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Introduction Chez les personnes qui ont subi un accident vasculaire cérébral (AVC), les déplacements faits dans la communauté peuvent représenter un défi, puisque ceux-ci nécessitent plusieurs prérequis, comme la capacité à gérer les obstacles et à diviser son attention entre la marche et la réalisation d'une tâche secondaire. Plusieurs études ont démontré la présence d'interférences lors d'une double tâche (DT), chez les personnes ayant subi un AVC. Ces études utilisent cependant des tâches peu représentatives de vie quotidienne, malgré l'influence connue de la nature de la tâche sur les performances locomotrices et cognitives. L'objectif est de mesurer l'interférence d'une DT lors de la réalisation de tâches locomotrices et cognitives représentatives de la vie quotidienne chez les personnes ayant subi un AVC.
Matériels et méthode Quinze personnes ayant subi un AVC devront se déplacer, à l'aide d'une plateforme omnidirectionnelle, dans un centre commercial virtuel (casque de réalité virtuelle) tout en mémorisant une liste d'épicerie. Deux niveaux de difficultés locomotrices et cognitives seront utilisés. Les interférences induites par la DT seront mesurées en comparant les performances locomotrices et cognitives lorsque les tâches sont effectuées séparément avec celles mesurées lors de la réalisation simultanée de ces tâches (test-*t* apparié). L'impact de la difficulté des tâches sera mesuré en comparant les interférences (ANOVA).
Résultats attendus La réalisation simultanée de tâches locomotrices et cognitives représentatives de la vie quotidienne aura un impact sur les performances locomotrices et cognitives des personnes ayant eu un AVC. La complexité des tâches influencera l'interférence.
Mots clés Locomotion ; Double tâche ; AVC

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Effect of upright standing postures on cortical oscillation spectral power modulations

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Introduction Amplitude modulation of cortical oscillations are associated to various movement parameters. Recently, theta-band cortical oscillations were shown to be involved in maintaining upright posture. However, the function of delta-, alpha-, beta-, and gamma-band cortical oscillatory components still needs to be clarified. To provide further understanding of the function of cortical oscillations in controlling balance, we investigated the effect of different upright standing postures on the modulation of cortical oscillations.
Materials and methods Brain activity and ground reaction forces of 13 participants were recorded using 64 electroencephalographic electrodes and a force platform. Participants stood upright in four conditions: with regular and narrow stance widths and on firm and foam surfaces. To obtain modulation of cortical oscillations, brain activity was also recorded while sitting on a chair. Modulation of cortical oscillation spectral power and the confidence ellipse area of the center of pressure displacement were compared between stance widths and surfaces using a linear mixed model.
Results Confidence ellipse area significantly increased during the narrow and the foam conditions. Delta-band synchronization significantly increased in the central region during foam and narrow conditions. In all conditions, alpha- and beta-band showed desynchronization in the central region. Additionally, alpha-band showed desynchronization in frontal and occipital regions, which was significantly greater during narrow stance conditions. Finally, gamma-band synchronization significantly increased in the right temporoparietal junction during narrow and foam conditions.
Discussion/conclusion Alpha- and beta-band desynchronization as well as delta- and gamma-band synchronization and their modulations during unstable postural conditions highlight the involvement of these cortical oscillatory components in balance control.
Keywords Balance; Electroencephalography; Task-related spectral power; Center-of-pressure

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Collision avoidance strategies in older adults

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Introduction In the younger adult (YA) population, collision avoidance has been found to be a collaborative process between two walkers. Further, the crossing order of two walkers, whether one crosses in front of or behind the other individual, is preserved during the interaction and impacts adaptive strategies used during locomotion. While these findings are consistent when analyzing YA, it is unknown whether these same anticipatory and adaptive strategies exist during collision avoidance in older adult (OA). The current study aims to identify whether differences in collision avoidance behaviours of OA during a person—person collision avoidance task are the result of age-related visuomotor processing deficits. It is hypothesized that OA will have delayed visuomotor processing leading to different adaptations.
Material and methods Eighteen OA (age 65—74) and eighteen YA (age 18—30) walk from one end to the opposite end of a 15 *15 m experimental area. During a single session, three YA and three OA participate in 141 walking trials resulting in YA/YA, YA/OA and OA/OA interactions. We analyzed participants' trajectories and computed number of crossing order inversions as well as clearance distance.
Results There were more crossing order inversion as well as smaller clearance distance in OA/OA interactions in comparison with YA/YA or YA/OA interactions.
Discussion/conclusion Although OA have similar and correct avoidance strategies as YA, their avoidance onset occurs later (i.e. closer to the other person), suggesting it is most likely due to delays in their visual processing, resulting in these different actions.
Keywords Person—person interaction; Collision avoidance; Human locomotion; Older adults behaviours; Perception—action integration