Application of MLS laser on muscular contracture caused by functional overload in a young athlete - case report.

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ABSTRACT
Myalgic fatigue (or muscular contracture caused by functional overload) is clinically detected as an unpleasant feeling of one or more muscles, that appears within 24 hours after exercise and disappears in 5-7 days. In athletes, often the muscular contracture is not due to pathological alterations of muscle metabolism, but rather to a condition of lack of training, as typically happens at the beginning of the training season or after a period of enforced rest due to trauma or injury. Laser therapy has long been widely used to treat muscle pain and contracture, and recently it has also been proposed to prevent injuries from overwork in athletes [2,3]. Although many studies have demonstrated the effectiveness of laser therapy in promoting vascularization through controlled vasodilation [4], reducing pain [5-7] and inflammation [8-10], the results reported in the literature do not allow to draw on clear indications on the therapeutic...
efficacy and the appropriateness of application of the different treatment parameters. This variety of results and often conflicting indications is largely due to the equally wide variety of laser sources and treatment parameters used in the studies.

In fact the interaction between laser radiation and tissue is highly dependent on the optical properties of the treated tissue, the characteristics of the source (wavelength, power, continuous or pulsed mode emission) and the treatment parameters chosen (frequency of the pulses, fluence, exposure time). In this study we used as the laser source an MLS laser with near infrared (NIR) emissions and treatment parameters specifically setted for muscle contracture.

**MATERIALS AND METHODS**

16 years old athlete in good health state and with no previous muscle injury was included in our study. The athlete reported a rectus femoris pain after a work of multiple running on 200 meters in the morning; the muscle appeared painful and contracted in absence of lesions on ultrasound examination. Athlete was treated with a MLS laser device provided by ASA s.r.l. (Arcugnano, Vicenza, Italy). This instrument has special characteristics: it combines the laser emission of two diodes with different wavelengths, one (λ = 808nm) may emit in continuous and in pulsed mode, in the first case with a power P = 1.1W, in the second with an average power Pa = 0.55W and a maximum frequency of 2000Hz. The other one (λ = 905 nm) may emit only in pulsed mode with a maximum frequency of 2000Hz and an average power Pa = 60mW. In pulsed mode, pulse repetition frequencies of the two diodes are the same.

For the treatment we used the following parameters (muscle contracture program): 700 Hz frequency, 2 min exposure, 39,67 J energy delivered by handpiece.

The treatment protocol was always carried out under the threshold of pain reported by the athlete.

**RESULTS**

The athlete was available to work with the team after 3 days of treatment. We joined the athlete to the team according to subjective symptoms and to the clinical examination negative for pain and muscle contracture.

**DISCUSSION**

The prognosis of a muscle contracture is 5-7 days as usually found in clinical experience. The athlete treated according to the new protocol was cured in just 3 days of therapies with no recurrence or new muscle injury. We should note that the injury occurred during the preseason, so the athlete was subjected to treatment twice a day rather than once, as often happens during the season. However, the result is very encouraging. Studies are in progress to confirm our findings increasing the number of cases and also evaluating the efficacy of MLS laser therapy on different the types of injury.
REFERENCES


