

Session: F22

Abstract No: 040

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Title: Standing, walking and climbing stairs at work associated with 11 year progression of atherosclerosis

Format: Paper

[Symposium: abstracts 39-43]

Recent epidemiological research has shown a strong association between prolonged standing at work and hospitalization due to varicose veins, four year progression of carotid atherosclerosis, and all cause mortality.

This study investigates the progression of carotid atherosclerosis among 599 middle-aged Finnish men who participated in the prospective population-based Kuopio Ischemic Heart Disease Risk Factor Study and were gainfully employed at some point during the study's 11 year follow-up period. Ultrasound measurements of intima media thickness (IMT) of the common carotid artery were taken at baseline and at four and 11 year follow-up. Percent time spent in occupational physical activities requiring an upright body posture, i.e., standing, walking, and climbing stairs, was ascertained from an occupational physical activity interview administered at each assessment point. Averaged over the 11 year follow-up period, the percentage of time upright at work per year ranged from zero to 43%. The association of the percentage of time upright at work per year and average yearly change in $\ln(\text{maximum IMT})$ between baseline and 11 years was studied in a multiple linear regression model controlling for 23 covariates, including technical, demographic, biomedical, psychosocial work, and behavioral factors, namely, leisure time physical activity, smoking, and alcohol consumption. Log transformed Maximum IMT was used because it gave substantially better fitting models compared to models with untransformed change in max IMT. Analysis of \ln transformed change leads to estimates of relative change = $RC = \text{Final/Initial}$. Also $\% \text{change} = 100(RC - 1)$.

Maximum IMT increased an average of 2.4% per year among men who spent zero time in an upright body posture at work and who were in reference categories and had average values on continuous covariates. Otherwise similar men, who were in an upright work posture 43% of the year, had a corresponding increase of Maximum IMT of 3.3% per year ($p=0.025$). The increases in systolic blood pressure ($p<0.001$) and LDL ($p=0.001$) needed to get the same effect are 43.1 mmHg and 2.76 mmol/l, respectively. Also, the result for upright body posture was similar to the result for smokers who in contrast to the same reference group with 2.4% per year increased at 3.2% per year ($p<0.001$). Neither BMI nor leisure time physical activity had an effect on IMT change.

These results suggest that an upright posture at work constitutes a major risk factor for the development of atherosclerosis, comparable to the risk found for traditional risk factors such as smoking, high blood pressure, and high cholesterol.

Session: F22

Abstract No: 041

Author(s): Messing, Stock, Tissot, Laperriere, Couture

Title: Standing vs. walking can we distinguish them, and is the distinction important

Format: Paper

[Symposium: abstracts 39-43]

Working posture is thought to be an important determinant of musculoskeletal and cardiovascular health. Knowledge of the context and type of postures is necessary in order to examine their associations with health-related outcomes. Questions on the mobility of working postures were administered in 1998 to 9,425 Québec residents employed part or full time for at least 6 months. Results showed that 58% usually stand at work, and that standing is more common among men, workers under 25, those in the two lowest educational quintiles, and those with incomes under \$20,000 CAD. Only one person in six who works standing reports being able to sit at will. Women and men differ in the types of usual standing and sitting postures at work. Those who work standing and/or who work in more constrained postures are more likely to be exposed to other physical work demands such as handling heavy loads, repetitive work, forceful exertion and low job decision latitude.

The questionnaire on working postures, with some changes, was administered in 2002-2003 to 92 factory, laundry, hospital and blue collar public service workers. Subjects who had usually stood during their workday reported retrospectively on their mobility: usual movement within a 1-meter radius; within a 5-meter radius; over 5 meters. They were also asked whether they could sit down at will, occasionally or never. Observers recorded working posture continuously throughout the workday and also answered the same questions as the workers at the end of the workday. Using observer estimates as the "gold standard", validity was good for the question on mobility (Cohen's weighted kappa = 0.60, concordance 70.1%) and for the question on freedom to sit (Cohen's kappa = 0.72, concordance 85.9%). The response categories for both questions also corresponded to clearly different degrees of exposure to standing, walking and sitting, as measured by the recorded work activity.

It is possible that some inconsistent findings in the literature with regard to the physiological effects of standing would be rendered more comprehensible if information were gathered on mobility and freedom to sit. A variety of possible ways to describe mobility will be discussed.

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