LASER THERAPY IN ACUTE LIGAMENTOUS INJURIES

Thesis

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By

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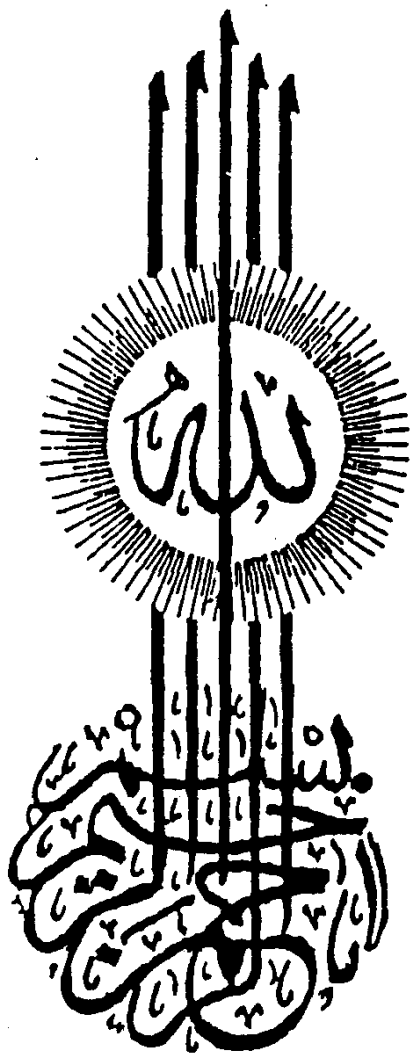

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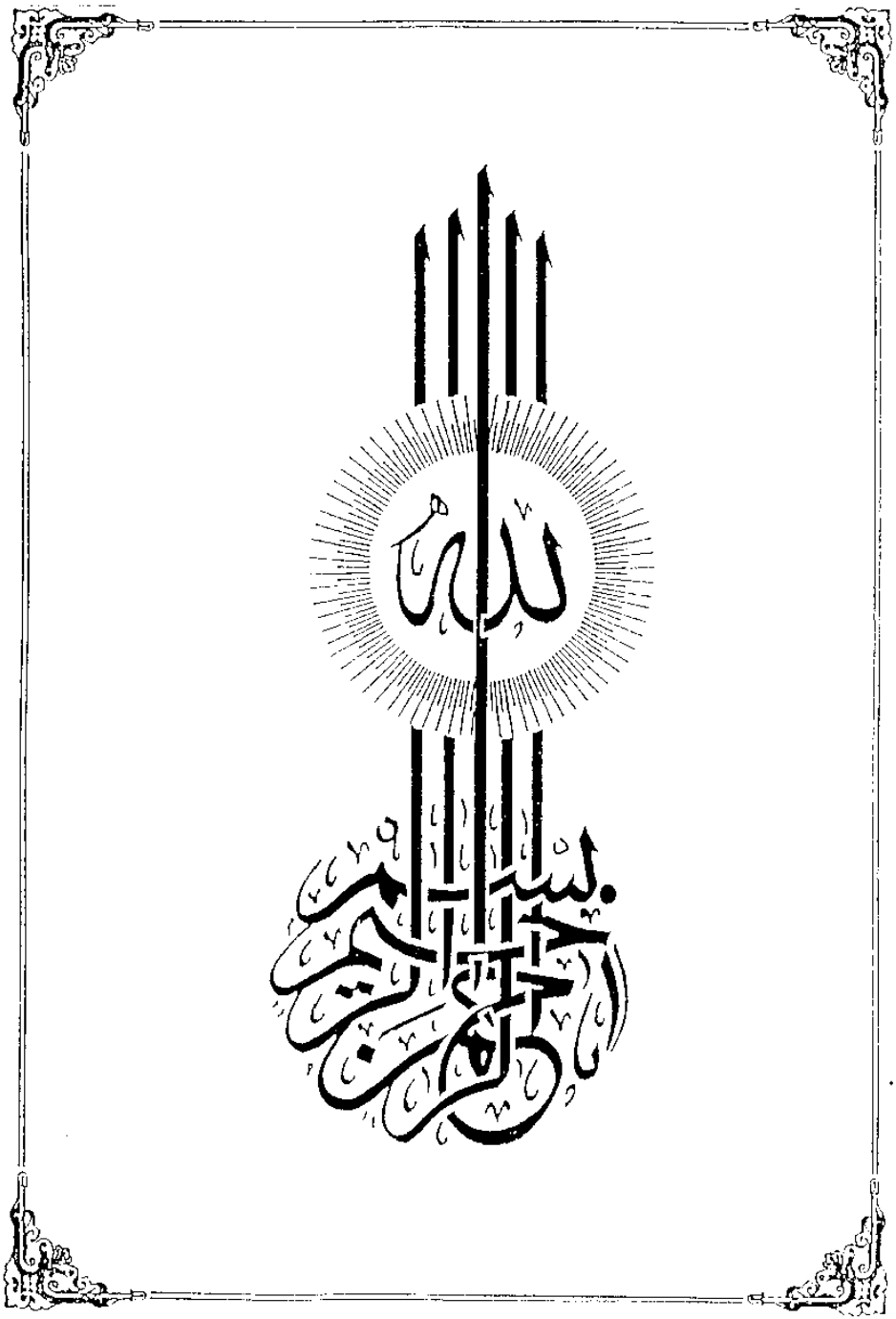

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INTRODUCTION

Introduction : -

Laser is an acronym derives from English and means light amplification by stimulation emission of radiation (Hansson , 1988) .

Laser is therefore light , or amplified luminous energy endowed with typical physical characteristics emitted by particular active elements, whose atoms, when charged by electro - magnetic radiation of a given wave length, emit luminous radiation in their turn (Maturo . 1981) .

The trials for utilization of laser in physical therapy appears promisimg. as yet, no more than hypothesis of the action mechanisn behimd the biological effect of the laser beam could be done. among the acrredited theories it seems logical to mention:-

1-The biostimulating effect depending on the stimulation of the mitochondria and the transformation of the laser energy into chemical emergy that is pronptly used in the form of ATP by the mitochondria (Mester et al, 1973; and Miro, 1979).

2- Its effects on the tissues reported in the experiments of various authours, particularly Miranda (1981) showing an increase in blood and lynph flow under laser radiation.

3- The pain killing effect that may be well linked to

interneuronal endorhin production.

There are various kinds of laser, but the most widely used in medecine are He-Ne,Co_2 and semi-conductor Ga-As laser.

- Depending on the frequency with exposure time used and way of application , a wide variety of diseases can be treated as (Forster & Polastanga , 1988).

Acute painful muscular pathology such as (contusions, sprains and haematoma); arthrosis such as cervical and lunbar; neuralgia such as trigeminal and sciatica (Jormuske et al, 1990).

Post - operative defects of wound healing (MuruLlaev, 1990) .

And painful articular pathology of the locomotor system as acute injury of the ligaments of the joints especially the knee joint which constitutes the most frequent disabling in sports.

And in turn there is an increase in the number of participants , and failure of adaptation to imposed demands, all relate to the increase in the frequency of knee injuries which continue to be a problem in most competitive sports (Zarins and Nemeth , 1985) .

So Laser therapy is recommended for use in acute ligamentous injuries of the knee joint for players in the sport field as it takes a short time and enhances patient recovery and doesn't cause any discomfort to the players.

Aim of the work

Aim of the work : -

1. The Frist is to clarify the role of laser therapy in sport injuries as a new trend in the field of physical therapy, (specialy the acute Injuries of the collateral ligaments of the knee joint) .

2. The second is to clarify the best wave - length of laser therapy (660 nm, and 904 nm) in our individual items of cases.

Review of Literatures

Historical review of laser : -

Laser is light amplification by stimulation emission of radiation , thus the term reflects the crucial role of the process of stimulation emission for quantum generator and amplification of coherent light .

According to Jayasurya (1984), the history of laser development should be traced as far back at (1917), when Albert Einstein Showed that the process of stimulation must exist .

In 1939 the Soviet physicist Fabrikant pointed out to the possibilities of exploiting stimulated emission to amplify electro-magnetic radiation travelling through a medium . More specificaly he got the idea of using micro - system with inverse population of levels .

In 1951, Fabrikant with Vudynsky and Butayava , they started to invent a mean to amplify radiation by stimulation emission .

A method to amplify electro-magnetic radiation (U.V. visible I.R) and radio frequencies is by passing it through a medium where an additional radiation or other means create excessive population over the equilibrum so that , atoms, other species in the upper energy states is corresponding to the excited state. If the transition frequency of a device operating in

accordance with the principle out-lined above, falls in the micro - wave region, this type of amplifier is called a maser amplifier, this term appeared earlier than laser as the idea was first realised in the micro-wave region ..(Jayasurya,1984).

In 1954, the molecular beam generator soon named the "maser" become a reality, It was developed independently and simultaneously by the team leaded by " Basov and Prokhovov ".

Then , the letter " m " in the term " maser " related to the micro - wave was replaced by a letter "l" corresponding to light to give birth to the term " laser " .

In 1955 " Basov & Prokhovov " substantiated optical pumping as a method of population inversion .

In 1957, "Basov" came up with the idea of using semi-conductor material for quantum oscillator and made the resonant cavity of the polished face of the semi - conductor chip

Also in 1957 ," Fabrikant & Butayava " observed the effect of optical quantum amplification in experimenting with electrical discharge through a mixture of mercury vapour and small amounts of Hydrogen and Helium .

Finally in 1960 , there appeared a substantial publication of Basov , Krohn & propov " which gave a thorough investigation to the development principles and theory of quantum oscillators and amplifications in the infra-red and visible portions of the spectrum .

In 1960, An American physicist "Mamian" reported a successful expermint on light generation with a ruby rod in the optical region .This device has a rather modest appearance as compared by today's standards

Historically , the next developement came up in 1960 when " Java and his colleagues" demonstrated laser action in a gaseous discharge of He-Ne, This was the first gas laser, the appearance of which actually had been prepared by the experimental studies of Fabrikant - Butayava " permorfed as early in 1957 .

By the start of 1961, various types of laser (solid state & gaseous) gained a strong foothold in the optical laboratories.

New active media were introduced and the laser technology was improved rapidly .

(Jayasurya , 1984)

Types of laser : -

lasers are normally classed by their active media and means employed for excitation. Solids, liquids and gases are used as active media in lasers . The heart of the laser is a certain medium, solid , liquid or gas called an active medium. This medium contains atoms, ions or molecules capable of decaying their high energy states in a radio active manner. (Tarasov L.V 1986) .

Types of Laser: according to Forster and Palastanga (1988)

1 - Solid

2 - Liquid

3 - Gaseous

4- chemical.

5- semi-conductor.

The main types of laser : -

1 - Solid state lasers : -

This type is also called doped insulator laser to avoid connotation of semi-conductor it is built around active media prepared as insulating material (dielectric crystal or glass), doped with ions of impurity in its host structure. These lasers are rugged, simple to maintain and capable of generating high peak powers as they employ optical pumping only, The ruby