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Mechanical biomarkers of medial compartment knee osteoarthritis diagnosis and severity grading: Discovery phase

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Title of the article

Mechanical biomarkers of medial compartment knee osteoarthritis diagnosis and severity grading: discovery phase

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Abstract

Objective: To investigate, as a discovery phase, if 3D knee kinematics assessment parameters can serve as mechanical biomarkers, more specifically as *diagnostic biomarker* and *burden of disease biomarkers*, as defined in the Burden of Disease, Investigative, Prognostic, Efficacy of Intervention and Diagnostic classification scheme for osteoarthritis (OA) [1]. These biomarkers consist of a set of biomechanical parameters discerned from 3D knee kinematic patterns, namely, flexion/extension, abduction/adduction, and tibial internal/external rotation measurements, during gait recording. Methods: 100 medial compartment knee OA patients and 40 asymptomatic control subjects participated in this study. OA patients were categorized according to disease severity, by the Kellgren and Lawrence grading system. The proposed biomarkers were identified by incremental parameter selection in a regression tree of cross-sectional data. Biomarker effectiveness was evaluated by receiver operating characteristic curve analysis, namely, the area under the curve (AUC), sensitivity and specificity. Results: Diagnostic biomarkers were defined by a set of 3 abduction/adduction kinematics parameters. The performance of these biomarkers reached 85% for the AUC, 80% for sensitivity and 90% for specificity; the likelihood ratio was 8%. Burden of disease biomarkers were defined by a 3-decision tree, with sets of kinematics parameters selected from

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