3-19-2019

The Expansion of the Rapid Office Strain Assessment: (ROSA) - An Office Ergonomics Tool

Ranny Michael
University of Windsor, michaelr@uwindsor.ca

David M. Andrews
University of Windsor, dandrews@uwindsor.ca

Michael Sonne
MyAbilities Technologies Inc., msonne@myabilities.com

INTRODUCTION: The Rapid Office Strain Assessment (ROSA) (Sonne et al., 2012) has been successful in quantifying and reducing musculoskeletal (MSD) risk, however, there have been many changes to typical office workstations since ROSA was first developed (i.e., laptops, cell phones, dual monitors, and sit-stand desks), which cannot be assessed by ROSA currently with great specificity. This study aimed to incorporate those changes into ROSA, while also examining psychosocial factors to improve the tool's robustness and relevance to today's office environments.

METHODOLOGY: Fifty-seven office workers from a healthcare organization were recruited. Inclusion criteria were: working at least 50% of their day on a computer and in at least one of the test conditions (i.e., use of laptops, cell phones, dual monitors, and/or sit-stand desks). Participants completed a basic information questionnaire, the Cornell University Discomfort Questionnaire (Hedge et al., 1999), and the Copenhagen Burnout Inventory (Kristensen et al., 2005). A trained ergonomics consultant then performed a modified ROSA of their workstation.

RESULTS: Laptop monitor, built-in keyboard, and trackpad mouse area scores had mean (SD) values of 3.07 (0.25) (n=45), 3.02 (0.15) (n=45), and 3.00 (0) (n=37), respectively. The mean (SD) phone score and duration was 0.54 (0.80) and 0.80 (1.06) hours. Dual monitors had a higher mean (SD) score of 3.79 (0.87) (n=56) compared to the single monitor score from the original study of 2.29 (1.20), which is attributed mainly to the neck twisting associated with dual monitors. Sit-stand users had mean (SD) monitor scores of 3.92 (1.31) and 2.67 (0.78), keyboard scores of 3.33 (1.23) and 3.00 (1.13), and mouse scores of 1.5 (0.52) and 1.16 (0.39) in seated and standing conditions, respectively. The largest increases in discomfort were in the right hand/wrist and upper & lower back, compared to the original ROSA study. A significant negative correlation was found in right-handed participants who had forearm support while texting and right hand/wrist discomfort [$r(52)=-0.299$, $p=0.035$]. A significant positive correlation was also found between personal burnout and whole body discomfort (WBD) [$r(53)=0.286$, $p=0.038$].

DISCUSSION: Laptops had consistent area scores for the monitor, keyboard, and trackpad. The decreased usage of phones and lower phone area scores were major changes from the original ROSA study, which is believed to be due to the increased number of alternative communicative platforms and hands-free options used today. Increased cell phone usage is also a major change to office work since the original ROSA study and is believed to have had an effect on the increased discomfort scores. Consequently, cell phones will be incorporated into the scoring of ROSA, depending on if the user texts and if forearm support is present. Dual monitors integrated well without needing to make significant changes to ROSA, but assessors should check the amount of neck twisting that occurs. Sit-stand users were found to have lower area scores in the standing versus the seated condition, likely due to having to actively adjust their workstations. Personal burnout was a greater predictor of WBD than work-related and client-related burnout.

CONCLUSIONS: Overall, the new workstation conditions tested in this study integrated well with the original ROSA tool. Incorporating these conditions into ROSA will facilitate greater tool accuracy, specificity and workplace relevance.

REFERENCES

Hedge, A., Morimoto, S., & Mccrobie, D. (1999). Effects of keyboard tray geometry on upper body posture and comfort. *Ergonomics, 42*(10), 1333-1349.

Kristensen, T. S., Borritz, M., Villadsen, E., & Christensen, K. B. (2005). The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work & Stress, 19*(3), 192-207.

Sonne, M., Villalta, D. L., & Andrews, D. M. (2012). Development and evaluation of an office ergonomic risk checklist: ROSA–Rapid office strain assessment. *Applied Ergonomics, 43*(1), 98-108.