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This study used convenience sampling to select its participants. This limited the external generalizability of any conclusions made by the study. Generalizing the results to the target population may not be appropriate and quite risky. Since the participants were taped and directly observed by researchers, they could have performed differently during the test. The results may change if and when there were no researchers observing them. The use of video recordings or inconspicuous methods of observation may have reduced biases.

The study hypothesized that gluteal taping will increase running speed by increasing the step length. However, the study concluded that gluteal taping decreases the running time over a 100-meter distance in healthy young adults, with a  $p$  value = .057. This result fell short of their set  $p$  value of <0.05. Though the merits of the study cannot be reduced to mere numbers, the conclusions of the study should have been qualified to emphasize the clinical implications of the findings in spite of the lack of statistical significance.

A well-constructed randomized controlled trial with a sample population tested for homogeneity is

highly recommended for future studies. The use of reliable and valid outcome measures cannot be over-emphasized. A well-designed methodology will strengthen the claim that taping does potentially and advantageously alter the biomechanics of gait.

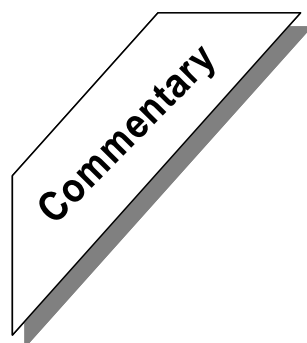
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## *IMPROVEMENTS IN MAXIMAL OXYGEN CONSUMPTION AMONG ELDERLY TAI CHI CHUAN PRACTITIONERS*

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## ABSTRACT

**Background and purpose.** This study was undertaken to provide information about the therapeutic effects of Tai Chi Chuan in improving the maximal oxygen consumption ( $VO_{2max}$ ) of the elderly. **Participants.** Twelve residents (11 females, 1 male) of Metro Manila with a mean age of 60.42 +/- 6.72 years were included in the study. **Methodology.** Tai Chi with 24 basic postures was used as the exercise protocol, 5 times a week for 6 consecutive weeks. The Bruce Treadmill Protocol together with the COSMED K4 b<sup>2</sup> metabolic cart was utilized to assess  $VO_{2max}$  prior to and after 6 weeks of Tai Chi sessions. Pre and post-test values were analyzed using the COSMED K4 b<sup>2</sup> ver 6.0. **Results.** Statistical analysis revealed a significant improvement in  $VO_{2max}$  after 6 weeks with a mean increase of 6.20 +/- 4.39 ml/kg/min. **Conclusion.** This study proves that Tai Chi training can improve cardiovascular endurance as measured by  $VO_{2max}$  among geriatric individuals.

**Key words:** *Tai Chi Chuan, Maximal Oxygen Consumption,  $VO_{2max}$*

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## COMMENTARY

The name *T'ai Chi Ch'üan* (TCC) is derived from the T'ai Chi symbol, the *taijitu* or *t'ai chi tu*, commonly known in the West as the "yin-yang" diagram. T'ai Chi Ch'üan techniques are said therefore to physically and energetically balance *yin* (receptive) and *yang* (active) principles: "From ultimate softness comes ultimate hardness." It is an ancient form of Chinese martial arts with a set pattern of movements designed to circulate the energy throughout the body for health and relaxation. Commonly termed as "morning meditation", its calming effect could induce relaxing state believed to be beneficial to person's well-being.

To validate the TCC's effect on physiological aspects of its practitioner, a number of studies were conducted with preponderance to TCC's cardiovascular and respiratory components. To the writer's knowledge, the first study published in English was by Gong et al. in 1981<sup>1</sup>. In this study, the changes in heart rate, blood pressure and electrocardiogram (ECG) were examined during performance of 24 simplified forms of TCC. The extensive studies of Lan et al.<sup>2,3,4,5,6</sup> showed that TCC can improve cardiorespiratory function, muscle strength, and balance, and that TCC is an exercise with moderate intensity that is aerobic in nature. *T'ai Chi Ch'üan's* effect on enhancing balance has been supported by other studies<sup>7,8,9</sup>, as well. Further studies of Hong et al<sup>10</sup> showed almost similar results about the favorable effects of TCC on the promotion of balance control, flexibility and cardiorespiratory fitness in older adults. From the perspective of exercise prescription, TCC is a suitable conditioning exercise because the training characteristics fulfill recommendations of the American College of Sports Medicine<sup>11</sup> for developing and maintaining cardiorespiratory fitness.

Maximum oxygen consumption, also referred to as  $VO_{2max}$  is one of the oldest fitness indices established for the measure of human performance. The ability to consume oxygen ultimately determines any human's ability for maximal work output over periods lasting greater than one minute. The higher the  $VO_{2max}$ , the greater an individual's potential work rate is.

This study of Dizon et al works on and anchors a similar theme with the previous studies cited above focusing on the cardiovascular and respiratory responses to exercise. Like most of the studies on TCC, the participants were older adults. Though the number of participants was small and the conclusions may have limited external generalizability to the general population, this may

be considered a good pilot study on Filipinos and may serve as a basis for large-scale studies in the future. The use of modern equipment and standardized testing protocols in this study contributed to the validity of the outcomes that served as basis for improvement. However, researchers who plan to pursue a follow-up study should emphasize on adequate training of personnel on the protocol, adherence to standardized procedures, and proper calibration of equipment in order to reduce bias due to instrumentation.

In the present clamor for fitness and health across all ages in the population, the results of this study may well provide readers with another option in selecting the exercises suited to their needs. Considering the benefits of engaging in regular *T'ai Chi Ch'üan* sessions, exercise for the elderly need not be stressful and bone-jarring.

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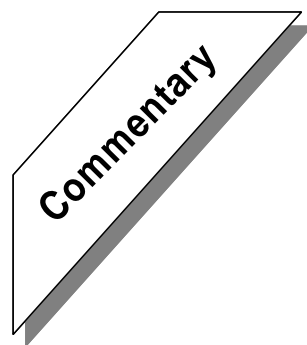
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## ***KINEMATICS OF BOWLING: A COMPARATIVE STUDY BETWEEN BEGINNER AND ADVANCED BOWLERS***

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### **ABSTRACT**

**Purpose:** The study aims to describe and compare the kinematics between beginner and advanced bowlers, and male and female bowlers. **Methodology:** Ten subjects, 5 beginner and 5 advanced bowlers participated, using snowball sampling method. Reflective markers were placed on the following anatomic landmarks: shoulder, elbow, hip, knee, and the ankle. Participants were made to execute a game while being recorded through a video camera. Observational analysis was used to describe the kinematics for each game. Codes, in 30-degree ranges, were used to determine the range of movement of every joint. An inter-rater and intra-rater reliability test was done for assessment of range of movement. Mode function was employed to measure frequency and standard deviation was used to measure dispersion of frequency. Chi square test was applied to measure significant differences of data. **Results:** There was a high inter-rater and intra-rater reliability. Advanced bowlers utilized the 5-step approach while the beginner bowlers used the 4-step approach when throwing. There was less variability in the joint angles seen in the performance of advanced bowlers unlike in the beginner bowlers. **Conclusion:** Differences were noted between beginner and advanced bowlers in terms of their kinematics in throwing. An understanding of the results in kinematics will determine focus of training in beginner bowlers.

**Key words:** *bowling, advanced and beginner bowlers, kinematics, 4 and 5 step-approach*

### **COMMENTARY**

Kinematics, a subdivision of biomechanics, describes the appearance of motion, including the

pattern and speed of movement sequencing by the body segments<sup>1</sup>. The study of the biomechanics of