PROCEEDINGS

THE 1ST YOGYAKARTA INTERNATIONAL SEMINAR ON HEALTH, PHYSICAL EDUCATION, AND SPORTS SCIENCE.

Evidence-Based Practice of Sports Science in Education, Performance, and Health.

October 14th, 2017. Eastparc Yogyakarta, Indonesia

Published by
Faculty of Sport Sciences
Universitas Negeri Yogyakarta

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OPENING SPEECH

As the Dean of Faculty of Sport Sciences Universitas Negeri Yogyakarta, I would like to welcome and congratulate to all speakers and participants of the First Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) 2017 entitled “Evidence-Based Practice of Sport Science in Education, Performance, and Health”.

This international seminar is actually an implementation in the framework of the assessment of the achievements and sports culture in society that can support the achievements of the Indonesian people, so that there will be a significant role of practitioners, academicians, sport people, and sports observers from Universities, Institutions and Sports Organizations to help actively facilitate in the development, assessment of innovative sports science development so as to achieve sport achievements at the National and International level.

Finally, we thank all the committee of YISHPESS for their hard work in organizing this activity, and congratulate the invited speakers and all participants. Hopefully, this seminar is significant for the development of physical education, health, and sports sciences.

Dean of Faculty of Sport Sciences,
Universitas Negeri Yogyakarta

Prof. Dr. Wawan S. Suherman, M.Ed.
PREFACE

Alhamdulillahi rabbil-'Alamin, thank Allah the First Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) has been prepared well and on time. With all humility, we welcome and congratulate the speakers and participants of Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) organized by the Faculty of Sport Sciences, Universitas Negeri Yogyakarta.

The YISHPESS 2017 is designed to updating and applying evidence-based practice in sports science aspects, including: education, performance and health. We hope that the invited speakers of this seminar can reduce the gaps between academic and field to get best output in the daily sport and health practices.

We would like to thank to Rector and the board of Universitas Negeri Yogyakarta for supporting this seminar come true. Praise and be grateful to the Lord, so that this proceeding can be issued. Hopefully, the publication of this proceeding can bring benefits to the participants in particular and readers in general.

Yogyakarta, October 14th, 2017
Chairperson of the Committee

Dr. Or. Mansur, M.S.
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THE EFFECT OF KICKING SPEED, STRENGTH AND LEG MUSCLE EXPLOSIVE POWER ON THE ABILITY OF DOLLYO CHAGI OF TAEKWONDO DOJANG ATHLETE

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Objectives: The purpose of this study is to see the effect of kicking speed, the strength and explosive power of leg muscle toward the ability of Dollyo Chagi kick on taekwondo dojang athletes of West Sumatera Regional Police.

Methods: The method was quantitative oneusing Path Analysis. The population in this research was all Dojang athletes of Regional Police West Sumatera as many as 20 people. The kicking was tested by using sandsack/ target, the kicking speed was tested by using Nurul-Shark instrument, the leg muscle strength was tested by using Leg Dynamometer and its explosive power was tested by using Standing Board Jump instrument.

Results: Based on the analysis, the kicking speed obtained sig = 0.043, the leg muscle strength obtained sig = 0.029, and leg muscle explosive power obtained sig = 0.093 which were smaller than probability value α = 0.05. Hence, the path analysis coefficient was significant. The speed of kick through the explosive power of leg muscle affects the dollyo chagi kick ability as much as 38.44%. The leg muscle strength through its explosive power affects as much as 12.18%. Thus, the effect of kicking speed, leg muscle strength and its explosive power towards Dollyo Chagi Kick ability was 55.06%.

Conclusion: 1) the kicking speed has direct and significant effect on Dollyo Chagi kick ability, 2) leg muscle strength has direct and significant influence to the Dollyo Chagi kick ability, 3) leg muscle explosive power has direct and significant effect on Dollyo Chagi kick ability of Dojang athletes, 4) There is an indirect effect of kicking speed on the ability of Dollyo Chagi kick through explosive power of leg muscle, 5) There is indirect influence of leg muscle strength to ability of Dollyo Chagi kick through the explosive power of leg muscle 6) There is significant influence between kicking speed, leg muscle strength and its explosive power which simultaneously effect the ability of Dollyo Chagi kick of Dojang athlete West Sumatra Regional Police.

Keywords: kicking speed, strength and explosive power of leg muscle, dollyo chagi kick

INTRODUCTION

Development and training of sport is part of the improvement of human quality which is directed in the improvement of physical and spiritual health of all Indonesians. In addition, it can also cultivate the character, personality, discipline, sportsmanship, and ability of critical thinking and the development of sports skills. The efforts to improve the quality of Indonesian society in order to have adequate health and fitness make physical education important. This can be accomplished through sport activities that ultimately obtain physical and spiritual health, as a nursery through educational institutions. In accordance with the above explanation, exercise is not only aimed at maintaining and improving physical health, but also can be used as a place of appreciation for those who obtained achievement at regional, national, and international levels. Sport is not only to train the physical course but also to cultivate morals and discipline. It is proved by the timeliness of exercise and sportsmanship in matches and practices.

To achieve the goal of the sport, it would be sustainable with the support and cooperation of various parties. This requires serious and tiered coaching. In accordance with Undang-Undang No. 3 Tahun 2005 on National Sport System CHAPTER II Article 21 section 4: "development and training of sports are implemented through long life education and community that are based on the development of sports for all people".

Tae Kwon Do is one of the many sport achievements in the world enjoyed by almost people in the world including Indonesia as well as the Western Sumatera. One of the goals of Tae Kwon Do training in West Sumatera Province is the junior category or 15-17 year old students (lee. 2009). The number of West Sumatera provincial championship events targeting the learners to give impact to
schools to include activities Taekwondo Do as an extracurricular school. In addition, achievement trainings in the Taekwondo Do sports can be achieved through coaching in Dojang which are spread throughout the West Sumatra province. One of the Dojang who is still active in conducting the guidance is Dojang of West Sumatera Regional Police.

Based on the observation and interviews done with the Dojang trainer of West Sumatra Regional Police, Ir. Budi Ilyas, on April 16th, 2017, he explained that Dojang athletes ability to perform Dollyo Chagi kick are still below the average. So that, at the time they compete in the match, they often lose speed and power compare to the athletes from other provinces. It can be seen from their kicks which were often deviated from the target or their kick ability is easily read by the opponent resulting in points or numbers for the opponent.

The kick is an attack whose value is higher than the punch attack. Physical ability state (strength, agility, endurance, explosive muscle endurance, speed and explosive power of the leg muscles) can affect the ability of Dollyo Chagi kicks. One of the factors that can affect kick dollyo chagi is power. Strength is the ability of a muscle to generate stretching against a resistance or a component of a physical condition that concerns an athlete's ability when using his muscles to accept the load in a given work time. Another physical condition that affects kick dollyo chagi is speed. Speed is the ability of the body to direct all systems in the fight load, distance, and time that produce mechanical work. In doing a Dollyo Chagi kick the Dojang athletes of West Sumatra Regional Police are often avoided and deflected by opponents, it signifies the speed in doing the kick is still less fast. Speed factor is allegedly influential on the ability of Dollyo Chagi kick of Dojang athletes of West Sumatera Regional Police.

Kick is a technique of attack that often appears and more likely to create points in a Taekwondo Do match both in using dollyo chagi kick and other kick techniques. This kick is the most kick used by Taekwondo Do athletes when competing. Ease of movement, power generated, and the ability of this kick is the reason why this kick is often used. Suryadi (2002: 34) mentions "the power of this kick is generated from the knee which is strongly supported by waist round as energy channel from the body". The waist rotation determines how much kick power is generated. When doing the Dollyo Chagi kick technique, the level of freedom movement will be very large and the kick will be easier to do so the opponent is difficult to anticipate an attack of this technique if the joints of the limbs, especially the hip joints can be fully utilized.

The Dollyo Chagi kick technique generates enormous power when it is done with the correct kicking technique. When doing Dollyo Chagi kick, the position of the knee that will kick has a pedestal that can be utilized to produce a kick. This kicking technique requires a high degree of hip joint flexibility due to rotation of the waist determining how much kicking power is performed. When Taekwondo Do’s athlete can do a Dollyo Chagi kick with a full waist round, then the strength and speed of kick Dollyo Chagi will be difficult to avoid by the opponent. According Suryadi (2002: 33): "Coordination of all gestures, especially with the waist, will produce maximum power". In addition, the spontaneous and the explosive kick-motion techniques in Dollyo Chagi's kick will be difficult to be anticipated by the opponent.

**METHOD**

This research used quantitative method by using Path Analysis approach, which uses structural equation to see the dimensional causality of the effects of Speed (X1), Muscle Limb Strength (X2), and Leg Muscle Explosive Power (X3) towards Dollyo Chagi Kicking Capability (Y). This study was conducted to see whether there is the direct a indirect effect of causal variables to the result variable through the use of Path Analysis method. The sample in this study is all athletes taekwondo dojang Polda West Sumatra, amounting to 20 peoples. The instruments used are (1) kicks dollyo chagi test, (2) Nurul Shark test for kick speed test, (3) leg dynamometer test to measure leg muscle strength, (4) test of standing broad jump to explosive Power of Leg Muscle.
Information:
X1: Kicking Speed
X2: Leg Muscle Strength
X3: Leg Muscle Explosive Power
Y: Dollyo Chagi Athletes Kicking Capability

RESULT
Based on the measurements in each research variables, the average ability of kicking speed = 0.48, average leg muscle strength = 170.30, average explosive power of the leg muscle = 225.70 and average ability dollyo chagi Kick = 21.10. following data measurement results of each variables:
1. Dollyo chagi kick

Graph 1. Diagram of dollyo chagi kick
2. Kick Speed

![Graph 2. Diagram of kick speed]

3. Leg muscle strength

![Graph 3. Diagram of leg muscle strength]

4. Explosive power of The Leg Muscle

![Graph 4. Diagram of explosive power of leg muscle]

1. Research Results Shows that There is Direct Effect of Kicking Speed Towards Dolly Chagi Capability of Dojang Athlete of West Sumatra Regional Police

Based on the calculation of path analysis, it was found that there is a direct effect of kicking speed as the dominant element of physical ability and has a significant relationship and influence on the ability of athletes to perform the Dollyo Chagi kick. If it is seen from the relationship, KickingSpeed and Dollyo Chagi kick had strong relationship that is equal to 0.542 or 29.38%.

2. Results Research Shows There is Direct Influence of Leg Muscle Strength Against the Dollyo Chagi Kick Ability Dojang Athlete of West Sumatra Regional Police

From the results of research, it was found that there is direct influence of leg muscle strength (X1) and the ability of Dollyo Chagi kick (Y). It can be seen in Table Coffesient which shows the effect.
of \( \rho_{YX^2} = 0.298 \). Based on the calculation done by using program SPSS.17, it was obtained the sig value = 0.029 which is smaller than probability value \( \alpha = 0.05 \), value 0.029 <0.05. Hence, in this case Ho is rejected and Ha is accepted which means that coefficient of path analysis is significant. So Leg Muscle Power is directly affected.

3. Research Results Shows Direct Influence of Leg Muscle Explosive Power Ability Towards Dolly Chagi Capability of Dojang Athlete of West Sumatra Regional Police

From result of the research, it was found that there is direct influence of Leg Muscle Explosive Power (X3) to the Accuracy of Kick To Wicket (shooting) (Y). This is seen in Table Coffesient which shows the effect of \( \rho_{YX^3} = 0.173 \). Based on the results of calculations using SPSS.17 program, it was obtained the sig value = 0.093 which is smaller than probability value \( \alpha = 0.05 \), value 0.093 <0.05. Then in this case Ha is accepted and Hois rejected which means the pathway analysis coefficient is significant. So, the muscle limb power directly affects the ability of Dollyo Chagi kick done by athletes Dojang Athlete West Sumatra Regional Police.

4. Research Results Indicate There is Indirect Influence of Kicking Speed Towards Dolly Chagi Capability Through Leg Muscle Explosive Power of Dojang Athlete of West Sumatra Regional Police.

In the results of path analysis calculations, it was found that the direct effect of Kicking Speed on Dollyo Chagi Kicking Capability was 0,542 or 29,38%, while the effect of Kicking Speed through Leg Muscle Explosive Power of Dollyo Chagi Kick was 0,173 or 2, 99%. This means that if these two variables are integrated, the effect is significant. It can be interpreted that Kicking Speed through Leg Muscle Explosive Power gives greater influence on the ability of Dollyo Chagi kick on Dojang athletes of West Sumatra Regional Police.

5. Research Results Indicate There Is Indirect Influence Between Leg Muscle Strength Against Dollyo Chagi Kicking Ability Through Leg Muscle Explosive Power of Dojang Athlete of West Sumatra Regional Police.

Based on the previous findings, the direct influence of Leg Muscle Strength on the ability of Dollyo Chagi kick obtained was 0.172 or 2.99%, while the influence of Leg Muscle Strength through Leg Muscle Explosive Power to Dollyo Chagi Kicking Capability was 0.298 or 8.88%. This means that the effect is quite significant. These findings show a direct influence between the explosive muscle limb power variables on the Dollyo Chagi Kick Capability is much more increased if it is integrated with the Leg Muscle Explosive Power variable. This can be interpreted that Leg Muscle Power through Explosive Muscle Limbs give a greater influence on the ability to Dollyo Chagi kick on Dojang athletes of West Sumatra Regional Police.

6. Research Results Shows There is Simultaneous Effect of Kicking Speed, Leg Muscle Strength and Its Explosive Ability Against Dollyo Chagi Kicking Ability of Dojang Athlete of West Sumatra Regional Police.

The effect of these three exogenous variables; the kicking velocity (X1), leg muscle strength (X2), and explosive muscle limb power (X3) on the ability of kick Dollyo Chagi shows score 0.742 or 55.06%. The findings of this study have statistically shown that Dollyo Chagi Kicking Capability is supported by three variables, while the rest equal to 44.94% caused by other factors. Other factors may be such as elasticity, Speed, Flexibility, Durability of Leg Kicker Muscle Speed and so on. It can be interpreted that in particular the ability of the three exogenous variables owned by Dojang athletes of West Sumatra Regional Police can still be increased again, so that the result effect in kicking will be more optimal and the actualization of Dollyo Chagi kick capability is better in accordance with expectations.
DISCUSSION

Many factors that can affect the ability of kick dollyo chagi include: Speed. Speed comes from word “fast”. According to Ihsan (2017), speed means the movement in a short time that can travel long distances. Speed is one of the basic components of physical condition that has a considerable role in achieving sports achievement for an athlete. The results showed that the kicking speed was the dominant element of physical ability and had significant relation and influence to the athlete’s ability to perform the Dollyo Chagi Kicking Capability (Tirtawirya, 2015).

The next factor is strength, according to Harsono (1988: 135) "one element of physical condition that needs to be trained first in the element of the physical condition is strength. It is because strength has an important role in protecting the athlete from injury and helps the stability of the joints. In relation to kicking accuracy, leg muscle strength is needed by taekwondo athletes, because when the muscle is exhausted, the muscle work will not be maximal and the kick done is not right on target because it does not have good kick power.

The next factor that affects the dollyo chagi kick is explosive power. It is an important biomotor component in the sport’s activities because explosive power determines how hard people can hit, how hard people can kick, how fast people can run, and how far people can do repercussions and so on (wheeler. 2011). Dollyo Chagi's kick in Tae Kwon Do's sport greatly prioritizes the muscle limb power of an athlete, especially when doing explosive strong kicks. If an athlete's limb muscle explosive power is low during a kick then the kick will be easily deflected and very beneficial for the opponent and not directly on target.

Based on the previous findings, the direct effect of Kicking Speed to Dollyo Chagi Kicking Capability was 0.542 or 29.38%, while the effect of Kicking Speed through of Dollyo Chagi Capability was 0.173 or 2.99%. This means that if these two variables are integrated, the effect is somehow significant. It can be interpreted that Kicking Speed through Explosive Muscle Limb gives greater influence on the ability of Dollyo Chagi kick on Dojang athletes of West Sumatra Regional Police. From the results of the research that has been done on the variables of Limb Muscle Power, Leg Muscle Explosive Power and Dollyo Chagi Kicking Ability of Dojang Athlete of West Sumatera Regional Police, it was found that there is indirect influence of Muscle Limb Strength (X2) to Dollyo Chagi (Y) Kicking Capability through Power Explosion (X3) as much as 0.173 so that Ho is rejected and Ha is accepted. It means there is indirect influence of Limb Muscle Strength on the ability of kick Dollyo Chagi through Muscle Limb Explosive Power on Dojang athletes of West Sumatra Regional Police. It can be said that with the findings of this study, the theoretical review, conceptual framework and hypothesis proposed in Chapter II can be empirically and truthfully accepted. The rationale laid out in the conceptual framework can be tested in real terms. Based on these findings, it can be interpreted that athletes who have a good muscular explosive power will affect the ability of his Dollyo Chagi kick when it is combined with the Muscle Limb Explosive Power. As the result, the kicking is better and maximum in accordance with the theories and reviews that have been presented. Muscle Limb Strength is a variable that has a very strong and mutually supportive relationship with Leg Muscle Explosive Power to Dollyo Chagi Kick, but the result effect is different between Limb Muscle Strength and LEG Muscle Explosive Power. Based on the findings of this study, the maximum results will be obtained if the muscle strength of the legs is combined with the explosive muscle limb.

The next factor affecting dollyo chagi kick is speed. Speed is an essential physical component. Limb muscle strength is the ability of muscles or a group of muscles to overcome a burden or resistance in running exercise activities. Explosive power is an important biomotor component in sports activities because explosive power determines how hard people can hit, how hard people can kick, how fast people can run, and how far people can do repercussions and so on. If all three components of the physical condition are owned by an athlete in relation to Dollyo Chagi's Kick Capability, it will result a good kick accuracy. As explained by Suharno (1981: 36), the determinants of accuracy are as follows: "1) high coordination of good accuracy, 2) the size of the target, 3) the sharpness of the senses, 4) the proximity of the target distance, 5) the mastery of the technique, 6) fast movement, 7) feeling of athlete and accuracy, and 8) strength and weakness of a movement".
From the results of research that has been done on variable Kicking Speed, Limb Muscle Strength, Leg Muscle Explosive Power and Dollyo Chagi Kicking Capability at Dojang athletes of West Sumatra Regional Police, it was found that there is simultaneous influence between The Kicking Speed (X1), Muscle Length (X2) and Muscle Explosive (X3) on Dollyo Chagi (Y) Kicking Capability (R² = 0.742 or 55.06%). In other words, Ho is rejected and Ha is accepted, in which there is simultaneous influence between Kicking Speed, Leg Muscle Strength and its Explosive power towards Dollyo Chagi Kick ability at Dojang athletes of West Sumatra Regional Police.

According to Nusufi (2015) "This explosive power is required in some acyclic movements, for example in Pencak Silat athletes, high kicks or long kicks. Explosive power is the ability of the athlete to overcome resistance with a high contraction speed. It is a combination of maximum speed and maximum strength ". Based on the previous hypothesis, the direct influence between each of these research variables Kicking Speed, Leg Muscle Strength, Leg Muscle Explosive power of Dollyo Chagi Kick at Dojang athletes of West Sumatra Regional Police, only Leg Muscle Explosive power which has smaller influence to the Dollyo Chagi Kicking Capability in Tae Kwondo.

The effect of these three exogenous variables; the kicking velocity (X1), leg muscle strength (X2), and explosive muscle limb (X3) on the ability of kick Dollyo Chagi was 0.742 or 55.06%. The findings of this study have statistically shown that Dollyo Chagi Kicking Capability is supported by three variables in this study, while the rest equal to 44.94% is caused by other factors. Other factors may be such as elasticity, Speed, Flexibility, Durability of Leg Kicker Muscle Speed and so on. It can be interpreted that in particular the ability of the three exogenous variables owned by Dojang athletes of West Sumatera Regional Police can be increased again, so that the result effect in kicking will be more optimal and the actualization of Dollyo Chagi kick capability is better in accordance with expectations.

CONCLUSION

Based on the results of hypothesis testing and discussion, the following are conclusions obtained:

1. There is direct and significant influence of kicking speed against the ability to perform Dollyo Chagi kick at Dojang athletes of West Sumatra Regional Police.
2. There is significant and direct influence of leg muscle strength on the ability to perform Dollyo Chagi kick at Dojang athletes of West Sumatra Regional Police.
3. There is direct and significant influence of Leg Muscle Explosive Power to perform Dollyo Chagi kick at Dojang athletes of West Sumatra Regional Police.
4. There is an indirect effect of kicking speed on the ability of Dollyo Chagi kick through leg muscle explosive power at Dojang athletes of West Sumatra Regional Police.
5. There is an indirect effect of leg muscle strength on the ability of Dollyo Chagi kick through the explosive muscle limbs at Dojang athletes of West Sumatra Regional Police.
6. There is a significant influence between kicking speed, leg muscle strength, and leg muscle explosive power simultaneously to the ability of Dollyo Chagi kicks performed by Dojang athletes of West Sumatra Regional Police.

SUGGESTION

In an effort to improve the quality of Dollyo Chagi kick performed by Dojang athletes of West Sumatra Regional Police, there are some suggestions as the following:

1. It is expected that the trainer to innovate the training method by improving the exercises of kicking speed, leg muscle strength and leg muscle explosive power directly and indirectly to influence the ability to perform perfect Dollyo Chagi kick.
2. To the athlete to be more focused in the training of speed kicks, leg muscle strength and leg muscle explosive power directly or indirectly to influence the ability to perform perfect Dollyo Chagi kick.
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