

A comparison between two different conditions of breaking up sedentary behaviour on glucose metabolism

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/ CONCLUSION

There is no effect of either breaking up sedentary behaviour each hour or performing 30 minutes of vigorous physical activity in one bout compared with prolonged sitting for six hours on glucose metabolism.

/ ABSTRACT

INTRODUCTION: Sedentary behaviour is suggested a risk factor for various health outcomes, independent of the amount of subcomponents of physical activity. There is currently paucity of experimental studies comparing frequent breaks of sedentary time with one single long bout of exercise in an iso-caloric design.

PURPOSE: to examine if breaking up sedentary behaviour with short five minutes' bouts or one continuous 30-minute bout of vigorous intensity activity differentially affects metabolic risk markers compared with a control condition of prolonged sitting.

METHODS: 12 healthy adults participated in a randomized cross-over design as follows; 1) six hours of quiet sitting; 2) six hours of sitting, including five minutes exercise bouts (treadmill running) at 70 % of maximal oxygen uptake (VO_{2max}) each hour; 3) continuous exercise at 70 % of VO_{2max} for 30 minutes followed by five hours and 30 minutes of sitting. Prior to each test, a fasting blood sample was collected and followed by a standardized meal consisting of 646 kilocalories. Blood samples were thereafter collected every hour. Maximal aerobic power was measured using indirect calorimetry and the running speed equivalent to 70 % of VO_{2max} was determined by extrapolation following a submaximal steady state exercise test prior to the experiment. Each condition was separated by a 6-day wash-out period.

RESULTS: There were no differences in insulin (mean (95 % CI); 1) 60704.8 (36352.4-79412.1) $pmol \cdot L^{-1} \cdot 360 min$; 2) 53375.7 (28787.8-71847.5) $pmol \cdot L^{-1} \cdot 360 min$; 3) 44827.3 (24853-67912.7) $pmol \cdot L^{-1} \cdot 360 min$) and glucose (mean (95 % CI); 1) 105 (27.6-150) $mmol \cdot L^{-1} \cdot 360 min$; 2) 48.4 (-88.6-113.5) $mmol \cdot L^{-1} \cdot 360 min$; 3) 105.8 (49.3-171.6) $mmol \cdot L^{-1} \cdot 360 min$) incremental area under curve between conditions.

/ METHODS

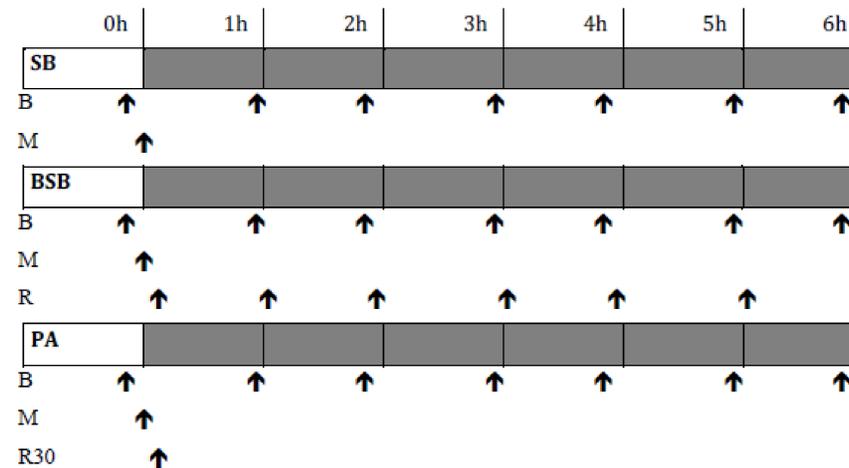


Figure 1: showing the protocol. SB=Sedentary behaviour condition, BSB=Breaking sedentary behaviour condition, PA=Physical Activity condition, B=Blood samples, M=Meal, R=Run 5 minutes, R30=Run 30 minutes continuously



Figure 2: catheter inserted in the median cubital vein

/ RESULTS

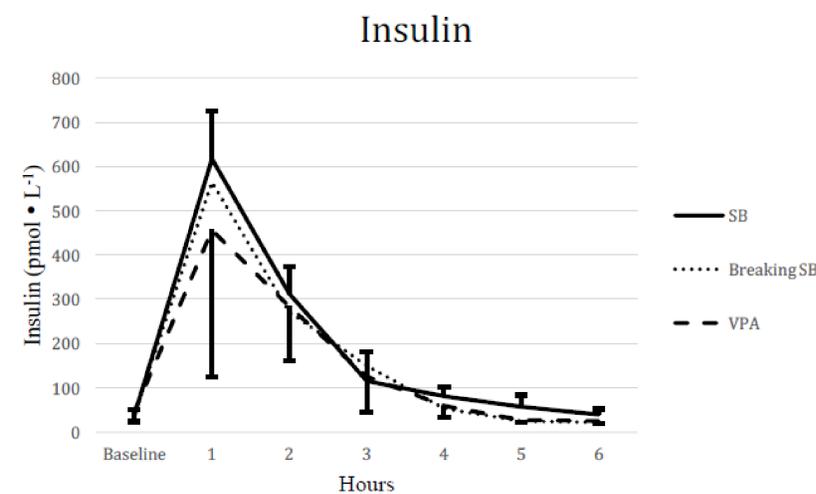


Figure 3: showing mean insulin concentration during six hours. Values are mean and error bars are SD. SB = sedentary behaviour condition, Breaking SB = Breaking sedentary behaviour condition, VPA = continuous vigorous physical activity condition.

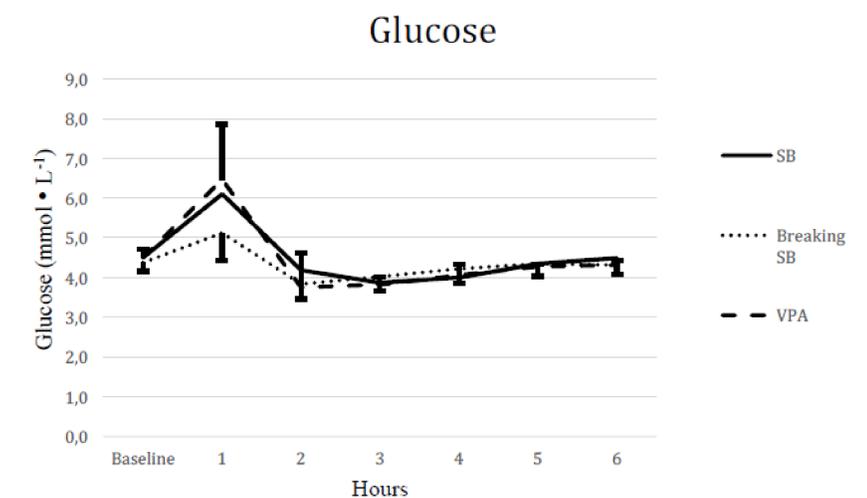


Figure 4: showing mean glucose concentration during six hours. Values are mean and error bars are SD. SB = sedentary behaviour condition, Breaking SB = Breaking sedentary behaviour condition, VPA = continuous vigorous physical activity condition.