

## PHYSICAL FITNESS TRAINABILITY IN YOUNG SOCCER PLAYERS

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### Introduction

Children and adolescents are often suggested to be more responsive to physical training during periods of rapid growth, the so-called “golden periods”. However, whether changes in physical fitness are related to the actual training or to the normal growth remains unclear<sup>1</sup>. The aim of this study was to investigate the effects of an entire season of soccer training and match play on physical fitness responses in two groups of highly-trained young soccer players differing in growth rate, biological maturity and age.

### Methods

Twelve pre-age at peak height velocity (pre-APHV) players (age  $12.9 \pm 0.5$  y;  $-1.34 \pm 0.60$  y to PHV, height  $1.51 \pm 0.07$  m; body mass  $40.2 \pm 7.2$  kg) and 11 post-APHV players (age  $15.7 \pm 0.6$  y;  $0.92 \pm 0.73$  y from PHV, height  $1.67 \pm 0.07$  m; body mass  $52.0 \pm 6.4$  kg) trained on average of  $\sim 14$  h of combined soccer training and competitive match play per week during an entire season (8 months). Physical fitness tests, conducted at the beginning and end of the season, included: counter movement jump (CMJ), acceleration (ACC) and maximal sprinting speed (MSS) obtained during a 40-m sprint with 10-m splits, repeated-sprints ability (10 x 30-m sprints, RSA) and an incremental running test to estimate maximal aerobic speed (MAS).

### Results & Discussion

The pre-APHV group displayed an almost three-fold greater increase in growth (i.e., height) than the post-APHV group. Substantial improvements in all physical performance variables were observed throughout the season in both groups. After adjustment for changes in height, between-group differences in training responses (Figure 1) favored the post-APHV group for CMJ, ACC, MSS and RSA. On the contrary, MAS was most responsive to training in the pre-APHV group.

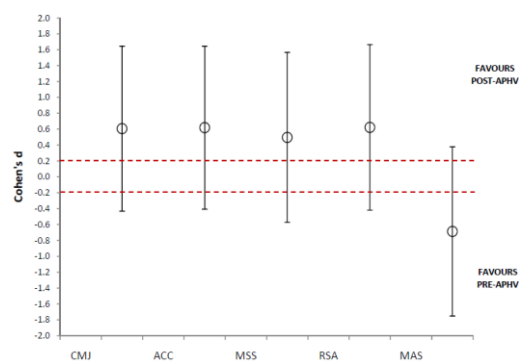


Fig 1. Between-group differences (expressed as Cohen's d or effect size) in training responses including changes in growth (i.e., height) as a covariate.

### Conclusions

The differential adaptive responses in neuromuscular (i.e., CMJ, ACC, MSS, RSA) and cardiovascular (i.e., MAS) fitness in response to soccer-specific training in our sample of young soccer players are likely to be mediated by age and/or biological maturation and growth-related factors, respectively.

### References

1. Malina, R.M. et al. (2004). *Human Kinetics*.