

**Jensen C. Development of neck and hand-wrist symptoms in relation to duration of computer use at work. *Scand J Work Environ Health* 2003;29(3):197-205.**

Design: Prospective cohort study

Population/sample size/setting:

- 2576 computer users (1721 women, 855 men, mean age 42) who responded to baseline and follow-up questionnaires in 11 Danish companies
- 5033 computer users were contacted for the baseline survey, with a response rate of 69% (n=3475)
- 3363 subjects received the follow-up questionnaire, and the 2576 respondents represent a 77% response rate to the follow-up questionnaire

Main outcome measures:

- The purpose of the survey was to investigate the effect of computer use on neck and hand-wrist symptoms; only the hand-wrist symptoms are discussed here
- The baseline questionnaire asked about age, duration of employment in the same job, and numerous aspects of computer use, including mouse use, software skills, technical support, glare, sensorial and cognitive demands, and social support
- Categories of computer use were: 0-25%, 50%, 75%, and 100% of the time
- Hand-wrist symptoms (trouble, ache, or pain) were classed as present if they had been present for more than 7 days in the last year of the follow-up
- At baseline, the prevalence of hand-wrist symptoms was very high: 25.8% of respondents reported such symptoms in the past year
- At follow-up, the prevalence of hand-wrist symptoms was also very high: 31.1% of respondents had such symptoms in the past year
- For respondents who did not have symptoms at baseline, 223 of 1035 women (21.6%) and 78 of 626 men (12.5%) developed symptoms during the follow-up period and were counted as incident cases
- The presence of symptoms at the follow-up survey was analyzed in separate logistic regression models for men and women; previous hand, wrist, and elbow symptoms were predictive of symptoms at follow-up for both men and women (adjusted odds ratios of about 3.3), and were the same whether or not the workers had changed jobs during the study period; low influence at work was also predictive of hand-wrist symptoms
- Hand-wrist symptoms were also analyzed in logistic regression models that controlled for age and sex; work time at the computer 50% of the time had the lowest risk of symptoms, while the odds ratios were elevated for work time of 75% of the time (OR=2.0) and 100% of the time (OR=2.3)
- Mouse use was influential in logistic regression models which were restricted to women with nearly continual computer use; mouse use 25% of the time had the lowest risk, but there were elevated odds ratios for both "seldom" mouse use (OR=4.0) and for mouse use 50-100% of the time (OR=4.0)

Authors' conclusions:

- Intensive computer use with a mouse for more than half the work time increased the risk of hand-wrist symptoms
- Intensive computer use with no mouse use also increased the risk of hand-wrist symptoms, possibly due to intense keyboard use, such as call-center work or data entry
- To prevent hand-wrist symptoms, computer use should be limited to less than  $\frac{3}{4}$  of work time

Comments:

- The analyses were done on all workers who had symptoms at follow-up; a separate analysis of only the incident cases would have been useful, as it might have predicted which workers who had no symptoms at baseline later developed new symptoms
- The intense computer use without mouse use was attributed to intense keying, but this was not directly measured, and no information was available on ergonomic variables such as keyboard placement; it may represent jobs with 7 or 8 hours of intense keyboarding, but this is not certain
- In Table 2, there are 4 groups (neck and hand/wrist for both sexes) and 18 exposures; this yields 72 independent group comparisons, and an adjustment for statistical significance would be appropriate ( $p < .007$ )
- Therefore, such variables as repetitiveness in women in Table 2 ( $p = .013$ ) should not be read as statistically significant
- However, there is no problem with using the Table 2 variables in the logistic regression models, which will eliminate the variables whose significance in Table 2 was dubious
- Some of the exposures (sensorial demands) are not clearly defined and probably should be overlooked

Assessment: Adequate only for evidence that intense mouse use more than half the time is associated with an increased risk of hand-wrist symptoms