INTEGRATED METHODOLOGIES FOR THE ASSESSMENT OF MUSCULO-SKELETAL DISEASES

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Background

In Italy, there were about 58.129 complaints for occupational diseases in 2017; many of them were addressed to the musculoskeletal system (about 61%). This represent a relevant data of morbidity in occupational health. Musculoskeletal diseases include a great number of inflammatory and degenerative conditions that cause pain and functional limitations. They have a multifactorial etiopathogenetic with diseases mainly addressed to spine and upper-limb. Talking about activities that require a great physical effort, there are several international standards that describe and suggest methods in which the employer can conduct the analysis. In particular, concerning manual handling task, references are included in the three parts of the ISO 11228. All these methods, although easy, low cost and low time consuming, are affected by overall simplification and difficulty in context-specific applications and can brought the evaluator to a non-completely correct and largely subjective evaluation. Thus, there is the need to make more effort in find new methods and indices able to objectively quantify the real risk for the exposed population to develop work related disorders.

Objectives

The aim of the project is to develop an objective and reliable method based on technique of movement analysis and biomechanical modelling for forecasting the occurrence of Upper Limb Work-related Musculoskeletal Disorders (UL-WMSD).

Methodologies

Based on the particular field of application, we decided to use movement analysis systems based on IMU technology to easily acquire objective and reliable kinematic data directly in the workplace. To access also to some info about kinetics, surface EMG wireless system has been chosen. An "ad hoc" biomechanical model will be designed in order to process all the data and give us as feedback the biomechanical load perceived by the workers. Results will be shown in the form of synthetic indices able to predict the occurrence of Upper Limb Musculoskeletal disorders.
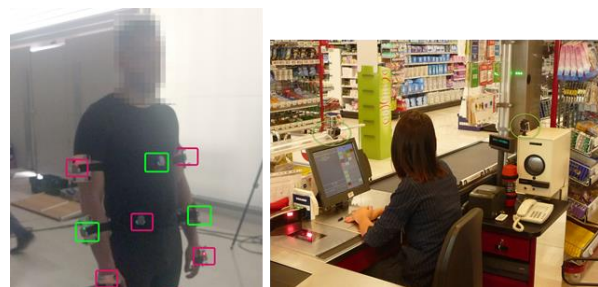

FIGURE 1. "ON FIELD" TRIALS SETUP WITH IMU SENSORS AND VIDEO ACQUISITION.

Expected Results and Impact

A new, reliable and objective method based on data acquired in the workplace, will be developed in order to help ergonomist to conduct a correct risk evaluation and thus protect workers from the development of work related musculoskeletal disorders.