Discrimination of Dizziness and Detection of Alcohol Consumption by Posturography

David Sommer, Andreas Fey, Hendrik Storch, Martin Golz
Department of Computer Science, Fachhochschule Schmalkalden - University of Applied Sciences
Schmalkalden, D-98574, Germany

Leif Erik Walther
University Hospital Aachen
Aachen, D-52074, Germany

Christian Eurich
Institute for Theoretical Physics, University Bremen
Bremen, D-28334, Germany

Posturography is widely used for quantitative assessment of balance control in patients with vestibular dysfunction. In the last decade a diversity of different analysis methods was proposed by several authors. We present results of some explorative and descriptive methods applied to time domain parameters and some nonlinear discriminance analysis methods applied to spectral domain parameters. Data of two different investigations are analyzed to evaluate sensitivity. In a first study the sensitivity to discriminate six patients with dizziness against 21 patients without dizziness is investigated. The objective of the second study was to investigate whether the postural control of normal subjects is influenced by a medium dose of alcohol. 51 young volunteers without known vestibular diseases examined 40-seconds trials on a fixed surface. Trials were completed under two conditions: eyes closed / opened and before / 40 minutes after consumption of 32 grams of alcohol. Results suggest that the combination of posturographic measurements, spectral domain analysis and neural network based discriminance analysis demonstrates highest sensitivity in discrimination of dizziness and in detection of small influential effects.