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Determining Dominant Physical Factors in Takraw Service Capability

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Abstract: Service technique is a quite important element in the game of takraw because it is the initial kick done by kicking bendly towards the opponent field as a sign of starting the game in takraw game. With a good service will make it difficult for the opponent to return the ball so that point achievement can be achieved by the team who do the service. The purpose of this study is to determine the dominant physical factors as determinant of takraw service capability. The method used is correlation with multiple linear regression analysis processed by SPSS program version 16. Sampling technique in this research is purposive sampling with 100 sample from population of120 students. This study was conducted on 07-13 October 2015 at the Sports Hall of Cenderawasih University, Jayapura Papua. The variables of this study are leg length, weight, flexibility of leg, leg power, balance and service capability with the formula Y = a + b1X1 + b2X2 + b3X3 + b4X4 + b5X5. The conclusion showsthat the dominant physical factor in the takraw servicecapability is the leg muscle power variable (X3).This is because the limb muscle has the highest standardized coefficient beta value (0.230) compared with other variables.

Keywords: Dominant physical factors, service capability, takraw

INTRODUCTION

"Takraw is a game that is a combination of soccer and volleyball that played on the field with the same size with double badminton field which at the time of the game, ball can not touch the hand" [1]. Takraw is played by two team, which in each team consists of three players, namely kicker bendly, left and right wedgewith a spare player. "The winner of a team is determined by many factors: two among them are (1) individual skills (individual skills) and (2) teamwork. The basic techniques of takraw are: (1) service (2) rocking, (3) smash, (4) heading and (5) block" [2].

Feet are the main role in playing the ball in takraw game. Service is performed by the kicker of the ball bouncing from the left or right wedge, which must be inside the predetermined circle during bouncing time. The kicker when performing the service, one of the legs must remain within the service circle. Therefore, "to be able to perform service well,the kicker needs good physical skills as well" [3]. Physical factors relate to morphological structures that are closely related to athlete body shapes such as height and weight. While the anthropometric structure is related to the size of the athlete's ability to perform movements related to the sport they are engaged. "Says that physical condition is a unified whole of the components that can not be separated for granted, either for its improvement or its maintenance because good physical ability is an important asset that every athlete must maintain such as stamina, speed, flexibility , agility, motion coordination, and strength because of the physical ability is needed in training and in the game" [4].

Dominant Physical Factors Anthropometry

"Anthropometry can be defined as body size or external size of parts of the body. In regard to physical measurements, anthropometry is one of the standard tecnique units for systematic measurement of the body as a whole or part of the body" [5]. Anthropometric measurements include quantities of dimentions of the body including weight, length and cross-sectional area of the body or parts of the body. Comparison of each organ provides a different look on each individual. The size of athropometry associated with the type or shape of the body, also can be used as a parameter to determine the nutritional status of a person.

Anthropometry or body posture is quite influential element on sports, especially for achieving high (sports achievement). To achieve high achievement, required certain physical characteristics and posture in accordance with the demands of the sport that followed. In the game sepak takraw anthropometry elements that must be considered is the ratio between height and leg length and weight. The length of the leg is closely

related to the ability of the range to perform the kick, also provides greater force for follow-up movement, such as when performing service. While the weight has a big role in various sports such as takraw sport that take long duration so that it requires a light weight of the player (Directorate Sports Students and Students).

Height

Essentially height is the form generated by the body in a state of motionless, height is one of the biological aspects of the human body that is part of the body structure and posture that varies. The height is the maximum distance from the vertex to the sole of the foot, the way to measures it is removing the footwear, standing straight, the back and the backside of the head touch the vertical measuring rod and the view of water level.

Height of the body is the height of a person measured using a Stadiometer device measured from the tip of the foot (sole of the foot) up to the top of the head when the head is upright. Talking about height, not only apart from the human frame itself. Where the human skeleton can be grouped into two parts, namely the axle parts of the body and motion parts. Axle Parts of the body consist of; skull bone (cranium), breastbone (sternum), ribs (costae), vertebrae, shoulder bracket, and hip bone. While the motion section consists of; (humerus, ulna, radius, carpal, metacarpal, phalanges), and leg bone (femur, patella, tibia, fibula, tarsal, metatarsal, phalanges).

Leg length

One of the important components in achievement sport is posture and body structure. Professional sportsmen and teachers have an interest in posture and body structure as a relative sense of the body type that success in various sports". Body shape or body portion ideally in accordance with the sports that is fond of him is one of the conditions that can affect the achievement of sports. One aspect in achieving sports achievement is the biological aspect which includes the structure and posture of the body that is 1) the height and length of the leg, 2) the size, width, and weight, and 3) somotype (body shape).

Leg length is the ratio between height of the body and height when sitting means that the length of the leg obtained from the division between height reduced by sitting height. The lower legs consisting of legs and hips. Overall the bone that became the member of the motion part of the body from down part consists of 31 bones. Generally, the human leg consists of three parts, namely the upper leg which includes the bone from the groin to the knee. The anatomy term is the femur or fligh. The thigh is the longest bone in the body, which is a pipe bone. The lower leg consists of the knee bone to the ankles (restricted to the patella), known as leg or calt

The lower leg is composed of the os tibia (the shin) which is the main skeleton of the lower leg and the bone of the pipe, and the fibular os (leg bone) which is located on the lateral side of the lower leg. The sole of the foot consists of tarsal bones and phalanx os. The tarsal bone consists of 7 pieces. This bone serves to support weight when standing. Os metatarsale consists of five pipe bones, consisting of the first os metatarsales of short fat bones, and the second os metatarsale of long bones. The phalanx Os is a toe joint that is the same shape as the fingers, but is shorter. The three parts of the lower motion have an important role in the takraw game, not least in the service movement

Ratio of Leg length and Body Height

The ratio of leg length and body height is the ratio between leg length and body height. In normal posture, the length of the legs with long stake in adults is balanced. But in reality, not all individuals have a balanced anthropometric size. There are individuals who have legs longer than stake, and on the contrary there is a stake higher than the legs. One of the causes of unbalance between leg length and stake is the rhythm of growth and development of maturity. One whois rapidly matured, in his adult age will have relatively shorter legs compared to his stake. One who is lately matured will have a leg that is relatively longer than the stake, whereas the development of normal maturity legs and stake is balanced. This can be known from the characteristics of growth that occurred during the growth period.

Weight

A person's weight can be classified into ideal or normal clustering, overweight, underweight, or obese. The classification is based on the Brocca index of ideal BB = (TB-100) ± 10% (TB-100). People weighing 10% above their ideal weight are included in the normal plus and otherwise normal minus classifications. The classes included in the overweight classification are those who weigh 25% above ideal, and vice versa, underweight.

Physical Ability Power of Legs

Power of legs have an important role in almost every sport. Starting from athletics, individual or team sports to various sports. Power of legs have a great contribution to an achievement of sports. Any activity or exercise, muscle is a component of the body that is dominant and it can not be separated. All movements made by humans because of muscle, bone, joints, ligaments and tendons, so that movement can occur through the movement of muscle tug and the number of muscle fibers are activated.

In connection with power, power is the ability of muscles to exert maximum power in a very fast time. Power is described as a function of the strength and speed of movement. Meanwhile, power is the ability of athlete's muscle to overcome load resistance with maximum strength and speed in one whole motion.

Flexibility of Stake

Flexibility is the ability of a person in adapt himself to do all the activities with stretching as far as possible, especially the muscles, ligaments around the joints. Furthermore, with the ability of joints, ligaments and tendons around the joints, carry out the motion as possible. According to Gallahue, there are two kinds of flexibility; the first is the static flexibility that is the flexibility of stake to overall direction, and the second, is the dynamic flexibility that is muscle ability of any parts of the body at the time of contracting.

Flexibility is the ability to perform movements in joints as long as possible. The flexibility is the ability of the body to make movement through the motion of joints or movement of the body maximally.

According to Bouchard, Flexibility is the quality that enables a segment to move as closely as possible according to the range of movement. "This quality allows the muscle or group of muscles in short positions maximally and long maximally to use joints maximally" [6].

Balance

Balance is the ability of a person to control the nerves of his muscles during to perform rapid movements, with the changes in the locations of rapid body-weight, both in static and more dynamic motions. A static balance is the ability to maintain a certain body position not to shake or collapse, while dynamic balance is the ability to keep the body from falling while doing motion. In other words, it can be said that static equilibrium is balance when the body is still, for example, standing on one leg. The dynamic equilibrium is the balance of body at the moment of movement, for example when running or on tiptoe, balance is the ability to maintain body position, for successful implementation of motor skills. The static balance is the ability to maintain body balance while standing in a sport. A dynamic balance is the ability to maintain balance while moving from one point to another.

METHOD

The method used in this research is correlation by using multiple linear regression analysis with SPSS program version 16. Sampling technique in this research is purposive sampling, with 100 samples from population 120 students. This research was conducted on 07-13 October 2015 at GOR Uncen in Abepura Jayapura-Papua. The variables of this study are the ratio of limb length and height, weight, flexibility togok, leg muscle power, balance and service ability. By the formula $Y = a + b1X1 + b2X2 + b3X3 + b4X4 + b5X5$.

RESULT AND DISCUSSION

Ratio of Body Hight and Leg Length

Based on the highest and lowest score will be obtained from data range of 66.67 - 58.24 = 8.43. The number of respondents in the study can be used to determine the number of interval classes by using the formula of number classes = 3.3 x log (n) to obtain a value of 7.6. For the frequency distribution of Ratio of leg length and body height, the number of rounding class and up to 8 classes is used so that the length of the interval class can be calculated by dividing the data range by the number of interval classes and obtaining the value of 1.053, then the interval class is 2.

Weight

Based on the highest and lowest score will be obtained data range of 88-45 = 39 kg. The number of respondents in the study can be used to determine the number of interval classes by using the formula of the number of classes = 3.3 x log (n) to obtain a value of 7.6. For the frequency distribution of body weight is used the number of class rounding upwards of 8 classes so that the length of the interval class can be calculated by dividing the range of data by the number of interval classes and obtained value of 4.875 then used interval class length 5.

Leg Muscle Power

Based on the highest and lowest score will be obtained data range of 82-54 = 28. Number of respondents in the study can be used to determine the number of interval classes using the formula number of classes = 3.3 x log (n) to obtain the value of 7.6. For the frequency distribution of leg muscle power is used the number of rounding class upwards of 8 classes so that the length of the interval class can be calculated by dividing the range of data by the number of interval classes and obtained the value of 3.5 then used the interval class length 4, then the frequency of distribution table of student leg muscle power arranged as follows.

Balance

Based on the highest and lowest scores will be obtained range of data of 98.71 - 8.91 = 89.8. The number of respondents in the study can be used to determine the number of interval classes by using the formula of the number of classes = 3.3 x log (n) to obtain a value of 7.6. For the distribution of the balance frequency is used the number of rounding classes upwards of 8 classes so that the length of the interval class can be calculated by dividing the data range by the number of interval classes and obtained the value of 11.225 and used interval class with the length 12, then the distribution table of student balance frequency can be arranged as follows.

T-Stake Flexibility

Based on the highest and lowest scores will be obtained range of data of 31.5-8 = 23.5. The number of respondents in the study can be used to determine the number of interval classes by using the formula of the number of classes = 3.3 x log (n) to obtain a value of 7.6. For the frequency distribution of togok flexibility is used the number of rounding class upwards of 8 classes so that the length of the interval class can be calculated by dividing the range of data by the number of interval class and obtained the value of 2.9375 then used interval class length 3, then the distribution table of student stake flexibility can be arranged as follows .

Service Capability of Takraw

Based on the score of the highest and lowest service capability will be obtained data range of 28-6 = 22. The number of respondents in the study can be used to determine the number of interval classes using the formula number of classes = 3.3 x log (n) to obtain the value of 7.6 . For the service frequency distribution the number of rounding classes is used up to 8 classes so that the interval class length can be calculated by dividing the data range by the number of interval classes and the value is 2.75 then the interval class length is taken 3, then the distribution table of frequency of service capability as follows. The result of table 6 shows the service capability of the students as much as in the interval class between 15-17 of 20 students. Graphically it can be seen by students with service capability that is in low interval class and high interval class is only few students, while service capability is in middle class at most, this result give picture of student service capability have normal distribution.

Regression Coefficient

Based on the result of regression line model equation can be explained as follows. Value Constant 12.053 means that if no other variables that affect the value of service takraw of 12.053. The coefficient value of limb length and height ratio (X1) - 0,106 means that if ratio of limb length and height value increase 1% it will decrease takraw service value equal to 0,106%. The value of weight coefficient (X2) - 0,105 means that if weight increase 1% it will decrease takraw service value equal to 0,105%. The value of leg muscle power coefficient (X3) 0.182 means that if the muscle leg muscle value increases 1% it will increase the value of service takraw by 0.182%.Equilibrium coefficient value (X4) 0,042 means that if the balance of value increases 1% it will increase the value of takraw service by 0,042%. Value coefficient of togok flexibility (X5) 0,168 means if the flexibility togok value increased 1% then will increase the ability of service takraw equal to 0,168%.

Coefficient of Determination

Adjusted R square value (coefficient of double determination) shows the value of 0.180 which means that 18.0% variance data service takraw variable can be explained by the five independent variables X1 = Limb Ratio and Height, X2 = Weight, X3 = Muscle Power Limbs, X4 = Balance, X5 = Flexibility Strike. And the remaining 82% is explained by other causes outside the model.

F Test (Simultaneous Influence)

F test is used to find out whether all independent variables together have any real or no effect on the dependent variable. Based on table 9 it is known that the significance value for F test gets p = 0,000 (p

<0,05), meaning H0 is rejected, so there is significant influence between X1 = Leg length and body height ratio, X2 = Weight, X3 = Leg Muscle Power, X4 = Balance, X5 = Stake Flexibility to the dependent variable Y = Service Takraw simultaneously.

T Test (Partial Influence)

Based on the results of table 9 it is known that the hypothesis test results of each independent variable to the dependent variable as follows. Leg Length ratio variable and body height get t value = -0,243 with p = 0,809 (p> 0,05) mean H0 accepted, so there is no significant influence between variable of leg length and body height ratio to takraw service value.

Variable weight gain t value = -1,378 with p = 0,171 (p> 0,05) mean H0 accepted, so there is no significant influence between weight variable to takraw service value. Leg muscle power variable get t value = 2,227 with p = 0,028 (p <0,05) meaning H0 is rejected, so there is positive and significant influence between leg muscle power variable to service takraw value. Balance variable get t value = 2,176 with p = 0,032 (p <0,05) meaning H0 is rejected, so there is positive and significant influence between balance variable to service takraw value. Stake flexibility variables get t value = 2.055 with p = 0,043 (p <0,05) meaning H0 is rejected, so there is positive and significant influence between variable of stake flexibility to takraw service value.

To be able to have a good ability of takraw service needs to be measured on several factors of physical condition such as leg length as the dominant physical condition factor. This study will examine the factors of leg length, weight and physical dominant determinant of takraw service capability. The results of this study indicate that 18.0% variance data variable service ability of takraw can be explained by the ratio of leg length and body height, weight, leg muscle power, balance and flexibility stake. Where the five variables significantly affect the ability of takraw service simultaneously with the value p = 0.000.

Variables That Affect The Takraw Service Score

In this research, there are 3 variables that have significant effect to service takraw that is leg muscle power variable get p value = 0,028. The balance variable gets p value = 0,032, and Together flexibility variable get p value = 0,043. These three variables have a positive influence on the ability of takraw service. Where the higher the value of leg muscle power, flexibility and balance then the higher the score of service ability. This leg muscle power variable is the dominant variable among the 3 significant and positive variables in influencing the takraw service score.

The freshness of muscle strength is a picture of the ability of muscles or muscle groups to do the work by holding the load lifted. As it is known that the leg muscles are the most powerful muscles after the back muscles in support of the legs in the activity because power is the maximum effort of the combination of strength and speed in moving explosively (Jansen, Schultn, and Bongerter, 1983). This leg muscle power component is not only required by kicking for service but also required by right and left player when doing smash.

Likewise with the balance variables also have a significant and positive impact on takraw service score where the higher the value of the balance, the higher the score takraw service. As it is known that balance is the ability of a person to control his nervous muscles during rapid motion, with the change of the location of the points of rapid weight, and, both in a static state and so in dynamic motion. In doing the service balance factor is needed by a kick in maintaining the position of the body during the service process so that in placing or handling the ball can hit the target appropriately.

Stake Flexibility variables are also significant and positive to the takraw service score. Where the higher the value of stake flexibility, the higher the takraw service score. Good flexibility is generally achieved when all the joints of the body show the ability to move smoothly in accordance with its function. Flexibility or not of a person is determined by the extent of the narrowness of movement of joints that can be done. Thus, the combination among flexibility and balanceand strenght will be a good fluidity for an athlete.

Flexibility of the body supports for the mastery of takraw. Players of takraw can learn takraw technique with satisfactory results if they have a body that is flexible and not rigid. Always warm up then stretch the body (streching) before playing takraw.

"Finally, The availability of quality human resources who have excellent physical, mental and social conditions and mastery of science and technology are indicators of the success of a nation's development" [7].

Implications

By looking at the results of the research, the conclusions, and the discussion of the results of the research, the implications of the results of this study may contain the development of broader multivariate statistics when examined about the dominant implications of the takraw service with multiple linear

regression analysis. From the variables that are analyzed by using multiple linear regression analysis will yield the dominant variable to service ability in takraw. On the basis of conclusions that have been taken, can be put forward implications in efforts to improve the achievement of takraw especially improve the physical condition of leg muscle power because of the three variables that positively influence the power leg muscles, balance and flexibility then the most high value t is leg muscle power.

With the discovery that the physical factor of leg muscle power becomes more dominant factor in the ability of takraw service then in learning takraw leg muscle power should be the main concern if we want to get good service result. Although in learning impossible leg muscle power will stand alone but also other physical conditions have a share so that mutual support in one unity becomes a good physical condition. With good leg power and anthropometry will be intertwined to produce a performance that is a good service ability. Because however good anhtropometri but do not have power legs then the expected service will not be achieved and vice versa if athletes have good limb power but athletes are less proportional because it does not have a good anthropometry then the service capabilities will not be maximized as well.

The weakness of this research is the sample is not an athlete so it needs to be continued by using the sample of athletes.

CONCLUSION

After discussion of research result, the dominant physical factor that become the determinant of service ability in takraw is successively as follows: Leg muscle power variable get t value = 2,227 with p = 0,028 (p <0,05) meaning H0 is rejected, so there is positive and significant influence between leg muscle power variable to service takraw value. Balance variable get t value = 2,176 with p = 0,032 (p <0,05) meaning H0 is rejected, so there is positive and significant influence between balance variable to service takraw value. Stake flexibility variables get t value = 2.055 with p = 0,043 (p <0,05) meaning H0 is rejected, so there is positive and significant influence between variable of stake flexibility to takraw service value.

REFERENCES

H. Thamrin. “Olahraga Pilihan Sepak Takraw". Yogjakarta: Pusat Pembinaan Dan Pengembangan Aktivitas Instruksional. 2008, pp 12.

P. Sudrajat.“Sepak Takraw”. Jakarta: Direktorat Jenderal Olahraga. 2004, pp 16.

D. Priyatno. “Cara Kilat Belajar Analisis Data dengan SPSS 20. Edisi kesatu”. Yogyakarta. 2012, PP 35.

M. Sajoto. “Pembinaan Kekuatan Kondisi Fisik Dalam Olahraga”. Semarang: Effhar & Dahara Prize Offset. 1995, pp11.

Malina. “Growth, Maturation, and Fhysical Activity, 2nd ed”. Champaign: Human Kinestics Publisher, Inc. 2004, pp 12

Jansen “Applied Kinesiologyand Biomechanies 3rd ed”. NewYork: Mc. CrawHill Book Company. 1983, pp 57.

Z. Zulbahri, “Tingkat Kemampuan Daya Tahan Jantung dan Pernafasan Mahasiswa Pendidikan Olahraga dan Kesehatan Universitas Pasir Pengaraian”, Gelanggang Olahraga: Jurnal Pendidikan Jasmani dan Olahraga, vol. 3, no. 1, pp. 96-101, Oct. 2019.