

INFOGRAPHIC: Body balance is not as automatic as we might think: insights from cortical activity in different balance tasks

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ABBREVIATIONS

EEG Electroencephalography
fNIRS Functional near-infrared spectroscopy

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INTRODUCTION

The perspective that the cortex controls body balance has gained attention with the advent of neuroimaging techniques that measure cortical activity on-site ¹. The growing accessibility of equipment like functional near-infrared spectroscopy (fNIRS) and electroencephalography (EEG), combined with advancements in data processing methods, make it possible to study cortical activation in the performance of balance tasks across various contexts ². Given that body balance depends on specific skills, investigating it through the lens of cortical activity provides insights into underlying higher-order neurologic mechanisms. Results from research addressing this topic have been summarized in different literature reviews ^{2,3,5}.

The reviews indicated that during balance control, the manipulations of visual and/or somatosensory information led to prevalent activity in the parietal, frontal and temporal regions; manipulations of the support base led to prevalent activity of the parietal and frontal regions; both balance-cognitive dual-tasking and reactive responses to extrinsic perturbations led to prevalent activity in the frontal and central (motor cortex and proximal sites) regions ²⁻⁴.

These cortical regions appear to play a major role in balance control both in healthy ³ and neurological ⁴ individuals. Thus, in neurologic research these results are able to guide the elaboration of accurate hypotheses on expected cortical sites activated to deal with body balance tasks. In clinical practice, the reviewed results can orient balance task selection aiming to stimulate precise cortical sites for rehabilitation purposes in neurological patients.

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