The effects of overcommitment and reward on muscle activity in the trapezius and forearm extensor muscles during computer work in a real work setting

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Abstract

Purposes

Workplace psychosocial and personal factors are widely recognized for their associations with work-related upper extremity symptoms among office workers. Biomechanically, these stressors could increase muscle activity, which in turn could lead to the development of musculoskeletal symptoms. Field studies investigating the effect of workplace stressors on muscle activity are scarce. Therefore, we aimed to investigate the effect of overcommitment and reward on muscle activity of the trapezius and extensor carpi radialis muscles in the field among office workers performing their own computer work at their own workstations.

Methods

In the PROOF study, we selected 120 office workers from 9 departments from VU University Amsterdam and VU University Medical Center, based on their reported overcommitment and reward scores. Workers were classified into 3 tertiles for overcommitment and reward, and from each of the most extreme tertiles 30 workers were selected (lowest overcommitment/lowest reward, highest overcommitment/highest reward, lowest overcommitment/highest reward, highestovercommitment/lowest reward). These 120 office workers (86 females and 34 males with an age range of 23-63 years) participated in a field study, in which muscle activity of their left and right trapezius as well as their left and right extensor carpi radialis muscle was measured using surface electromyography for about two hours, while they performed their own computer work at their own workstation. Based on registered computer activity, median muscle activity during computer use was determined. MANOVA for repeated measures was performed with right/left side, overcommitment, reward, and the overcommitment-by-reward interaction as the independent variables.

Results

Median trapezius activity was significantly affected by overcommitment ($p<0.01$) and also the interaction between overcommitment and reward was statistically significant. Participants who were overcommitted

had a higher median trapezius activity during computer use (5.9%MVC) than those who were not overcommitted (4.3%MVC), and even more so when they also reported a low reward (6.6%MVC). There were no main or interactive effects of overcommitment and reward on extensor carpi radialis muscle activity (p=0.68), extensor muscle activities were approximately 5%MVC in all workers during computer use.

Conclusions

We observed that median trapezius activity was higher in workers with high overcommitment than in those with low overcommitment, and especially higher in those who also experienced low reward. Median extensor carpi radialis muscle activity was not affected by either overcommitment or reward. These findings provide some evidence in support of a biomechanical pathway, indicating that workplace psychosocial and personal factors must be considered when developing workplace interventions.

Keyword : Psychosocial, office ergonomics, upper extremities, musculoskeletal disorders

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ABSTRACTS