Contribution ID: **354** Type: **Poster**

Understanding the Impact of Limb Dominance on Body Representation Following Amputation: Insights from a Behavioral Study

Wednesday, September 25, 2024 2:10 PM (20 minutes)

Previous findings show a strong involvement of the right dominant limb on the Body Schema (BS), a sensorimotor body map: a dominant body part is recognized faster than the non-dominant one in a mental rotation task (e.g., 'feet dominance effect'). Although the reorganization in the left hemisphere strongly impacts the body processes involved in motor control, further investigations must clarify the effects of dominant limb amputation on other body representations, as on the one coding visuospatial inputs (Body Structural Representation, BSR).
This study assessed the BSR changes occurring as a function of the dominant or non-dominant lower limb amputation.
Twenty-five participants (22 males; 13 with right amputation; age: 42.6±11.4) underwent a task implicitly investigating the BSR.
Participants responded manually to the colour of task-relevant stimuli superimposed upon non-task-relevant pictures of feet and hands.
Faster reaction times (RTs) were expected for the body parts envisioned on the same side of the space of the task-related response key (e.g., 'Sidedness effect').
Results confirmed the consistency of the Sidedness effect ($F(1,23)=7.32$; $p=.01$, $\eta 2g= .003$) but showed significantly slower RTs in participants with dominant amputation compared to those with non-dominant amputation ($W= 187$; $p=.002$; $\delta=.23$).
The Sidedness effect supports the hypothesis that amputees can implicitly access BSR. However, in the case of right dominant limb amputation, the access appears to be more demanding as it requires a massive and general cortical reorganization in the left hemisphere, which is acknowledged to be more involved in body processing.

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Session Classification: Lunch & Poster 3