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Commentary

# Laser Treatment and its Effect on the Human Skin

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## DESCRIPTION

Laser treatment is a non-invasive use of laser energy to trigger a photochemical reaction in damaged or dysfunctional tissue. Laser treatment can relieve pain, reduce inflammation, and speed recovery from a variety of acute and chronic conditions. Laser treatment is a drug-free surgical procedure. Laser treatment is a treatment that uses a powerful light beam to cut, burn, or destroy tissue. The term LASER is an abbreviation for "light Amplification by Stimulated Emission Radiation". Laser is more accurate than traditional surgical instruments. The cut can be short and shallow. This will reduce the damage to the tissue.

Laser treatment is a treatment that uses focused light. Unlike most light sources, it is tuned to a very specific wavelength. This allows you to focus on a powerful beam. Despite advances in laser treatment technology in dermatology, medical accidents are on the rise scientists are using standardized questionnaires to investigate the reasons for medical accidents caused by the use of lasers. They reported that the main causes of such accidents were: 62.8% over-energy, 39.5% adaptive device error, 20.9% dark skin or severe sunburn. Treatment 7% without cooling, 4.6% false information [1]. Based on these findings, researchers concluded that inadequate training and inadequate skills/skills were the cause of the accident. A deeper understanding of the principles of laser treatment, such as how laser equipment parameters and how the subject's skin condition affected treatment can help improve physician training and reduce medical accidents.

In laser treatment, different levels of skin pigmentation in patients are an important factor that can lead to medical accidents. However, traditional heat transfer models cannot be used to analyze the effect of pigmentation levels on laser treatment. Therefore, a new microscopic radiant heat transfer model that takes into account the point heat source of laser treatment. In this model, the skin is considered as a bulk medium consisting of two layers, a normal layer and a pigmented layer, the latter containing a large number of melanosomes with a specific volume fraction as the degree of pigmentation [2]. Using the proposed model, it was found that the distribution of absorbed laser energy and the temperature rise of the skin tissue were affected by the degree of pigmentation. At which has a high volume fraction, the absorbed energy per individual melanosomes, and therefore the temperature rise of the pigment layer, is lower than that of deeper skin tissue. It has also been shown that the distance between melanosomes decreases with volume fraction.

A high volume fraction increases the temperature of the skin tissue between the melanosomes. Spots and freckles on human skin are caused by an abnormal increase in pigments called melanosomes. The detailed mechanism of pigmentation is still under investigation. Melanosomes are scattered on the skin and have an oval shape of about 500 nm. When irradiated with laser light, melanosomes absorb the light and convert it into heat energy, raising the temperature of the skin tissue. During such treatment, the skin tissue will be destroyed along with the melanosomes. Second, excessive destruction of skin tissue can lead to poor skin regeneration, leading to medical accidents such as scarring and changes in skin texture. Many successful laser treatments for a variety of illnesses have been reported in the medical field [3].

The reports describe successful lasing wavelength, pulse width, and incident energy conditions. However, despite many success stories, medical accidents are common. This is because it is difficult to determine appropriate treatment conditions for each patient. In fact, the laser condition needs to be adapted to the patient's pigmentation level and natural skin color. For example, depending on the level of pigmentation, it is difficult to predict how laser wavelength, pulse width, and incident energy conditions will affect skin temperature rise. In order to elucidate the mechanism of laser treatment in more detail, it is important to consider not only clinical research but also numerical analysis using a realistic model of heat conduction in the skin. It is important to investigate the reasons for excessive exposure to laser light, especially in treatments that are considered to be the leading cause of many medical accidents.

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