

## The Differences of Gross Motor Development Level among Taekwondo Athletes

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**Abstract:** This study was conducted to identify the level of gross motor development Taekwondo athletes in the early stages of schooling. Methods: A total of 120 participants (M = 60, F = 60) participated in this study. Ulrich Gross Motor Development Test (2000) was conducted to determine the level of gross motor development Taekwondo athletes in terms of locomotor skills and object control skills. Scores obtained by Taekwondo athletes have been transcribed for locomotor standard score and score object control standard Gross Motor Development Quotient (GMDQ). ANOVA statistical analysis is used to analyze the findings in comparing scores mean Taekwondo athletes based on age groups. In addition, different levels of locomotor skills age equivalents and age equivalents in the object control skills among Taekwondo athletes aged 8 years to 10 years were also studied. Findings: Results showed significant differences in the level of locomotor age equivalents ( $F_{2,117}; 14.162; p < 0.000$ ), age equivalent level object control skills ( $F_{2,117}; 31.675; p < 0.000$ ) and the level of gross motor development ( $F_{2,117}; 15.423; p < 0.000$ ) between the age group athletes Taekwondo. Results and Discussion: The study shows that there is deviation in the development of gross motor skills among Taekwondo athletes in the early stages of schooling.

**Key words:** Gross Motor Development • Locomotor skills • Object control skills • Taekwondo Athletes

### INTRODUCTION

Motor development is an ongoing process and a lifetime. It started in the Womb until death. Motor development not only refers to the age and physical growth but also include other aspects such as physiology, motor system and the nervous system (Gallahue and Ozmun, 2006). Motor skills are divided into two parts, gross motor skills and fine motor skills (Arasoo, 1989). Gross motor skills are skills that involve large muscle groups with the participation of many bodily movements. Gross motor skills are defined as the process of building large muscles which includes members of the body such as arms, legs and neck (Taber, 2009). Gross motor skills are divided into two sub-components of locomotor skills and object control skills.

Locomotor skills are the movement from one place to another, such as walking, running, jumping and lateral run in a straight line or bent with all members of the body are in the same direction and speed. Locomotor movements occur in tandem with the development of object control skills. Object control skills involving movement and

coordination between the members of the body with objects either take action or to receive a response from the object. Object control skills are also an ability to do something towards the device by using the members of the body such as hands and feet with static and dynamic conditions.

Locomotor age equivalents is average age timeline representing the test score for locomotor skills in the population tested and age equivalents object control is average age timeline representing the score for the test object control skills subjects tested.

Physical activity plays an important role in the development of motor and child health. Participation in physical activity can contribute to the development of motor and a healthy lifestyle for prevention of chronic diseases (Bauman, 2002).

This situation became a major requirement for physical educators and trainers to teach their natural behavior of early motor skills were at the school so that their gross motor development growing age chronology. The level of locomotor skills age equivalents and control objects should also be emphasized that the development

of this child motor according to motor development sekuen.

According to the National Standards of Physical Education (NASPE, 2004), various studies have shown that the reference motor skills in childhood may grow through sports and games. Active lifestyle since childhood can help in improving motor development during the growth to be an adult. One example of a healthy lifestyle is to participate in activities that teach sport like Taekwondo martial ways. Taekwondo is beneficial in terms of physical and mental fitness, self-confidence and self-reliance.

This study focuses on gross motor development of human young athletes in Taekwondo sport activities. This study has been implemented in a number of Taekwondo training center using TGMD-2. Athletes selected as there are no relevant studies done by researchers. Martial arts Taekwondo is one of the sports activities of martial interest in children early schooling. In addition to martial arts that could be learned from Taekwondo sports, children can also increase their physical fitness as mental intelligence.

According to previous studies, age norms are important in helping researchers identify the performance review based on the specific subject of age. The rate of growth and development of Taekwondo athletes may differ Between target groups because of differences in terms of current care, nutritional diet or lifestyle of the community environment. This situation could not be denied that there is a difference between the young athletes participating in different sports like football, volleyball or badminton. Accordingly, this study will be the pioneer to other review.

The purpose of this study is to identify the level of gross motor development Taekwondo athletes either above or behind the achievement of motor development according to their chronological age. This study also assesses the level of individual gross motor development of Taekwondo athletes and identifies gross motor development Taekwondo athletes based on age equality.

## **MATERIALS AND METHODS**

Studies conducted ex post facto nature. Study design was chosen because of its tested among Taekwondo athletes naturally occurring and researchers did not do any manipulation of these features. This study includes data obtained from Taekwondo athletes aged eight years (M= 20, F= 20), nine (M = 20, F = 20) and ten years (M = 20, F = 20).

Taekwondo athletes in the study follow this sports training twice a week with two hours for each training session.

Before the test is carried out, 120 taekwondo selected given parental consent letter to join the test gross motor development. Guardians or teachers are required to complete a personal information form students contains the following information: (i) name (ii) gender, (iii) date of birth (iv) (v) the name of the school and (vi) the consent and permission of a parent or guardian to sign the public the name and signature of parent or guardian provided personal information form.

Taekwondo athletes groups divided into two groups by gender, men and women athletes. After the Division of the group are conducted, students need to do tests on two experimental station. All students are required to do all the tests based on locomotor skills and object control skills. Locomotor skills tests involving skills gallop, jump the feet, jump far stand, side ejection, run away and ran. Skill tests involved object control skills still hit the ball, bouncing balls, kick balls, an overthrow the ball, catch the ball and throw the ball.

Every action-action test will be shown how to do it by the researcher prior to all students doing a test action. Arrangement of test began with locomotor skills and skills of control objects. Each test involves two trials for each subject. The existence of the criteria in movement shown by the subject during the test will be evaluated according to test scores form motor skills. All movements and motor behaviour during tests carried out were burned completely.

TGMD-2 testing is carried out only once on three different taekwondo group age. Descriptive analysis is carried out to obtain the score mean and standard deviation. Anova analysis is conducted to determine significant differences between age groups based on the score of locomotor skills age equivalents, age equivalents score object control skills and gross motor development scores.

Studies on the level of gross motor development and age equivalents early childhood schooling involves the following equipment: (i) a set of brand Sony Handycam video recorders (ii) a tripod (iii) a Toshiba laptop (iv) skital(v) measuring tape (vi) 4 inch rubber ball (vii) basketball (viii) the bladder nut (ix) batting tee (x) plastic bat (xi) football (xii) the ball softball (xiii) tennis ball (xiv) plastic ball 4 inch (xv) Form of Gross Motor Development Test scores Ulrich 2000.

**Data Collection:** Athletes study divided into two groups

according to gender. After the Division of the Group carried out the study, athletes have to perform tests on two specified test stations of locomotor skills test station and test stations control objects. Locomotor skills tests involving skills leap next foot gallop, jump, remote stand, side ejection, run away and ran. Object control skills test involved skills still hit the ball, bouncing balls, kick balls, an overthrow the ball, catch the ball and throw the ball.

Department demonstrator Coordinator will show you how to do the test skills skills before the review doing stunts athletes ' tests. The test performed in accordance with the order of skills that started with locomotor skills and skills of control objects. Each test involves two trials for each participant. Test action are recorded using a video camera.

Researchers analyze video footage to get a raw score of the test results. All raw scores were recorded in the form Gross Motor Development Test scores. Gross motor skill performance data obtained through video Sony Handycam recording. Recordings obtained were transferred to a Toshiba laptop. Toshiba laptops are equipped with the movie maker version 2.6 to do the editing. All 12 gross motor skills tested were collected by researchers in a folder for each of Taekwondo athletes. Taekwondo athletes are given two attempts for each behaviour and the behaviours that was done will be recorded and then evaluated according to predefined criteria. Given a score based on the existence of the behaviour of the criteria that should be evaluated according to the motor movement. Score one (1) is granted if they meet the test criteria and the score of zero (0) is given if the test criteria do not exist. Raw scores for locomotor skills and object control is from zero (0) to forty-eight (48). The raw scores obtained were recorded in Form Gross Motor Development Test scores.

Raw score of locomotor skills and control object will be converted to standard scores based on the norm of standard scores. Total standard score between locomotor skills and control object will be converted to GMDQ score based on norm GMDQ. Raw score locomotor skills and control object will be converted to a score of age-equivalents based on the norm of the skills age equivalents.

## RESULTS

Gross motor development scores were analyzed descriptively to evaluate the mean and standard deviation (Table 1). Figure 1 shows that the mean performance of gross motor development between the age group of taekwondo athletes.

Table 1: Analysis Descriptive Score of Performance of Gross Motor Development between Age Group

Age Group	N	Mean	Standard Deviation
	40	80.13	6.817
9	40	83.35	2.957
10	40	86.28	4.291
Total	120	83.25	5.522

Table 2: ANOVA Analysis of Age Equivalent Level for Locomotor Skills

	Sum of Squares	Df	F	Sig.
Among the Group	30.758	2	14.162	.000*
In Group	127.055	117		
Total	157.813	119		

\*p<.05

Table 3: ANOVA Analysis of Equivalent Level for Object Control Skills

	Sum of Squares	df	F	Sig.
Among the Group	37.191	2	31.675	.000*
In Group	68.689	117		
Total	105.880	119		

\* p<.05

Table 4: Descriptive Analysis Score of Motor Gross Development between Age Group

	Sum of Squares	df	F	Sig.
Among Group	757.050	2	15.423	.000*
In Group	2871.450	117		
Total	3628.500	119		

\* p <.05



Fig. 1: The Mean Performance Of Gross Motor Development Between The Age Group

Comparisons were also performed using ANOVA for locomotor skills age equivalent level (Table 2), the level of object control skills age equivalents (Table 3) and the level of gross motor development (Table 4). Results showed a significant difference (F 2,117; 14 162; p <0.000) between the age group of Taekwondo athletes in the age

equivalent level of locomotor and object control skills age equivalents ( $F_{2,117} = 31.675$ ;  $p < 0.000$ ). In addition, the findings showed that there were significant differences ( $F_{2,117} = 15.423$ ;  $p < 0.000$ ) in gross motor development between the age group of Taekwondo athletes.

## DISCUSSION

This study measured the level of gross motor development differences among Taekwondo athletes based on age groups. The results showed significant differences between groups Taekwondo athletes aged 8 years, 9 years and 10 years. Tested skills like running, jumping, bouncing the ball and kicking the ball can be achieved by a child under a certain age (Ulrich, 2000). This situation proved again through the theory of Karl Newell (1986) discuss that each individual has a different body system and constantly changes according to age groups.

Taekwondo athletes' achievements over the age of 10 years to achieve the highest score compared with athletes aged 8 years and 9 years. It has been an increase in the balance of gross motor skills should be in the Taekwondo athletes.

Score of locomotor skills age equivalents taekwondo show delay for all ages. Similar findings are shown for a score of age equivalents object control skills. The achievement of the level of gross motor development based on the percentile score GMDQ shows all age groups fall below average.

**Summary:** Based on the results of the study carried out for the development of gross motor Taekwondo athletes proved that the performance of gross motor skills in Taekwondo athletes varies by age group even if taught by a Head Coach who teaches from various centres.

The findings show that motor related changes occur achievement is to follow the increase in age. Physical fitness as a result of Taekwondo training specific to certain members of the body such as concentration of specific muscle formation, movement biomechanics, speed of kick, speed of reaction, the reaction of aerobic endurance attack or directly affect every gross motor related Taekwondo athletes. Specialized training received by members of the Taekwondo athletes body cause limb movement coordination and gross motor development for the better.

Taekwondo athletes ability to analyze behaviour locomotor skills and object control skills are reflected in the behaviour of researchers play a role in motor

development tests performed. This ability can be distinguished by the number of test scores recorded in gross motor development. Taekwondo training that uses the jump on one foot as one of the equilibrium method and a method of increasing leg strength for all Taekwondo athletes led to increased locomotor skills in one leg jump test performed. Conditions in line with the theory of the development of environmental factors explain that the environment experienced by each child can help in achieving the maximum level of development (Newell, 1986).

**Suggestion:** The level of gross motor development Taekwondo athletes showed a parallel with their chronological age. Observing the continuous development must be done in order to meet gross motor development sequence should be. Further studies should be done on young athletes from different sports to determine the best sports which can help develop gross motor development level athletes. The study can also be done to look at the development of gross motor taekwondo athletes on different coaches.

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