



# The 6th Asia-Pacific Conference on Exercise and Sports Science

**Caring for the Future Generation:  
A Holistic Approach Leading towards Health and Active Living**

## 第六屆亞洲太平洋運動科學大會

# 會議手冊 Programme

*Date: November 2~4, 2013*

*Venue: Sports Center, Chinese Culture University, Taipei, Taiwan*

*Website: <http://apcess2013.pccu.edu.tw>*

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# Programme

November 2-4, 2013

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Organizer: Chinese Culture University

Guide:

Sports Administration, Ministry of Education

Ministry of Foreign Affairs

Bureau of Foreign Trade, Ministry of Economic Affairs

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# The 6th Asia-Pacific Conference on Exercise and Sports Science ( APCESS 2013 )

## Abstract Form

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### **The Decreased Bone Density due to High Intensity Exercise through The Changes in Levels of Osteoprotegerin, Osteocalcin and C-telopeptide**

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#### **Abstract**

**Background/Purpose:** Exercise provides benefits to the body, include to the musculoskeletal function. The dose of exercise that exceeds the threshold of the body's adaptability will cause the elevation of the body's cortisol through the Hypothalamus Pituitary Adrenal (HPA) Axis. High level of glucocorticoids can disrupt the balance of the body functions resulting in pathologies, one of them is the bones. Previous study revealed that administration of glucocorticoids enhance the osteoclastogenesis by inhibiting osteoprotegerin, so that the resorption process increase, causes the decrease of bone density. Throughout our lives, the bones will experience the remodelling process, which is the formation process by osteoblasts and resorption by osteoclasts. In the process of formation, osteoblasts produce osteocalcin, whereas at the resorption, osteoclasts release Cross-linked Telopeptide (C-telopeptide). Based on the description above, research that describes the mechanism of decreased bone density due to high intensity exercise through the changes in levels of osteoprotegerin, osteocalcin and C-telopeptide, was conducted. **Methods:** The experimental animals used were 20 female rats (*Rattus norvegicus* strain Wistar), which is divided into two groups, the control and the treatment group. The treatment group was given high intensity swimming exercise,

with a load of 18% body of weight within 90% of the maximum time, performed two times per set with a frequency of 3 times per week, for 8 weeks. At the end of the experiment, the experimental animals were anesthetized and the blood was drawn to examine the levels of osteoprotegerin, osteocalcin and c-telopeptide. Data were analyzed using t-2 free sample test (independent t-test) to determine differences between control and treatment groups and path analysis. **Results:** T-test results in this study showed a significant difference in the osteoprotegerin, osteocalcin and c-telopeptide ( $p < 0.05$ ). Path analysis results showed a correlation between increased high intensity exercise with decreased level of osteoprotegerin with the standardized direct effect -0.66; elevated levels of C-telopeptide with a value of -0.6733 standardized direct effect, and decreased level of osteocalcin with the standardized indirect effect -0.40. **Conclusion:** The results of this study indicate the changes in levels of osteoprotegerin, osteocalcin and C-telopeptide in bone density decreased due to high intensity exercise, in female rats (*Rattus norvegicus*).

**Keywords:** High intensity exercise, osteoprotegerin, osteocalcin, c-telopeptide.

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