

**08** EFFECT OF DIFFERENT WARMING-UP PROTOCOLS ON TIME TO EXHAUSTION AT MAXIMAL AEROBIC SPEED

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Middle distance races are characterised by a start at high intensity without progression. Some studies focused on the warming-up (WU) effects on physiological parameters during race from 95% to 120% of the work rate at  $\text{VO}_2\text{max}$ . The aim was to determine the efficiency of different WU protocols on time to exhaustion at maximal aerobic speed (M.A.S.). We recruited 11 middle distance runners (mean age  $30\pm 4$  years, height  $177\pm 7$  cm,  $\text{VO}_2\text{max}$   $59.7\pm 6.4$   $\text{mlO}_2\cdot\text{min}^{-1}\cdot\text{kg}^{-1}$ , M.A.S.  $17.7\pm 1.16$  km/h). Subjects performed a triangular aerobic test to determine M.A.S. and three randomised rectangular tests at M.A.S. after three different WU protocols at 7 days of interval. The three WU protocols consist in no warming-up; 20 min WU at 55% of  $\text{VO}_2\text{max}$  (low WU); 15 min WU AT 55% and 5 min at ((speed at LT 1 + speed at O.B.L.A.) / 2) (intense WU). After the WU, subjects observed 5 min rest before the rectangular test. Blood lactate concentration was measured four times (before WU, after WU, before and after rectangular test); whereas heart rate,  $\text{VO}_2$  and ventilation were monitored continually. The mean heart rate during the rectangular test was higher ( $p<0.05$ ) from the 1st–7th min after low and intense WU than without WU. The  $\text{VO}_2\text{max}$  kinetic was the same in the three tests. Average blood lactate concentration was similar at the end of the race in the three protocols ( $6.9\pm 0.8$   $\text{mmol}\cdot\text{l}^{-1}$  without WU,  $6.8\pm 0.8$   $\text{mmol}\cdot\text{l}^{-1}$  low WU and  $6.6\pm 0.7$   $\text{mmol}\cdot\text{l}^{-1}$  intense WU). Time to exhaustion at M.A.S. was higher ( $p<0.05$ ) after intense WU. Results suggest that the intense WU has a positive effect on time to exhaustion at M.A.S. and therefore on aerobic performance. This is probably the result of a faster cardiovascular adaptation.



## Effect of different warming-up protocols on time to exhaustion at maximal aerobic speed

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