

WII BALANCE BOARD AS A TOOL FOR ERGONOMIC EVALUATION DURING SURGICAL TRAINING

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Background. Surgeons spend long time standing up and in awkward postures. This has to be taken into account to reduce musculoskeletal problems for the surgeons. Moreover, it is interesting to prevent bad habits by teaching new surgeons to perform the tasks in a correct ergonomic posture.

There are tools to evaluate surgical training but usually designed to reach satisfactory results regarding the patients. Therefore and in order to evaluate the ergonomic praxis, new objective methods must be developed. Furthermore, the literature focused on the ergonomics of the lower body during MIS presents works where force platforms are used. These devices are more expensive than the Nintendo's Wii Balance Board® (WBB).

Purpose. This paper describes the design of an application that uses WBBs to capture data for an objective assessment of ergonomics.

Materials and methods. WBB is a peripheral of the Wii® gaming platform. In its original use, the user stands on it to perform different tasks that are evaluated by the console to indicate progression.

In this work, two WBBs are used in order to obtain the main metrics provided by force platforms using one WBB for each foot. Moreover all sessions were video recorded.

Results. An application which displays in real time how center of pressure (COP) and weight loading ratio (WLR) evolves in a visual and intuitive form has been developed. In addition, it also records the surgical training sessions, capturing data from the WBBs and a webcam to easily proceed to subsequent visual and statistical analysis. Same software is able to play the saved sessions with real-time graphs that indicate how the weight is distributed, making easy to show examples of good ergonomically practice, checking the progression of the surgeon or allowing self-assessment.

Conclusions. A system focused on the detecting the ergonomics of the surgeon is of high interest in surgical training for reducing physical problems associated with minimally invasive techniques.

This software, which is based on WBBs, will be used to analyze experts so a pattern of right and wrong postures could be obtained and in order to finally automate the ergonomic evaluation of the subjects.