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The Effect of Omega-3 Supplementation on Exercise-Induced Muscle Damage

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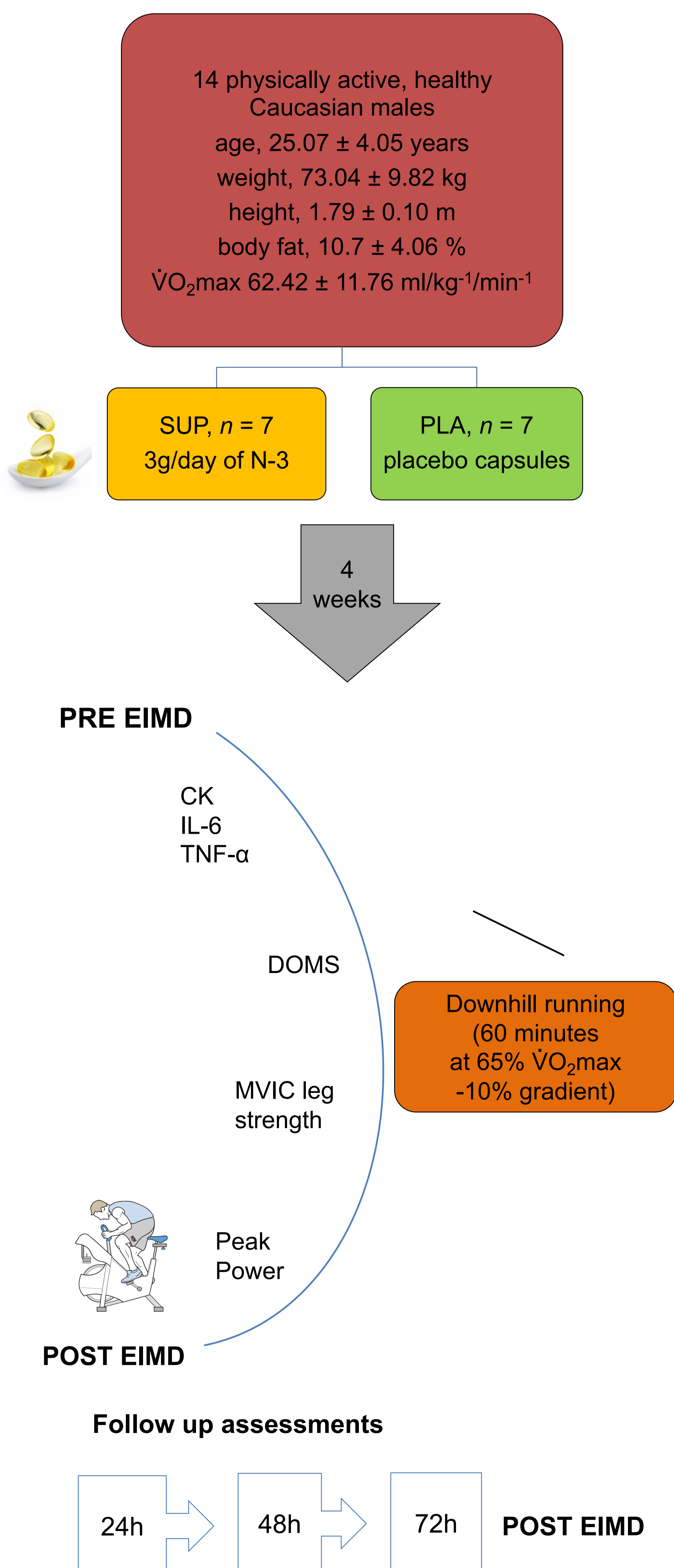
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INTRODUCTION

Exercise-induced muscle damage (EIMD) results in transient muscle inflammation, strength loss, muscle soreness (1) and can result in subsequent exercise avoidance. This affects athletes, those who engage in vigorous physical activity (2) and elderly people who demonstrate chronic basal inflammation (3). Omega-3 (n-3) supplementation has been proposed to minimise EIMD via its anti-inflammatory properties (4), however its action remains unclear.

We aimed to examine the effects of n-3 supplementation on exercise-induced inflammatory response following muscle-damaging exercise, hypothesising a) n-3 supplementation would decrease muscle inflammation and b) improve muscle function measurements.

METHODS



RESULTS

1)

Figure 1. PLA group showed a larger increase in plasma IL-6 compared to N-3 group immediately post-EIMD (143.9% vs 131.1%, respectively), however, there was no significant difference between groups at any time point ($p > 0.05$). Data are presented as median and interquartile range

2)

Figure 2. No significant differences in median TNF- α concentration were found between groups at any time point ($p > 0.05$). However, TNF- α showed a smaller increase for the N-3 group compared to the PLA during the recovery phase at 24, 48 and 72 h post-EIMD. Data are presented as median and interquartile range

3)

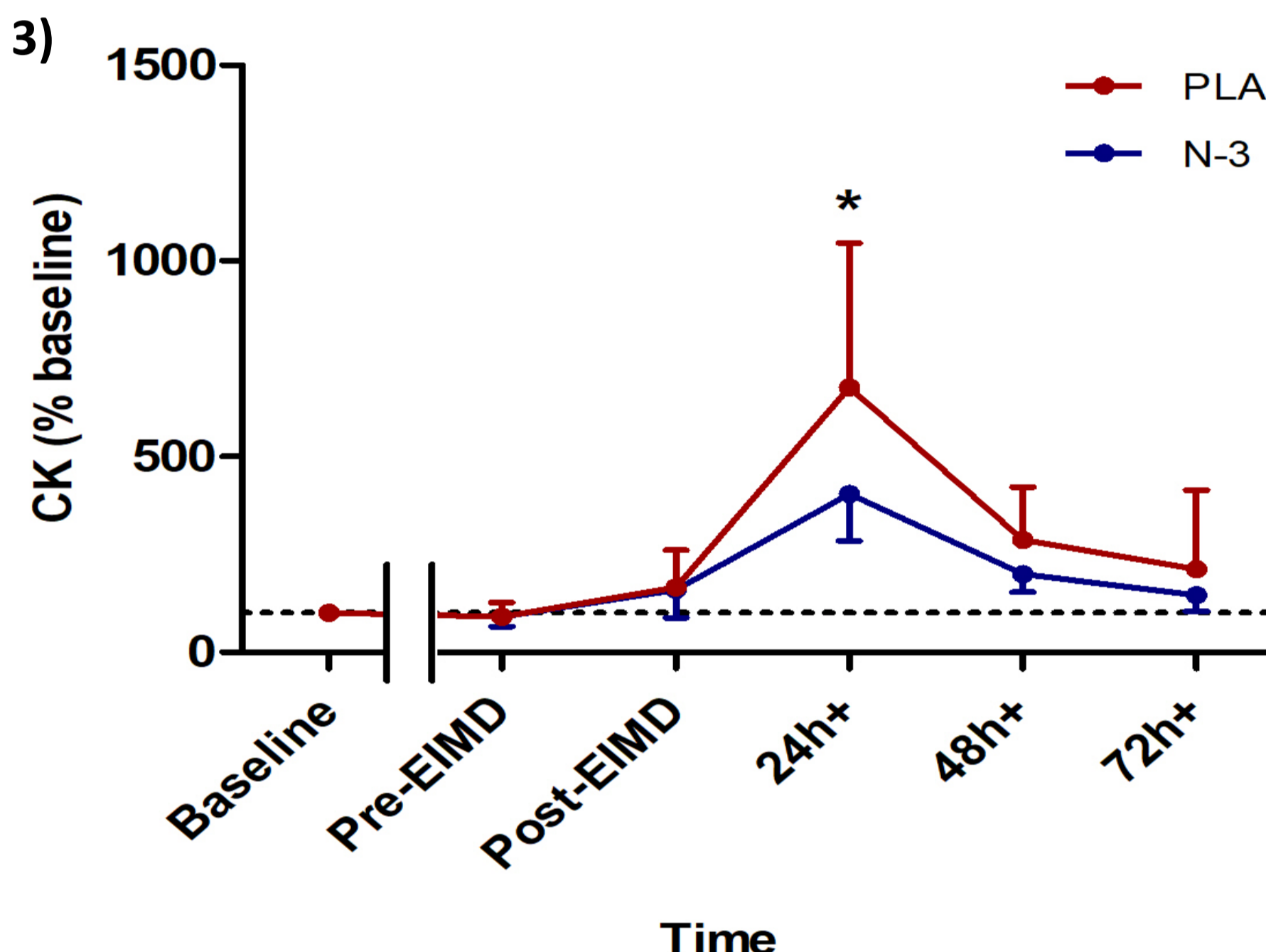


Figure 3. There was a significant difference in serum CK activity between groups at 24 h post-EIMD ($p = 0.048$), with PLA showing a larger increase in serum CK (baseline- vs 24 h post-EIMD) compared to N-3 (677.4% vs 459.6%, respectively). Data are presented as median and interquartile range

4)

Figure 4. No significant difference in VAS score percentage change was observed between groups at any time point ($p > 0.05$), with a peak in DOMS that was similar in both groups. Data are presented as median

5)

Figure 5. A significant main effect for time was observed for MVIC leg strength $F_{5,6} = 7.45$, $p = 0.015$, $\eta^2_p = 0.86$, with both groups showing a significant reduction in leg strength immediately post-EIMD. However, there were no significant differences between groups ($p = 0.26$) nor any group by time interactions ($p = 0.90$). Data are presented as mean ± SD

6)

Figure 6. A significant main effect for time was observed for peak power $F_{4,6} = 7.95$, $p = 0.014$, $\eta^2_p = 0.84$, with PLA showing a larger reduction in peak power at 24 h post-EIMD (pre- vs 24 h post-EIMD) compared to the N-3 group (>96.6% vs N-3). However, there were no significant differences between groups ($p = 0.31$) nor any group by time interactions ($p = 0.51$). Data are presented as mean

CONCLUSION

In this study, even though we recorded some reduction in the plasma markers for the N-3 group, there was no statistically significant decrease to allow us to draw any definitive conclusions about the n-3 supplementation on exercise-induced muscle inflammation. However, there was a significant reduction in serum CK activity in N-3 group whereby n-3 supplementation may potentially reduce muscle damage following EIMD. Additionally, there was no impact on muscle function nor power output. Future studies might compare the dosage and duration of n-3 supplementation on muscle function or examine the effect of n-3 supplementation on EIMD during ageing-associated muscle function loss, where increased basal inflammation is seen.

References

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