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Active Sitting in Office Work – SUMMARY of Official report from a study at the Karolinska Institute in Stockholm, Sweden

Introduction: About 70% of all employees work in Sweden every day at a computer-based workstation. 15% exclusively perform computer work during their working day, and these numbers increase each year. Although the scientific evidence needs to be established furthermore, sedentary behavior has recently been identified as an alone-standing risk factor for ill-health and efforts are made to increase human activity levels of office workers. One way to mitigate this is to put efforts on active chairs or standing desks. Different chair companies have been working in this area and recently the HÅG SoFi chair was designed for active sitting. The idea is that by the use of a center-tilt mechanism, the office worker becomes more mobile while still sitting. However, the effects of activating this mechanism on human activity levels during office work are currently not known.

Aim: The aim of this study was therefore to evaluate the HÅG (hereafter centre tilt) chair's activated center-tilt mechanism in respect to human activity, posture, comfort and office performance. Comparisons were made during simulated office work in the laboratory, with an inactivated center-tilt mechanism, a conventional dynamic chair and standing. Another aim of this study was to compare the centre tilt chair's activated tilt-mechanism to an inactivated tilt mechanism and the chair they normally use at

the office, with respect to human activity and comfort during three days of registration.

Methods: Using a 3D-motion capture system, force platforms and high frequency digital videocameras, 15 healthy subjects with long computer experience were studied during randomized dynamic and static simulated office work, each recorded during four minutes time sequences. Moreover, five ActiGraph high sensor accelerometers, attached to different body parts and the chair, were used to study human activity levels. This was the primary outcome variable on human activity and operationalized by a large range of parameters on kinematic and kinematic data, as well as mean accelerometer counts per minute. Secondary outcomes were posture, performance and comfort ratings. In addition, empirical data on 13 office workers were measured to study the effects during three days of registration at an ordinary office, using long-term accelerometer data and comfort ratings as outcomes.

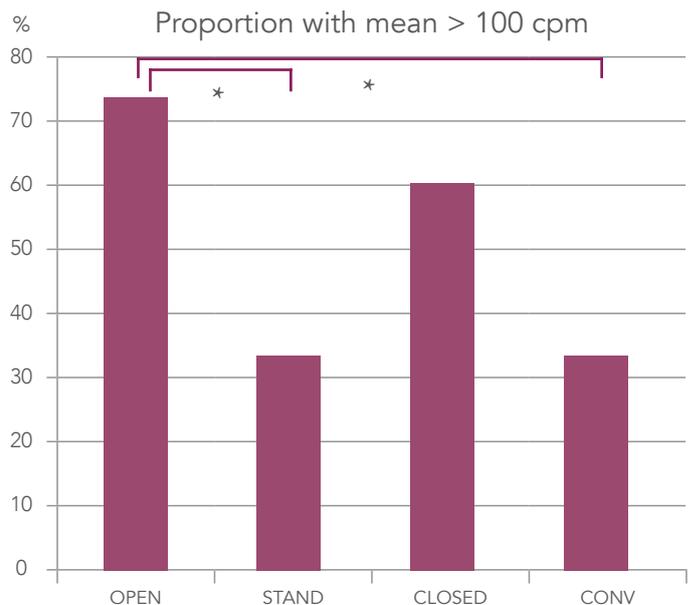
Results: The results showed some positive effects of the center-tilt mechanism on human activity during office work, when studying human activity with kinematic, the kinetic and accelerometer measures in the laboratory study and accelerometer measures of human activity



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in the field study. The most important positive effect of the center-tilt mechanism was seen using the $\text{cpm} > 100$ cut off for the accelerometer of the waist during the laboratory study. Here the activation of the center-tilt mechanism resulted that a larger proportion of the subjects could be classified as performing light physical activity during dynamic office work, compared to performing dynamic office work while seated on a conventional chair or standing. Secondary outcomes show neither any positive nor any negative effects on posture, performance or comfort of activating the center-tilt mechanism.

Discussion/Conclusion: In general the results confirmed that during most conditions office work can be classified as sedentary. The task performed was a more important contributor to human activity than the sitting or standing conditions. Still, standing and the chair with open center-tilt mechanism was confirmed to promote some positive results, especially in the active desk task where 73 % of the subjects reached the level of light human activity when seated on a center-tilt chair with open mechanism. These results indicate that there is a difference between seating solutions capacity to unconsciously promote human activity without changing behavior. The results of this study also challenges standing as a solution to increase human activity and performance. In several parameters standing was associated with increased human activity, however, not in all parameters and sometimes even associated with lower human activity, thus in contradiction



Proportion of subjects with “light physical activity” (mean > 100 cpm) in accelerometer B (waist), i.e. not sedentary activity.

with the primary hypothesis. This indicates that we need to deepen our knowledge of the disadvantages of conventional sitting and advances of light activity during office work to be able to establish better guidance for sedentary office work.

The leader of the research project was Associate Professor Wim Grooten and a senior research team at the Department of Neurobiology, Care Sciences and Society at the Karolinska Institute