סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 11.07.2016 (ה' בתמוז, תשע"ו), בבניין דן-קאהן, קומה 0, אודיטוריום 1, 14:30.

תרצה: אולגה פולובינץ

מנחה: פרופ"ח אלון וולף
מנחה שותף: פרופ' ענת פישר, פקולטה להנדסת מכונות
מנחה שותף: פרופ' רונית וולשטיין, פקולטה לרפואה

על הנושא:

Wrist Biomechanics During Dynamic Loading

The seminar will be given in Hebrew

להלן תקציר ההרצאה:

Push-ups are a basic sport activity used for multiple purposes, such as military physical training, rehabilitation after injury, and martial arts. The wrist is an important joint in this activity, transferring the force to the upper limbs. The biomechanics of the wrist is not yet completely understood. The purpose of this study was to compare the forces in the wrist during push-ups on a hyperextended wrist and during push-ups performed on a straight wrist. We hypothesized that force transmission in the wrist differs between these two push-up methods.

Fourteen healthy right-handed male volunteers performed two sets of push-ups on a straight wrist and two sets on a hyperextended wrist. The push-ups were performed in a gait analysis laboratory using a Vicon motion capture system and 26 reflector markers to follow the kinematics of the exercise. The force vectors were measured and computed using two AMTI force plates. An ultrasound machine was used to determine the capitate bone location. Statistical analysis using IBM SPSS software on the forces, the force angle and marker position was performed.

In both methods, the force was not uniform throughout the push-up task. The force patterns did not change while the dominant hand was loaded with a higher force, regardless of the type of push-up. In addition, the distance between the force vector and the shoulder marker in average is greater than the distance between the force vector and elbow markers regardless of the push-up method. In all push-ups the right and left upper extremity (all joints) moved equally in the vertical plane. Knuckle push-ups had a more uniform force, the angle of force distribution was smaller and a capitate marker had smaller location distribution. Furthermore, the elbow marker had a larger movement in space. In hyperextended push-ups the horizontal distance between the capitate bone location and force origin was smaller. Moreover, the force origin was closer to the ulna marker and the force passed more dorsally to the joint. In addition, the shoulder marker had a larger movement in the laboratory space.

As a result, it was found that forces through the wrist are distributed differently during the different types of push-ups. In hyperextended wrist the forces are more dorsal, ulnar and have a wider distribution. It seems that while in a neutral position the force is less diffuse, this compensation can be seen in elbow movement and force transmission.

Future research includes building a computer model of the wrist from CT images for visualization and analysis. By building a computer model and tracking the hand position during the exercise, we can achieve full registration of the wrist in order to build and establish the best pattern for push-up performance.

בברכה,

שרון'א אמיר שמן

מרכז הסמינרים