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[Increase in skin blood circulation and transcutaneous oxygen partial pressure of the top of the foot in lower leg immersion in water containing carbon dioxide in patients with arterial occlusive disease. Results of a controlled study compared with fresh water]

[Article in German]

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Abstract

Semi-quantitative Doppler laser flowmetry and measurement of transcutaneous oxygen partial pressure (TCPO2 in mmHg) are reliable, non-invasive methods of continuous measurement suitable for underwater use. We measured the effect of aqueous CO2 (succinate + sodium bicarbonate = Kao Bub; 1400 mg CO2 per kg water) compared with fresh water (both at 34 degrees C, depth of leg immersion 35 cm, immersion time 20 min) on circulation and TCPO2 in the feet of 15 patients with bilateral stage-II occlusion of the Aa. fem. superf. intraindividually in a randomised, crossover trial. Measurements were made at the same time of day on two consecutive days. No change in either cutaneous microcirculation or TCPO2 was observed during immersion in fresh water. During immersion in a CO2 bath both culaneous blood flow (as expressed by Doppler laser flux) and the amplitude of the Doppler laser vasomotion flux increased more than threefold (p less than 0.001, Wilcoxon), while sitting TCPO2 increased by over 10% (from 63 to 71 mmHg; p less than 0.001). The observed changes in oxygen dissociation and cutaneous microcirculation may help to provide an explanation for the well-known therapeutic effect of CO2 baths in all stages of occlusive arterial disease.

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