不同負荷的划船運動之上肢肌肉疲勞分析
Fatigue analysis of upper limb muscles during different rowing loads

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摘要-本研究目的在針對不同負荷的划船運動對上肢肌肉疲勞的分析。本研究徵召 6 位健康的大學生，一個可攜式記錄器搭配肌電圖(EMG)提供肌電訊號的收集。上肢肌肉包括：肱二頭肌、肱三頭肌、屈腕肌、和伸腕肌。讓受測者在 Concept II 划船測功儀上分別在 60%、70%、80% Wmax 的負荷下作划船運動直到力竭，計算肌電圖在整個運動時期的 0%、50%、和 100% 時的活化程度。結果顯示上肢肌肉在不同負荷下，都隨著運動過程皆有持續活化增加的情形(p<0.05) (0%-50%)。但在 50% 運動過程後呈現不同的情形(p<0.05)，其中高負荷(80% Wmax)的划船過程中，肱二頭肌和伸腕肌較易達到疲勞。結論:了解划船運動中肌肉疲勞的順序，可事先避免傷害，並可設計運動處方加強關鍵肌肉的訓練。

關鍵詞：肌電圖、划船運動、肌肉疲勞

Abstract-- The purpose of this study was to investigate the analysis of upper extremity muscle fatigue on different rowing loads. Six healthy college students were recruited, and a data logger with electromyography (EMG) and two-biaxial goniometer provides a collection of EMGs and elbow angles in rowing. Four EMG electrodes were utilized to measure their muscle activities in biceps and triceps brachii, and wrist flexors and extensors muscles. Subjects were asked to row in a Concept II rowing ergometer under 60%, 70%, 80% Wmax loads, respectively, until the exhaustion. EMG values were measured in 0%, 50%, and 100 % of rowing exercise. Results showed that the upper limb muscles in different loads have significant differences at initial rowing (p<0.05). All of muscle activations were increased by increasing rowing time (0%-50%) (p<0.05), but muscle activations were significant differences after 50% rowing (p<0.05). In high load (80% Wmax) rowing, biceps brachii and wrist extensor muscles may be easier to reach fatigue than other muscles by EMG reductions. Conclusion, Understanding the sequence of muscle fatigue would prevent injury in rowing. It may also be to design exercise prescription in enhancing key muscles training.

Keywords: electromyography, rowing exercise, muscle fatigue