

TREATMENT EVALUATION IN MUSICIAN'S DYSTONIA USING OBJECTIVE QUANTIFICATION TOOLS: FOLLOW-UP AFTER DIFFERENT THERAPIES

Hans-Christian Jabusch

Eckart Altenmüller

Institute of Music Physiology and Musician's Medicine, Hanover University of Music and Drama, Germany

Background

Musician's dystonia is a task-specific movement disorder which presents itself as a loss of voluntary motor control in extensively trained movements. So far, the degree of the disorder has mainly been estimated by visual inspection and comparison of video documentations. Due to the lack of a reliable quantification method, follow-up examinations were difficult to assess and evaluation of different therapies was hardly possible.

Aims

Two different techniques have been developed for quantification of musician's dystonia. The aim was an evaluation of treatment effects in affected musicians.

Methods

- 1) For assessment of dystonia in pianists, a MIDI-based software has been developed to analyze irregularities in scale playing. Velocities, tone durations, inter onset intervals and tone overlaps were derived for all individual notes of C-Major scales played in a standardized tempo. Mean standard deviations of the respective parameters were calculated.
- 2) For quantification of focal dystonia in non-keyboard musicians (e.g. string and wind players), a computer based three-dimensional movement analysis system has been utilized.

Standardized movements of affected hands were captured by digital high-speed video cameras and finger movements were tracked by a computer. Parameters such as velocities and accelerations of phalanges were analyzed.

Quantification methods were used for follow-up examinations in musicians with dystonia during treatment with Botulinum Toxin-A or during pedagogical retraining.

Results

Therapies such as injection of Botulinum Toxin-A or pedagogical retraining resulted in relief of symptoms in musicians with focal dystonia. In pianists, scale analysis revealed a significant decrease of irregularities in scale playing after treatment. In non-keyboard musicians, movement analysis demonstrated initial alterations in acceleration behavior of affected fingers as well as substantial improvement after treatment.

Conclusions

Quantification tools allow us to monitor the development of movement disorders on the instrument and to display encouraging treatment effects of pharmacological and pedagogical treatment approaches.