Detecting periodic limb movements with off-the-shelf accelerometers: a feasibility study.

Periodic limb movements are short movements of the legs that can lead to low sleep quality in the general population. Currently, the gold standard to measure periodic limb movements for diagnostic purposes is polysomnography. This is an expensive technique that requires specially fitted laboratories and specialized personnel. In this paper we explore the use of commercial, off-the-shelf accelerometers to detect periodic limb movements during sleep and compare the results to the gold standard. We recruited two subjects for one night and measured limb movements with polysomnography and Actigraph GT3X accelerometers. We developed an open source Java application for processing the data. A total of 846 events were recorded. We found a very low similarity between polysomnography and GT3X data, indicating that our accelerometer-based method is not yet feasible for medical diagnosis. Several options for further development are: the exploration of different sensor locations, sensors with higher sampling rates, as well as enhancement of data analysis methods.