

Journal of Dentistry Forecast

Laser Biostimulation: Healing Through Light

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Editorial

“If all the information required to control the body’s biochemical processes is in the light that the body emits, and if disturbances in that light disrupt biochemical processes and cause disease — as Popp claimed — then it must be possible to ‘examine’ the light and remove the disease. Then you return the ‘repaired’ light to the body. If it works, it will have enormous consequences for everything.”- Johan Boswinkel, circa 1982.

Lasers have been used in dentistry for a few decades now. There has been a plethora of research work done on the dental applications of lasers. They have been used as ‘hot’ lasers or ‘cold’ lasers. Unlike the ‘hard’ or ‘hot’ lasers, the ‘soft’ or ‘cold’ lasers are low power therapeutic lasers which have been used for biostimulation or photo biomodulation or low-level laser therapy (LLLT). Laser biostimulation involves exposing cells or tissue to low levels of red and near-infrared (NIR) light and is referred to as “low level” because of its use of light at energy densities that are low as compared to other forms of laser therapy that are often used for ablation, cutting, and thermally coagulating tissue. The effect of biostimulation for each treatment depends on a large number of laser parameters such as the wavelength, fluence, power density, pulse structure, and timing of the applied light. A less than optimal choice of parameters can lead to a reduction in effectiveness of the treatment or even a negative therapeutic outcome. So, doses higher or lower than this optimal value may have no therapeutic effect that means laser biostimulation is characterized by a biphasic dose response: lower doses of light are often more beneficial than high doses [1-4]. It is a magical tool which can reduce pain, improve wound healing, relieve muscle tension and regenerate nerves without the use of pharmaceuticals and the associated side effects. The basic principle of LLLT is based on the biomodulation effect [5], which consists of the fact that irradiation at a specific wavelength is able to alter cellular behavior [6,7]. This effect is achieved by acting on the cellular mitochondrial respiratory chain [8] or on membrane calcium channels [9]. This action subsequently promotes an increase in cell metabolism and proliferation [10]. Laser biostimulation has a wide range of applications in the oral hard and soft tissues and covers a number of key dental specialties including endodontics, periodontics, orthodontics and maxillofacial surgery. These include healing of aphthous ulcers, mucositis, herpes labialis lesions and bisphosphonate-related osteonecrosis of the jaw. It has also been used for acceleration of healing post surgery after depigmentation or gingivectomy procedures. It accelerates bone healing in extraction sites, bone fracture defects, and distraction osteogenesis.

Laser biostimulation is an evolving and advancing technology. With the advent of technology, more is being discovered about the mechanisms of laser therapy, doses, treatment locations, and diseases in which a laser will have an effect. At our hands, it is a tool that can reduce pain, accelerate wound healing, and modulate the inflammatory response. Further research is required to explore the complete potential of lasers for its biostimulating properties.

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Received Date: 08 Feb 2018

Accepted Date: 23 Feb 2018

Published Date: 27 Feb 2018

Citation: Chawla K. Laser

Biostimulation: Healing Through Light. J Dent Forecast. 2018; 1(1): 1007.

ISSN 2643-7104

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