CORRELATIONS BETWEEN KINEMATICS AND CLINICAL MEASURES IN END-STAGED KNEE OSTEOARTHRITIS PATIENTS

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INTRODUCTION

Osteoarthritis (OA) of the knee, one of the most common causes of disability and continues to increase in prevalence as the older adult and obese populations grow. Biomechanical assessment during gait, which currently can be easily acquired in clinical settings [1], provides objective and quantifiable information about knee function. This leads to opportunities to develop automatic objective methods of computer aided diagnosis and personalized care pathways. A better understanding of the relationships between kinematics and clinical evaluation would be contributive. The aim of this study is to analyze these correlations and assess if they are gender specific.

METHODS

IRB approval was obtained for this non-interventional study. 143 knee osteoarthritis patients referred for orthopaedic arthroplasty consultation were enrolled in this study (mean age of 65 years old and mean BMI of 32kg/m^2). All participants underwent a treadmill kinematic assessment (KneeKG^{TM}, Emovi Inc., QC, Canada) and completed patient reported outcome measures (Oxford-12 Knee, PCS, Frailty index) as well as functional tests (Time up and Go) and clinical assessment. Knee kinematic parameters were extracted from gait patterns to assess correlation with clinical measures. Statistical analysis has been performed using the Pearson correlation coefficients between biomechanical features and clinical evaluation. Since gait parameters can differ between gender [2], the analysis has been performed for men and women separately.

RESULTS

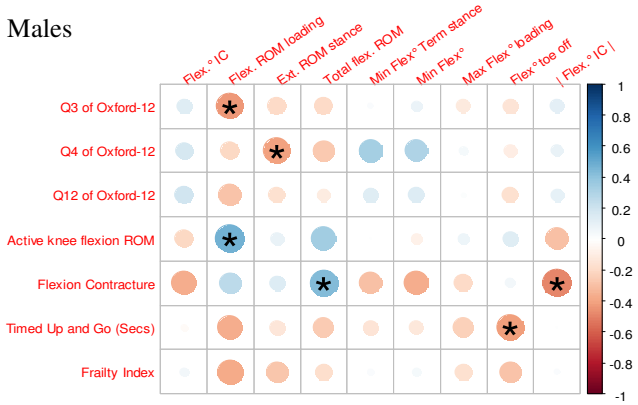
Only significant correlations ($p < 0.05$) with an absolute correlation coefficient higher than 0.4 ($|r| > 0.4$) were retained. Figure 1 (a: males) and (b: females) show the significant cross correlations between kinematic features and clinical measures, for males and females. Kinematics shown to be correlated with the level of pain during specific tasks, active range of motion, functional test and frailty. We note that for the same clinical measure, kinematic parameter correlating to it can vary based on gender. Only kinematic parameters in the sagittal presented significant correlations with $|r| > 0.4$.

DISCUSSION / CONCLUSIONS

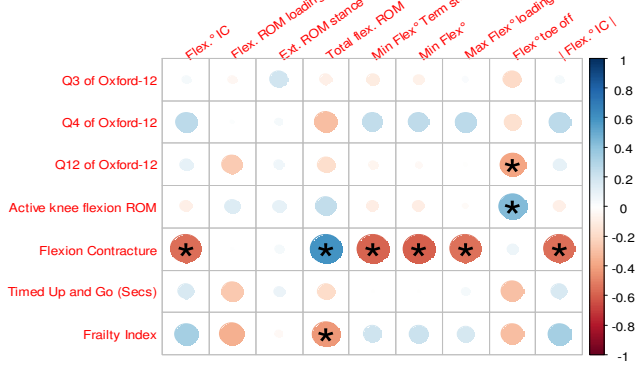
This study highlights correlations between knee kinematics and clinical measures relating to the patient's symptoms and function. Interestingly, these correlations seem to be gender dependent. Lack of correlation with parameters in frontal and transverse plane could be explained by the high inter-subject variability in this specific population. It would be interesting in future studies to explore advanced multivariate analyses to highlight correlations between two data matrices. Results help prioritize which kinematic deficiencies to address to improve patients' symptoms and function.

Figure 1: Correlation between kinematics and clinical measures. Coefficient values of linear correlations are symbolized by colour. *denotes correlations with $p < 0.05$.

(a) Males



(b) Females



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