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Laser – A Review

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ABSTRACT:

In fifty years, laser technology has made great progress, and its many applications make it essential ineveryday life. Across multiple applications, there is particular focus in the field of medicine, for diagnosis fortailored therapies, and as a research tool in biology. the term “laser” was joined with “surgery”, “ablation”, “lithotripsy”, “cancer treatment”, “tumor ablation”, “dermatology”, “skin rejuvenation”, “lipolysis”, “cardiology”, “atrial fibrillation (AF)”, and “epilepsy” during separate searches in the PuBmeD database. Most of these approaches, butal though not exhaustively, will be presented here.

KEYWORDS: Laser, Biology, Laser lithotripsy, Laser treatment

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INTRODUCTION:

The first theoretical foundation of LASER was given by Einstein in 1917 using plank's law of radiation that was based on probability coefficients (Einstein coefficients) for absorption and spontaneous and stimulated emission of electromagnetic radiation. LASER (light amplification by stimulated emission of radiation). Laser are installed wide spread in everyday life across multiple numerous applications. CD and DVD. Bar code scanners, entertainment, welding or cutting in industry aid to fire control or alignment of road sand tunnels. In the medical field laser are diagnostic and therapeutic instruments that offer a whole range of solutions. The laser which enables for greater surgical precision is less invasive and promotes healing time or cure at an appropriate wave length exposure of a nano particle to a laser can trigger a photo thermal effect in the particles where by electronic oscillations at the particle surface are converted to heat.[1, 2]

Lasers in medicines

1. *Laser in ophthalmology*

Its advantages have been demonstrated in the treatment of my opia and cataract where they enable patients with visual impairment to regain a clear vision and forget the stress of wearing glasses or contact lenses.[3]

2. *Laser in dermatology*

Treatment of vascular lesions such as angiomas, telangiectasias, spider naevi, treatment of pigmented lesions (brown spots, naevus of Ota, freckles) and tattoo or hair removal targeting the melanin stored in the hair follicles in order to destroy the hair matrix to enable permanent hair removal.

3. *Laser in surgery*

Laser surgery has the advantage of reducing the risk of infection and it promotes healing. It is used in cosmetic surgery to erase cellulite and superficial wrinkles. Often less invasive than conventional surgery, laser surgery is however not without risks.

4. *Laser in other applications*

Laser can also be used dentistry (gum care and treatment of tooth decay) and phlebology (treatment of varicose veins).[4]

1. Types of lasers:

a. Gas laser (Argon, Kryptonetc….)

- ✓ Use of lasers in the treatment of various types of glaucoma is an important tool in ophthalmic practice. Both Argon and YAG lasers are now commonly used in the treatment of angle-closure and open-angleglaucoma.[5,6]
- ✓ The Laser Krypton has applications close to those of argon and is useful to restrict bleeding.
- ✓ The Co_2 laser belongs to the gas lasers. It is the excitement of the gas that produces a laser beam.

b. Liquid dye lasers

- ✓ Dye lasers produce their light radiation by stimulating a liquid dye. They are mostly "tunable" between 550 and 590nm. Their light is visible. Less frequently, this type of laser is used in other diseases such as psoriasis where it is effective against new lesions.[7,8]

c. Solid-state lasers

- ✓ The medium is a crystal (ruby, sapphire titanium…), glass (neodymium glass…) or ceramic. In a non-exhaustive list, the reareal so laser diodes, such as those found in the CD.[9]

2. APPLICATION OF BIOLOGICAL TISSUES:

The lasers used in biology have a wavelength located either in the infrared range or in the ultra-violet rangethey operate in continuous or pulse mode. The high-power density and the precise location of the laser beamsuits its application to the cutting of biological tissue. The high concentration of photon will destroy existing chemical bridges in the tissues.[10]

3. CONCLUTION:

In medicine, the energy delivered by the laser, whose intensity can be modulated, can cut destroy or alter the cellular or extracellular structure of biological tissue. In addition, laser applications have the advantage of reducing the risk of infection and promoting healing. Now integrated in surgical procedures, for a better focusand precise cutting, laser surgery is not however without risks for pregnancy or contra-indications for the use of photo sensitizing drug.

In biology, the complexity of tissue makes the results of "classic" biological analyses often difficult to interpret. The laser is an effective tool for destroying cancer cells. However high-power lasers act in discriminately and thus destroy cancer cells but also surrounding tissue. This property is a crucial tool in the laser micro dissection technique when you want conduct molecular analysis in a region of interest with the ability to selectively destroy contaminating cells. The use of laser in medicine and biology has demonstrated its interest through innovation advanced technologies such as laser microdissection and photoablation which at different levels of expression enable understanding of the physiological mechanisms in the evolution of a disease. The results will help establish better diagnosis and treatments tailored to each patient, as well as the development of nanotechnology in close connection with the technological advances in the field of imaging which will help not only in diagnosis but also in the possible application of minimally invasive treatment protocols.

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