ELECTROMYOGRAPHIC ANALYSIS OF DEADLIFT FOR CONSTRUCTION WORKERS

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Introduction

Working in construction is physically demanding. The tasks inherent to this professional occupation physically wear workers down, leaving then at a high risk of injury, mostly in the shoulder and knee joints and in the lumbar region (Chung et al., 2019; Umer et al., 2018). Those tasks require a great balance capacity and strength of the postural muscles, with the Construction Workers (CW) having to support heavy equipment on unstable surfaces (Manttari et al., 2021). The aim of this study was to analyse the muscular activity in trained civil construction workers (CWPE) and untrained civil construction workers (CWnPE), during a realisation of the deadlift (DL).

Methods

Subjects

Eleven male CW (38.00 ± 9.60 years; 172 ± 1 cm; 87.01 ± 9.8 kg), of which 7 were untrained (N =7) and 4 were trained (N=4).

Procedures

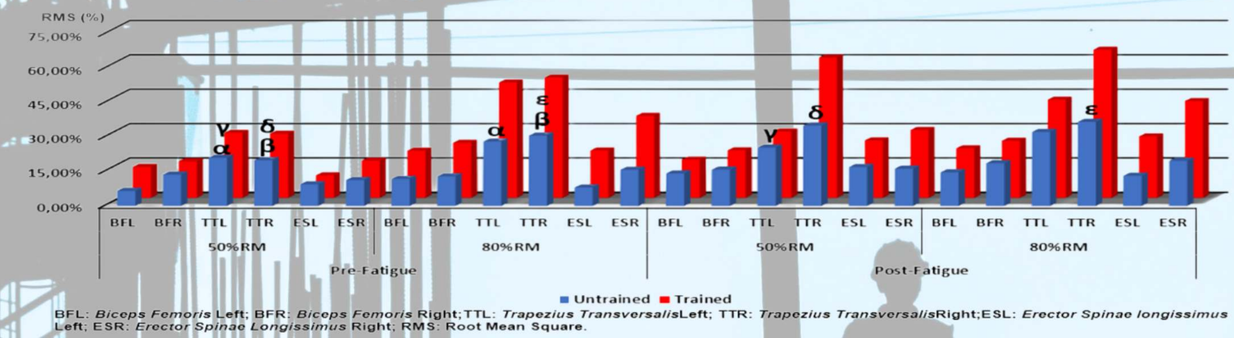
Firstly, each subject filled out a questionnaire, and the evaluation of the maximum repetition for the DL was carried out, secondly, the muscular activity was evaluated while performing the deadlift in four different situations, at 50%RM at rest, at 80%RM at rest, at 80%RM at fatigue and at 50%RM at fatigue. Surface Electromyography (EMG) measured the muscular activity of the Biceps Femoris (BF), Trapezius Transversalis (TT), Erector Spinae longissimus (ES).

Data Analysis

The data were collected through the MonitorPlux, using a frequency of 1000Hz, and exported into MATLAB software for data processing. The relative values of Root Mean Square (RMS), were obtained reflecting the muscular activation during the realization of the exercise, and Mean Frequency (MFREQ) which is an indicator of fatigue (Puce et al., 2021). Means, minimums, maximums, and standard deviations were also calculated as also significant differences ($p \leq .05$) using the Mann-Whitney U Test.

Results

CWPE had higher muscle activity values, as well as they do not present significant differences in the muscular activation. The muscle with higher activation was the TT in both groups and with was highly perceived at the set at 80%RM at fatigue, being observed the greater activation on the CWPE (TT left: 42.93 ± 31.40%; TT right: 64.75 ± 68.43%) when compared to the CWnPE (TT left: 32.31 ± 25.87%; TT right: 36.69 ± 29.61%). CWnPE showed significant differences between sets of differences intensities and conditions on the TT ($p \leq 0.05$).



BFL: *Biceps Femoris* Left; BFR: *Biceps Femoris* Right;TTL: *Trapezius Transversalis*Left; TTR: *Trapezius Transversalis*Right;ESL: *Erector Spinae longissimus* Left; ESR: *Erector Spinae Longissimus* Right; RMS: Root Mean Square.

Conclusion

As the results suggest, sets performed in the presence of fatigue and series at higher intensities provide greater muscle activations. There seems to be a strong influence of physical exercise on muscle activity and fatigue in CW.

References

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