Musician's Dystonia: Family History as a Predictor for Onset and Course of the Disease

Musician's dystonia (MD) is a task-specific movement disorder that leads to the loss/deterioration of control of highly skilled movements at the instrument.

The pathophysiology is not fully understood; however, a number of risk factors are known like genetic predisposition and workload/over-practice at the instrument.[1] The importance of over-practice in the genesis of MD is corroborated by the higher prevalence in instrumentalists with higher virtuoso demands and is consistent with findings of an influential non-human primate model in which an occupationally derived dystonia was induced by highly repetitive movements over an extended period of time.[2]

Other studies, showing neurophysiological alterations in healthy relatives of patients with dystonia[3] as well as brain network alterations in patients even in the absence of a dystonic task,[4] have suggested an underlying endophenotype. Thus, unsurprisingly, a genetic predisposition in the form of a positive family history (FH+) for dystonia was found in MD. Interestingly, individuals with FH+ for non-dystonia movement disorders also had an increased risk of developing dystonia.[5] This is consistent with frequent overlapping of symptoms of dystonia, tremor, and Parkinson's syndromes, and with evidence that dystonia shares some pathophysiological traits with other movement disorders,[6,7] including functional maladaptation of basal ganglia, cerebellum, and sensorimotor networks.

To assess the impact of genetic influence on course and outcome of MD we collected data from 367 MD patients treated in our specialized outpatient clinic. We divided the patients into two groups with either a positive family history for movement disorders such as dystonia (eg, writer's cramp, musician's dystonia), tremor, and Parkinson syndromes (50 patients, FH+) or a negative family history (314 patients, FH−). Three patients with a family history of other neurological diseases were excluded.

Using Wilcoxon rank sum tests for non-parametric data and a chi-square test for outcome measures of the course of MD, we found that cumulative practice time until onset of MD and age of onset were significantly lower in the FH+ group. Taking into account the high correlation of age and cumulative practice time, we performed a post-hoc analysis and found a significantly earlier onset of dystonia in professionals compared to amateurs, corroborating workload as the primary risk. Moreover, a significantly larger portion of FH+ patients reported a deterioration of symptoms over time (Fig. 1, Appendix: Table S1). These findings suggest that structural/functional neural alterations found in MD may be less reversible in the case of a genetic predisposition than alterations caused mainly by overtraining, which in turn could be more amenable to interventions such as retraining.

Limitations of our study are in particular the retrospective data collection and, while this is to our knowledge the largest sample of MD patients evaluated in terms of family history, it was still too small to allow for statistical comparison between different kinds of family history with regard to type and frequency of movement disorders.

Our findings suggest that when counseling MD patients with a positive family history of movement disorders, the emphasis should be on alternative career options other than concert activity at the time of the diagnosis.

Acknowledgments: We would like to thank the participants of this study. Open Access funding enabled and organized by Projekt DEAL.

Key Words: musician's dystonia; task-specific dystonia; family history; genetic predisposition

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Funding Agencies: The study was funded by Hannover University of Music, Drama and Media, Hannover, Germany.

Received: 8 March 2023; **Revised:** 28 April 2023; **Accepted:** 1 May 2023

Published online 22 May 2023 in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/mds.29448

Data Availability Statement

The data that support the findings of this study are available on reasonable request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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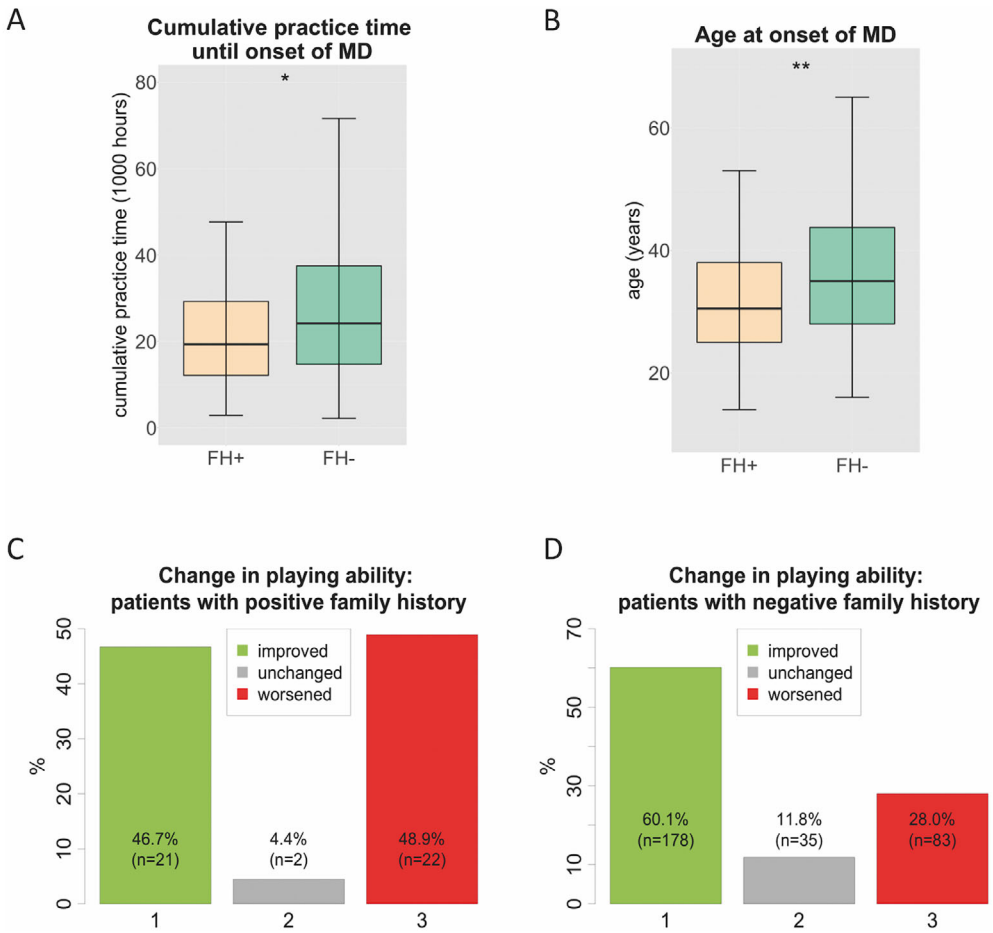

FIG. 1. (**A**) Cumulative practice time (1000 hours) until onset of musician's dystonia (MD) in patients with positive (FH+) versus negative (FH−) family history for movement disorders. (**B**) Age at onset (years) of MD in patients with positive (FH+) versus negative (FH−) family history for movement disorders. (**C**) Change in playing ability since onset of MD in patients with positive family history for movement disorders: improved, unchanged, worsened (%). (**D**) Change in playing ability from onset of MD until visit in patients with negative family history for movement disorders: improved, unchanged, worsened (%). [Color figure can be viewed at wileyonlinelibrary.com]

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Supporting Data

Additional Supporting Information may be found in the online version of this article at the publisher's web-site.