

The effects of mechanical focal vibration (Equistasi®) on walking impairment in multiple sclerosis patients: a randomized, double-blinded vs placebo study

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Introduction and Aims

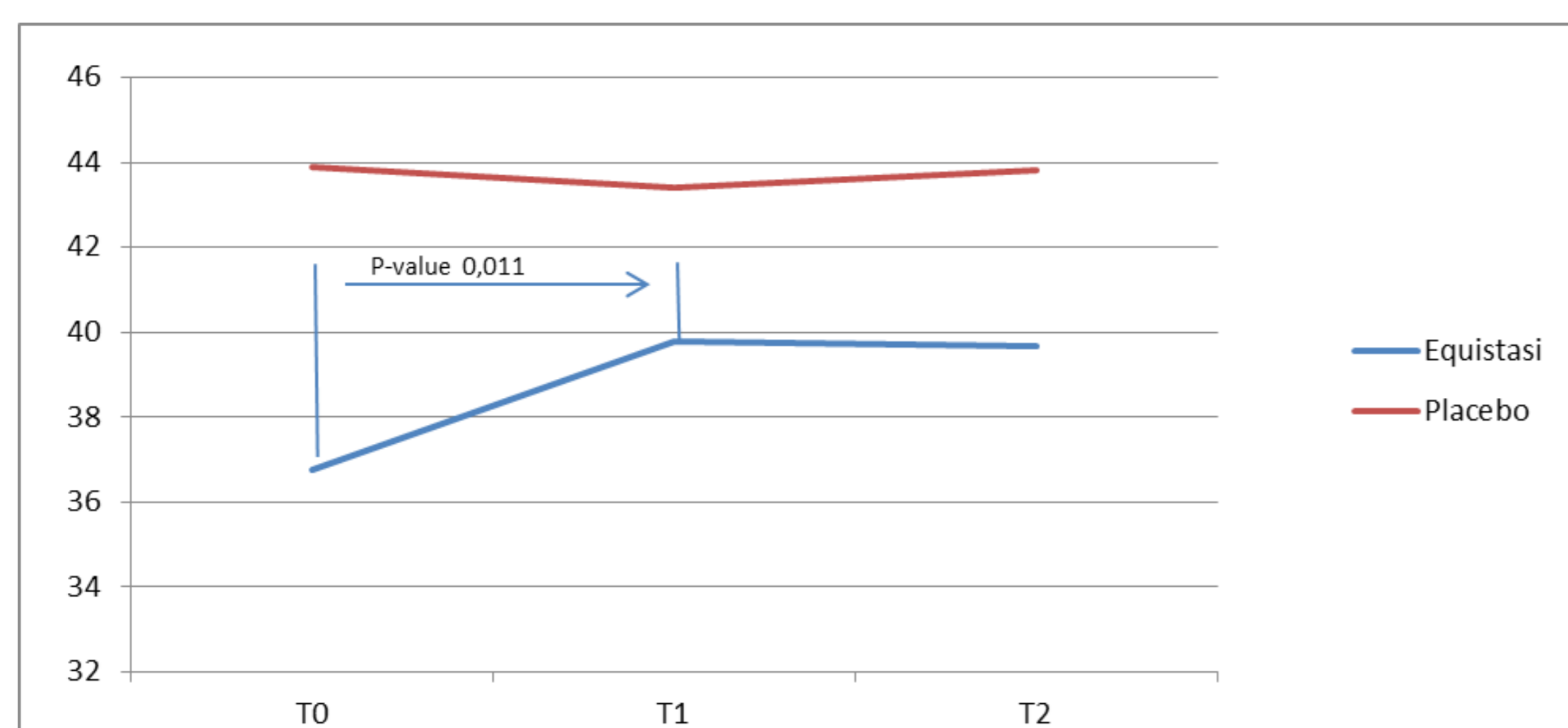
Multiple Sclerosis (MS) is an heterogeneous disorder affecting gait and balance since early stages. Together with immunomodulating therapies, rehabilitation had a crucial role in improving motor tasks and quality of life. Among the emerging techniques, Focal Vibrations (FV) could play a role as rehabilitative tool, but they have been used, at present moment, in MS only to reduce muscle tone and fatigue alone or together with botulinum toxin. Our aim was to assess whether FV is effective on walking impairment in a cohort of MS patients.

Methods

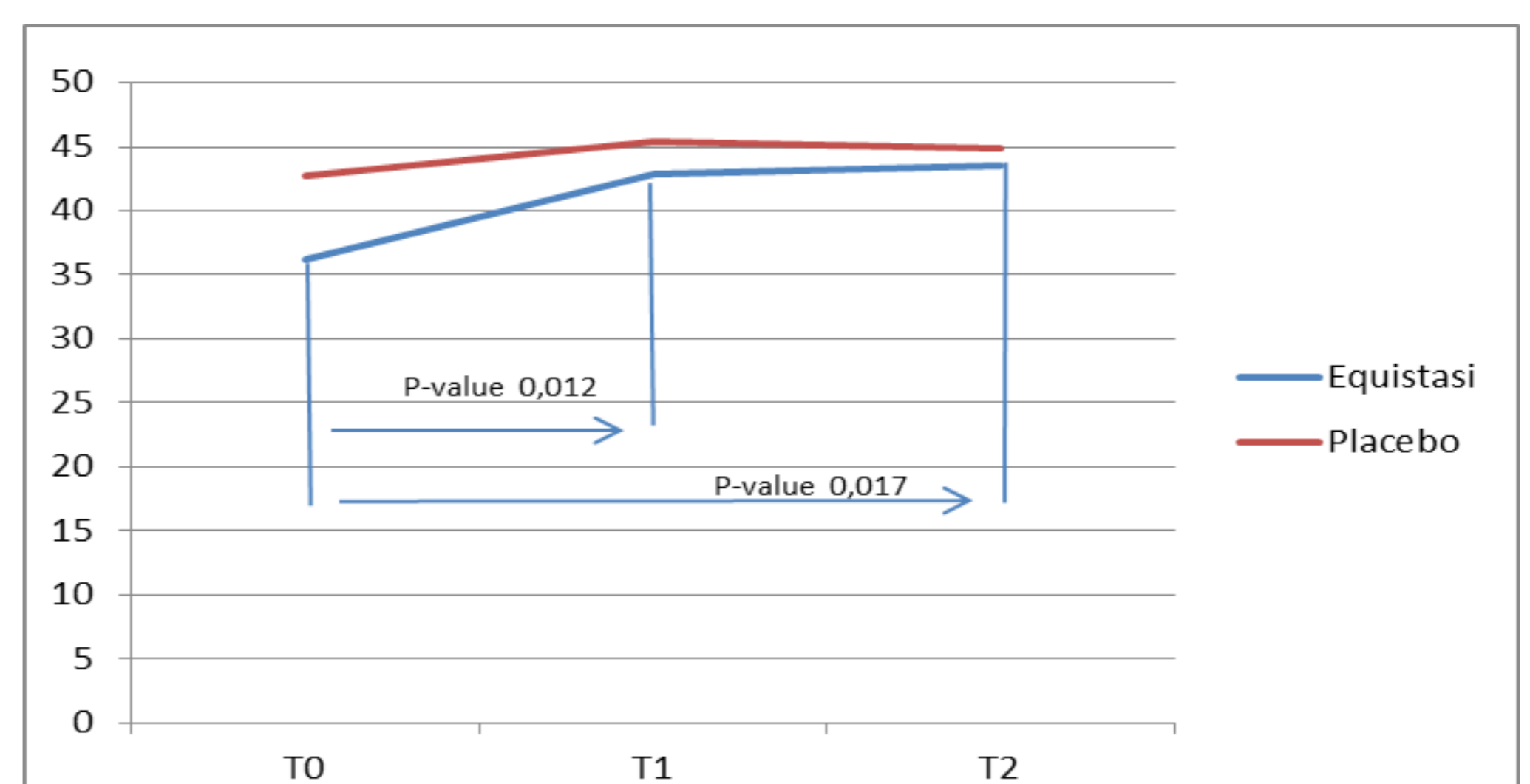
We performed a single-centre randomized, double-blind, sham-controlled study to investigate the efficacy of FV vs sham vibration in 20 Relapsing Remitting (RR) MS patients suffering from spasticity and gait imbalance. Ten patients received active device and ten patients the sham ones. Demographical, clinical and gait instrumental data analysis have been collected for each patient at baseline (T0), after treatment (T1) and after three weeks of wash out (T2).

Results

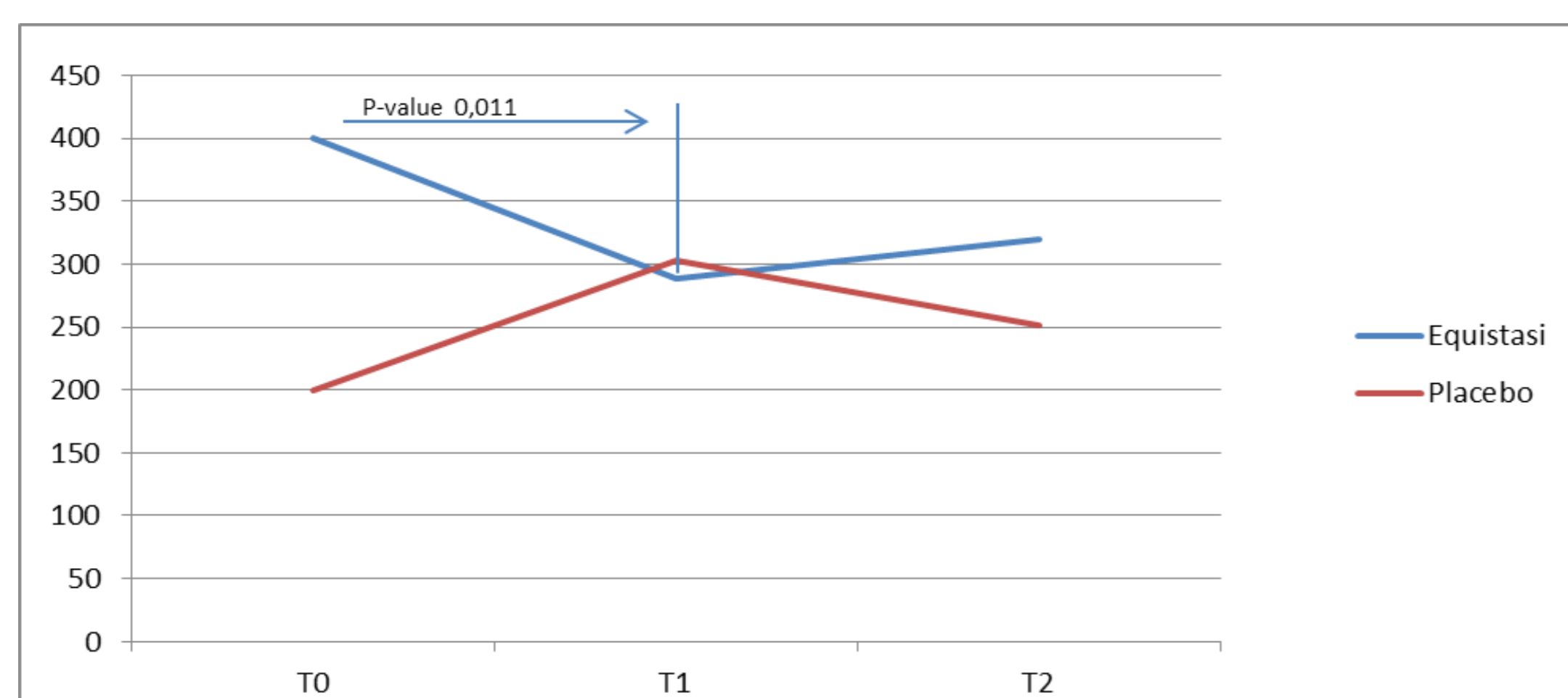
Case and control groups were comparable for clinical and demographic differences. Treated patients showed significant improvements during the first right step (FRS) ($p=0.007$), average stride length (ASL) ($p=0.012$), double support right (DSRT) ($p=0.016$) and left (DSLTL) ($p=0.003$) time. Non-treated patients did not improve in any variable after sham treatment. Moreover on posturographic measurements we registered only a trend towards significance in swing area with eyes open (SAEO) ($p=0.087$) after treatment. We found in treated group significant improvements in functional reach test (FRT) ($p=0.018$); Berg Balance Scale (BBS) ($p=0.037$) and Fatigue Severity Scale (FSS) scales ($p=0.038$) between T1 and T0 too. Lastly we found an inverse correlation in treated group between disease duration and percentage of improvement for DSLTL ($r=-0.775$; $p=0.014$) in T1 vs T0 and between percentage of improvement of FSS with both disease duration ($r=-0.775$; $p=0.014$) and age ($r=-0.733$, $p=0.025$) in T1 vs T0



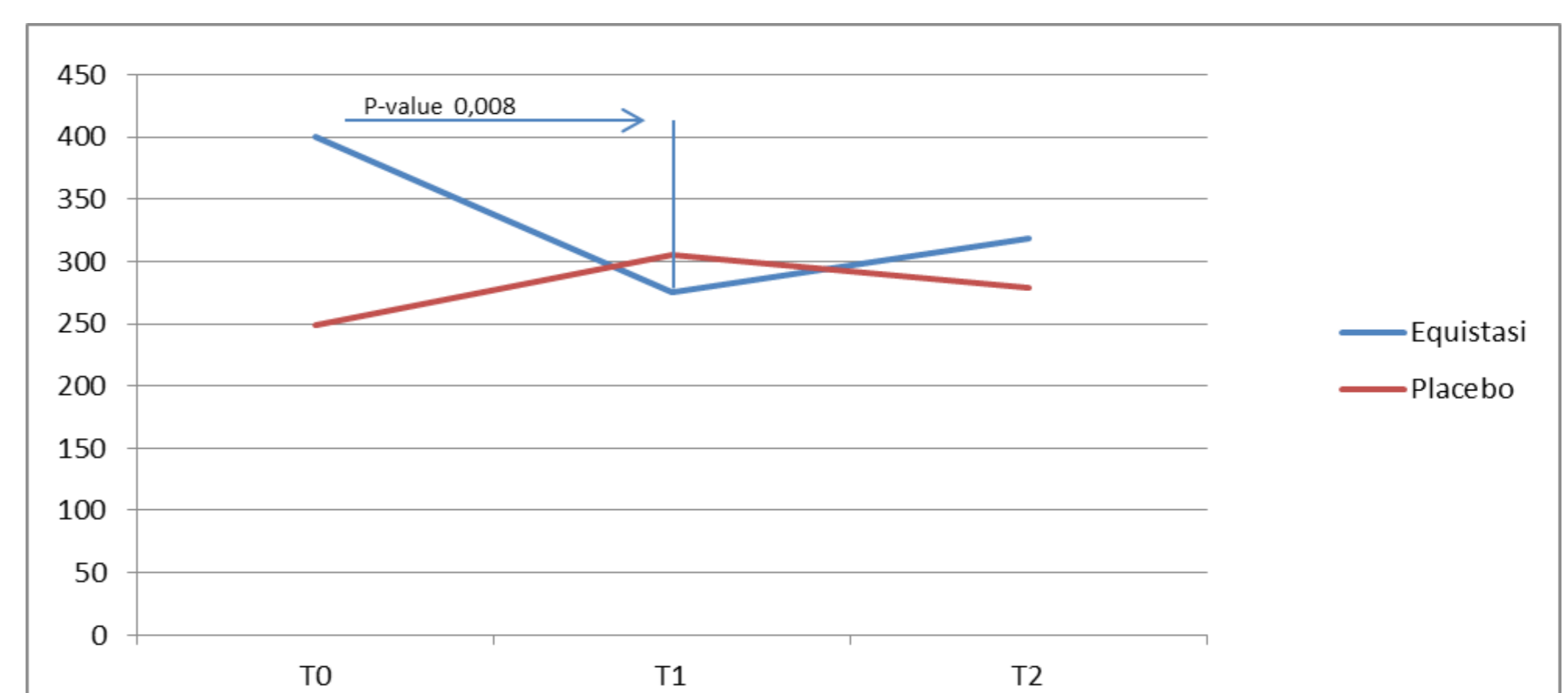
Average stride length (cm)



First right step (cm)



Double support right time (ms)



Double support left time (ms)

Conclusions

Our results suggested a beneficial effect of FV on walking impairment in MS patients suffering from spasticity and/or postural instability, partially lasted after follow up.

References

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2. Paoloni, M., Giovannelli, M., Mangone, M. et al. (2013). Does giving segmental muscle vibration alter the response to botulinum toxin injections in the treatment of spasticity in people with multiple sclerosis? A single-blind randomized controlled trial. *Clinical Rehabilitation*. 27(9):803-12.
3. www.equistasi.com