Induced stress during dual task improved secondary task performance at the sacrifice of primary task performance

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INTRODUCTION

• Completing a simultaneous secondary task while standing or walking, i.e. a high cognitive load situations, may disrupt one’s postural control [1,2].

• Several factors such as pathology, aging, and stress may have an effect on the performance of each task being completed [3].

PURPOSE:

• We aimed to investigate the effect of induced stress on the performance of each task during a high cognitive load situations. The high cognitive load situations S included standing while completing a secondary motor task (wire maze).

METHODS

• Participants (Tab. 1) were asked to randomly stand 1) quietly, or while completing the wire maze 2) with or 3) without a loud buzzer noise (Fig. 1). Stress was induced through a loud buzzer when the ring contacted the maze.

ABOVE: Posture was more irregular during quiet standing (ST) compared to standing while doing wire maze (DT) with and without the buzzer in both the AP and ML directions (p=0.02, p=0.001, respectively in AP) & (p=0.004, p<0.0001, respectively in ML). (NOTE: GRF=Ground Reaction Force, SampEn=Sample Entropy).

RESULTS

• Perceived stress was significantly lower during quiet standing (single task: ST) compared to standing while doing wire maze (dual task: DT) with and without the buzzer in conditions (p=0.001) and (p=0.007) conditions.

• Wire maze errors were significantly higher during standing while doing wire maze (DT) without the buzzer compared to the buzzer DT condition (p<0.0001).

DISCUSSION and CONCLUSIONS

• During the most stressful high cognitive load situations, the high level of perceived stress coincided with less wire maze errors.

• The addition of a secondary task increased the regularity of the ground reaction force in both directions, which might be due to more automatic and less flexible postural control.

• Induced stress during high cognitive load situations caused a cost for postural control, yet a benefit for wire maze performance, indicating task prioritization under stress.

• Identifying the strategies underlying task prioritization can help clinicians design appropriate interventions to challenge patients appropriately to improve performance during high cognitive load situations.

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