systems, as well as the solid basis for many scientific measurements and research programs. Laser is used as a general term for different types of lasers

It has special features that help in its use with different characteristics. However, all lasers emit radiation

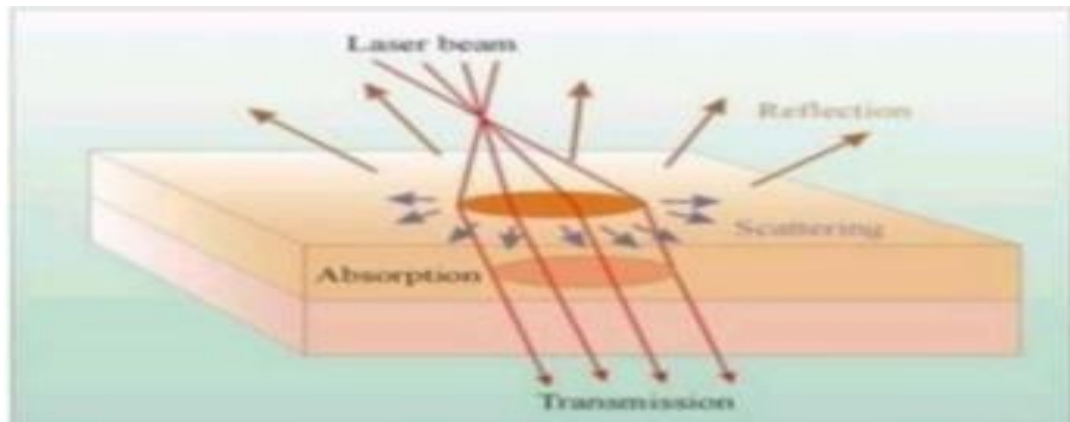
Wide range of applications beyond ordinary light sources. In light of the wide applications of lasers, it is clear that users who are not physicists need to acquire new information about lasers so that they can understand the specific applications that interest them. This knowledge will of course enable them to perform as well as understand the advantages and limitations of using lasers. Rational selection of the lasers and other ancillary compounds they wish to purchase. The list of users includes mechanical engineers, electronics specialists, civil engineers, communications engineers, chemists, life scientists, surgeons, military personnel, and artists [1]. Laser properties;

Monochromatic: (single-frequency) which means that the laser beam has only one wavelength, i.e. a single frequency. Laser light differs from other types of light in that it consists of a band of narrow optical frequencies where the laser light appears. In one color and with a high degree of purity, while other types of light consist of the colors of the visible spectrum. This property is also exploited and laser light is used in fiber optic communications systems as a carrier of directionality. It is one of the most important characteristics of the laser, as the angle of exposure of the laser beams is very small, and thus it can travel long distances without dispersing its energy or changing its direction. This property is used in many applications that depend on measuring near and long distances and identifying targets with extreme accuracy, such as systems. Space Coherency; The optical frequencies produced by laser rays are characterized by the fact that the photons of these rays are interconnected and cohesive and do not have the same structural phase and the same size of polarization. These are properties that do not exist in any other type of light. This property is used in optical interference, three-dimensional imaging, studying the composition of materials, and measuring speed and distance.



(Figure 1-1) (Waves in the same phase as in a laser)

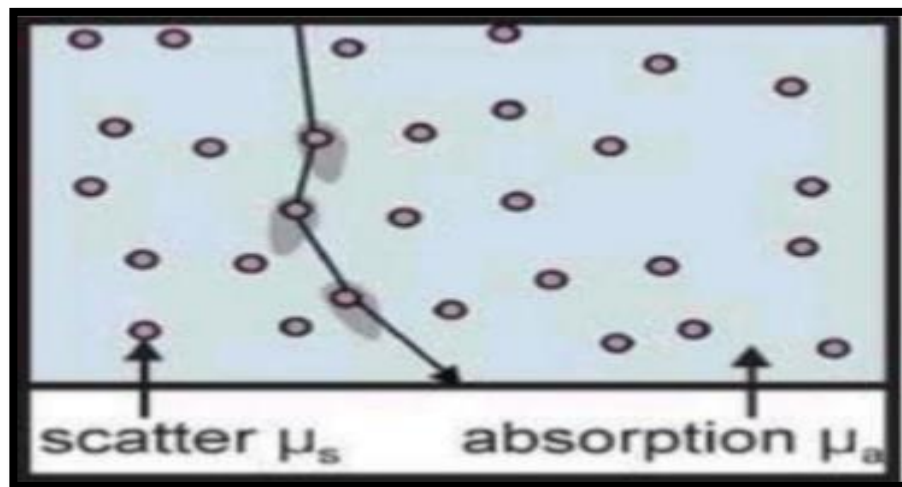
The basic processes of laser interaction with tissue. Absorption and scattering are two physical phenomena that have an important effect on the spread of light through tissues. However, scattering is vital and will be discussed in this section, although both are the most important mechanical processes. The relative degree of these processes depends on the type of tissue. For example, in the skin, these processes differ according to the condition of the skin (Figure 1-2). The basic phenomena accompanying the interaction of light with tissue [2].



(Figure 2-1) The basic phenomena accompanying the interaction of light with tissue [2]

Scattering

The transmission of radiation through complex models such as biological tissues can be controlled by light scattering interactions in the medium. Scattering is essentially a physical process that occurs within tissue and in a manner Particularly within delicate structures such as cell membranes, it occurs as a result of the interaction of radiation randomly and mediated by small atoms in the medium, and as a result, light is scattered in all directions with different refractive indices. Vital tissues scatter light strongly in the frontal direction (Figure 3-1). Between multiple scattering in tissue [3]



(Figure 3-1) between multiple scattering in tissue [3].

Penetration and Absorption of the laser Different lasers are characterized by wavelength, which is an important parameter. The density of the beam passing through the medium will decrease due to absorption, which determines the penetration distance that occurs. Bouguer was the first to establish in 1729 a relationship linking the absorption of light in a completely absorbing medium and the thickness of that medium. After that, Lambert derived the expression (1760). The athlete For the relationship known as Law 102. (Bouguer-Lambert) $dI/I = \mu_a dL \dots (1-1)$

Which describes how each successive layer (dl) of the medium absorbs the same part (I/dl) of the incident intensity (I₀) for the constant (1). (I) over the distance) L (incident intensity)

$$I = I_0 e^{-\mu x} \quad (2-1)$$

After that, Beer (in 1852) issued a law that stipulated the following: The absorption coefficient of a compound has a linear relationship with the concentration of the non-absorbing medium,

$$\mu = \epsilon c \quad (3-1)$$

Where (a) represents the specific absorption coefficient. This law was applied in the same year by Bernard, and by substituting the value of (εa) into the Bouguere- Lambert law, what is known as the Bouguere-

$$I = I_0 e^{-\epsilon c l} \quad (4-1)$$

Lambert law produces what is known as the Beer-Lambert law. This law is valid only under specific conditions. When light enters the medium, this light must completely and completely. Ideally, the medium itself is absorbent. It is single-wavelength and permeable unified; Therefore, some errors will appear when applying the law to practical spectra. [4] Reflection occurs at the boundaries between media with different optical properties, and the amount of reflected light depends on the incident light and the refractive index of each medium [5]. Some different types of lasers in medicine .arbon Dioxide Laser (2Co) It is a molecular laser that is issued according to a continuous or pulsed system. It is one of the most powerful lasers that emits an infrared field. It is the oldest laser used in the medical field, and working with it requires experience, precision, and skill. This laser was more common in the past, but its uses have decreased in the field of medicine. Teeth in recent years due to the emergence of more effective and sensitive types. The reason for its medical uses is due to the following: [6] A - The absorption of the energy of the CO₂ laser beam is good by soft tissues with a high water content. As for the tissues adjacent to the targeted tissue to be treated, their absorption of laser rays is minimal, and this feature is considered one of the important advantages of the laser. 2CO is important in oral and facial soft tissue surgery (quick and deep cutting of tissue and bone with minimal blood bleeding). B - A CO₂ laser beam enables the doctor to reach the most difficult areas in the mouth and pharynx. T - The 2CO laser beam is emitted continuously or in a pulsed manner as required by the work approach. For my surgeon, D - The use of the 2CO laser in the field of orthopedic surgery, including jaw bone surgery. Microscopic examinations and study of radiographs of bones treated with a 2CO laser beam showed that bone restoration. In the incision area, bone repair was either equal to or faster than in similar bone incisions healed in bone with conventional surgical instruments. It should be noted that the carbon dioxide laser and the neodymium-back laser are also useful in treating the following diseases: A - Gingivitis, nerve inflammation and engorgement, periodontal infections, osteomalacia. B - cysts. T - Removal of salivary stones in the salivary glands. D - Surgery before prosthesis (denture). C - Soft tissue tumors. H - In reconstructive surgery. C- Dental implants and periodontal surgeries [6]. Excimer laser It means dimer-excited complex, which is a new class of pulsed molecular lasers that emit in the field of ultraviolet radiation and are commonly used in eye surgery. In the typical case, the excimer laser combines an inert gas (such as argon and xenon in specific proportions) and an active gas (such as fluorine and chlorine), the most famous of which is composed of chlorxenon (xe - Cl). It has the property of photoresection, not burning[7]. YAG-Nd laser: It is the most common type of solid-state laser, and the active medium simply consists of glass, which acts as a host medium for the active laser ions, Nd tri-ionization ions (called Nd laser: glass ** Also, a potassium aluminum garnet crystal (12AlO₃Y) may work), which It is called abbreviated as “Nyak” as a host medium for nydium ions (3Nd*). The resulting laser is called a nedmium laser: “Nyak” **” The nydium ions present in the crystalline environment give multiple laser transitions, but the most intense occurs at the transition, which has a wavelength equal to 1,064 micrometers between the two energy levels. 2/111 - 32F. This transition is prohibited according to the selection rules for

the electric dipole, so the average lifetime of the upper level of transmission (laser) is relatively long ($T = 0.23$ milliseconds). As for the upper level of pumping, it is represented by the ground level 12 with two spectral bands around the length. The wavelengths are 0.73 and 0.8 micrometers. The many levels used for pumping and using a light source with a wide spectral range increase the efficiency of the pumping. The upper levels of pumping are emptied quickly and with non-radiative transitions to the upper level of laser transmission (32F), and the lower level For laser transmission (level 2/111) it also empties quickly and with non-radiative transitions also to the ground level Ne-He helium laser: Of the gas lasers, the active medium of this laser consists of a mixture of neon gas and helium gas in proportions. The Under low pressure, the pumping process is carried out by: And mixture is placed in the closed tube, a high potential difference estimated at several thousand volts is applied, and a small current (several milliamperes) is applied between the cathode and the anode to cause the electrical discharge process. The process takes place by colliding with the helium atoms⁴, resulting from the passage of current through an electrical discharge, where they are excited to the energy level, and because the higher energy levels of helium are adjacent (close to) the upper levels of neon, so $n = n$. Energy can be transferred from helium atoms to neon atoms as a result of colliding with them to move them from the ground level, thus achieving the inverse distribution for the neon atoms $n = 3$ to the higher level 2 for the neon atom so that the atom moves to the $n = 3$ level. Then the stimulated emission occurs at the nanometer level. 336 Emits a red laser beam with wavelength $n =$ The atoms may fall to $n = 1$, and the atoms fall quickly and automatically to the ground level by colliding with the walls of the tube. The efficiency of this laser is considered very low and does not exceed the maximum power that can be obtained from this type of laser (50 milliwatts). Its uses are very many, especially in paving And operations in aircraft and ship construction, laying oil pipelines, and building roads and bridges. All this is due to its visible wavelength, its small diffraction, and its high conformation. [7,8] .Ruby laser: The ruby laser (or ruby laser) is a type of solid-state laser that uses a crystal of artificial ruby (produced according to the Verneuil process) as the effective medium for the laser. This form was one of the first forms of obtaining a laser, through the efforts of the scientist Theodor Harold Maiman n .0691 year HRL Laboratories Theodore Harold Maiman's laboratories The ruby laser emits pulses that are visible in the visible field at a wavelength of 3.694 nanometers. It has a red color, and the duration of a single pulse is on the order of milliseconds[9]. Presenter. the human eye is considered one of the most important senses, as it takes a large part of a person's vital energy. Therefore, this chapter is concerned with the properties of the human eye, its diseases, and its treatment. The human eye and its properties: The human eye is like a camera, and it never stops capturing as long as it is open. At its front there is a slight bulge, and its width in a newborn child is about three-quarters of an inch, increasing to an inch. The outer covering of the eyeball is white except at the front bulge, where it is transparent in an adult and thus allows light to enter the eye. This transparent bulge is called the cornea and its function. Basic protection of the eye. Its color ranges from blue to gray to hazel, and the color of the back side of the iris is always chrysanthemum. In the middle of the iris is a round hole called the "oculum." Its width is controlled by two groups of muscles. In strong light, the diameter of the hole expands, while in strong light it narrows. The lens is located behind the human eye. Directly to the eye, it is a fine disc with a diameter of a third of an inch. It is thin at the edges and thick in the middle. There is a circular muscle around the lens that, by . contracting it, can make the lens smaller in diameter and larger in thickness. In this way, the eye can see strange objects with complete clarity. When the muscle relaxes, the eye can see distant objects clearly. The space between the cornea and the lens is filled with a liquid, most of which is water, called (aqueous fluid). These things appear at the back of the eye, covered by a thin membrane called (aqueous fluid). The retina (contains light-sensitive nerve endings. Two types of light-sensitive cells enter the retina. About six million cone cells and silver-shaped cells, numbering approximately one hundred and twenty million. The function of cone and satellite cells in... Receiving light pulses, converting them into electrical currents, and sending them to the brain via optical fibers to translate them into what you call vision. Cone cells are responsible for the process of vision in daylight. Color vision is

the retina's ability to distinguish between different colors

Eye diseases: Eye diseases are considered among the most dangerous diseases that affect the human eye, and they are many, but some of them are studied, such as cataracts, glaucoma, retinal detachment, and visual defects. Vision defects, such as long and short vision, are not diseases, but defects in vision. They do not occur Caused by microorganisms, but it often occurs as a result of a deformity in the shape of the eye. Myopia occurs in front of the retina, so clear vision occurs only when the visible object is close to the eye. Myopia occurs as a result of the elongation of the eye or the extreme curvature of the cornea. The light is focused at a point that when the light reaches . it, it does not become focused in front of the retina. However, in the case of farsightedness, the image is formed behind the retina, and then the object cannot be seen clearly unless it is moved away from the eye by a sufficient distance, and this occurs. Long-sightedness due to short-sightedness or flattening of the cornea. Light is concentrated at a point located behind the rim of the retina. Therefore, the light effectively reaching the retina is not concentrated as in the case of astigmatism (astigmatism is the strength of the cornea of the eye). It is not equal in all axes, because the cornea takes a non-spherical shape, meaning it is completely round The light is refracted in one direction by a different amount than in another direction, and therefore the light is not focused accurately at one point on the retina, and this leads to blurred vision. Also in the case of weakness of the focusing muscles (presbyopia) the concentration of light due to aging. This progression is due to the eye lenses losing their elasticity that they had in early life and assuming that there are no eye health problems such as the formation of cataracts, glaucoma, or retinal detachment... Etc., the main reason for blurred vision is due to a defect in the process of refraction of light as it passes through the eye, and that is, the light reflected from visible objects is not focused on a specific point on the retina. Scientists have been able to use the argon laser in treating age-related blindness, which means... And recently: The part gradually atrophies with age, and doctors advise everyone to do early detection and take into account early warning signs, the most important of which is seeing straight lines bent or distorted. The role of the laser becomes effective, so the more it is done! By detecting the disease early, Then it is possible to successfully treat it within two weeks of the onset of symptoms. Even in this case, the success rate is 85% of cases, and this percentage drops to 10% if symptoms have passed. Cataracts: The lens of the eye focuses light on the retina just as the lens of a camera focuses light reflected from the body onto sensitive film. If the lens of the camera is not clean or clear, the image captured by this machine will be unclear and blurry. This is very similar to what happens when cataracts form in the eye. Since cataracts mean the formation of clouds on the lens of the eye, which is clear in its natural state, this leads to blurring of the light images formed on the retina, and the retina converts the light images into electrical signals that are transmitted. To the brain through the optic nerve, and again, if these optical images are blurry, it causes the formation of cataracts, and the vision that is clear is usually due to the process of natural aging, which affects the eye. Cataract eye disease is still the primary cause of vision loss, but with practical (scientific) and medical progress, it has been possible to successfully restore sight to those who lost it for this reason. In recent years, a method of breaking up this water with light waves has emerged through a small surgical hole. This method results in... It does not fit all eyes and its twilight and implanting a soft, flexible lens in its place, but To dissolve cataracts with laser, which is a method that hasit eismaerngeedw, more advanced method. Finally, it is safe and can be intervened in all cases. It is done through a smaller opening than in the case of ultrasound. It takes less time during the procedure and is even easier to practice than ultrasound. Cataracts affect the transparent lens of the eye, which is responsible for focusing the image on a surface. Therefore, the patient complains of blurred vision, and the condition gradually worsens with the retina over time. This disease can affect the eye at any time of life. It can appear after birth in the eye or in one eye, and is caused by a deficiency of (vitamin S) during pregnancy or the mother's infection with some viral diseases. Cataracts also occur as a result of complications of diabetes, especially if it is not controlled for several years. Cataracts often spread more among children. The elderly, and science . has not been able to prove the reason for the spread of this eye disease throughout the world. However, there is evidence of a deficiency in some

enzymes necessary for the metabolism of food in the lens of the eye, but this is not conclusive evidence. Glaucoma: Glaucoma is a disease that affects the human eye and can rob it of vision within an adult without realizing the depth of the problem. It often reaches a certain point after which it is difficult for eyesight to return to its previous state. The problem is related to high intraocular pressure to the extent that it destroys the delicate nerve fibers in the optic nerve. The level of high intraocular pressure that causes the destruction of nerve fibers varies from one person to another, and the amount of damage that occurs does not depend only on the level of high intraocular pressure, but on the sensitivity of the optic nerve to the process of destruction. A moderate increase in the internal pressure of one person's eyes may not cause destruction of nerve fibers, while this same increase in another person's eye pressure makes his optic nerve more sensitive. Vision loss can also be caused by the formation of glaucoma due to taking certain drugs or infections, such as cortisone, and specific causes of blood pooling in the blood vessels of the eye and narrowing of the eye. Gradual in the fluid drainage channels of the eye for no known reason, and this is more likely inside any eye where there is a watery fluid with a normal pressure. The most common causes of glaucoma. To maintain the eye in a healthy condition. Scientific research indicates that the dominant factor causing increased pressure inside the eye is the gradual obstruction of the drainage channels of the eye, known as the (septal network), if the pressure remains high enough and for a relatively long period, the delicate nerve fibers in the optic nerve will be destroyed. If they are destroyed, the optic fibers will not be generated. Again, for this reason, the key to treating glaucoma can be in early diagnosis, so that measures are taken to reduce intraocular pressure before destruction occurs : Retinal detach; The retina plays an important role in the vision process as it is responsible for receiving light falling on it, so it helps early detection of eye symptoms thanks to the millions of visual cells it contains. Retinal detachment that occurs unnoticed may protect against vision loss. Light reaches the eye through the pupil

Just like what happens inside photographic cameras, the visible image is reflected on the annular wall of the eye. The classic view is that the retina does not stick to the eye permanently, but rather sticks to its annular wall through the vitreous being a transparent gelatinous material similar to the Vicro adhesive, indicating It makes the retina adhere to the back wall of the eye, which helps supply it with important nutrients through the layers of skin underneath. But when retinal detachment occurs, this supply does not reach the visual cells in the retina, leading to congenital eye their death in the worst cases. Retinal detachment is also due to many causes, including a simple weakness. People with nearsightedness are more susceptible to retinal detachment. Symptoms of retinal detachment include seeing flashes of light and moving black spots in one eye. may be Treatment of eye diseases with laser: Lasers are used to treat many diseases, perhaps the most important of which are retinal vein blockages, treatment of high intraocular pressure (glaucoma), treatment of long and short sightedness, astigmatism, treatment of blockages in blood channels, treatment of some diseases inside the eye, and water therapy is also used. Cataracts, glaucoma, and other diseases. Below we review some of them in detail Treatment of eyes and eyesight: Vision defects are treated using a concave lens in the case of nearsightedness, but in the case of farsightedness (farsightedness) using a convex lens, and in the case of astigmatism (astigmatism), a laser is used in operations to tear up liquid opacity, and medical glasses with cylindrical lenses. Vitreous or cutting threads of vitreous fluid, and performing operations such as peripheral corneal incision, cutting adhesions, and lifting some implanted materials, as well as cutting the nooses and cannulas from the eye in case of weak focusing muscles (presbyopia).Cataract treatment: 31 A more advanced method has emerged for treating cataracts, using an erbium YAG laser beam, which works to dissolve cataracts through a very small opening that does not exceed 2 mm, compared to an opening of up to 4 mm in the case of The use of ultrasound waves, which takes time to dissolve and suction out the water. Laser rays are characterized by the absence of high-frequency oscillations and affect only the white matter of about a quarter of the eye. Using a laser is much easier than ultrasound in training and learning

because it is safer, and therefore it can be intervened in all cases. It is used Lasers body. They are the same soft lenses that have become more advanced and have less interactions with the are more efficient, and the laser beam dissolves at a depth of less than one millimeter, where the cataracts are dissolved and suctioned out layer by layer. (3-4-3) Treatment of glaucoma: The use of an argon laser (green light) for many years in the treatment of chronic open-angle glaucoma. In this process, a closed-mounted lens is used, placed in front of the eye, and through it, the laser beam is focused in the area of the barrier mesh (drainage canal). The laser beam is directed several times around the area of the septal mesh with the aim of widening its openings, clearing the drainage channels and thus reducing the pressure inside the eye. This operation is not accompanied by any feeling or feeling that there is no surgery, and he completed. The lasbeer gisinaslsto ucaserrdy.out his usual activity immediately after the operation is The patient is able to have an iridotomy in the case of narrow-angle cataracts, and because there is a defect in the structure of the eye, the passage leading to the septal mesh is very narrow and may be closed. The laser is used efficiently and painlessly to make an opening in the pupil to open the passage leading to the septal mesh. (4-4-3) Treatment of retinal detachment with laser: In cases of retinal detachment in the human eye, i.e. tearing, which may cause loss of vision, precise laser beams can be used. After greatly reducing its capacity, the retina was welded in small points at the back of the eye, and then it was possible to restore sight to people who were suffering from retinal detachment or from diabetic retinal detachment, which may result in chronic diabetes. The laser beams are directed into the patient's eye through the lens of the eye, without causing any damage, as it is transparent. The heat of the laser helps in welding the retina back to its original position. Refractive surgery: Refractive surgery is a practical term used to describe a group of different surgical operations that change the relationships between the light-concentrating components of the eye. This is in an attempt to collect light in a specific focus on the retina without being exposed to the difficulties that may result from wearing prescription glasses or eyeglasses. In the following paragraphs, we review some refractive surgeries. Contact lenses, radial corneal incision: This process involves using a diamond blade to make radial incisions in the peripheral and central part of the cornea to a depth of about 90%. This causes flattening of the central part of the cornea by weakening the surrounding parts that support the corneal structure and thus reduces or eliminates myopia. Astigmatic keratotomy: In this case, incisions are made in the peripheral tangential part of the cornea or partial incisions are made. One of the advantages of incision surgery that can remove the circumferential convex part of the cornea and make it spherical in shape is that it is relatively low-cost and produces good results for people who suffer from short-sightedness. It has many disadvantages, including that the incisions may be larger than what is required, leading to farsightedness that exceeds three amputees. There is a possibility of scarring resulting from wounds, and this procedure may also lead to a general . weakness in the structure of the cornea and blurred vision at high altitudes.

Automated lamellar keratomileusis: However, significant progress has only occurred in recent years. This operation has been performed since 1949 AD. The equipment used is used in this operation. A complex performance is used as a result of the tremendous progress in devices and installation called (automated microkeratome). The superficial part of the cornea is opened and is called (the corneal cap). (Then a certain portion of the tissue is removed from the center of the cornea. Then the corneal cap is put back in place without the need for surgical suturing. Removing this central tissue from the cornea allows it to flatten and reduce its convexity, and thus to reduce and remove short-sightedness. One of the advantages of this operation is that it allows for the correction of severe short-sightedness. (up to 18 diopters) and also allows for rapid recovery and the patient's return to his usual activity in a short time. Its disadvantages may result in technical problems as a result of the mechanical removal of corneal tissue, which may cause scarring or unexpected results. This is why the excimer laser has replaced this technology. A laser device is used. Excimer lasers produce high-energy pulses of ultraviolet rays that cut the partial bonds between corneal cells with high precision. The excimer laser differs from other types in that it emits

(cold) or non-thermal light rays. Therefore, this technique is ideal for reshaping the cornea, as it does not cause any damage to the cells. Surrounding the operation area. 34 A complex computer is used to accurately control and direct the laser beam. In the process, the laser beam destroys a small (microscopic) amount of corneal tissue located on the front surface of the central part of the cornea, which makes this central area flatter and thus allows the light to be focused precisely on the retina. Among the advantages of the operation is that it achieves good results for mild myopia (up to three diopters), and that it is more accurate after the operation is than the operation and the patient can resume his normal life within two or three days performed. As for its disadvantages, the recovery period is relatively long for cases of myopia that exceed four. Diopter and the eye may water for three days until the wounds

Conclusion

This research aims to study lasers in terms of the principles of lasers, their foundations, stages of development, and the most important applications, and the major role that lasers have come to represent and the uses of lasers in the medical field and in the eye in particular recently, as it has greatly reduced the risks and costs of surgical operations. And periods of recovery that the patient needed after undergoing this type of surgical operation. Our research, Nephi, devoted a large amount of space to studying the eye and the diseases that afflict it due to the importance of the sense of sight, which is considered the most important of the senses for man. God Almighty said: (And He brought you out of your mothers' wombs knowing nothing, and made for you Hearing, sight, and hearts, so that you may be grateful.) The problem of the research: The problem of this research is that can lasers be used in surgery and ophthalmology? We will discuss in particular eye injuries such as cataracts, glaucoma, and the retina, and how to treat them using lasers. Research Content In this research, we will discuss the introduction in the first chapter, the basics of lasers, safety factors, and the harms of medical lasers in the second chapter, and the human eye and how it works in the third chapter.

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