

Impact of stance position during overcoming isometric conditioning activity on sprint and jumping performance in young soccer players



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Introduction

Complex training is defined as the combination of biomechanically similar high-load exercises with lighter-load power exercises, alternating set by set (e.g. back squats followed by countermovement jumps (**CMJ**)). The heavy resistance stimulus increases motoneuron excitability, possibly creating optimal training conditions for subsequent explosive exercises through post-activation performance enhancement (**PAPE**). PAPE refers to an acute improvement in voluntary performance often achieved by maximum voluntary contractions as a condition activity (**CA**). Isometric contractions can effectively develop joint-specific forces, making them suitable as a CA to enhance acceleration ability in soccer.



Aim

To evaluate the acute impact of maximal bilateral and unilateral isometric contraction as CA on 30 meters sprint time and CMJ height in a group of U15 soccer players.

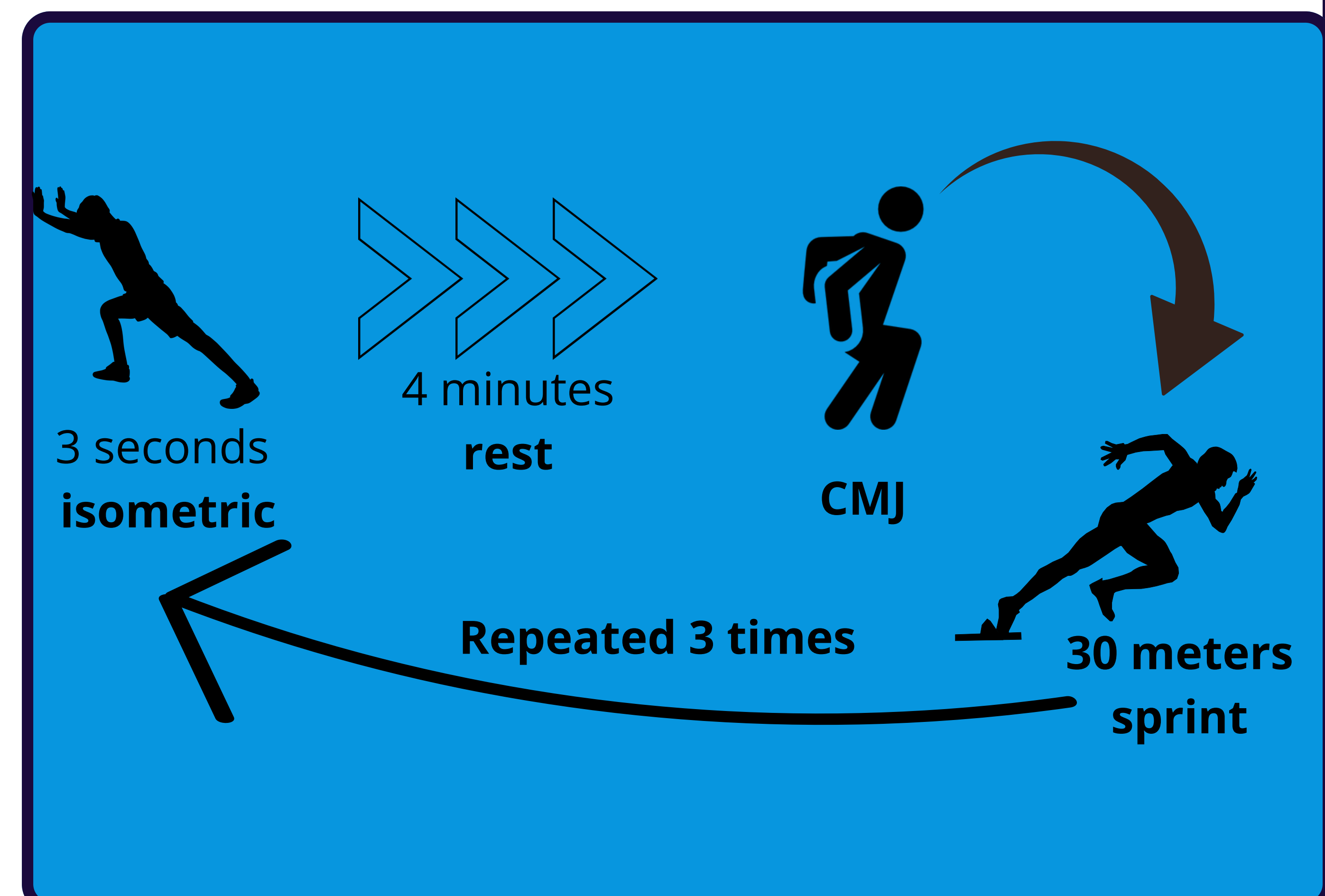


25 U15 soccer players
underwent training
intervention

Materials and methods

The study involved 25 male U15 academy soccer players (age: 14 years, body mass: 62.9 ± 11 kg, body height: 172.5 ± 9.2 cm) divided into 3 groups: i) bilateral isometric (parallel stance) ($n=10$), ii) unilateral isometric (split stance) ($n=9$), iii) control (no CA) ($n=6$). As CA, participants performed maximal pushing against the wall with different stance positions. Every group performed 3 sets of: 3 seconds of maximal isometric contraction. CMJ and 30 meters sprint time was measured 4 minutes after every bout of isometric muscle action.

Experimental protocol



Results

The two-way repeated measures ANOVA (3×4 ; group \times set) did not show statistically significant interactions nor main effect of group and set in 5m and 30m sprint time, but showed significant interactions in set ($p < 0.001$; $\eta^2 = 0.035$) for CMJ height. Pairwise comparison for the interaction effect revealed that jump height was significantly lower in 1st, 2nd and 3rd set compared to baseline ($MD = -1.4 \pm 2.4$, -2.1 ± 3.2 , -2.1 ± 2.4 cm; $p = 0.03$, 0.002 , < 0.001 ; Cohen's d : 0.33 , 0.43 , 0.47 ; respectively) with no difference between groups.

Practical implications

The fatigue induced by overcoming isometric contraction may be too pronounced for young male athletes, as indicated by the decrease in CMJ height despite the lack of differences in sprint time.



References

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