

Effect of age on the dynamic response of muscle hyperaemia during exercise

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Ageing reduces the muscle hyperaemic response during steady-state exercise. However, the effect of ageing on dynamic response characteristics of muscle blood flow during exercise is not known. To test this effect, ten younger (27 ± 2 y) and ten older (61 ± 1 y) subjects performed eight trials of calf exercise. Each trial consisted of five minutes of intermittent contractions of the left calf muscle (1 s contraction, 2 s relaxation) at two intensities (30 and 60 % peak force), during which leg blood flow (LBF) and mean arterial pressure (MAP) were measured between each contraction. Four sets of LBF responses (per intensity) were averaged for each subject and the amplitudes and temporal parameters of two growth phases and a decay phase were estimated. At rest, MAP was 19 % greater ($p < 0.05$) in older than younger subjects but its increase during exercise was not significantly different at either intensity. LBF was not different at rest between older and younger subjects (48 ± 4 vs 44 ± 5 ml·min⁻¹); whereas the end-exercise responses and amplitude of the initial, rapid phase of the dynamic response at both intensities were significantly blunted in the older subjects (98 ± 20 vs 175 ± 20 ml·min⁻¹; 200 ± 22 vs 310 ± 30 ml·min⁻¹). The slow growth and rapid decay phases, as well as force output at the two intensities, were not different between the groups. These results suggest that the effect of ageing on exercise hyperaemia is targeted at the rapid growth phase of the response.