

國立臺中教育大學 112 學年度研究所碩士班招生考試

運動科學概論試題

(含運動生物力學及運動生理學)

適用系所：體育學系碩士班（運動科學組）

一、運動生理學部分(50%)

Title: supplementation attenuates cycling exercise-induced oxidative inflammation but fails to improve time trial performance in healthy adults

INTRODUCTION:

Garlic extract has been shown to enhance antioxidant and anti-inflammation activities in humans. The present study investigated the effects of garlic supplementation on 40-km cycling time trial performance, exercise-induced oxidative stress, and inflammatory responses including blood biomarkers of oxidative stress, inflammation, and muscle injury in healthy adults. We hypothesized that four weeks of daily garlic supplementation (1000 mg/day) would improve cycling performance by relieving systematic oxidative stress, inflammation, and muscle injury.

METHODS:

Eleven physically active males (mean age: 22.0 ± 4.8 years old, height: 174.9 ± 7.7 cm, 77.0 ± 13.3 kg, VO_2 max: 45.3 ± 5.5 ml/kg/min) were recruited to perform this single-blind crossover study. Participants were randomly assigned to either garlic (garlic extracts 1000 mg/d for 4 weeks) or placebo trials. Following 4 weeks of supplementation, participants performed a 40-km cycling challenge and Total cycling performance time and respiratory exchange ratio (RER) were recorded. Blood samples were collected every 10 km to determine exercise-induced oxidative stress, inflammation, and muscle damage. A paired t-test was used to analyze the time recorded from participants during the 40 km time trial. Data for blood and gas samples collected at different time points were analyzed by repeated measure two-way ANOVA (trial \times time). If a significant interaction was observed between treatments and time points, we further conducted a simple main effects analysis. In this regard, for post hoc analysis, Fisher's least significant difference (LSD) was used. The α value was set at $p < 0.05$.

(背面尚有試題)

RESULTS:

The 40-km cycling time trial performance was not improved following 4 weeks of garlic supplementation. However, 4-wk garlic supplementation significantly increased whole-body antioxidant capacity (total antioxidant capacity, TAC), and subsequently attenuated MDA, TNF- α , and LDH during the 40-km cycling exercise period ($p < 0.05$). There were no significant differences among the blood biomarkers glucose, NEFA, IL-6, UA, and CK respectively. The respiratory exchange ratio was similar between garlic and placebo trials.

CONCLUSION:

Four-week oral garlic supplementation attenuates exercise-induced oxidative inflammation and muscle damage during a 40-km bout of cycling. However, it appeared that 4-wk oral garlic had no ergogenic effect on cycling performance in healthy males.

1. 請以中文寫出這篇研究論文的題目。(5%)
2. 這篇研究論文的結論?(5%)
3. 就運動生理學的觀點，寫出你 / 妳閱讀這篇研究論文摘要的心得。(40%)

二、運動生物力學部分(50%)

1. 反向垂直跳(Countermovement jump, CMJ)、著地反彈跳(Drop jump, DJ)與深蹲跳(Squat jump, SJ)，這三種跳躍方式為運動生物力學中測量人體下肢能力的方式，請寫出這三種跳躍方式在動作特徵上的不同之處(6%)？並詳述這三種跳躍方式在運動學或動力學上的相異之處？(14%)

2. 閱讀後回答下列各問題：

The effects of tai chi chuan exercise training on countermovement jump performance in the elderly

Research in Sports Medicine, 28(4), 563–571.

Abstract

This study sought to compare the biomechanical parameters of the lower extremities during a countermovement jump in elderly people who are engaged in frequent practice of tai chi chuan (TCG) and in the general population of healthy elderly people (HG). Each group included 12 participants. Ten Vicon Motion System infrared cameras and two Kistler force plates were employed for measurement. The jump height, duration, center of mass (COM) displacement, joint ROM, and upward velocity were analyzed in this study. Motion analysis and force platform data were combined to calculate joint

moments and powers during the takeoff phase. The data were analyzed using independent sample t-tests. The results showed that the tai chi chuan practitioner group (0.13 m) achieved 44% higher jump heights ($p < 0.05$). The COM displacement during squatting was lower in the TCG (0.25 m) than in the HG (0.19 m) ($p < 0.05$). The knee and ankle ROMs of the TCG were higher than those of the HG ($p < 0.05$). Peak knee moment 23% and peak knee power 32% higher in TCG compared to the HG ($p < 0.05$), suggesting that frequent practice of tai chi chuan may slow the rate of knee degeneration.

Keywords: Jump height; fall risk; knee moment; knee power.

- (1)寫出本篇期刊論文的研究目的。(5%)
- (2)請寫出研究方法中所提到的二個儀器用途(10%)？與可應用方式。(10%)
- (3)請詳述本篇期刊論文的研究結果。(5%)

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體育概論試題

(含運動社會學及體育行政管理)

適用系所：體育學系碩士班（運動人文社會組）

- 一、運動社會學為人文社會科學領域重要科目，請論述其主要研究範疇。(25%)
- 二、運動與政治之間存在著特別關係，爰此，請論述政治與運動結合所扮演的角色。(25%)
- 三、國民體育法為臺灣保障國民體育參與及健全國內體育環境的主要依據之一，請闡述國民體育法的主要內容綱要。(25%)
- 四、2022 足球世界盃再度喚起國人及立法委員對臺灣足球運動之重視，請試就參與性及觀賞性運動之觀點，闡述臺灣應如何提升我國足球運動之競技水平。(25%)