

Optimal Moving Tracks of the Hand-Raising and Gait

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Abstract

This paper investigates the optimal moving tracks of hand-raising and gait. In rehabilitation, the patients are usually guided to follow fixed patterns of motions. However, there is no clear definition on what the best motion is. Therefore, we propose a method to evaluate the influence of moving tracks on body loadings, and illustrate how a special form of physical therapy known as the Alexander Technique can effectively reduce the loads placed on the joints. Since we cannot directly measure the force and moment data within the joints, a motion analysis system is utilized to analyze information about body position which is then transmitted to ADAMS models to estimate the reaction forces and moments on the joints. Furthermore, an optimal control algorithm is introduced to quantitatively identify the optimal contours of the movements. By analyzing the reactions of the joints, this paper demonstrates that better moving tracks are beneficial for reducing body loads.