

Effect of transcutaneous application of gaseous carbon dioxide on cutaneous microcirculation

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Abstract

Background: The inefficient healing of chronic wounds is a result of poor blood perfusion at the wound and surrounding tissues. Artificially applied carbon dioxide (CO₂) has the potential to improve the perfusion and oxygenation of tissues, hence is useful for the healing of chronic wounds.

Objective: The aim of the present study was to determine the effect of a transcutaneous application of physiological vasodilator gaseous CO₂ on cutaneous blood flow.

Methods: Laser Doppler (LD) flux in cutaneous microcirculation, skin temperature, electrocardiogram and arterial blood pressure were measured simultaneously in a group of 33 healthy men, aged 21-28 years, during rest and a 35-minute CO₂ therapy. One lower limb of each subject represented the studied extremity, being exposed to gaseous CO₂. The contralateral limb was the control, being exposed to air. Each limb was sealed in a plastic bag.

Results: During CO₂ therapy the LD flux in the studied extremity increased from 5.8 PU ± 3.9 PU to 30.3 PU ± 16.7 PU (mean ± standard deviation; paired t-test, p < 0.001), while that in the control extremity did not change significantly.

Conclusions: Our results confirm a local vasodilatory effect of applied CO₂ therapy. This finding indicates its potential clinical use.