

Mobile Jump Assessment (mJump)

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Abstract

Background. This study had two general objectives. 1) To analyse and study the kinematic characteristics in the Squat Jump and Countermovement Jump Tests, the variables studied were derived from accelerometry, angular velocity and displacement, using the inertial sensor incorporated in the iPhone 4S. 2) To study and locate the correlation between the inertial sensor variables, contact mat variables and dynamometry.

Methods. This is a cross-sectional study over 12 healthy young subjects. In an attempt to locate the series of kinematic variables that had a significant relationship degree with the contact mat or dynamometry, Pearson's linear correlation with 95% Zr. The statistical significance level was established at $p < 0.05$. The subjects performed the Squat Jump and Countermovement Jump Tests three times, and the best record was analyzed and included in the study.

Results. The best significant correlation was localized in the Squat Jump test were

between the minimum rate rotation in the z axis and jump fly time ($r=-0.793$; $p=0.002$) and jump height ($r=-0.805$; $p=0.002$). Others significant correlation in the Squat Jump test were between the maximum rate rotation in the x and: the right lower limb dynamometry ($r = -0.660$; $p = 0.020$) and left lower limb dynamometry ($r = -0.613$; $p = 0.034$). In the Countermovement test, the best relationship were between maximum acceleration in the x axis with jump fly time ($r=0.819$; $p=0.001$) and jump height ($r=0.823$; $p=0.001$). Others significant correlation in the Countermovement test were between the minimum rate rotation in the z axis and jump fly time ($r=-0.671$; $p=0.017$) and jump height ($r=-0.667$; $p=0.018$).

Conclusions. The inertial sensor fitted in the iPhone4 is able to study and analyze the kinematics of the Squat Jump and Countermovement Jump Tests in young healthy people. In this study had been localized significant quantitative relationship between kinematic variables and jumping contact mat or isotonic strength. This contribution of this cross-sectional study could be used to develop algorithms with the help of software to designed mobile apps, thus allowing their application in clinical practice.