Prepare of arrays arranged flexible EMG electrodes and identification of muscle fatigue

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Abstract

Recognition and analysis of electromyography (EMG) signals have been applied in the detection of neuromuscular diseases[1, 2, 5]. However, there is still limitation of measuring the EMG signals in measured location, connecting and accuracy by using the traditional electrodes. In this work, micro-fabrication technology[3, 4, 6, 7] will be used to design and manufacture flexible EMG electrode devices with electrode arrays arranged on its surface. A signal acquisition system based on the flexible EMG electrodes will also be established to realize the convenient, real-time, multi-part and wearable acquisition of spatial distribution of EMG signals. Mechanical characterization experiments, electrical test experiments and numerical calculation methods will be carried out to optimize the electrode structure, thus improve the mechanical properties and signal acquisition performance of the electrodes. Depending on the flexible EMG electrodes, acquisition methods based on the spatial EMG signal distribution will be studied. Methods of feature signals extraction and pattern recognition analysis will be developed to improve the accuracy of identification of muscle fatigue. This work aims to integrate a set of EMG signal acquisition system based on the arrays arranged flexible EMG electrodes, and develop the analysis and identification methods for identification of muscle fatigue as well as other muscle diseases, which will be of great significance for promoting the development of wearable intelligent medicine systems.

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