

神經肌肉電刺激對羽毛球蹬跨步靈敏性的影響

陳朝福^{1*} 沈成東² 王舒凡² 廖強² 尹杰² 譚文鋒²

^{1*} 淮北師範大學體育學院 教師

² 淮北師範大學體育學院 學生

摘 要

目的：本研究主要探究神經肌肉電刺激對羽毛球蹬跨步靈敏性的影響並比較各個瞬間的運動學差異。**方法：**8名師範大學體育學院羽毛球專項男性大學生作為研究對象（皆沒接觸過神經肌肉電刺激），其平均身高 174.75 ± 4.17 公分，體重 69.75 ± 5.75 公斤，年齡 23.63 ± 1.41 歲。第一次實驗（T1）受試者根據實驗要求，進行右前場主動蹬跨步擊球，將羽毛球放置於啟動點右斜 45 度單打綫上進行光學捕捉拍攝，三天後進行第二次實驗（T2），先進行 20 分鐘調頻脈衝治療儀電療後立即進行主動蹬跨步擊球。以描述性統計計算出平均數和標準差，再以 Wilcoxon signed-rank test 分別考驗 T1 與 T2 運動學參數差異，顯著水準定為 $\alpha = .05$ 。**結果：**在整個蹬伸階段中，蹬伸的總時間 T2 較 T1 的時間較短 ($z = -2.100, p = 0.036$)，在蹬伸階段-左腳著地瞬間，髖關節角度 (右) T2 較 T1 小 ($z = -2.380, p = 0.017$)，膝關節角度 (右) T2 較 T1 小 ($z = -2.521, p = 0.012$)，小腿速度 (右) T2 較 T1 快 ($z = -2.521, p = 0.012$)，在蹬伸階段-右腳著地瞬間，小腿速度 (右) T2 較 T1 快 ($z = -2.240, p = 0.025$)。**結論：**羽毛球蹬跨步技術特徵在比賽中具有極高的使用頻率，使用 NMES 介入訓練可以在運動前啟動其肌肉神經，使得更多的肌肉參與運動，使運動員的肌肉更快的進入良好運動狀態，從而提高了運動表現能力。

關鍵詞：運動學、運動表現、肌肉活化、電療、羽球

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*聯繫作者：淮北師範大學體育學院，中國安徽省淮北市相山區東山路 100 號。

Tel: 0921-315-578

E-mail: chenchaoфу@chnu.edu.cn

Effects of Neuromuscular Electrical Stimulation on Badminton Pedal Stride Sensitivity

Chao-Fu Chen^{1*} Cheng-Dong Shen² Shu-Fan Wang²
Qiang Liao² Jie Yin² Wen-Feng Tan²

^{1*}Physical Education College, Huaibei Normal University/Teacher

²Physical Education College, Huaibei Normal University/Student

Abstract

Introduction: This study mainly explores the effect of neuromuscular electrical stimulation on the sensitivity of badminton pedaling and compares the kinematic differences at each moment. **Methods:** 8 male college students specializing in badminton from the Physical Education College of Normal University were used as the research participants (none of them had been exposed to neuromuscular electrical stimulation). Their average height was 174.75 ± 4.17 cm, weight 69.75 ± 5.75 kg, and age 23.63 ± 1.41 years old. In the first experiment (T1), the participants took the initiative to stride and hit the ball in the right front court, and placed the badminton on the 45-degree right oblique singles line at the starting point for optical capture. Three days later, the second experiment (T2) was carried out. After 20 minutes of electrotherapy with frequency modulation pulse therapeutic apparatus, active kicking and stepping were performed immediately. The mean and standard deviation were calculated by descriptive statistics, and then the difference between T1 and T2 kinematic parameters was tested by Wilcoxon signed-rank test, and the significance level was set at $\alpha = .05$. **Results:** In the whole stretching phase, the total time T2 of stretching was shorter than that of T1. In the stretching phase - the moment when the left foot touches the ground, the hip joint angle (right) of T2 was shorter than that of T1. Small, knee joint angle (right) T2 was smaller than T1, calf speed (right) T2 was faster than T1, in the push-extension stage - the moment the right foot hits the ground, the calf speed (right) T2 was faster than T1. **Conclusion:** The technical feature of badminton kicking and stepping has a very high frequency of use in the competition. The use of NMES intervention training can activate its muscle nerves before exercise, so that more muscles can participate in the exercise, so that the athletes' muscles can enter a good exercise state faster, thus Improved athletic performance.

Keywords: kinesiology, sports performance, muscle activation, electrotherapy, badminton

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*Corresponding Author : Physical Education College, Huaibei Normal University. No.
100 Dongshan Road, Xiangshan District, Huaibei City, Anhui Province
Tel: 0921-315-578
E-mail: chenchaoфу@chnu.edu.cn