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# Reappraisal of gait patterns in minimally impaired Multiple Sclerosis patients reveals characteristic foot shuffling sounds

van Zwieten, Koos Jaap; Narain, Faridi H.M.; Kosten, Lauren; Wens, Inez; Eijnde, Bert O.; Vandersteen, Marjan; Schmidt, Klaus P.

University of Hasselt, Diepenbeek, Belgium

While Neamțu et al. (2012) have sufficiently explained the various morphofunctional aspects of lower limbs in multiple sclerosis (ms), several multiple sclerosis patient communities worry about questions as : “Can ms cause legs to turn outwards ?” (<http://www.mssociety.org.uk/>). For this reason, our Functional Morphology group at the BioMed Research Institute of the University of Hasselt, Belgium, performed a meta-analysis of archived data, based on clinical observation in minimally impaired multiple sclerosis patients during shod walking exercises on a treadmill. Because early ms patients sometimes experience their forward swinging feet to drag, or to catch the floor unintentionally, special attention was paid to the initial and terminal swing phases of gait. Remarkably, characteristic shuffling sounds (frequencies roughly estimated between 1,5 kHz and 2 kHz) could be noted in the terminal swing phases, e.g. after fatigue. As a working hypothesis, we adopted the next explanation. In healthy subjects, the swing phase of gait starts with a distinct eversion of the foot (see left person in Figure 1). The swing phase ends with a heel stroke including slight dorsiflexion of the foot, which is accompanied by an inversion of the foot (see right person in Figure 1). Heller et al. (2013) state that in ms patients, inversion of the foot at terminal swing is insufficiently corrected. However, it is the inversion of the foot at the end of the stance phase that is insufficiently corrected because of poor eversion of the foot in the early swing phase, which results in early ground contact of the outside border of the still partially inverted foot in the terminal swing phase. This in turn leads to producing the characteristic high-pitched shuffling sounds, generated in fact by a temporary friction of the outside border of the shod foot-in-terminal-swing, along the surface of the treadmill belt. Such shuffling sounds may be considered pathognomonic for some minimally impaired Multiple Sclerosis patients.



Figure 1. Young people walking barefoot (tracing of a random photograph, selected from a newspaper)

## References

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