Effect of Low-Frequency Electrical Stimulation as a Means of Post-Activation Potentiation on Vertical Jump

Exercise Science

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Purpose
The purpose of the current study was to evaluate low frequency electrical stimulation (LFES) as a tool to stimulate a post-activation potentiation (PAP) effect on a countermovement jump (CMJ) and compare that effect to a dynamic warm-up (DWU).

Methods
Six (n=6) Division III football players participated in this study. Descriptive characteristics of participants were as follows (age = 18 ± 1.0 yrs, weight = 92.4 ± 15.4 kg). Participants complete one trial consisting of the following: a 3-minute walking warm-up, three baseline CMJs, a standardized dynamic warm-up, three CMJs, 15-minutes of LFES to the quadriceps and calves, three CMJs. Peak CMJ from each assessment group was used for statistical analysis. A Repeated Measure ANOVA and a Fisher transformation were used to determine the differences between pitching velocities between innings following each treatment. Additionally, a Cohen's d effect size was calculated.

Results
DWU (59.3 ± 7.8 cm) provided a statistically higher CMJ that LFES (56.1 ± 8.5 cm, p = 0.46) or control (53.8 ± 8.3 cm, p = 0.006). LFES and control were not significantly different.

Conclusion
Results from this study demonstrate that the DWU resulted in the statistically significant higher CMJ than LFES or control. There were no statistical differences in CMJ height following LFES compared to control. There is further support for the DWU treatment over control via a moderate effect size. Limitations include low participant numbers and lack of a counterbalanced treatment design. A more optimal study design would be to either counterbalance treatment order within one day between participants or perform each treatment on separate days in a counterbalanced order. This lack of counterbalance may have led to participant fatigue prior to LFES exposure and, thus, impact CMJs.

Link: https://s3.us-east-2.amazonaws.com/lagrangecollegecitations/ESTIMPAP.pdf

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