

**Could cognitive and emotional information processing influence obstacle negotiation in patients with Parkinson's disease and freezing of gait?**

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Freezing of gait (FoG) causes a transient inability to generate an effective forward stepping. The underlying pathophysiology is still not fully understood: an emerging hypothesis explain FoG episodes as a processing overload of information produced by faulty basal ganglia control of cognitive, limbic and motor networks [1].

In order to study the cognitive and emotional information processing influence on FoG genesis, we used emotional images (from the International Affective Picture System - IAPS) and cognitive inputs (visual perturbation in obstacle crossing tasks) during an obstacle negotiation task. 12 Parkinson's patients with FoG, 11 without, and 15 healthy elderly controls underwent neurological, neuropsychological, and affective assessments. 20 different images were used as emotional stimuli; the cognitive stimulus consisted in an obstacle with a light placed at its top. Standing participants were asked to look at a screen (where the IAPS images were presented) and to walk and step over the obstacle in the middle of the walkway. In half trials, when the subject began the last step before overcoming the obstacle, the light placed on the top was turned on randomly. When the unpleasant images were presented, PD-FoG group showed slow reaction times ( $p=0.028$ ), longer times to approach ( $p=0.012$ ) and cross ( $p=0.023$ ) the obstacle, and lower step clearance ( $p=0.020$ ) when the light was off. A similar slowing was present in the mean velocity of the crossing step in response to unpleasant images ( $p=0.044$ ). Our data support the hypothesis that the increase of cognitive and emotional information processing could affect FoG.

**References**

[1] D. Weiss, A. Schoellmann, M.D. Fox, N.I. Bohnen, S.A. Factor, A. Nieuwboer, M. Hallett, S.J.G. Lewis. Freezing of gait: understanding the complexity of an enigmatic phenomenon. *Brain*. 2020 Jan 1;143(1):14-30.