Achilles Tendon Traumatism

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Low-level laser therapy (LLLT) prevents oxidative stress and reduces fibrosis in rat traumatized Achilles tendon.

Fillipin LI, Mauriz JL, Vedovelli K, Moreira AJ, Zettler CG, Lech O, Marroni NP, Gonzalez-Gallego J.

Department of Physiology, Universidade Federal de Rio Grande do Sul, Brazil.

Background and Objectives:

The present study investigated the effects of low-level laser therapy (LLLT) on oxidative stress and fibrosis in an experimental model of Achilles tendon injury induced by a single impact trauma.

Study Design/Materials and Methods:

Male Wistar rats were randomly divided into four groups (n = 8): control, trauma, trauma+LLLT for 14 days, and trauma+LLLT for 21 days. Achilles tendon traumatism was produced by dropping down a load with an impact kinetic energy of 0.544 J. A low level Ga-As laser was applied with a 904 nm wavelength, 45 mW average power, 5 J/cm(2) dosage, for 35 seconds duration, continuously. Studies were carried out at day 21.

Results:

Histology showed a loss of normal architecture, with inflammatory reaction, angiogenesis, vasodilatation, and extracellular matrix formation after trauma. This was accompanied by a significant increase in collagen concentration when compared the control group.

Oxidative stress, measured by the concentration of thiobarbituric acid reactive substances and hydroperoxyde-initiated chemiluminiscence, was also significantly increased in the trauma group. Administration of LLLT for 14 or 21 days markedly alleviated histological abnormalities reduced collagen concentration and prevented oxidative stress. Superoxide dismutase activity was significantly increased by LLLT treatment over control values.

Conclusions:

LLLT by Ga-As laser reduces histological abnormalities, collagen concentration, and oxidative stress in an experimental model of Achilles tendon injury. Reduction of fibrosis could be mediated by the beneficial effects on the oxidant/antioxidant balance.

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