The impact of some manoeuvres on postocclusive reactive hyperaemia in the cutaneous microcirculation

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AIM: to assess the impact of skeletal muscle activity, mental stress, and local anaesthetic on the post occlusive reactive hyperaemia (PORH) of the skin, and elucidate some of the potential mechanisms.

METHODS: In 14 young healthy volunteers, we measured cutaneous laser Doppler flux (LDF) and induced PORH by a 3-min occlusion of the brachial artery in basal conditions, during handgrip exercise and mental arithmetic. In 16 age-matched volunteers, we assessed PORH in basal conditions and after the application of EMLA cream. Simultaneously, we measured local skin temperature (T), arterial blood pressure (BP), and the heart rate (HR).

RESULTS: Handgrip exercise increased the peak LDF after PORH (LDFmax) in the forearm, and showed a trend of smaller area under the curve (AUC) and shorter duration of PORH (tdur), whereas in the pulp, shorter tmax and smaller AUC were shown. During mental stress, HR and BP increased, and in the pulp, trends of shorter tmax and tdur were found. The application of EMLA decreased AUC and showed trends of shorter tmax and longer tdur.

CONCLUSION: Handgrip exercise reduces the overall PORH response, which might imply the ´stealing phenomenon´ of skeletal muscles. Mental stress reduces PORH in areas rich in arteriovenous anastomoses (finger pulp), suggesting the importance of the sympathetic nervous system also in local vascular control. Decreased PORH response after EMLA application emphasizes an important contribution of axon reflex in the PORH phenomenon.