

Post Activation Potentiation Effects on Change of Direction Speed in Youth Rugby Players



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Centre for Sport Science and Human Performance, Wintec, Hamilton, New Zealand (2018)

Introduction

Post Activation Potentiation (PAP) is a phenomenon where by performance movement patterns can be improved due to a previous conditioned contraction (CC) at submaximal-maximal resistance load (1). The potentiation developed through a CC increases signals between the nervous system and muscle group involved in the performance movement resulting in an increase in force generating capacity (1). To date there is currently no research considering priming for change of direction speed (CODS). The purpose of this study was to investigate the applicability of PAP as a priming method for CODS in youth rugby players.

Methods

Ten youth male rugby players with a minimum of six months resistance training volunteered for this study. Participants were required to attend two sessions. Session one required the assessment of predicted 1RM for a loaded squat to be determined. 1RM predictions were made using the Brzycki equation from a progressive loading scheme (2). Session two commenced 48 hours later, where participants were required to perform a dynamic warm up and zig zag course familiarisation. One test zig zag sprint was performed at maximal effort then the participant was required to go to the gym to perform the CC intervention followed by a retest of the zig zag course as soon as possible and after eight minutes of rest. Time to complete course was taken off swift timing gates. The zig zag course had two right and one left turn separated diagonally by 5m and horizontally by 3.7m (3). Comparisons were made using the methods of Hopkins (4).

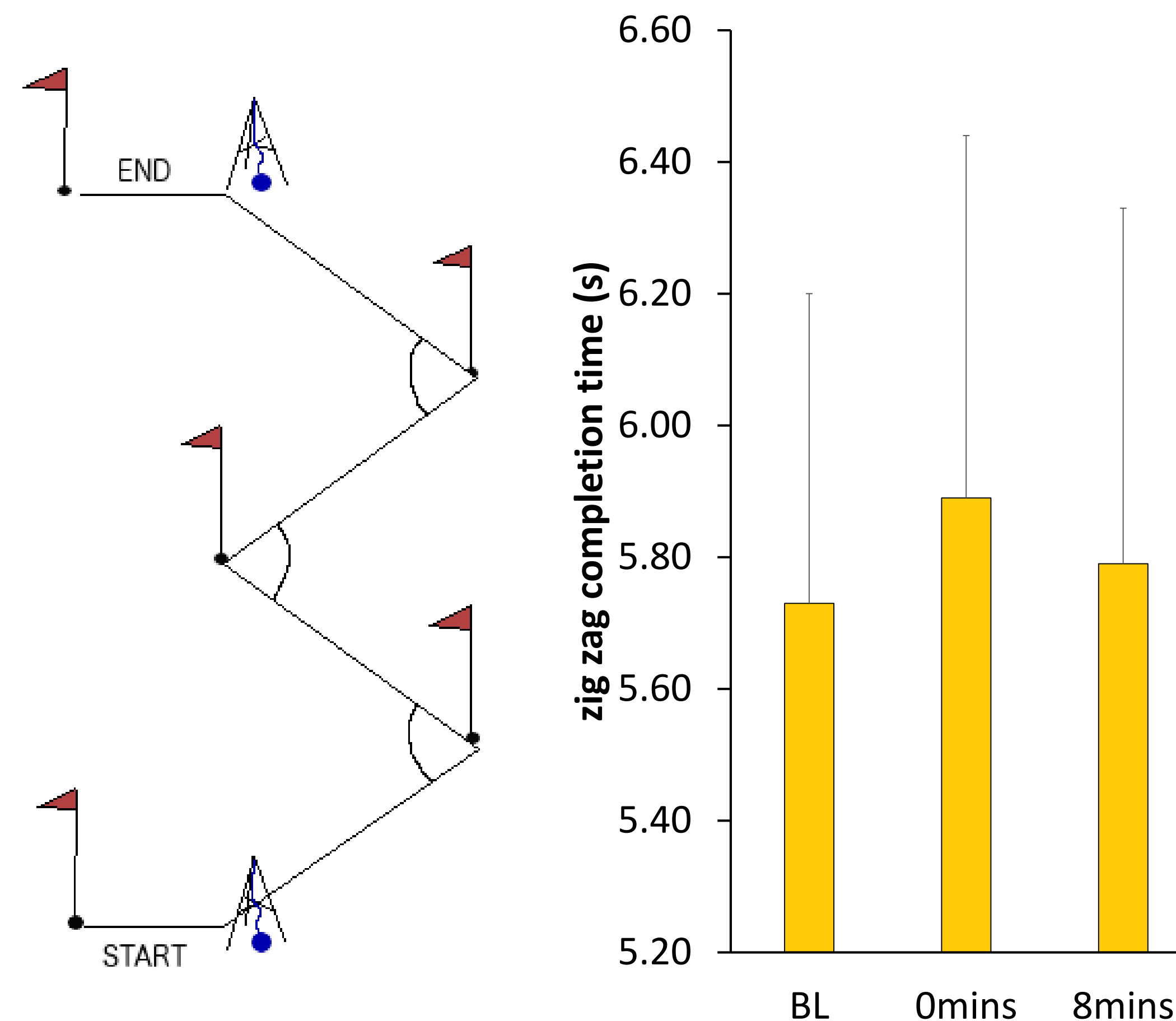
Results

Table 2. Comparative Data for baseline to post intervention trials

	P value	% Diff., ± 90% CL	ES, ± 90% CL
0min vs BL	0.007*	2.8, ± 1.5	0.32, ±0.17 (S)
8min vs BL	0.292	1.0, ±1.7	0.12, ±0.02 (T)
8min vs 0min	0.072	-1.7, ±1.5	-0.20, ±0.18 (S)

*significant difference ($p < 0.05$); %Diff= difference; CL= Confidence Limits; BL=Baseline; ES= Effect Size; S= Small; T=Trivial

Figures



Findings

Compared to baseline, participants ran significantly slower ($p=0.007$) during the zig zag course immediately after the CC. Specifically, the CC had a small effect on CODS performance (2.8%, ES= 0.32). After an eight-minute rest, the time taken to complete the zig zag course came back to near baseline; making the resting period a trivial effect on performance. The effects of PAP as a priming condition for CODS in this study has shown to have a negative response to performance levels. However, there is another aspect to consider which is the potentiation-fatigue relationship. Potentiation and fatigue differ in when they are elicited and when they diminish (1). Therefore, the optimal level to perform an explosive movement pattern is dependent on the window of opportunity where fatigue levels have decreased and potentiation levels have been maintained. Manipulating the resting period may have seen a better result using the same PAP CC for CODS.

Take Home Message

The conditioned contraction (80% of 1RM in a loaded squat, with 3 repetitions and 2 sets, with a 3-minute resting period in between sets.) was not effective enough to acutely improve CODS performance.

References

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