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CONTRIBUTION OF ARM MUSCLE STRENGTH AND REACTION TO STRAIGHT PUNCHES IN BOXING SPORTS

Widuri Jais[1], Surisman[2], Candra Kurniawan[3], Dwi Priyono[4]
Universitas Lampung, Indonesia
widurijais30@gmail.com[1],surisman.1962@fkip.unila.ac.id[2], rajhencandra@gmail.com[3],
dwi.priyono@fkip.unila.ac.id[4]

Abstract
This study aims to determine the contribution of arm muscle strength and reactionto straight punches in boxing at Sasana A 23 BC Bandar Lampung, both individually and collectively. This research is correlational research. The population of this study was 20 boxing athletes at the 23 BC Bandar Lampung gym. In this research, the sample collection method was total sampling. Datawere collected using tests and measurements with instruments in the form of a push and pull dynamometer for the arm muscle strength variable, whole body reaction for the reaction variable, and the straight punch test for the straight punch variable. The data analysis technique uses product- moment correlation analysis through prerequisite tests for normality and linearity. The research results showed that there was (1) a contribution between arm muscle strength andstraight punches, with a value of rx1.y = 0.607 > r(0.05)(28) = 0.374, and the contribution amount was 26.9%; (2) there is a contribution between the reaction to a straight punch, with a value of rx2.y = 0.447 > r(0.05)(28) = 0.374, and the magnitude of the contribution is 20%; and (3) there is a contribution between arm muscle strength and the reaction to a straight punch, with a calculated F value > F table (21.244 > 3.354), and the contribution amount is 61.1%.

Keywords: *Arm Muscle, Punches, Boxing*

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Correspondence Author: Widuri Jais, Universitas Lampung, Indonesia.
E-Mail: widurijais30@gmail.com

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INTRODUCTION

The sport of boxing is a branch of self-defense in which you compete one on one to carry out attacks by hitting with gloved hands and protecting yourself from blowsgiven by your opponent in a series of matches lasting three minutes called rounds(Chaplin & Mendoza, 2017). In each round, the boxer who delivers more clean punches or attacks is considered more effective and can avoid the opponent's attacks, is declared to have won the round (Chaplin & Mendoza, 2017).

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If the opponent is able to knock down or (knockdown) then one point will be deducted for the boxer who falls. The boxer who wins the most points after the specified number of rounds will be declared the winner (Murphy & Sheard, 2016). However, if a fallen opponent cannot get up after 10 seconds, then he is considered a knockout and declared defeated (Murphy & Sheard, 2016). Victory can also be achieved if one of the boxers is deemed unable to continue the match by the referee, this is called a TKO (Technical Knockout) (García-Martí, 2021).

In the sport of boxing, physical elements and biomotor components are very necessary, such as arm muscle strength and reaction speed, because in the sport of boxing, you are required to play fast and how to survive with a fast rhythm or tempo of punches and to win the match, the emphasis is placed on collecting as many points as possible to outperform the opponent (Amahoru, 2020). One of the techniques and strategies to beat your opponent and collect points effectively is by throwing as many punches as you can to get a clean and decisive number or score (Ricardo, 2020). Therefore, boxing athletes need biomotor components that need to be built from the start and need strength to execute punches such as hand muscle strength.

Arm muscle strength is the ability of a group of muscles in the hand or lower arm that spreads to the fingers to contract or work as hard as possible to the maximum in holding the load (Kurniawan, 2014: 12). A boxing athlete who has strong arm muscle strength will be able to overcome body weight support by gripping each punch (Chaplin & Mendoza, 2017). Apart from that, boxing athletes need to have arm muscle strength to support every punching movement during a match.

There are two types of speed, namely reaction speed and movement speed (Palar et al., 2015). Reaction speed is a person's ability to respond to a stimulus in the shortest possible time (Sukadiyanto, 2011:111). Reaction speed is needed for attacks that apply precise punching techniques in boxing (Loffing & Hagemann, 2015). Reaction speed in boxing is needed for speed of movement or hitting action

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whether initiated by a stimulus or without a stimulus (Muis, 2016). Reaction speed is used when the opponent is open to defense or there is a gap to attack so that a fast response to attack is very necessary in boxing, whether in an attack or avoidance situation (Ricardo, 2020).

However, based on the facts that identified the problem that the author carried out at the A 23 BC gym in Bandar Lampung, training to increase arm muscle strength and reaction speed is not very developed in the sport of boxing. Most still use monotonous exercises to train the biomotor component. Technical drilling training is still the most effective training. Meanwhile, physical training is only limited to maintaining athlete fitness, not improving the biomotor components that support boxing.

Meanwhile, physical training such as weight training is actually needed in every sport, including boxing. Due to the lack of weight training models to increase arm muscle strength and strength reaction speed for boxing athletes so that these biomotor components are not given much attention. A study can be real evidence to change this perception. Arm muscle strength and reaction speed are biomotor components needed in boxing. Meanwhile, straight punch speed is an ability that must be mastered in boxing. It has not been scientifically studied whether arm muscle strength and good reaction speed contribute to straight punch speed in boxing.

METHOD

This research is quantitative descriptive research. Research conducted to determine whether there is a relationship between two or several variables (Suharsimi Arikunto, 2002: 247). The method used is a survey with data collection techniques using tests and measurements. The survey method is an investigation carried out to obtain facts from existing symptoms and look for factual deficiencies (Suharsimi Arikunto, 2002: 56). This research aims to determine whether there is a contribution/contribution between arm muscle strength (X1), reaction (X2) to straight punches in boxing at gym A 23 BC Bandar Lampung (Y).

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According to Suharsimi Arikunto (2006:130) population is the entire object of research. According to Sugiyono (2007: 55) population is a generalized area consisting of objects or subjects that have certain quantities and characteristics determined by researchers to be studied and then concluded. The population used in this research was 20 boxing athletes at the A23BC Bandar Lampung gym. According to Suharsimi Arikunto (2010: 112) the sample is a portion or representative of the population studied. To determine the number of samples, we are guided by what was stated by Suharsimi Arikunto (2010:112) if there are less than 100 subjects, it is better to take all of them, then if the number of subjects is large, between 10 - 15 % can be taken or 20 – 25 %. In this research, the sampling method is total sampling, namely including all individuals or members of the population as samples. The sample in this study were boxing athletes at the A23BC gym in Bandar Lampung. as many as 20 athletes. The instruments used in this research are measuring arm muscle strength with a pull and push dynamometer, measuring reaction speed with a whole body reaction device, and straight punches with a stopwatch and then counting the number of punches.

RESULT AND DISCUSSION

This research was conducted to determine the contribution between arm muscle strength and the reaction to straight punches in boxing at the A 23 BC Bandar Lampung gym. The description of the data in this study is intended to obtain an overview of the distribution of data which includes the average value, standard deviation, highest value, lowest value, mode value, median value, frequency distribution, as well as histograms of each variable X1, X2 and Y.

Hypothesis Testing

Table 1. Contribution of Arm Muscle Strength to Straight Punches

Data	r_{count}	r_{tab} (0,05)(28)	Criteria	Information
X1 – Y	0,607	0,374	Strong	Significant

Testing Criteria Ho is accepted if r count □ r table Ho is rejected if r count > r table The correlation coefficient significance test was carried out by consulting the value rx1.y = 0.607 with r(0.05)(28) = 0.374. Because the correlation coefficient

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between rx1.y = 0.607 > r(0.05)(28) = 0.374, it means that the correlation coefficient is significant. Thus the hypothesis which states "There is a contribution between arm muscle strength to straight punches in boxing at gym A 23 BC Bandar Lampung" is accepted.

Table 2. Contribution Between Reaction to Straight Punches

Data	rcount	r tab (0,05)(28)	Criteria	Information
X2 - Y	0,447	0,374	Strong	Significant

The correlation coefficient significance test was carried out by consulting the value rx2.y = 0.447 with r(0.05)(28) = 0.374. Because the correlation coefficient between rx2.y = 0.447 > r(0.05)(28) = 0.374, it means that the correlation coefficient is significant. Thus the hypothesis which states "There is a contribution between the reaction to straight punches in boxing at gym A 23 BC Bandar Lampung" is accepted.

The magnitude of the correlation/relationship value (r) between the reaction to a straight punch is 0.447 (medium) and explains the percentage influence of the independent variable on the dependent variable which is called the coefficient of determination which is the result of squaring r, obtained a coefficient of determination (r2) of 0.200, which is implies that the influence/contribution of the independent variable (reaction) on the dependent variable (straight shot) is 20%, and the remainder is determined by other factors/variables. The magnitude of the correlation/relationship (r) between arm muscle strength and the reaction to a straight punch is 0.782 (strong) and explains the percentage influence of the independent variable on the dependent variable which is called the coefficient of determination which is the result of squaring r, to obtain the coefficient of determination (r2)amounting to 0.611, which means that the influence/contribution of the independent variables (arm muscle strength and reaction) on the dependent variable (straight punches is 61.1%, while the rest is influenced by other variables.

DISCUSSION

The research was designed to find the contribution between arm muscle strength and reaction to straight punches in boxing at the A 23 BC gym in Bandar

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Lampung using a correlational descriptive methodology of the above variables. The results of the contribution analysis between the two independent variables and the dependent variable in hypothesis testing need to be studied further by providing an interpretation of the relationship between the analysis results achieved and the theories underlying this research.

This explanation is needed so that we can know the suitability of the theories put forward with the research results obtained. When the results obtained are linked to the framework of thinking and underlying theories, basically the results of this research support the existing theory. Based on the findings of the first research results in accordance with the proposed hypothesis, it shows that there is a significant contribution between arm muscle strength to straight punches in boxing at the A 23 BC Bandar Lampung gym. Thus, it can be interpreted that the better the athlete's arm muscle strength, the better the results of the straight punches he makes.

Based on research results, it shows that strong arm muscles have an important role in triggering fast straight punches, in line with previous research which stated the same thing (Hasyyati & Winarno, 2021; Ruskin & Liputo, 2021; Yolanda et al., 2020). The main factor that plays a role in triggering a fast punch is arm muscle strength (P & Ibrahim, 2021; Same, 2021). In principle, the strength of a muscle is based on two main factors, namely (1) it is influenced by the structural elements of the muscle, especially volume. Muscle strength increases as muscle volume increases. (2) muscle strength is determined by the quality of involuntary control over the muscles or muscle groups concerned, in other words, muscle strength essentially shows the number of muscle groups working (Reddy Ramadas, 2016). Arm muscle strength in general, which is a person's ability to use maximum force when resisting a load, this force is produced by contraction of the arm muscles or a group of muscles in the arm as a reaction to overcoming the load (Aras et al., 2017; Hidayat et al., 2019). Arm muscle strength is the ability of a muscle or group of muscles in a person's arm to handle a load and withstand it or

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moving loads in daily activities.

The conclusion is that the more trained a person's arm muscles are, the more they reduce the level of fatigue when lifting, pushing or holding a load or resistance, so that the impact of trained arm muscles can contribute to the arm itself

in the form of increased strength, and with maximum strength in boxing it is used as a strategy. to create straight punch speed through developed arm muscle training techniques.

The results of the second hypothesis test stated that there was a reaction contribution to straight punches in boxing at the A 23 BC Bandar Lampung gym. This means that for an athlete to have a good straight punch he must improve his reaction ability. In other words, it can be said that the better the athlete's reaction, the better the speed of the straight punch he makes.

In general, speed implies a person's ability to carry out a movement or series of movements as quickly as possible in response to stimuli (Mahfud et al., 2020). There are two types of speed, namely reaction speed and movement speed (Palar et al., 2015). Reaction speed is a person's ability to respond to a stimulus in the shortest possible time (Sukadiyanto, 2011:111). Reaction speed is needed for attacks that apply precise punching techniques in boxing (Loffing & Hagemann, 2015). Reaction speed in boxing is needed for speed of movement or hitting action whether initiated by a stimulus or without a stimulus (Muis, 2016).

Reaction speed is used when the opponent is open to defense or there is a gap to attack so that a fast response to attack is very necessary in boxing, whether in an attack or avoidance situation (Ricardo, 2020). The sport of boxing has different punching techniques that require good coordination. Arm muscle strength contributes more than reaction. This is in accordance with the results of the r calculation between arm muscle strengths is 0.607 greater and the calculated r reaction is 0.447. The greater the athlete's arm muscle strength, the stronger the straight punch produced.

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CONCLUSION

Based on the results and discussion of research that has been carried out regarding the contribution of arm muscle strength and reactions to straight punches at the A 23 BC gym in Bandar Lampung, the following conclusions can be obtained: 1) There is a contribution between arm muscle strength to straight punches in boxing at gym A 23 BC Bandar Lampung. 2) There is a contribution between reactions to straight punches in boxing at gym A 23 BC Bandar Lampung. 3) There is a contribution between arm muscle strength and the reaction to straight punches in boxing at gym A 23 BC Bandar Lampung

REFERENCES

Abdurrojak, H., & Imanudin, I. 2016. Hubungan Antara Reaction Time Dan Kekuatan Maksimal Otot Lengan Dengan Kecepatan Pukulan Pada Cabang Olahraga Tinju. *Jurnal Terapan Ilmu Keolahragaan*, *1*(2), 53. https://doi.org/10.17509/jtikor.v1i2.2681

Amahoru, A. 2020. Analisis Koordinasi Mata-Tangan Dan Daya Ledak Lengan Terhadap Kecepatan Pukulan *Jab Straight* Atlet Tinju PPLP SulawesiSelatan. SKRIPSI. Universitas Negeri Makassar.

Arikunto, S. 2002. *Prosedur Penelitian Suatu Pendekatan Praktik*. Rineka Cipta, Jakarta.

Azwar, Saifuddin. 2016. *Metode Penelitian*. Pustaka Pelajar, Yogyakarta.

Chaplin, D., & Mendoza, S. 2017. The history of competitive balance in Commonwealth Games Boxing. *Sport in Society*, *20*(3), 428–437. https://doi.org/10.1080/17430437.2015.1088718

Daniele, G., Weinstein, R. N., Wallace, P. W., Palmieri, V., & Bianco, M. 2016. Rapid weight gain in professional boxing and correlation with fight decisions: analysis from 71 title fights. *Physician and Sportsmedicine*, *44*(4), 349–354. https://doi.org/10.1080/00913847.2016.1228421

Davis, P., Waldock, R., Connorton, A., Driver, S., & Anderson, S. 2018. Comparison of amateur boxing before and after the 2013 rules change and the impact on boxers' safety. *British Journal of Sports Medicine*, *52*(11), 741–746. https://doi.org/10.1136/bjsports-2017-097667

Delalija, A., & Babić, V. 2008. Reaction time and sprint results in athletics. International *Journal of Performance Analysis in Sport*, 8(2), 67–75. https://doi.org/10.1080/24748668.2008.11868436

García Martí, C. 2021. Arrival of the international Team of English Boxing in Spain in 1911: boxing bans and clashes over bullfighting, regeneration and

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Europe. *Sport inHistory*,*41*(1),25–49. https://doi.org/10.1080/17460263.2020.1778514

Ismaryati. 2008. *Tes dan Pengukuran Olahraga*. UNS Press, Surakarta.

Loffing, F., & Hagemann, N. 2015. Pushing through evolution? Incidence and fight records of left-oriented ighters in professional boxing history. *Laterality*, *20*(3), 270–286. https://doi.org/10.1080/1357650X.2014.961471

Murphy, P., & Sheard, K. 2016. Boxing blind: Unplanned processes in the development of modern boxing. *Sport in Society*, *9*(4), 542–558. https://doi.org/10.1080/17430430600768785

Narendra, Mayun. 2012. *Seni Olahraga Tinju*. PB. Pertina, Jakarta.

Nurhasan dan Abdul Narlan. 2015. *Tes dan Pengukuran Pendidikan Olahraga*. PJKR FKIP UNSIL, Tasikmalaya.

Sedentary. Ricardo, R. 2020. Pengaruh Latihan Bench Press Terhadap Kecepatan Pukulan *Straight* Pada Cabang Olahraga Tinju. *Pendidikan Kepelatihan Olahraga*, *12*(2), 41–47.

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