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Pain reduction by infrared light-emitting diode irradiation: a pilot study on experimentally induced delayed-onset muscle soreness in humans

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Abstract The present pilot study investigated the analgesic efficacy of light-emitting diode (LED). In view of a standardised and controlled pain reduction study design, this *in vivo* trial was conducted on experimentally induced delayed-onset muscle soreness (DOMS). Thirty-two eligible human volunteers were randomly assigned to either an experimental ($n=16$) or placebo group ($n=16$). Immediately following the induction of muscle soreness, perceived pain was measured by means of a visual analog scale (VAS), followed by a more objective mechanical pain threshold (MPT) measurement and finally an eccentric/concentric isokinetic peak torque (IPT) assessment. The experimental group was treated with infrared LED at one of both arms, the other arm served as control. Irradiation lasted 6 min at a continuous power output of 160 mW, resulting in an energy density of 3.2 J/cm². The subjects of the placebo group received sham irradiation at both sides. In post-treatment, a second daily assessment of MPT and VAS took place. The treatment and assessment procedure (MPT, VAS and IPT) was performed during 4 consecutive days. Statistical analysis (a general linear model followed by post hoc least significant difference) revealed no apparent significant analgesic effects of LED at the above-described light parameters and treatment procedure for none of the three outcome measures. However, as the means of all VAS and MPT variables disclose a general analgesic effect of LED

irradiation in favour of the experimental group, precaution should be taken in view of any clinical decision on LED. Future research should therefore focus on the investigation of the mechanisms of LED action and on the exploration of the analgesic effects of LED in a larger randomised clinical trial and eventually in more clinical settings.

Keywords Light-emitting diode · Infrared · Analgesic effect · Delayed-onset muscle soreness · *Musculus biceps brachii*

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