






Abstract

Electromyographic analysis of deadlift for construction workers

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Working in construction is physically demanding. The tasks inherent to this professional occupation physically wear workers down, leaving them at a high risk of injury, mainly in the shoulder and knee joints and 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) supporting 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).

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). Firstly, each subject filled out a questionnaire, and the maximum repetition for the DL was evaluated. Secondly, the muscular activity was evaluated while performing the deadlift in four different situations: at 50%RM at

rest, 80%RM at rest, 80%RM at fatigue, and 50%RM at fatigue. Surface Electromyography (EMG) measured the muscular activity of the *Biceps Femoris* (BF), *Trapezius Transversalis* (TT), and *Erector Spinae longissimus* (ES). 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 realisation of the exercise, and Mean Frequency (MFREQ), which is an indicator of fatigue (Puce et al., 2021). Means, minimums, maximums, and standard deviations were calculated as significant differences ($p \leq .05$) using the Mann-Whitney U Test.

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

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 civil construction workers.

Keywords: deadlift; electromyography; construction workers; exercise.

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