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Assessing the individual relationship between physical fitness improvements and external load match performance in male professional football players – a case study

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INTRODUCTION:
Coaches and practitioners may interpret improvements in physical capacity via fitness tests as coinciding with improvements in external load match performance, based on the assumption of a causal relationship between these variables. However, numerous factors, including reliability and validity of different measures, must be considered before making such an interpretation (1,2). Currently, there is limited research investigating these match related effects following an improvement in relevant physical fitness assessments. The aim of this study was to investigate if a meaningful improvement in physical fitness tests following an in-season strength training period can be related to and affect external load match performance at an individual level in professional male football players.
METHODS:
Eight professional football players (25.4 ± 3.1 yrs, 184.1 ± 3.4 cm, 79.3 ± 2.2 kg) completed an in-season 10-week strength intervention period and participated in >2 matches with >60 min playing time pre- and post-intervention, to be included in the analysis. Physical fitness tests were undertaken pre- and post-intervention and included: 10-, 30-m and peak speed sprint times, countermovement jump (CMJ) and leg press power. External load match performance was recorded pre- and post-intervention and included: total distance, peak speed, high (19.8-25.2 km/h) and sprint (>25.2 km/h) intensity running distance, PlayerLoadTM, and high intensity events (>2.5 m/s) consisting of accelerations, decelerations and change of directions. Physical fitness improvements had to exceed the measurements typical error (TE) and the smallest worthwhile difference (SWD) to be considered meaningful (1,2). A non-overlap of all pairs analysis (NAP; 3) was performed to assess external load match performance pre- and post-intervention and Bayesian pairwise correlation analysis was performed to assess the relationships between changes in physical fitness and external load match performance.
RESULTS:
Three players displayed meaningful improvements in 2-5 physical fitness tests. However, NAP analysis showed positive effects in external load match performance for all 8 players. Kendal's Tau correlation analysis showed evidence (Base factor >3) for only one correlation (peak speed – decelerations, τ = -.62) between the changes in physical fitness and external load match performance, while the remaining comparisons were unrelated.
CONCLUSION:
Our findings suggest that improvements in physical fitness may not necessarily translate to improved external load match performance. Further research is required to understand the potential relationships between physical fitness improvements and changes in football external load match performance.

1. Lindberg et al. Int J Sports Physiol Perform, 2022
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Topic: **Training and Testing**

Presentation **Poster**

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