

# A WARM-UP INCLUDING A 5RM SQUAT PROTOCOL INCREASED BLOOD LACTATE, WITHOUT ALTERING THE SUBSEQUENT JUMP PERFORMANCE

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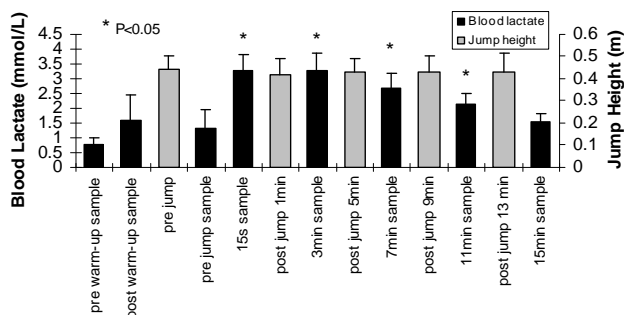
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**KEY WORDS:** Potentiation, 5RM Back Squat, Acute Metabolic Changes, Vertical Jump.

**INTRODUCTION:** The execution of an acute resistance exercise has shown to enhance a subsequent explosive movement; this enhancement is termed Post Activation Potentiation (PAP). PAP exists in conjunction with both acute metabolic and neuromuscular fatigue mechanisms which still are not fully understood. This study aimed to identify the effect of a five repetition maximum (5RM) back squat on vertical jump performance and blood lactate.

**METHODS:** Six strength-trained male track and field athletes ( $21.50 \pm 2.43$  yrs, height  $1.81 \pm 0.08$ m, mass  $83.05 \pm 10.29$  kg and 1RM back squat strength  $145.83 \pm 9.17$  kg) participated in this study. In brief, the study consisted of a single countermovement vertical jump (CMJ), a subsequent 5RM back squat and four successive CMJs, which were performed on a Kistler force plate (1000 Hz), at 1, 5, 9 and 13 minutes after completing the 5RM squat. Jump height and other mechanical variables (e.g. peak power) were calculated from the force-time curves. In addition, finger tip blood samples were collected in Lithium Heparin tubes and then analysed for lactate using the YSI 2300. The blood samples were collected at pre warm-up, post warm-up, after the pre squat CMJ and then at 15s, 3, 7, 11 and 15 minutes post squat.

**RESULTS:** A repeated measures ANOVA revealed significant increases in blood lactate in the post squat samples (15s – 11min) as compared with the pre squat samples ( $p < 0.05$ ), whereas the mechanical variables including the jump height did not change (graph 1).



**Figure 1: The effect of a 5RM back squat on both blood lactate and vertical jump height.**

**DISCUSSION:** The 5RM squat induced acute metabolic changes, as this was observed in the elevated lactate levels, but it failed to affect positively the jump performance. It appears that the acute metabolic changes had no effect on the jump performance. The inappropriateness of the selected exercise to induce PAP through the necessary neuromuscular mechanisms and improve vertical jump performance has also been observed by Scott & Docherty (2004).

**CONCLUSIONS:** The integration of a 5RM back squat into a warm-up increased blood lactate but did not improve vertical jump performance in university level track and field athletes.

## REFERENCES:

Scott, S. & Docherty, D. (2004) Acute effects of heavy preloading on vertical and horizontal jump performance. *Journal of Strength & Conditioning Research*. 18, 201-205.

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