عنوان مقاله:

Investigating Glenohumeral Joint Contact Forces and Kinematics in Different Keyboard and Monitor Setups using Opensim

محل انتشار:

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خلاصه مقاله:

Background: The musculoskeletal complaints of the shoulder are prevalent in people who work with computers for a long time.Objective: This study aimed to investigate the glenohumeral joint contact forces and kinematics in different keyboards and monitor setups using OpenSim.Material and Methods: Twelve randomly selected healthy males participated in an experimental study. A ۳×۳ factorial design was used in which three angles were considered for the monitor and three horizontal distances for the keyboard while performing standard tasks. The workstation was adjusted based on ANSI/HFES-۱۰۰-۲۰۰۷ standard to maintain a comfortable ergonomic posture for controlling confounding variables. Qualisys motion capture system and OpenSim were used.Results: The maximum mean range of motion (ROM) of both shoulders' flexion and adduction was observed when the keyboard was ۱۵ cm from the edge of the desk, and the monitor angle was ۳۰°. The maximum mean ROM of both shoulders' internal rotation was recorded for the keyboard at the edge of the desk. Peak forces for most right shoulder complex muscles were obtained in two setups. ۳D shoulder joint moments were significantly different among nine setups (P-value<۰.۰۵). The peak anteroposterior and mediolateral joint contact forces were recorded for the keyboard at ۱۵ cm and the monitor at zero angles (۰.۷۵۱ and ۰.۷۸۰ N/BW, respectively). The peak vertical joint contact force was observed for the keyboard at ۱۵ cm and the monitor at ۱۵° (۰.۳۱۰ N/BW). Conclusion: The glenohumeral joint contact forces are minimum for the keyboard at ۸ cm and the monitor at zero angles.

کلمات کلیدی:

biomechanics, Shoulder, Musculoskeletal disorders, Ergonomics