

## Quantitative spatio-temporal gait parameters while walking and dual tasking in functional gait disorders: a possible new biomarker

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*Introduction:* Functional gait disorders (FGDs) are disabling symptoms of Functional Motor Disorders. Clinical observations show gait improvement with distraction suggesting an association with higher-level control mechanisms [1-2]. Dual tasking is a valuable tool for exploring the interplay between gait and cognition [3].

*Objective:* To identify measures of quantitative spatio-temporal gait parameters while walking and dual tasking in FGDs that best discriminate performance from healthy controls.

*Methods:* This observational cross-sectional study enrolled 76 patients with FGDs (77.63% females; mean age  $41.85 \pm 15.26$ ) and 42 healthy controls (59.52% females; mean age  $42.14 \pm 16.03$ ). An electronic walkway performed spatio-temporal gait analysis under a single task (ST), a motor DT (mDT), a cognitive DT (cDT), and a visual-fixation DT (vDT) [1-3]. Outcome measures included gait speed (cm/s), swing time variability (%), and stride time variability (%) as a measure of high-level gait control [2]. The Dual Task effect (DTE, %) was calculated to evaluate the gait performance changes induced by the dual task with respect to a single task [3].

*Results:* Overall lower gait speed and higher stride time variability were noted in FGDs compared to healthy controls (for all,  $p < 0.001$ ). No significant Task $\times$ Group interactions were detected in any gait measure. There was a significant effect of group and Task $\times$ Group interaction for the dual-task effect on gait speed ( $p < 0.001$ ) but not for swing and stride time variability.

*Conclusions:* FGDs reported poorer gait performance and less automaticity and steadiness than healthy controls. However, gait performance but not automaticity and steadiness were affected by dual tasking, unlike different neurological diseases. Our findings shed light on higher-level gait control mechanisms in FGDs and suggest stride time and swing time variability as potential diagnostic biomarkers.

### References:

- [1] Gandolfi et al., 2021; Motor dual task with eyes closed improves postural control in patients with functional motor disorders: A posturographic study; Gait Posture.
- [2] Geroin et al., 2018; Does dual-task training improve spatiotemporal gait parameters in Parkinson's disease?; Park Relat Disord.
- [3] Gandolfi et al., 2023; Dual tasking affects gait performance but not automaticity in functional gait disorders: A new diagnostic biomarker Park Relat Disord.