

出國報告（出國類別：國際會議）

參加 2012 年第 59 屆美國運動醫學年
會暨運動是良藥世界大會
59th Annual Meeting and 3rd World
Congress on Exercise is Medicine

就讀學校：國立體育大學 教練研究所

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摘要

第 59 屆美國運動醫學年會暨運動是良藥世界大會於 2012 年 5 月 29 日起至 6 月 2 日止，在美國舊金山市會議中心盛大舉行，共有世界各地超過 6600 名學者專家與會，會議中進行了數千篇論文的發表，為運動醫學界的國際年度盛會。

作者本人全程參與，共發表 2 篇論文（主要論文 1 篇，共同作者 1 篇），與國外學者交流獲益良多。除了往年著重的健康促進議題外，此次會議內容呼應奧運年，將許多競技訓練的課題加入，邀請了美國、澳洲、加拿大、以色列等許多世界最優秀的運動科學人員到會議中，探討競技運動科學之執行面的相關討論及高級運動選手的訓練及運動醫學、運動傷害的相關議題。

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壹、目的

- 一、參加美國運動醫學會舉辦之第 59 屆美國運動醫學年會暨第 3 屆運動是良藥世界大會。
- 二、進行個人論文發表，藉由國際學術交流，提昇國際視野。

貳、過程

一、會議背景介紹

每年輪流於美國各州舉行由美國運動醫學會（American College of Sports Medicine, ACSM）所舉辦的年會是運動科學領域的年度盛會，會議中有來自世界各國不同運動領域之頂尖學者及研究人員，利用此會議來交流各自的研究成果。美國運動醫學會成立逾 1954 年，成立宗旨為促進全民健康為使命。2012 年第 59 屆 ACSM 年會更突破了過去歷年與會學者的人數，共有超過 6600 位來自世界各國的學者專家受邀與會參與。

年會於 2012 年 5 月 29 日起至 6 月 2 日止，在美國舊金山市會議中心盛大舉行，共有世界各地超過 6600 名學者專家與會。會議中進行了數千篇論文的發表，為運動醫學界的國際年度盛會。

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二、會議活動簡介

此非常具規模性的會議，包含了許多相關活動同時進行，每日會議時程依據不同領域及主題，在不同的會議廳內展開。主辦單位將會議分為：大會會長主題

演講、各領域主要專題報告、跨領域議題的受邀特別演講、主題口頭報告(oral presentation)、海報發表(posters)、主題海報發表、工作坊(work shop)等，每個時段都有數個場次，由與會者自行選擇參與。名稱雖稱為運動醫學學會年會，就發表的論文內容而言，也廣泛的包含各領域，包括：運動生理學、運動醫學、運動心理學、運動訓練、運動生化血液值、運動營養、運動生物力學、運動員表現、運動傷害防護、體適能、特殊族群體育教育、幼兒教育等等，不僅是運動科技領域學者，臨床醫師、職能治療等相關專業人士，故此次會議除了發表之論文量相當可觀外，論文內容也非常豐富並兼具多樣性。

由於是歷史悠久的國際年度盛會，會議現場也有設置廠商展覽，包含各種最新的圖書、研究設備器材、軟硬體設備、運動營養產品、運動傷害防護產品、能量補給品等，世界各大知名廠商皆將最新穎的器材成列於場中，供大家詢問及試用。

三、發表經過

作者搭乘 2012 年 5 月 25 日晚間班機抵達舊金山機場，半夜抵達下榻旅館，5 月 26 日經過一日休息調整時差後；5 月 27 日前往著名學府史丹佛大學進行文化參觀，置身於全美排名前五大學的校園內，除了幅員廣闊的草坪外，校園地標胡佛塔及校內一致設計風格的各棟建築，令人印象深刻；校園內運動風氣興盛，當天便有許多學生在校園內慢跑及騎自行車，對於這樣有朝氣活力的風氣，身為體育大學學生深受感動，期待台灣各大學的運動風氣也可如此盛行。5 月 28 日於舊金山市市區內進行文化參訪，準備隔日研討會行程。

會議於 2012 年 5 月 29 日至 6 月 2 日於美國加州舊金山市會議中心舉行，5 月 29 日上午前往舊金山會議中心註冊報到，領取會議資料及通行證。會議所舉辦的各項報告發表在 5 月 30 日至 6 月 2 日進行，會議課程安排非常流暢，每位口報告時間掌握得宜。

5月31日早上9:00至10:30進行與學妹進行學術海報發表(第三作者)並於當天下午進行作者學術海報發表(主要論文),自14:00至17:00報告並接受各國學者詢問,交換意見。6月1日至2日作者前往各項專題發表、演講進行聆聽,並瀏覽其他主題海報之發表。6月2日結束研討會行程,稍作休息便搭乘6月3日凌晨班機返回台灣。

海報發表題目分別為:

- 1、Changes of Incremental Exercise $\dot{V}O_2$ Kinetics between Different Fitness Levels.
- 2、Physiological Indexes of Fitness between Aboriginal and non-Aboriginal College Baseball Players.

上述主要論文發表內容是以大學學生為研究對象,探討不同的體能水準對於攝氧動力學的表現。過去針對攝氧動力學的分析較常使用連續性的運動測驗進行,然而近年來在臨床的研究中,將漸增式運動測驗作為評估攝氧動力學的方法已慢慢受到重視,但目前相關研究證據仍是缺乏。目的:本研究旨在探討不同心肺適能水平者在漸增式運動測驗中,攝氧動力學變化情形。方法:本研究對象為有運動習慣之男性大學生,分為兩組,高適能組(HF)(平均 20.22 ± 2.11 歲、 177.89 ± 4.48 公分, 72.06 ± 10.88 公斤, $VO_{2max}: 58.87 \pm 1.62 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$;共9名)和低適能組(LF)(19.33 ± 1.12 歲, 177.78 ± 5.95 公分, 79.82 ± 13.34 公斤, $VO_{2max}: 44.10 \pm 2.31 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$;共9名)。所有受試者皆進行中強度(63% VO_{2max})及高強度(95% VO_{2max}) 2個6分鐘的漸增跑步運動測驗(中間會各間隔10分鐘的休息時間)。使用氣體分析儀(SensorMedics, Vmax 29)分析耗氧量,及運動心電圖(SensorMedics, CardioSoft V4 (37/38) ECG)進行心跳的測量。以單因子重複量數來分析不同組別間在不同強度下每分鐘耗氧量的差異。結果:在高強度運動中的結果為:兩組皆在第3分鐘達到高原期(VO_2 between 3 and 4 min, HF: $p = .15$, LF: $p = .26$)。而中強度的結果為:高適能組在第二分鐘就近入高原期了(VO_2 between 2 and 3 min, $p = 1.5$),而低適能組在第三分鐘才進入高原期

(VO₂ between 3 and 4 min, p = .87)。結論：在中強度運動時，不同的心肺適能水平的受試者到達穩定狀態的時間不同，高心肺適能水平的受試者能較低心肺適能水平者早到達穩定狀態。

而次要論文是比較原住民與非原住民運動員在最大運動測驗中最大攝氧量與乳酸分析，作者利用參加本年會的機會，與國外學者專家進行相關主題的討論與分享。

參、心得建議

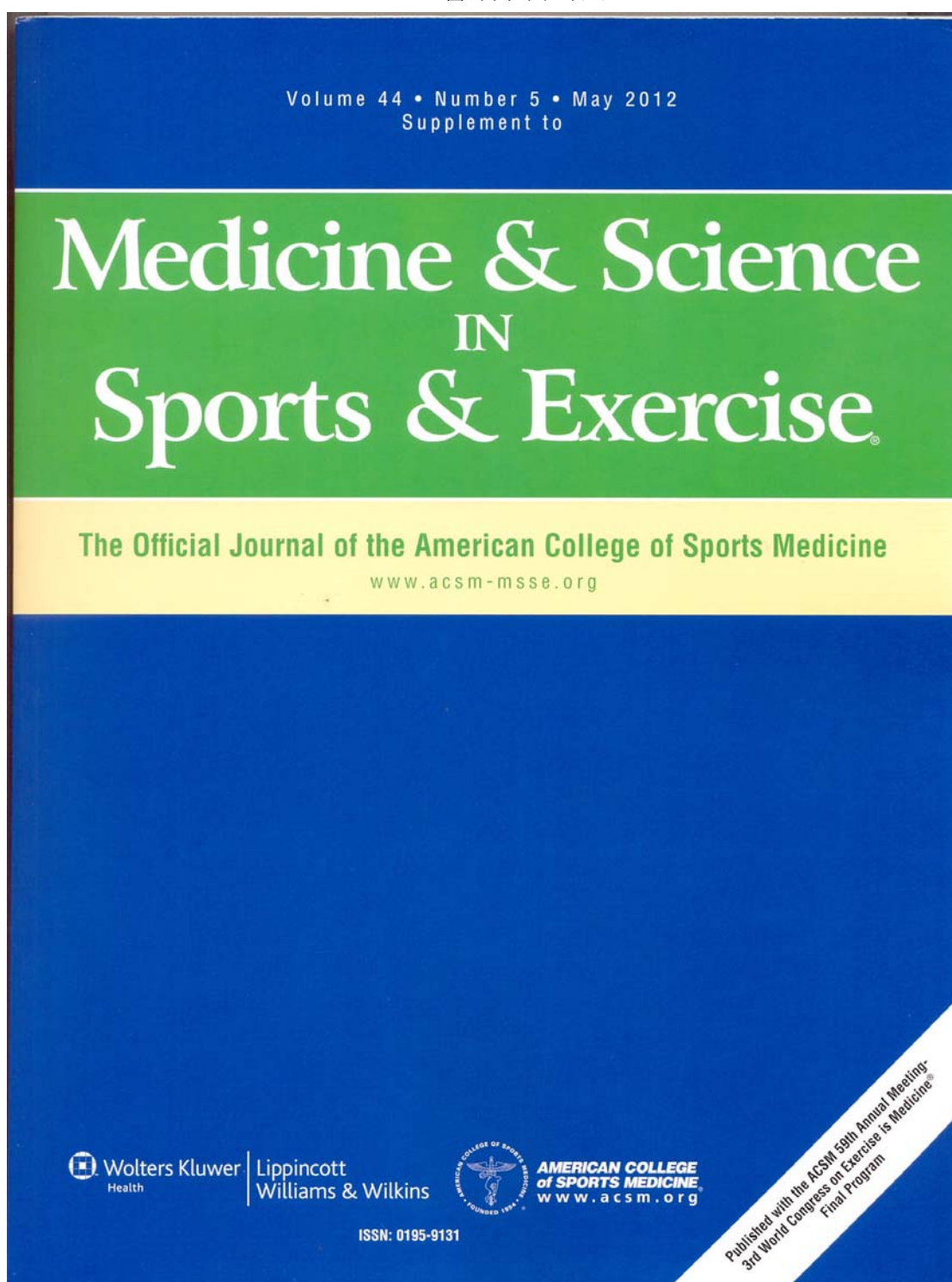
2012 第 59 屆的 ACSM 年會活動，共有超過 50 個國家以上的學者與會，是一場非常盛大的學術饗宴。會議中，除了對於各領域的學術專業增廣見聞外，也目睹了各國對於運動科學、運動醫學類研究領域的蓬勃發展的風氣。每每在實驗室披星帶月的進行研究，偶而會對於本身的研究方向產生迷惘，但在會場中，感受著與會者及世界頂尖專家分享著自己研究的熱情，不禁砥礪自己更加大步向前邁進。因此。學校可多鼓勵研究所學生多參與此類大型的研討會議，吸收各領域的新知，累積國際交流之經驗。

在本次會議中，學生深深感覺到外語能力的重要性，尤其是表達方面，要讓自己能夠可以快速吸收到國際上最新的研究成果，或是讓國內優秀的研究成果登上國際優秀期刊，就必須要避免語言上的隔閡，多加強語言的表達，並增加應予發表論文的機會，如此才能在學術領域上更上一層樓，並能與國際學術領域接軌。

最後要感謝指導教授傅麗蘭老師及補助作者出席國際會議機票經費的教育部和國立體育大學，使得本次會議能夠順利成行。並感謝此次一同前往的台北體院、實踐大學、台北醫學大學、世新大學、元智大學等師生，特別感謝他們的協助及照顧。除了同行的師長們，也於會議中與國內幾所名校台灣師大、慈濟大學、文化大學、高雄師大等師生進行接觸，互相交流，聽取前輩建議；相信藉由參與國際研討會之經驗，可以提昇國內體育界學術水準，與國際趨勢沒有時差。

肆、附錄

ACSM 會議手冊封面



done $>CP(W_{cp})$ during exhaustive exercise is the same irrespective of the work-rate forcing function, provided that the work-rate does not fall below CP.

PURPOSE: To test the hypothesis that the CP and W' derived from the 3-min all-out test accurately predict time-to-exhaustion (T_{lim}) during ramp incremental and constant work-rate (CWR) exercise $>CP$.

METHODS: Following ethical approval, seven recreationally-active male subjects (mean \pm SD: age 21 \pm 4 years) completed a ramp incremental test, a 3-min all-out test for the determination of CP and W' , and a CWR test until exhaustion on a cycle ergometer. The CWR was predicted to result in exhaustion in 3 min using the power-duration equation [$P = (W'/180 s) + CP$] and the predicted T_{lim} in the ramp test (T_r) was calculated as: $T_{lim} = CP/S + \sqrt{2W'/S}$, where S is the ramp slope (0.5 Watts/s). Data were analyzed using paired samples *t*-tests and Pearson correlation coefficients. Significance was accepted at $P < 0.05$.

RESULTS: The CP and W' estimated in the 3-min all-out test were 260 \pm 60 W and 16.5 \pm 4.0 kJ. The W_{cp} during the CWR (16.5 \pm 7.4 kJ) and the ramp incremental test (16.4 \pm 8.4 kJ) were not different from the W' measured in the all-out test ($P > 0.05$). The predicted T_{lim} (754 \pm 122 s) for the ramp incremental test was not different from ($P > 0.05$), and was highly correlated with, the actual T_{lim} (753 \pm 121 s; $r = 0.92$, $P < 0.01$). The predicted T_{lim} in the CWR test of 180 s was not different from ($P > 0.05$), and was highly correlated with, the actual T_{lim} (185 \pm 24 s; $r = 0.99$; $P < 0.01$).

CONCLUSION: The 3-min all-out test accurately predicted the T_{lim} during both ramp incremental and CWR exercise. These results provide further evidence that the power-duration parameters estimated in a single-visit all-out protocol provide meaningful predictions of exercise tolerance, and support the notion that only a finite amount of work is achievable above CP before exhaustion.

2412 Board #87 MAY 31 2:00 PM - 3:30 PM
The Effect of a Priming Exercise on Cardiac Output Kinetics
 Ryan A. Seeto, Greg D. Wells, Scott G. Thomas. *University of Toronto, Toronto, ON, Canada.*
(No relationships reported)

A priming or warm-up exercise has been shown to accelerate oxygen uptake kinetics in a subsequent exercise; however, the mechanisms in which these changes occur is not well understood. One possible explanation for the accelerated oxygen uptake kinetics following a priming exercise may be due to adaptations in cardiac output (Q).

PURPOSE: To determine the effects of a priming exercise on Q kinetics.

METHODS: Following an assessment day to determine VO_{2max} and lactate threshold, seven moderately trained cyclists (VO_{2max} : 58.4 \pm 11.6 mL \cdot min $^{-1}$ \cdot kg $^{-1}$; height: 1.75 \pm 0.07 m; weight: 73.9 \pm 14.1 kg; age: 29 \pm 6 yrs) performed 6 minutes of cycling at a work rate equal to 10% above lactate threshold (unprimed; U) followed by a 3 minutes of no cycling and 6 minutes of cycling at an equivalent work rate to U (primed; P). Bioelectrical impedance was used to determine Q. Kinetics were modeled using a monoexponential equation and comparison between U and P trials were made using ANOVA.

RESULTS: While the Q time constant (τ) was not significantly different between U and P trials (42.3 \pm 9.6 vs. 39.7 \pm 10.7 s, $p = 0.62$), baseline Q was trended higher in the P trial (5.1 \pm 0.8 vs. 6.6 \pm 1.9 L \cdot min $^{-1}$, $p = 0.06$). The absolute asymptotic Q value was significantly higher in the P trial (15.9 \pm 2.1 vs. 16.7 \pm 2.1 L \cdot min $^{-1}$, $p < 0.05$). Heart rate (HR) kinetics shared a similar trend with Q. The HR τ was not significantly different between U and P (41.1 \pm 7.2 vs. 40.9 \pm 9.1 s, $p = 0.95$) while baseline HR (68.9 \pm 8.8 vs. 83.7 \pm 14.0 beats \cdot min $^{-1}$, $p < 0.025$) and absolute asymptotic HR (152.8 \pm 13.3 vs. 159.7 \pm 14.3 beats \cdot min $^{-1}$, $p < 0.005$) were significantly higher in the P trial.

CONCLUSIONS: There was no significant difference between the HR and Q τ of the U and P trial and there is significant increase in baseline HR and close to a significant increase in baseline Q in the P trial. Differences in Q response with priming may be due to absolute stroke volume. Faster VO_2 kinetics with priming does not reflect a faster rate of Q adjustment.

2413 Board #88 MAY 31 2:00 PM - 3:30 PM
Changes of Incremental Exercise VO_2 Kinetics between Different Fitness Levels
 Pei-Fan Wang, Li-Lan Fu, Yi-Tzu Chen. *National Taiwan Sports University, Taoyuan, Taiwan.*
(No relationships reported)

The analysis of VO_2 kinetics in the previous studies focused more often in continuous exercise test. However, incremental exercise as a evaluation test or prescription raised clinical attention recently, but research evidence is still scant.

PURPOSE: The purpose of this study was to investigate the changes of incremental exercise VO_2 kinetics between people with different fitness level.

METHODS: Physically active college male students were recruited into this study. There were two groups of subjects, high-fitness (HF: 20.22 \pm 2.11 yr, 177.89 \pm 4.48 cm, 72.06 \pm 10.88 kg, VO_{2max} : 58.87 \pm 1.62 mL \cdot kg $^{-1}$ \cdot min $^{-1}$; n=9) and low-fitness (LF: 19.33 \pm 1.12 yr, 177.78 \pm 5.95 cm, 79.82 \pm 13.34 kg, VO_{2max} : 44.10 \pm 2.31 mL \cdot kg $^{-1}$ \cdot min $^{-1}$; n=9). All subjects completed two 6-min bouts of moderate-intensity (63% VO_{2max}) and severe-intensity (95% VO_{2max}) running incremental exercise test (separated by 10 min of rest). Breath-by-breath pulmonary gas exchange (SensorMedics, Vmax 29) and HR

were measured. One-way repeated-measure ANOVA was used to compare the ΔVO_2 of each minutes between the 2 groups under different intensity.

RESULTS: The ΔVO_2 during SE exercise [HF: ΔVO_2 : 20.21(13.27,14.17,15.41,16.11,11.48, 6.65, 0.49, 0.73, -0.73 mL \cdot kg $^{-1}$ \cdot min $^{-1}$; LF: ΔVO_2 : 20.21(13.27,14.17,15.41,16.11, 6.65, 0.49, 1.31, 0.54, -0.54 mL \cdot kg $^{-1}$ \cdot min $^{-1}$, respectively) was plateaued at third minute for both groups (VO_2 between 3 and 4 min, HF: $p = .15$, LF: $p = .26$). The ΔVO_2 during SE exercise [HF: ΔVO_2 : 20.21(13.27,14.17,15.41,16.11, 9.51, 3.11, 0.48, -0.30, 0.30 mL \cdot kg $^{-1}$ \cdot min $^{-1}$; LF: ΔVO_2 : 20.21(13.27,14.17,15.41,16.11, 6.41, 3.4, 0.98, 0.27, -0.27 mL \cdot kg $^{-1}$ \cdot min $^{-1}$, respectively) was plateaued at third minute for LF groups (VO_2 between 3 and 4 min, $p = .87$), but at second minute for the HF group (VO_2 between 2 and 3 min, $p = 1.5$).

CONCLUSIONS: Under moderate-intensity exercise, subjects at different fitness level achieved stages of stable VO_2 at different timing. HF participants can reach stable VO_2 earlier than participants in LF.

2414 Board #89 MAY 31 2:00 PM - 3:30 PM
Effect Of Exercise Order On Cardiorespiratory And Perceptual Responses To Concurrent Exercise

Nicholas W. Aguirre¹, Jeremy G. Tan¹, Daniel R. Coats¹, Barry A. Spiering², Lee E. Brown, FACSM¹, Jared W. Coburn, FACSM¹, Daniela A. Rubin¹, Daniel A. Judelson, FACSM¹. ¹California State University, Fullerton, Fullerton, CA; ²United States Army Research Institute of Environmental Medicine, Natick, MA.
(No relationships reported)

A training bout combining resistance (RE) and endurance exercise (EE) in a single session is termed concurrent exercise (CE). To date, few investigations have characterized the acute physiological and perceptual responses to CE order despite its popularity of its use for sport, recreational and health reasons. Since exercise order might influence RE and/or EE quality (and thereby overall training adaptations), elucidating these acute responses is integral for optimizing program design.

PURPOSE: To examine the effects of CE order on cardiorespiratory and perceptual responses.

METHODS: Nine healthy, concurrently trained subjects (age = 22.7 \pm 1.7 y; mass = 84.8 \pm 11.9 kg; height = 176.1 \pm 7.4 cm) performed two CE trials: one in which RE (squat, bench press, lat pulldown: 60% 1-RM, 4 sets x 10 reps, 90-s rest) preceded EE (RE-EE) and one in which EE (cycling: 80% ventilatory threshold for 30-min) preceded RE (EE-RE). Heart rate (HR) and rating of perceived exertion (RPE) were recorded following each set of RE and every five minutes during EE. In addition, VO_2 and respiratory exchange ratio (RER) were recorded every 2.5 minutes during EE.

RESULTS: Subjects experienced significantly greater HR throughout RE in EE-RE (151 \pm 5 bpm) compared to RE-EE (136 \pm 5 bpm), concomitant with increased RPE during the squat exercise (EE-RE = 15 \pm 2; RE-EE = 13 \pm 1). Similarly, the HR and RPE elicited by EE during EE-RE significantly exceeded RE-EE for the first 10 and 15 min of exercise, respectively. Finally, VO_2 significantly increased and RER significantly decreased periodically during EE in RE-EE compared to EE-RE.

CONCLUSIONS: In conclusion, 1) preceding RE with EE increases RE cardiovascular and perceptual demands, and 2) preceding EE with RE increases EE caloric expenditure, fat oxidation, HR and RPE. This study supports performing RE before EE if superior caloric expenditure and fat oxidation is desired during EE, albeit at a higher physiological and perceptual cost.

2415 Board #90 MAY 31 2:00 PM - 3:30 PM
Strength And Cardiovascular Fitness Measures Over Time Regarding Sex, Age, And Season Of Testing

Katherine E. LaBarbera¹, Justin Keadle¹, Kevin S. O'Fallon¹, Priscilla M. Clarkson, FACSM¹, Linda S. Pescatello, FACSM¹, Beth A. Parker², Paul D. Thompson, FACSM¹. ¹University of Massachusetts Amherst, Amherst, MA; ²University of Connecticut, Storrs, CT; ³Hartford Hospital, Hartford, CT.
(No relationships reported)

Muscular strength and cardiovascular fitness are often assessed during short- and long-term research studies. Familiarization sessions are intended to habituate participants with testing procedures, but they are typically used before initial data collection and not prior to follow-up testing.

PURPOSE: To examine the repeatability of muscular strength and VO_{2max} measures over 6 months regarding age, sex, and season of initial testing, and to determine if repeating a familiarization session after a 6 month time period is necessary.

METHODS: 208 participants (100 men and 108 women, aged 20-76 yr) completed a familiarization session at visit 1 consisting of all strength assessments. Baseline testing occurred 3 days later and consisted of handgrip, isometric, and isokinetic strength measures of the dominant arm and leg at visit 2 and visit 3, which were also separated by 3 days; VO_{2max} was assessed only at visit 2. After 6 months, participants completed the same strength assessments at visit 4 and 5; VO_{2max} was assessed only at visit 4. A second familiarization visit was not performed prior to visit 4 or 5. Data were analyzed using a repeated measures analysis of variance (ANOVA). Significant interactions were investigated *post hoc* using a Tukey's HSD test.

RESULTS: No changes in strength over time with regard to sex, age cohort, or season

CONCLUSION: These results show that professional Futsal players have moderate endurance, power and explosive strength levels, moreover Futsal played at professional level have to develop high-intensity exercise during short and moderate periods of time, although they provide of few periods of rest to recover moderately the fatigue accumulated during rotations or periods of exercise.

2266 Board #312 MAY 31 9:00 AM - 10:30 AM
Comparison Of Fitness Characteristics Between Men's And Women's Rugby Sevens Players

David B. Pyne, FACSM¹, Dean G. Higham¹, Anthea Clarke¹, John Mitchell¹, Anthony Eddy², ¹Australian Institute of Sport, Belconnen, Australia, ²Australian Rugby Union, St Leonards, Australia.
 (No relationships reported)

Both Men's and Women's Rugby Sevens have been added to the program for the 2016 Olympic Games in Rio de Janeiro, Brazil, but little is known about the comparative fitness requirements.

PURPOSE: To determine magnitudes of difference, and degree of variability, in standard anthropometric and fitness characteristics of national level men and women Rugby Sevens players.

METHODS: National Sevens squad players (males n=32, age 22 ± 3 years; height 1.82 ± 0.06 m; mass 90 ± 8 kg; females n=32, age 25 ± 6 years, height 1.68 ± 0.06 m; mass 70 ± 9 kg; mean ± SD) age were tested during routine training camps. All testing was conducted indoors on a synthetic running track after instruction, warm-up and familiarization with each test protocol. Each player completed a 40 m maximal sprint test, standing vertical jump and the YoYo Intermittent Recovery Level 1 (YoYo-IRL1) tests. Difference in mean scores between male and female players were expressed as a percentage, and variability as a ratio of the coefficients of variation (CV).

RESULTS: Male players had ~40% more lean mass and 40% lower skinfolds than the women. Speed (40 m sprint time and maximal running velocity Vmax) was only ~10-20% faster for the Men, while lower body power and momentum (mass x Vmax) were 40-50% higher in Men. The most marked difference was in endurance capacity (YoYo distance covered) where the Men (2260 ± 270 m; mean ± SD) were ~two-fold better on the YoYo-IRL1 than Women (990 ± 320 m; mean difference ± 90% confidence limits of 1234 ± 184 m). The Women were more than twice as variable (ratio of CV <0.4) in endurance fitness than the Men.

CONCLUSION: Women Rugby Sevens players should focus conditioning programs on power, size and endurance to improve these aspects of fitness.

2267 Board #313 MAY 31 9:00 AM - 10:30 AM
The Influence of Different Weighted Warm-up Bats on Swinging Performance

Nicole C. Dabbs, John C. Garner, Robert C. Ricks, Harish Chander, Cade Wilderson, Jordan Young, *The University of Mississippi, University, MS.* (Sponsor: Mark Loflin, FACSM)
 (No relationships reported)

In sport performance today it is vital to maximize performance to stay a top competitive athlete. In softball, this is very prevalent and is seen through a variety of hitting performance enhancements. Implementing a weighted bat prior to maximum swinging performance has traditionally been utilized but recent research has shown a decrease in bat swing velocity.

PURPOSE: The purpose of this study was to determine the influence of different weighted warm-up bats on swinging performance in varsity softball players.

METHODS: Ten active participating Division I female softball varsity athletes volunteered to participate. The order of the three warm-ups were randomized at the beginning of testing session and all conditions were completed in one visit. Subjects performed a self-selected warm up (instructed to simulate their on-deck warm up routine) with a normal weight (NW); 29oz, heavy (HW); 45oz or light-weight (LW); 13oz bat immediately following 5 maximal bat swings using a normal weight bat. Following each condition a 3mins washout/rest period was given prior to the following condition. This wash out/rest period allows adequate time decreased fatigue between conditions. Each swing in conditions was analyzed to assess swing kinematics and bat speed using Vicon Nexus Software. The swing with the highest motion capture clarity was used for analysis of the trajectory and velocity of a marker placed on the most distal portion of the bat.

RESULTS: A 1x3 repeated measures analysis of variance was used to analyze mean differences. There were no significant (p>.1) differences in maximal bat swing velocity following NW (56.97 ± 14.82mph), LW (48.34 ± 20.47mph) and HW (51.22 ± 22.70mph).

CONCLUSIONS: These results indicate that warming up with different weighted bats has no effect on bat swing velocity. However, there is a practical trend that supports previous research that HW warm-up demonstrates a decreased bat velocity compared to NW warm-up. Considering the current data is 3D, it may be considered to be a more precise estimate of bat swing velocity, which also supports the 2D linear velocity that has previously been investigated. Further research investigating the time point of maximum bat swing velocity during the swing should be performed to see if the warm-up bat has any influence on the joint mechanics rather than just bat velocity.

2268 Board #314 MAY 31 9:00 AM - 10:30 AM
Influence of Twelve Second Pitching Interval Time on Muscle Damage and Inflammation in Baseball Pitcher

Sun Chin Yang¹, Chia-Chi Wang¹, Yu-Chung Lee², Kuei Hui Chan¹, Chia-Hua Kuo, FACSM³, ¹Shih-Hsin university, Taipei, Taiwan, ²National Taiwan Sport University, Tao-Yuan county, Taiwan, ³Nanung University, Tao Yuan County, Taiwan, ⁴National Taiwan Sport University, Tao Yuan County, Taiwan, ⁵Taipei Physical Education College, Taipei, Taiwan. (Sponsor: Chia-Hua Kuo, FACSM)
 (No relationships reported)

PURPOSE: To investigate the reaction of 12 sec pitching interval on baseball pitcher's muscle damage and inflammatory cytokine markers in a simulate game.

METHODS: Eight baseball pitchers were recruited from an excellent university baseball team. Subjects participated a simulate game that pitching interval time was 12 sec, 15 pitching per inning for 7 innings and the rest time between inning was 5 minutes. Venous blood were drawn on pre-game, post-game and days 1, 2, and 3 after-game to measure the activity of CK, LDH as well as the concentration of IL-1β, IL-6, TNF-α and IL-10. Parametric data were analyzed using repeated-measures ANOVA.

RESULTS: Activity of CK was elevated significantly on post-game (205.75±23.05 U/l) (p<.05) and peaked value was on day 1 (348.87±83.59) after-game (p<.05) and then gradually decreased on days 2 and 3, but day 2 was still significant higher than pre-game. Activity of LDH was elevated significantly on day 1 (185.38±32.74 U/l) and then close to value of pre-game on day 2 and 3. IL-1β reminded steady during post-game period. In contrast, IL-6 was elevated significantly on the end of post-game (3.30±1.61 pg/ml) (p<.05) and had no significant difference on day 2 and 3. TNF-α was elevated significantly on day 1 (4.05±0.29 pg/ml) and 2 (3.90±0.26 pg/ml) after-game (p<.05) and then close to value of pre-game on day 3. IL-10 was elevated significantly on post-game (6.67±0.88 pg/ml) and days 1 (7.15±1.18 pg/ml) and 2 (6.14±0.99 pg/ml) after-game (p<.05).

CONCLUSION: Twelve sec pitching interval for 7 innings induced significant muscle damage and inflammation reaction, but returned the baseline on days 3 after-game.

2269 Board #315 MAY 31 9:00 AM - 10:30 AM
Physiological Indexes of Fitness between Aboriginal and non-Aboriginal College Baseball Players

Yi-Tzu Chen, Li-Lan Fu, Pei-Fan Wang, Jung-Tang Kung, *National Taiwan Sport University, Taoyuan, Taiwan.*
 (No relationships reported)

PURPOSE: The purpose of this study was to compare various physiological indexes of fitness between aboriginal and non-aboriginal college baseball players of a treadmill incremental maximal test.

METHOD: Ten aboriginal (Ab) (ht: 180.40 ± 3.13 cm, wt: 81.70 ± 10.85 kg, age: 19.20 ± 1.13 yrs) and 27 non-aboriginal (nAb) (ht: 177.97 ± 4.79 cm, wt: 77.07 ± 10.08 kg, age: 19.69 ± 1.13 yrs) healthy college baseball players participated in this study. Treadmill (COSMED) and indirect calorimetry (SensorMedics, Vmas 29) were used during maximal exercise test and calculation of physiological indexes of fitness. Finger-tip blood samples were collected right before and after exercise, and then analyzed (Biosen C_Line Analysers). Unpaired t-test and two-way ANOVA were used for significant differences calculation (α=0.05).

RESULTS: Ab have significantly lower VO_{2max} (Ab: 48.53 ± 5.62 mL·min⁻¹·kg⁻¹; nAb: 54.21 ± 4.82 mL·min⁻¹·kg⁻¹, p=0.00) and significantly higher post-exercise Lac (Ab: 14.33 ± 3.31 mmol·L⁻¹; nAb: 11.35 ± 2.24 mmol·L⁻¹, p=0.00) compared to nAb. But total exercise time, HR_{max}, VE, and post-exercise Glu were not significantly different between Ab and nAb.

CONCLUSION: Ab group have significantly lower VO_{2max} and higher post-exercise Lac than nAb. Possible underlining mechanism could be related to the different performance of anaerobic metabolic pathway, which caused the higher post-exercise Lac after exercise test.

2270 Board #316 MAY 31 9:00 AM - 10:30 AM
Total Touch Height in Football Performance Testing: A Case for Practicality

Cole M. Thompson, Brian J. Campbell, *University of Louisiana at Lafayette, Lafayette, LA.*
 (No relationships reported)

Performance testing in football might suggest how fast a player can run (40-yard dash), the upper/lower body strength (1 rep max), or the agility of a player (pro-agility test). Most coaches would assume that traditional vertical jump (TVJ) testing suggest how high a player can jump. TVJ assesses the relative power of an athlete, but does not measure how high a player can reach. Thus total touch height (TTH) is a more practical test for coaches to assess how high an athlete can jump. If a football is thrown up in the air, it's the player with the highest TTH that has the best chance to catch the ball, not necessarily the player with the best vertical jump.

Abstracts were prepared by the authors and printed as submitted.

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TO WHOM IT MAY CONCERN:

Please allow this letter to serve as official confirmation that

Pei-Fan Wang

attended the 59th Annual Meeting of the American College of Sports Medicine and World Congress on Exercise is Medicine, held May 29th – June 2nd, 2012 at the Moscone Convention San Fran Cisco, California.

If I can provide any further information, please contact me.

Sincerely,

Dawn M. Hamilton

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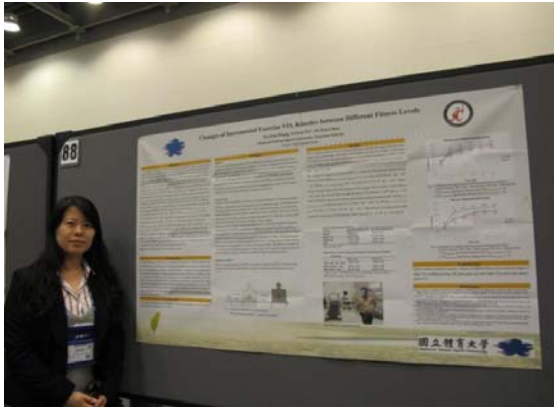


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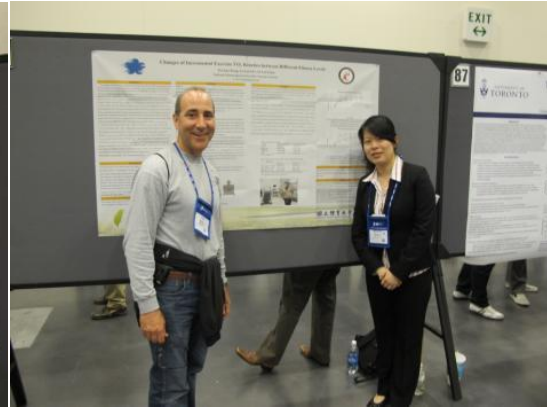
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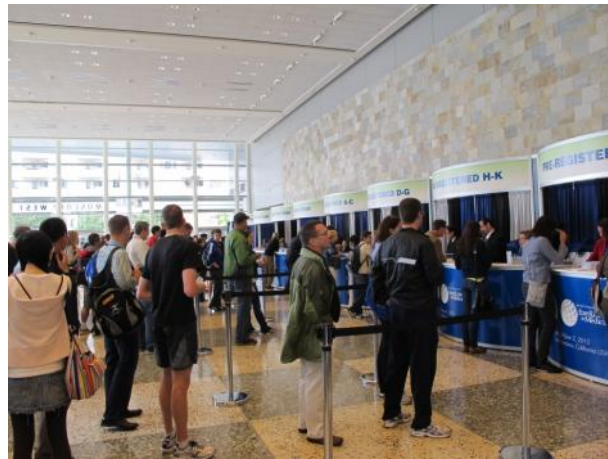
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