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INVOLVEMENT OF LIMB MUSCLE EXPLOSIVE POWER AND BODY FLEXURE ON FRONT KICK ACCELERATION

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Abstract
The problem of this research is the low ability of the front kick of UNP martial arts athletes. The purpose of this study was to find out: 1) how much the contribution of leg muscle explosive power to the speed of the front kick of pencak silat athletes at Padang State University, 2) how much the contribution of body flexibility to the speed of the front kick of pencak silat athletes at Padang State University, 3) how much the contribution of leg muscle explosive power and body flexibility to the speed of the front kick of pencak silat athletes at Padang State University. This research is correlational, which is to find out how much the relationship of variables with one another. The population in this study was atlet pencak silat UNP, and untill amounted to 20 people who were carried out at the Lubuk Buaya PGSD Campus using purposive sampling techniques , namely sampling based on the researchers' considerations. Based on the calculation of product moment correlation, 1) There is a significant contribution to the explosive power of the leg muscles with the kick speed of UNP pencak silat athletes of 22.66%, 2) There is a significant contribution of body flexibility with the kick speed of UNP pencak silat athletes of 25.7%, 3) There is a contribution which is significant, the explosive power of the leg muscles and flex with the ability of the kick speed of UNP martial arts athletes by 30.25%. This shows that the improvement to the speed of the front kick of UNP Padang pencak silat athletes can be done by making improvements to thelegs and flexibility of the athlete's body.

Keywords: *Explosive Power; Limb Muscle; Flexibility; Speed; Front kick*

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INTRODUCTION

The role of schools and colleges as the foundation of national sports development in laying the foundation for cognitive, affective and psychomotor development and sports skills development through physical learning activities (Lanos et al., 2023) (Iyakrus, 2019). Performance is needed as an athlete's ability

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to master effective techniques and strategies in defeating opponents and achieving high scores in matches (Pratiwi et al., 2020). Pencak is Pencak Silat Martial arts have various forms such as martial arts attacks in the form of dance and rhythm with rules (polite customs), and can be used as performances (Ediyono, S., &; Widodo, 2019) (Lanos et al., 2020). Pencak silat is unique in combining sports movements and martial arts moves with elements of art, as well as breathing techniques and spiritual awareness (Lanos &; Lestari, 2022). The factors that influence any sporting achievement, which is interpreted as a form of direct influence are the complex influences of interrelated physical conditions, techniques and tactics". In martial arts sports, this direct influence is urgently needed. With a direct influence between physique, technique, and tactics, a martial arts athlete can obtain maximum achievements.

Pencak silat is one of the sports that is competed both at the provincial, regional, national and international levels. Pencaksilat material in schools and colleges has become a favorite subject, because this sport can improve health and can also provide opportunities for students to explore it (Lanos &; Lestari, 2019). The pencak silat branch competes in several categories, namely: action, single art, double art, and team. The match category pits two individuals in one arena where they try to attack each other and try to dodge the opponent's attacks with various techniques such as: punches, kicks, sweeps, catches, cutouts, deflections, and dodges, In the single art category, and teams perform predetermined standard moves. While the double category is almost similar to matches, which feature various forms of attack, block, dodge and capture.

Many benefits are obtained in learning pencak silat, such as cognitive, affective, and psychomotor development. Cognitive abilities develop in line with training in the concept of pencak silat, which is the process of thinking quickly in facing problems that are immediately solved and making decisions appropriately and accurately (Gristyutawati et al., 2012). In martial arts, there are many factors that influence to be able to achieve an achievement. The factors affecting achievement are: physical, technical, tactical and mental (psychic)

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condition. The match category is a pencak silat competition category that competes two fighters from different teams. Both confuse each other by using elements of self-defense and attack such as defending/dodging/hitting/attacking targets and knocking opponents down; the use of competition techniques and tactics, stamina and endurance, and fighting spirit, using principles and using a wealth of technical movements (Nugroho, 2020).

In addition, mastery of good techniques and tactics is very necessary once good physical condition, because without good physical condition an athlete will not be able to manage techniques and tactics well. Therefore, it is necessary to understand the physical condition of the athlete, so that a coach can design and run an exercise program according to what is his goal in training (Arisman et al., 2021).

To achieve pencak silat achievements in addition to the efforts of coaches and coaches who are organized, directed and continiu, coaching must be directed at developing physical condition as the dominant success factor in reaching the peak of achievement. The components of physical condition consist of: endurance, strength, speed, explosive power, flexibility, balance, coordination, agility, precision and reaction (Sayoto, 1988). pencak silat sports achievements, which include program background, objectives of pencak silat sports achievement coaching programs (Winata et al., 2015). Each of these components should be at the top level according to the demands of each sport (Arisman & Agun Guntara, 2021). In martial arts, almost every component of physical condition becomes dominant in martial arts matches, such as: endurance, strength, speed, explosive power, agility and flexibility.

Based on the description above, it can be concluded that physical, technical, tactical and mental condition factors play an important role in achieving the desired achievement. If one element does not possess or master, then the best achievement will not be achieved. In martial arts matches, physical ability, and technical ability are very important. Physical abilities consist of: endurance, strength, speed, agility, flexibility, explosive power, and reaction technical

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abilities consist of: (1). Offensive techniques, that is, kicking, and punching. (2) Defense techniques, namely elak, badminton, avoid, and catch (Haryadi, 2003).

The lack of maximum for front kick speed is made possible by several factors, including: lack of explosive power of the leg muscles, lack of flexibility, lack of leg muscle strength, lack of balance, lack of ankle coordination, lack of speed and inaccurate coordination of movements resulting in UNP pencak silat kick speed, still not optimal. A sportsman who has good power, it can be ascertained that he will have optimal physical strength (Honestly Gunawan Manullang, 2018). Physical condition factors affect the ability of front kicks, from several factors that have been described above, it is suspected that the explosive power factor of the leg muscles and the bending factor have the strongest influence. The explosive leg muscles possessed by the fighter make the front kick strong and fast, and flexibility will make the distance and reach of the foot when kicking wide and on target.

METHOD

This type of research is correlation research that wants to see the relationship between the independent variable and the dependent variable.(Sudjana, 1992) suggests that "Correlation research is a study to determine whether there is a relationship between two variables, whether or not the relationship between the two variables is expressed in the form of a correlation coefficient". The independent variable in this study is explosive power of leg muscles and body flexibility while the dependent variable is front kick speed. The population of this study is the entire subject to be investigated. This is in accordance with the opinion expressed (Arikunto, 2006) population is the entire subject of research. The population in this study was 32 UNP pencak silat UK athletes with 20 boys and 12 girls.

RESULT AND DISCUSSION

From the results of measuring the explosive power of leg muscles (X_1) and body flexibility (X_2) with kick speed (Y) as a dependent variable. Furthermore, the results of the study will be described as follows.

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Limb Muscle Explosive Power

From the results of measuring the explosive power of leg muscles conducted on 20 UNP martial arts athletes, the highest score was obtained 2.63 and the lowest score was 2.06, based on the group's data the average count (mean) was 2.32, and the standard deviation (standard deviation) was 0.13. Furthermore, the distribution of the category of explosive power of the limb muscles of UNP martial arts athletes is seen in the table.

Table 1. Frequency distribution of limb muscle explosive power categories.

Interval Class	Absolute Frequency	Relative Frequency (%)
2,06 – 2,17	2	10
2,18 – 2,29	7	35
2,30 – 2,41	8	40
2,42 – 2,53	1	5
2,54 – 2,65	2	10
Sum	20	100

In table 1, it can be concluded that out of 20 UNP pencak silat athletes, 2 athletes (10%) have a value category of 2.06-2.17 and 7 athletes (35%) have a value category of 2.18-2.29 and 8 athletes (40%) have a value category of 2.30-2.41 and 1 athlete (5%) has a value category of 2.42-2.53 and 2 athletes (10%) have a value category of 2.54-2.65. For more details can be seen in the following graph:

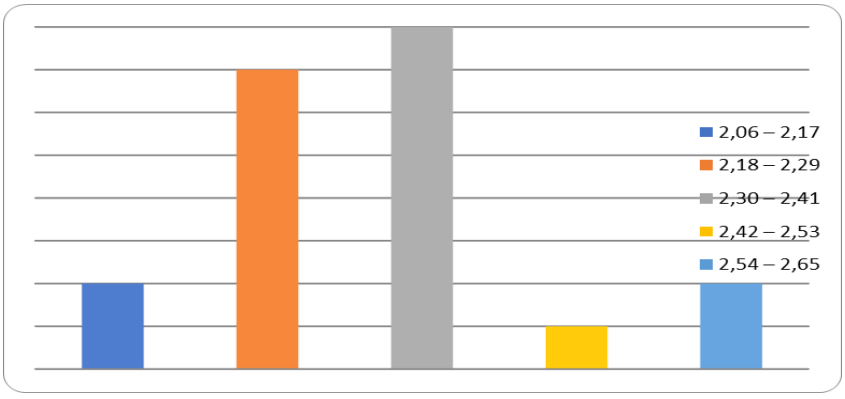

Figure 1. Histogram of Variable Score Distribution of Limb Muscle Explosive Power

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Body Flexibility

From the results of flex measurements carried out on 20 UNP pencak silat athletes, the highest score was 29 and the lowest score was 13, based on the group's data the average count (mean) was 28.35 and the standard deviation (standard deviation) was 3.60.

Furthermore, the distribution of the body flexion category of UNP pencak silat athletes can be seen in the table.

Table. 2. Frequency Distribution of Body Flexure Categories

Interval Class	Classification	Absolute Frequency	Relative Frequency (%)
1 – 5	Less	-	-
6 – 11	Enough	-	-
12 – 17	Good	3	15
18 – 23	That's very nice	9	45
>24	Sempurna	8	40
Sum		20	100

In the table, it can be concluded that out of 20 UNP pencak silat athletes, there are no athletes who are in the less and sufficient category, 3 athletes (15%) have a good category, 9 athletes (45%) have a very good category and 8 athletes (40%) have a perfect category. For more details can be seen in the following histogram:

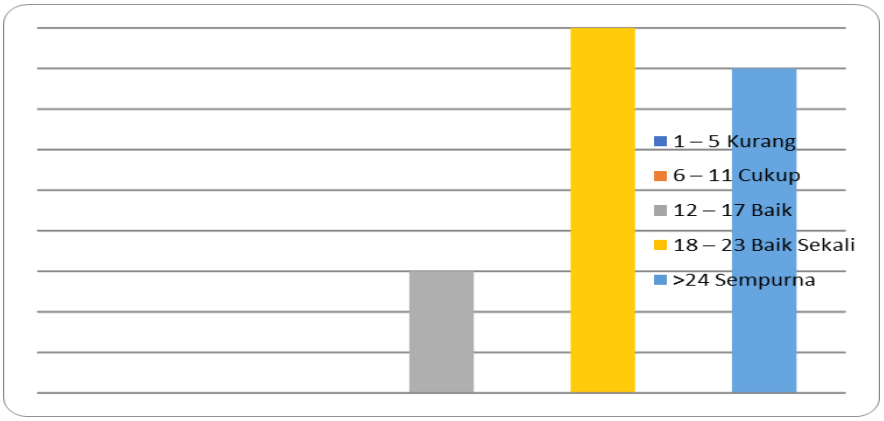

Figure 2. Histogram of Flexural Variable Score Distribution

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Kick speed

From the results of measuring the speed of kicks carried out on 20 UNP martial arts athletes, the highest score was 36 and the lowest score was 22, based on the group's data, the average count (mean) was 28.35 and the standard deviation (standard deviation) was 3.60. Furthermore, the distribution of the UNP pencak silat athlete kick speed category can be seen in the table.

Table. 3. Frequency Distribution Category Kick speed

Interval Class	Classification	Absolute Frequency	Relative Frequency (%)
22 – 24	Good	3	15
25 – 27	That's very nice	6	30
28 – 30	That's very nice	6	30
31 – 33	That's very nice	4	20
34 – 36	That's very nice	1	5
Sum		20	100

In table 3, it can be concluded that of the 20 UNP pencak silat athletes, 3 athletes (15%) have a good category, 6 athletes (30%) have a very good category, and 6 athletes (30%) have a very good category, 4 athletes (20%) have a very good category, and 1 athlete (5%) has a very good category. For more details can be seen in the following histogram:

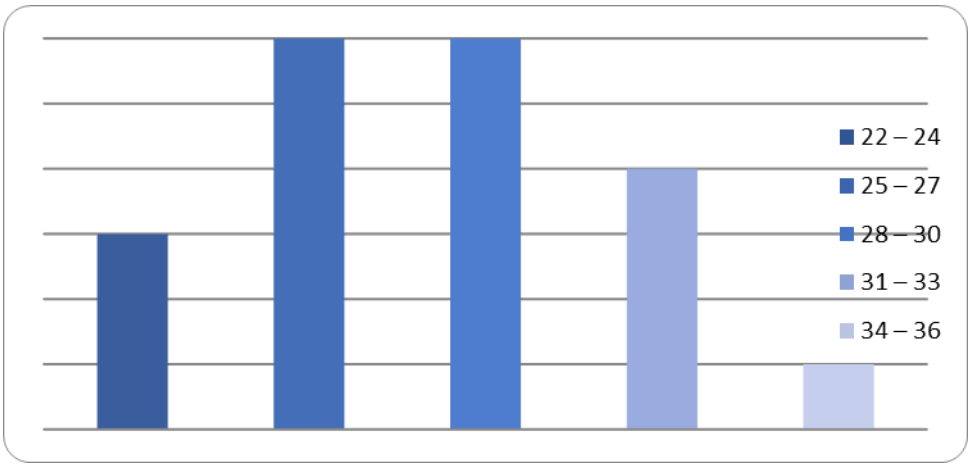

Figure 3. Histogram of Variable Score Distribution Kick Speed

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Discussion

Before testing the hypothesis proposed in this study, a data analysis requirements test is first carried out, namely the data normality test.

Data Normality Test

The results of the data normality test for each variable are presented in the table below.

Table. 4. Data Normality Test

No.	Variable	The	Lt (0.05)	Information
1	Limb muscle explosive power (X_1)	0,139	0,190	Normal
2	Body flexibility (X_2)	0,063	0,190	Normal
3	Kick speed(Y)	0,073	0,190	Normal

The table shows that the test results for the explosive power of the limb muscles (X_1) score Lo = 0.139 with n = 20 while Lt = at the level of significant testing α = 0.05 obtained 0.190 which is greater than Lo so that it can be concluded that the score obtained from the explosive power of the limb muscles of the population is normally distributed.

The table shows that the test results for body flexibility (X_2) Lo score = 0.063 with n = 20 while Lt = at the significant test level α = 0.05 obtained 0.190 which is greater than Lo so that it can be concluded that the score obtained from the flexibility of the population is normally distributed.

The table shows that the test results of kick speed (Y) score Lo = 0.073 with n = 20 while Lt = at the level of significant testing α = 0.05 obtained 0.190 which is greater than Lo so that it can be concluded that the score obtained from the kick speed of the population is normally distributed.

Sample Test

Sample is a small part of the population that is the subject of research, this is in accordance with the opinion expressed by Arikunto (1996: 117) that "the sample is a part or representative of the population studied". In this study, the sampling technique was carried out by purposive sampling.

The sample in this study was obtained using purposive sampling techniques, in purposive sampling sampling based on the consideration of the researcher. The sample is UNP pencak silat athletes who are active and registered

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in the UK pencak silat UNP, they are athletes who have often competed between regions. The number of samples or athletes is 20 people

CONCLUSION

Based on the results of research that have been described in the previous chapter, several conclusions can be put forward as follows:

1. Leg muscle explosive power has contributed to the speed of the front kick of UNP martial arts athletes by 22.66%.
2. Body flexibility has contributed to the speed of the front kick of UNP pencak silat athletes by 25.70%.
3. There is a contribution between the explosive power of leg muscles and body flexibility to the speed of the front kick of UNP martial arts athletes by 30.25 %.

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