西式划船划槳週期不同發力時序對划船動力學之影響

摘要

　　划船項目既是體能項目又是技術項目，提高划船運動成績，除考慮體能因素外，技術因素顯得更重要。目的：探討在划槳過程中的拉槳初期發力(front-loaded)、拉槳中段發力(Middle-loaded) 以及拉槳後段發力 (back-loaded)等三種發力模式下所產生的槳力曲線之間之差異性及其對船速的影響，並利用肌電圖探討不同划槳技術下發力時序模式之差異。方法：研究對象為台北市立內湖高工與基隆高中划船隊 16 名學生，在測功儀上實行划槳 20 槳，拉槳頻率每分鐘 30 槳，資料擷取其中 10 槳力量曲線，分別取出划船表現參數有衝量、爆發力、最大力量、運動學及動力學資料。以 SPSS 18.0 實行重複量數單因子變異數分析，以比較不同發力時序上划船表現之差異。結果：(一)前段發力肩跟髖關節屈曲較大，能充分利用到腿部發力。(二)前段發力的動作週期中，發力順序為腿部，軀幹和手臂，能充分利用到下肢肌肉。 (三)前段發力軀幹跟大腿能同步驅動，因此最後在最大力量及平均力量上皆能顯著優於中段及後段發力。結論：前段發力較能依據動力鏈原理，在肌肉發力、運動學及動力學上皆能獲得最高效能。

關鍵詞：槳力時間曲線、肌電訊號、發力時序

Different power modes of rowing dynamics

Abstract

Rowing is a combination of physical fitness and skills. In the process of improving rowing performance, skill factors outweigh physical factors. This study discussed differences between the force curves of front-, middle-, and back-loaded power modes as well as compared differences in the electromyography of different force orders. This study recruited 16 students from the rowing teams of Taipei Municipal Nei-Hu Vocational High School and National Keelung Senior High School as research targets. The students completed 20 stroke cycles on a rowing ergometer at a speed of 30 strokes/min. This study selected 10 force curves and extracted rowing performance parameters, including impulse, explosiveness, maximum force, kinematics, and dynamics. SPSS 18.0 was employed to conduct a repeat measures one-way analysis of variance as well as compare performance differences between different force orders. The results were as follows: (1) In the front-loaded phase, the rowers' shoulders and hip joints exhibited larger bending angles to enable them to thoroughly utilize their leg drive. (2) During the movement cycle of the front-loaded phase, the force was transmitted from the legs, to the body, and then to the arms, thereby fully utilizing the rowers' lower limb muscles. (3) Because the rowers' body and legs simultaneously exerted force