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Title: Percent time at work in an upright posture associated with 11 year change in systolic blood pressure

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Recent epidemiological research has shown a strong association between prolonged standing at work and four year progression of carotid atherosclerosis. Increases in blood pressure (SBP), over time, could be one of the main pathways for the observed effects of an upright work posture on the development of atherosclerosis.

This study investigates the association of an upright work posture with 11 year change in SBP among 602 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. SBP was measured five times during a baseline examination and at four and 11 year follow-up exams. The average of the five values at baseline and at 11 year follow-up were used in the present analysis. 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 average percentage of time upright at work per year and average yearly change in SBP between baseline and 11 years was studied in a multiple linear regression model controlling for 18 covariates, including technical, demographic, biomedical, psychosocial work, and behavioral factors, namely, leisure time physical activity, smoking, and alcohol consumption.

SBP increased an average of 0.35 mm Hg per year, or 3.85 mm Hg over the 11-year follow-up period, 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 in SBP of 1.18 mm Hg per year, or 13 mm Hg over 11 years ($p = .009$). Age, income, and use of cholesterol-lowering medications were the only other factors found to have a significant positive association with change in SBP. The increases in age ($p < 0.001$) and income ($p=0.03$) needed to get the same effect found for men in an upright work posture 43% of the year are 20 years and 44,000 Finnish marks. Neither BMI nor time spent in conditioning leisure time physical activities had an effect on SBP change.

These results suggest that prolonged time in an upright posture at work constitutes a risk factor for the development of hypertension comparable to 20 years of aging, which in turn is one of the accepted major risk factors for the development of cardiovascular disease.

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