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Peer-reviewed author version

BALISTIERI SANTINELLI, Felipe; Sebastiao, Emerson; Simieli, Lucas; Palucci Vieira, Luiz Henrique; Antunes, Barbara Moura; Kalron, Alon & Barbieri, Fabio Augusto (2021) Relationship of BDNF and gait in multiple sclerosis. In: Multiple sclerosis, 27 (S3), p. 33 (Art N° 64).

Handle: http://hdl.handle.net/1942/36486

## Relationship of BDNF and gait in multiple sclerosis

## Main author: Felipe B. Santinelli

Felipe Balistieri Santinelli<sup>1,2</sup>; Emerson Sebastião<sup>3</sup>; Lucas Simieli<sup>4,2</sup>; Luiz Henrique Palucci Vieira<sup>2</sup>; Barbara Moura Antunes<sup>2</sup>; Alon Kalron<sup>5</sup>; Fabio Augusto Barbieri<sup>2</sup>.

<sup>1</sup> Hasselt University, Diepenbeek, Belgium; <sup>2</sup> São Paulo State University, Bauru, Brazil; <sup>3</sup> Northern Illinois University, Dekalb, United States of America; <sup>4</sup> Faculdade ESTÁCIO DE SÁ, Ribeirão Preto, Brazil; <sup>5</sup> Tel-Aviv University, Tel-Aviv, Israel.

Brain-derived neurotrophic factor (BDNF) has a key role in the recovery of the central nervous system (CNS) and it is involved with cognition in people with multiple sclerosis (pwMS). Also, gait is impaired in pwMS, especially during walking demanding higher cognitive resources such as walking avoiding an obstacle. However, it is not known if BDNF is related to walking in pwMS. We aimed to investigate the relationship between BDNF and spatial-temporal gait parameters in pwMS. Twenty pwMS and 18 healthy controls (HC) walked, at their self-selected speed, in two conditions: unobstructed gait and avoiding an obstacle (15cm height). BDNF serum concentration was obtained with the participants in fasting. Gait parameters were acquired using a motion capture system (Vicon<sup>®</sup>). We used five steps performed in the middle of the walkway for the unobstructed gait (average values), while in the obstructed gait, the analysis was divided into approaching phase (AP- three steps before the obstacle – average values) and crossing phase (leading and trailing steps). The step length, width, duration, velocity, and double support time were calculated. The horizontal distance from both leading and trailing steps before  $(T_{-1})$  and after  $(H_{+1})$  to the obstacle was also calculated. Pearson's correlations were performed between BDNF and gait parameters. For the pwMS, higher BDNF was related with faster step (r=0.442, p<0.05- unobstructed), with longer (r=0.469, p<0.03) and faster (r=0.473, p<0.03) step, lower time in double support (r=-0.461, p<0.04) and with farther T<sub>-1</sub> of the leading step (r=0.486, p<0.03) (obstructed). In addition, higher BDNF was related to smaller steps (r=-0.598, p<0.009) for the HC during AP. Higher BDNF serum concentration was related to a better gait behavior in pwMS, mainly during a task requiring higher cognitive demands. The relationship between these parameters may be attributed to the role of BDNF on cognition and recovery of the CNS.