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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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لم ترد بالأصل

بعض الوثائق الأصلية تالفة

ESSAY
UPDATE APPLICATIONS OF LASER IN OTORHINOLARYNGOLOGY

BY
MOHAMED SHERIEF AHMED
ABD EL MONIEM
E.N.T DEPARTMENT

TO FULFIL MASTER DEGREE E.N.T

E.N.T. DEP. FACULTY OF MEDICINE
MINIA UNIVERSITY

SUPERVISORS

PROF. DR. ABD ELREHIM AHMED
ABDEL KERIM SINGER
PROFESSOR & HEAD OF
E. N. T DEPARTMENT
E.N.T. DEP. FACULTY OF MEDICINE
MINIA UNIVERSITY

PROF. DR. AHMED MAHMOUD YOUSEF
PROFESSOR
E. N. T DEPARTMENT
E.N.T. DEP. FACULTY OF MEDICINE
MINIA UNIVERSITY

DR. RAOUF MICHEAL ESSAC
LECTURER
E. N. T DEPARTMENT
E.N.T. DEP. FACULTY OF MEDICINE
MINIA UNIVERSITY

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TO MY PARENTS

TO MY WIFE

TO MY SON (AHMED)

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INTRODUCTION

It has been said that when the time in which we live finally named, it will not be known as the atomic or space age but the laser age. At present, we are still only at the dawning of this age the first lase was not produced until 1960, but since then a large number of lasers has been developed with a vast range of scientific, industrial and military uses. With these lasers astronomers have measured the distance to the moon to an accuracy of centimeters, huge numbers of telephone calls can be transmitted by flexible glass fibers and physicists have probed plasmas hotter than the sun.

These diverse uses of the laser (light amplification by stimulated emission of radiation) are all dependent on the basic characteristics of the laser beam: an intense beam of pure, monochromatic light which does not diverge and in which all the light waves are of the same length. Travel in the same direction and are in phase, rising and falling together. The beam can be focused to a fine point to produce very high energy levels.

The concept of stimulated emission of radiation was initially proposed by Albert Einstein in 1916 (van der Waerden. 1967). Until that time, physicists believed that there could be only two interactions between matter and light, absorption and emission. An atom is normally in a low energy or ground state but may be excited by the absorption of a photon (a quantum of radiant energy) of precisely the correct frequency and energy level. Conversely, an atom in the excited state can emit a photon spontaneously and drop to its ground state.

Einstein suggested the third possibility, stimulated emission, which forms the basis of the laser. He stated that under certain circumstances a photon could stimulate an excited atom or molecule to emit another photon with the same energy travelling in exactly the same direction. This could only happen if the stimulating photon had exactly the same energy as that which would normally be emitted spontaneously. With this concept it was possible to imagine that, in a population of excited atoms a series of collisions would result in the release of an increasing number of photons – a beam of laser light. (Scott-Brown's 1997).

Schawlow and Townes (1953) are credited with the first published detailed proposal for the production of a laser which they called an optical maser. After further development, Townes. Basov and prokhorov were awarded the Nobel Prize in 1964 for the maser (microwave amplification by stimulated emission of radiation) and the publication of their work stimulated intense laser research. In 1961, the first gas and continuous wave laser, the helium neon laser, and the neodymium laser were produced

In the latter, neodymium was present in a calcium tungstate host and this device demonstrated that a solid state laser could be operated at room temperature. The neodymium YAG, carbon dioxide, diode, ion, chemical, dye and meal vapour lasers were produced shortly afterwards (Geusic, Marcos and van Vitert, 1964; Patel, 1965). More recently, the excimer laser has been developed, an example of which is the argon fluoride laser. In these lasers, the medium is composed of two atoms which are only stable in the excited state. (Scott-Brown's 1997).

At about the same time, the xenon-arc photocoagulater was introduced into ophthalmology by Meyer- Schwickerah (1956) to treat threatened retinal detachment and certain other disorders. It was rapidly apparent that there were inherent problems with this system largely due to its lack of power. Ophthalmologists rapidly evaluated the more powerful pulsed ruby laser and concluded that it was superior for retinal photocoagulation
Zweng. 1964).

In 1965, Patel produced the carbon dioxide (CO_2) laser and first experiments showed that the focused beam could be used to divide a wide range of animal tissues in a precise and bloodless manner (Yahr and Strully, 1966). Further studies failed to reveal any viable cells in the plume emitted during vaporization of tissue using the CO_2 laser (Mihashi et al., 1976). These findings have recently been challenged and it has been suggested that there may be viable, viral particles in the vapour produced by the destruction of tissue with this type of laser (Walker, Mathews and Newson. 1986).

Breidemeier (1969) developed an endoscopic coupler for the CO_2 laser which enabled the first in vivo studies to be carried out on the canine larynx. Discrete lesions of a clinically desirable size could be produced on the vocal cords, in a bloodless field, using powers of 5-30 watts, with a spot size of 2 mm and an exposure time of 0.1-0.5 s. Healing of these lesions was excellent. This laser was then coupled to a Zeiss operating microscope and used in laryngeal microsurgery for vocal cord keratosis, carcinoma in situ, vocal cord nodules, polyps and papillomas (Strong and Jako, 1972).

At the same time that the CO_2 laser was being evaluated, ophthalmologists were experimenting with the continuous wave argon laser. It was found that the blue / green light produced by this laser was readily absorbed by vascular tissue and was thought to be of considerable value for the treatment of diabetic retinopathy (Zweng. 1971).

Although the pulsed. Neodymium-glass laser was not found to have significant applications in medicine and surgery, the continuous wave neodymium YAG laser did. It could be transmitted by fibreoptics and in this form was used for the control of bleeding in the gastrointestinal tract .

Laser used in all EAR, NOSE and THROAT lesions. Our Review includes all applications of laser in Oto-Rhin-Laryngology and Spot light upon recent applications (Scott-Brown's 1979).