



GUIDING (METHODOLOGICAL ASPECTS) FOR ELECTROMYOGRAPHIC SIGNALS COLLECTION IN EXPERIMENTS FOR GAIT ANALYSIS

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Background, Motivation and Objective. The gait can be analysed and studied by different methods, among them the electromyography (EMG). This work consists in the elaboration of a directing guide of actions that must be performed in experiments to collect electromyographic signals, to study and analyse relevant aspects related to human gait. These procedures use active surface electrodes, characterizing non-invasive data collections, whose focus is the study of muscle function through the interpretation of the electrical signal that the muscles distribute. Due to the lack of substantial information on electromyographic data collection, a need was felt for a standard design, characterized by a description of all the procedures to be followed during the experiments. The objective of the present study was to propose a guide for surface electromyograms acquisition during gait analysis. It is hoped, therefore, to optimize the time and mitigate failures or errors that could compromise the result, guaranteeing greater reliability of the electromyographic characteristics collected.

Methods. After approval by the Ethics Committee, the collection procedure begins, following guidelines that have the effect of improving the reliability and viability of the search. The next steps to be followed include preparation of materials and skin, positioning of the electrodes, the normalization and control of the equipment used (DOI: 10.1016/j.jelekin.2010.07.004). The following materials are indispensable for the collection of electromyographic signals in scientific research: electromyograph; surface electrodes; portable computer; gloves and aprons; shaving foam and disposable razor (for trichotomy); cotton towel or paper; water and alcohol 70%; scissors and micropore (to standardize the size of the electrodes and obtain a better fixation of them on the skin, respectively). For the collection of the electromyographic signals, it is suggested the execution of three stages: I) Preparation of Environment and Individuals; II) Placement of the electrodes at points where the electrochemical potentials reach the muscle fiber with greater amplitude, that is, the muscle bellies (DOI: 10.1016/S1050-6411(00)00027-4); III) Measurement of the Maximum Voluntary Isometric Contraction – MVIC (MVIC of each muscle represents measurements as the basis for signal normalization).

Results. With the development of this work, it was possible to improve the process of capture of electromyographic signals by describing the stages of experimentation. With this guide, the collection time is reduced, and the effectiveness of the entire process is improved.

Discussion and Conclusions. This paper presents some recommendations on the methodological aspects related to the experimental practices for the study of gait, involving the collection of



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electromyographic signals. For a more complex analysis, it is recommended to consider three aspects: electromyographic, that measures the intensities of the electrochemical potentials of the muscular fibers; kinetic, which evaluates resulting from forces; and kinematic, which allows the spatial analysis of movements as well as the course of time, speeds and accelerations. Currently, it is identified that surveys related to the collection of electromyographic data are quite lacking in methodological standardization and evaluation protocols used for the study of gait. Thus, the need for uniform and valid guidelines for the evaluation of the gait study using electromyographic data is extremely important. In this way, this guide was prepared to contribute with a greater contingent of information, facilitating its reproduction by being simple and easy to apply, in order to encourage future studies for the development of scientific and technological knowledge.

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Keywords. Collection Director, Electromyography, Gait analysis.