An objective tool to detect lack of mobility of the arm and shoulder and the presence of lymphedema after breast cancer treatment

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Introduction: As survival of breast cancer is getting better, morbidity related to breast cancer treatment (BCT) is of extreme importance, namely the one related to the impairment of the arm and shoulder. Our aim was to create a "simple" tool that can objectively ascertain the lack of mobility of the arm and shoulder and the presence of lymphedema after BCT.

Methods: A series of exercises, using Microsoft Kinect®, were executed by 40 patients, after BCT. Those patients also completed the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire. Results achieved with DASH were used to train a predictive model to detect lack of mobility and lymphedema. An initial classification was given with features captured from movements performed using specific classification methods (Support Vector Machines). Agreement between DASH (ground truth) and predictive model was computed using a Misclassification Error Rate (MER) [zero - all classifications correct; 1 - none classification correct].

Results: The test results concerning the MER for lymphedema and lack of mobility was 0.15 and 0.10, respectively, which can be considered very good.

Discussion: Although the results are preliminary, this new tool performed very well. In the future, we hope to turn it in an in-home rehabilitation method.