The placebo effect on dual task in gait performance

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The ability to perform two tasks simultaneously is an essential feature of daily life. In the elderly, this ability becomes more difficult when two tasks (e.g., walking and talking) share common attentional resources. In this case, the increased attentional load for a specific task reduces the available resources for completing a second task. The aim of our study was to investigate whether a placebo effect, consisting of a positive verbal suggestion, can redirect the attentional resources during the performance of cognitive-motor dual-task (DT) in the elderly population.

Thirty-five healthy older adults were recruited and randomized into two groups: Placebo and Control. Participants performed two gait tasks: the single task (ST), walking at their self-selected speed and pace; and the dual task, walking like in the ST while performing a cognitive task (serial 7's subtraction). The experiment consisted of two session: pre-test and post-test. In the pre-test and post-test participants performed the ST and DT. A placebo procedure was inserted between these two sessions for the placebo group. Specifically, an inert treatment, *sham* transcranial direct current stimulation (tDCS), was applied on the frontal areas for 5 minutes. Along with *sham* tDCS, subjects received a positive verbal suggestion of enhancement of concentration and attention, required to perform well the cognitive task. After that, participants performed the post-test session. The control group underwent both sessions without any treatment and with 5-minutes rest period.

Different gait parameters were evaluated during both sessions. Dual-task cost, defined as the interference of the cognitive task on the normal gait performance [(DT-ST)/ST], was computed for each single gait parameter in each session. Cognitive and subjective parameters were also collected. Gait speed cost and stride speed cost were significantly lower in the placebo group than the control group at the post-test session. Additionally, gait speed, stride speed and stride length costs decreased from pre-test to post-test only in the placebo group. The total number of subtractions were stable across sessions in both groups. Finally, the perception of mental fatigue was not modulated by the placebo procedure.

In conclusion, the placebo procedure could be a potential method to re-establish the allocation of attentional resources across two tasks, thus reducing the attentional costs of a dual task and improving gait in the elderly population.