

# Analysis Of Anthropometric Factors And Physical Conditions Dominant Of Petanque Shooting Game

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## Abstract:

Petanque is one of the new sports that is developing in Indonesia, especially in East Java. Petanque sport has one of the basic techniques that must be mastered by athletes, namely the shooting throw technique. To carry out this technique there are dominant factors from the realm of anthropometry and physical conditions. This study aims to determine the most dominant factor from the realm of anthropometry, and the physical condition of shooting game throws in petanque sports. This research uses quantitative research methods. The source of the data in this study were petanque athletes of PORPROV 2022, totaling 12 athletes. Data collection techniques through observation tests were carried out which consisted of height, arm length, and sitting height tests for the anthropometric realm. Push ups, hand eye coordination, standing balance test, for the realm of physical condition. and also a shooting throw test. The data analysis technique used in this study is multiple regression analysis by determining the partial t level. . From the results of calculations performed on the partial t test based on the significance value, the research conducted produced the dominant indicator from the anthropometric domain, namely arm length with a significance value of 0.045, then the dominant physical condition variable, namely arm muscle strength with a significance value of 0.006 and balance with a significance value of 0.017 for shooting throws in the petanque sport of PORPROV athletes, Ngawi Regency 2022.

Keywords: petanque, shooting, anthropometry, physical condition.

## INTRODUCTION

Petanque is a type of sport that originates from France. This sport is played by throwing a ball made of metal towards a target ball made of wood. The original form of this game appeared in 1907 in La Ciotat, in Provence, in the south of France. The name comes from Les Ped Tanco in the Provençal dialect of the Occitan language, which means "feet together". The world's International Petanque Federation is under the auspices of FIPJP (Federation Internationale de Petanque et jeu Provençal) while for the Asian region it is under APSBC (Association Petanque and Sport Boules Confederation) (Pradana & Nurkholis, 2019). Petanque is a very easy sport and can be

played by anyone. Gilles said that tactically, Petanque is a simple game. In the sport of petanque, there are several ways to throw to get points, namely: (1) pointing throw is a throw that is used to get points by getting as close as possible to the wooden ball area, (2) shooting throw is a throw that is used to shoot the opponent's iron ball that is in the area. the area near the wooden ball so that the opponent's iron ball can move away or leave the petanque court area. (Kustiawan & Perkasa, 2020). There are three types of shooting, namely full iron shot, in front shot and rolling shot (Iskandar, Ridlo, & Oktaviana, 2019). Shooting is mostly done standing up, because the view is wider and the position is more stable (Pradana & Nurkholis, 2019).

Putman in(Pradana & Nurkholis, 2019)states that Petanque shooters are the same as goal scorers in American Football. They are called into play, doing simple, well-defined jobs. The most difficult part of shooting is the player's mindset and reaction not being in a position of pressure or stress. Similar to pointing, shooting has three standard throws that vary in output, height, power and application. Shooting is a technique that aims to bring the opponent's metal ball away from the wooden ball (target ball). There are three types of shooting, namely full iron shot, in front shot and rolling shot (Iskandar, Ridlo, & Oktaviana, 2019).

The problem faced by coaches so far is that they do not yet know the dominant physical condition factors that determine petanque performance, so that coaches have difficulty in preparing training programs as well as looking for athlete talent. So far, coaches have only assumed that the physical condition requirements in the sport of petanque are almost the same as sports with the characteristics of throwing at a target, such as handball, basketball, golf and others. (Hanief & Purnomo, Petanque: What are the physical factors that determine achievement?, 2019). Physical condition is a very important element in all sports. The importance of the physical condition of athletes according to(Harsono, M., & Sugiantoro, 1988)If your physical condition is good then: there will be an increase in the ability of the circulatory system and the work of the heart, there will be an increase in strength, flexibility, stamina, speed and other components of physical condition. Petanque sports have components of physical conditions including: height, arm length, palm length, arm muscle strength, wrist flexibility, balance, arm muscle power, hand squeeze strength, concentration and eye-hand coordination.(Hanief & Purnomo, Petanque: What are the physical factors that determine achievement?, 2019). Several other studies link physical condition to petanque, research from(Pradana & Nurkholis, 2019)explained that body height, arm length and balance determine shooting accuracy. Anthropometry is the realm of science related to the structure of the human body. James Tangkudung in(Kustiawan & Perkasa, 2020)explained that Anthropometry is a science about the problems of measuring weight, size and proportions of the human body and its parts. Anthropometric factors are formed from body height, arm length, and palm length(Hanief & Purnomo, Petanque: What are the physical factors that determine achievement?, 2019)

Research conducted by (Pradana & Nurkholis, 2019) shows the results that body height has a high contribution to shooting accuracy in petanque sports. Meanwhile, the results of research conducted by (Kustiawan & Perkasa, 2020) show that anthropometry, namely hand span, has a positive influence on the petanque sport pointing throw.

The explanations and phenomena that have been explained previously are the background for the author to conduct research aimed at determining the anthropometric factors and physical condition factors that are dominant in shooting game throws.

## METHOD

For the research site at the Petanque Field, Muhamadiyah University Solo Campus and the Petanque Field PONPES Temulus Ngawi, the research time and data collection was carried out in the 4th week of April 2022. This research uses a quantitative approach, with a multiple correlation factor analysis research method. Multiple correlation is a correlation between two or more independent variables together with the dependent variable. A number that shows the direction and strength of the relationship between two or more independent variables and one dependent variable. Correlation research aims to determine whether there is a contribution and if there is, how much the contribution is and whether the contribution is meaningful or not. The bivariate correlation coefficient is a statistic that can be used by researchers to determine the closeness of the relationship between two variables. The population and sample in this study were all 12 Ngawi Regency PORPROV athletes. The sampling technique used was purposive sampling. The type of research used in conducting this research is dominant factor analysis research between anthropometry and physical condition with indicators related to petanque shooting game throws. The indicators used in this research are as follows:

1. X 1a : Height
2. X 1b : Sleeve length
3. X 1c : Sitting height
4. X 2a : Arm muscle strength test (Push up)
5. X 2b : Hand-eye coordination test
6. X 2c : Balance Test (standing balance test)
7. Y : Throw Shooting game

The research instrument in this study is the device used to collect data, namely:

1. To measure height using a stadiometer or tape
2. To measure arm length, use a manual measuring tape
3. To measure sitting height, use a stadiometer or tape
4. To measure arm muscle strength using the push up test
5. To measure eye-hand coordination using the tennis ball throw and catch test.
6. To measure balance with the standing balance test
7. To measure shooting throws with test *shooting games*

This test was taken because the motion of the shooting throw uses many elements from the test presented. By carrying out these tests, it is hoped that the results of this research can be used to develop appropriate training programs and as a reference for subsequent research.

The analysis in this study was carried out to determine whether there was a relationship between anthropometric factors and the dominant physical condition of

petanque shooting throws in Fopi Ngawi athletes. For data processing in this research, the SPSS 22 program was used and with the help of the SPSS manual from (Stanislaus S, Uyanto 2009: 243)

The test requirements to check the validity of the sample are:

1) Normality test

Test the normality of the data in this study with non-parametric statistics using Kolmogorov-Smirnof. As for testing normality, this means that if it is significant  $> 0.05$  it means normal, and if it is significant  $< 0.05$  it means it is not normal.

2) Linearity Test

This linearity test is intended to see whether there is a linear relationship between the predictor data, namely anthropometric coordination variables (X1), body height (X1a), arm length (X1b), sitting height (X1c) and physical condition (X2), arm muscle strength (X2a), eye-hand coordination (X2b), balance (X2c) in shooting (Y). In testing the linearity of this regression line by looking at the F value with the following conditions, if  $F_{count} > F_{table}$  or if the significant value is  $< 0.05$  it means it is linear. Meanwhile, if  $F_{count} < F_{table}$  or if the significant value is  $> 0.05$ , it means it is not linear.

3) Correlation Analysis

To analyze the data using a correction test. The correction test is used to determine the relationship between each variable. In this analysis test, the SPSS 22 program was used with the Pearsen formula or known as product moment.

4) Multiple Linear Regression Analysis

Multiple Linear Regression Analysis is used to see the influence of a number of independent variables X1, X2, X3.....Xk on the dependent variable Y (Stansilaus S. Uyanto (2009: 2).

## RESULTS

In this discussion, an analysis of the most dominant factors from the realm of anthropometry and physical condition can be described regarding the results of shooting throws in the petanque sports game. In accordance with the objectives of the research and the results of research regarding various tests carried out on 12 PORPROV athletes in Ngawi Regency 2022, a description of the research used can be displayed first. This is useful for knowing the distribution of data that has been tabulated. The initial stages of the steps taken to answer the problem formulation or test classical assumptions are the normality test and linearity test. In the normality test, data is said to be normal if it follows a diagonal line. For more details, we can use the Kolmogorov Smirnov test. From the Kolmogorov Smirnov test, normal data was obtained. After passing the normality test, continue with the linearity test. The linearity test is carried out to see whether there is a linear relationship between the independent

variable and the dependent variable. From the tests carried out, all research variables were declared linear with respect to the dependent variable.

After passing the classical assumption test, the next step is to enter the correlation test. This test is used to see the relationship between variables. The results of the research show that the variables arm length, arm muscle strength and balance have a relationship with the throw variable. After carrying out correlation testing, multiple correlation analysis testing is carried out. In testing multiple regression analysis that can be displayed are the regression model, Hypothesis Test (T Test and F Test) and the Coefficient of Determination value. The conclusion obtained through hypothesis testing is that partially the variables arm length, arm muscle strength and balance have a significant influence on the throw variable. Meanwhile, based on the F test or tests carried out simultaneously, it was concluded that there was a simultaneous influence between the variables body height, arm length, sitting height, arm muscle strength, eye hand coordination and balance on shooting. And finally, testing the coefficient of determination which is used to measure how far the model's ability is to explain variations in the independent variable on the dependent variable. Based on the calculation results, the Adjusted R Square value is 0.945, so the model is able to explain diversity of 0.945 or 94.5% and the rest is influenced by other factors that cannot be explained by the model.

Based on the tests that have been carried out, it can be seen that arm length, arm muscle strength and balance have a significant influence on shooting in petanque sports. By knowing the length of the arm, an athlete can find out how capable he is of throwing precisely at a predetermined target. The length of the arm is very influential because if the arm is measured, the length of the arm will be greater and the chance of throwing accuracy will be better. The game of petanque is often considered easy by some people. Technically the game consists of throwing a ball towards a target. Petanque sports use the length of the arm to swing the ball so that throwing accuracy can be achieved. Long arms have an important role in throwing the ball a longer distance, because longer arms always have an advantage in throwing. The results of similar research were conducted by Hanief and Purnomo (2019) who stated that one of the dominant factors that determines success in shooting in petanque is arm length.

Arm length alone is still not decisive if arm muscle strength is not proven. Arm muscle strength has a significant and positive influence on throwing (shooting) in the sport of petanque, meaning that the higher the arm muscle strength of a petanque player, the better the accuracy of the shot results and conversely, the lower the value of the arm muscle strength of a petanque player, the accuracy of the shot results will be less precise. ensure accurate shooting results. The results of this study are similar to the results of research conducted by Anwar (2019), where the results of his research showed that there was a significant relationship between arm muscle power and shooting in the sport of petanque.

Apart from arm muscle strength, balance also influences the accuracy of shooting throws in petanque. From the results of data analysis, it is known that balance has a significant and positive effect on shooting in the sport of petanque. Throws made in petanque games often employ a parabolic motion, where the consistency of force during the throw and the angle of the throw are the keys to achieving a certain horizontal

distance. Apart from that, good balance is needed to maintain consistency in the direction of the throw which is done by training the body's balance muscles.

## DISCUSSION

The results of this research are supported by the results of research conducted by Isyani and Primayanti (2019). Based on the significance test of the effect of Core Stability training on shooting ability, the calculated t value was 9.815, which means there was a significant influence between before the sample received core stability training and after receiving the training. These results contain the interpretation that core stability training has a very significant influence on shooting ability in petanque sports.

## CONCLUSION

Based on the results of calculations carried out in the partial t test based on significance values, the research carried out produced the dominant indicator from the anthropometric domain, namely arm length with a significance value of 0.045, followed by the dominant physical condition variable, namely arm muscle strength with a significance value of 0.006 and balance with significance value 0.017 towards the shooting throw in the petanque sport of PORPROV athletes in Ngawi Regency 2022.

## Conflict of Interest

We declare as authors that we have no conflict of interest on this paper. we wrote this article based on the results of our own research

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