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Laser therapy

The term "laser" is an acronym for Light Amplification by Stimulated Emission of Radiation. There are effectively two types of laser; thermal and non-thermal. Thermal lasers are used in surgery and by ophthalmic surgeons to treat detached retinas.

Physiotherapists use non-thermal laser treatment and there is intense interest in the clinical application of the interactions of laser light with tissue. Early research work in the 1960s and 70s indicated the potential of relatively low intensity laser irradiation applied directly to tissue to modulate certain biological processes – in particular to photobiostimulate the wound healing process.

The low intensity laser therapy (LILT) modality has found an increasing application by many health care professionals, including physiotherapists, dentists, acupuncturists, doctors and veterinary surgeons to treat a range of conditions including open wounds, soft tissue injuries, arthritic conditions and pain.

Musculo-skeletal tissues use the energy from light in a broadly similar way in which plant cells use light for photosynthesis. In tissues, absorption of radiation occurs when a photon of light interacts with an atom or molecule in which the difference in energy of the valance bands exactly equals the energy carried by the photon. This has two consequences: for a photon of a given quantal energy (and thus wavelength) only certain molecules will be capable of absorbing the light radiation; conversely, for a given molecule, only certain quantal energies (and thus wavelengths) can be absorbed (termed the absorption spectrum for the molecule) Thus absorption is said to be wavelength specific. This is an important concept in LILT applications, as the wavelength specificity of absorption effectively determines which types of tissue will preferentially absorb incident radiation and in turn the depth of penetration of a particular treatment unit.

Put very simply, laser delivers large amounts of energy to tissues. Laser is commonly used for stimulating epithelial cells to enhance wound healing (see photograph). Because the light energy is absorbed mainly in superficial tissues, it is only generally used for injuries to those superficial tissues or to pain and injury to joints.