Kinestetik : Jurnal Ilmiah Pendidikan Jasmani 9 (2) (2025)
Kinestetik : Jurnal Ilmiah Pendidikan Jasmani
https://ejournal.unib.ac.id/index.php/kinestetik/index
DOI : 10.33369/jk.v9i2.42320

The Effect Of Core Training On The Balance Of Shooting Athletes In Banjarbaru City

Adinda Tri Maharani[1], Eka Purnama Indah[2], Akhmad Amirudin[3]

[1]Physical education student, Faculty of Teacher Training and Education, Lambung Mangkurat University, Banjarbaru, Indonesia
[2,3]Lecturer in Physical Education, Faculty of Teacher Training and Education, Lambung Mangkurat University, Banjarbaru, Indonesia

Article Info

Article History :

Received : June 2025
Revised : June 2025
Accepted : June 2025

Keywords:

Balance
exercise core
shoot

Abstract

Shooting requires a high level of concentration and balance of the body to maintain accuracy and stability when aiming at the target. Good balance is an important factor because athletes must maintain a fixed position for a long time. This study aims to analyze the effect of core training on the balance of shooting athletes in Banjarbaru City. The method used was pre-experiment with a pretest-posttest control group design. The population in this study is shooting athletes in the city of Banjarbaru which consists of 20 athletes. The sample in this study uses the total sampling technique, which uses the entire population. The sample of this study was divided into two groups, namely the treatment group that was given core training and the control group that underwent regular physical exercise. The instrument used is the standing stork test to measure balance. The results of the data analysis showed that the data was distributed normally and homogeneously. The paired t-test showed significant results ($p < 0.05$), indicates the influence of core training on balance that has never been applied to shooting athletes in the city of Banjarbaru.

*Corresponding email: adindatrimaharani14@gmail.com

ISSN 2685-6514 (Online)
ISSN 2477-331X (Print)

INTRODUCTION

Shooting is one of the sports that requires a very high level of accuracy and focus. According to (Pranoto et al., 2025). High concentration allows athletes to control movement stably and execute strategies more effectively. In the match, the athletes are required to have high concentration in order to achieve victory (Halimatussa'diyah & Jannah, 2019). The ability to concentrate or focus is very important for athletes, because the greater the degree of concentration, the better the performance displayed when competing (Bahri et al., 2023). In the world of sports, concentration is the ability of athletes to focus their attention during matches to achieve more optimal achievements (Riyadi et al., 2019). Success in shooting is determined not only by aiming and pulling targets, but also by the stability of the body. Concentration is the most important thing, because with full concentration, a person can feel various changes that are closely related to muscle contractions and responses to bodily functions (Kamseno et al., 2018). A shooting athlete must be able to maintain a fixed position for a long time to avoid vibrations that can reduce the accuracy of the shot. Therefore, body balance, especially static balance, is a crucial element in enhancing the performance of shooting athletes. Balance is a person's ability to maintain a stable posture when stationary, without unwanted movements. If the athlete does not have good balance, then he will not be able to perform movements optimally (Khotijah Rahma, 2023). The lack of strength in the footrest has a great effect on the outcome of the shot, as an unstable position of the foot can cause the shot to be inaccurate due to shifting, shaking, or wobbly footwork (Rochmad & Irawan, n.d.). In shooting sports, balance plays an important role because it helps athletes control their bodies and weapons to the maximum when aiming at targets. If the balance is disturbed, small accidental movements can affect the accuracy of the shot. The ability to maintain a balance between body mass and the field of support allows a person to be active in an effective and efficient way (Putra, 2017). Therefore, special training methods are needed to improve balance for shooting athletes.

One effective way to improve balance is through core or core muscle exercises (Mumtaz et al., 2024). As conveyed by (Dewi & Palgunadi, 2021). Core muscles are a group of muscles in the torso that surrounds the abdominal,

gluteal, hip or hip girdle, paraspinal, and other muscles that cooperate to keep the spine and abdomen stable of the spine. Core *stability* exercises aim to strengthen the torso and improve the balance of the athlete (Widiastuti, 2013). Strengthening the When it comes to posture, core muscles are crucial of the body, because these muscles can be good at maximizing balance and movement. The stomach, lower back, and pelvic muscles are examples of core muscles that are crucial for sustaining body stability. Core stability training is an exercise kind that focuses on strengthening the stabilizing muscles of the torso, pelvis, and lower legs, with the aim of training the postural muscles so that they can contract and work optimally coordinated, so that they are able to maintain posture and balance effectively, which is very important in supporting movement during activity (Pramita et al., 2022). A good torso can improve postural control, as the muscles are able to maintain a more stable body position, both in the lower and upper limbs (Pristianto, 2020). The abdominal muscles are among the main components that are crucial to static core stability exercises (Gunawan Pratama, 2020). These exercises aim to strengthen those muscle groups, so that athletes can maintain a stable posture for longer and minimize vibrations that can affect the accuracy of shots.

In the sport of shooting, the length of the match varies depending on the type of number being contested. In general, the average time to complete 60 shots is about 1 hour and 30 minutes (Federation, 2019). In the city of Banjarbaru shooting sports are developing with the increasing number of athletes. However, because there has never been a core training program, many athletes are not aware of the importance of core training to improve their balance. There are several types of exercises that can improve the physical component in the form of balance, one of which is by using the core stability training model (Zulvikar, 2016). Core stability training is an exercise concept designed to train stabilizing muscles in the torso, pelvis, and lower legs. The purpose of this exercise is to train the postural muscles so that they can contract and work optimally coordinated, so that they are able to maintain posture and balance well (Anjasmara et al., 2021). Core stability can be interpreted as a set of muscles located in the front of the body or abdominal area, paraspinal muscles, pelvic muscles, gluteus, and diaphragm (Christanto et al., 2017). Most training programs still focus on shooting techniques, without paying special attention to body stability. In fact, a lack of balance can be an obstacle for athletes in achieving their best performance. Not

all coaches have systematic training methods to improve static balance through core training**.** To overcome these problems, coaches and athletes need to gain a deeper understanding of the importance of core training**.** Training programs should be systematically designed with the types of exercises that are effective for improving balance. With this data-driven approach, it is hoped that shooting athletes in the city of Banjarbaru can significantly improve their shooting accuracy. This study aims to analyze the effect of core training on the balance of shooting athletes in Banjarbaru City. By conducting a pre-experiment on a group of athletes, this study will find out whether core training can improve static balance. In addition, this study will also examine the types of core exercises that are most effective in improving the body stability of shooting athletes.

METHODS

The research method used is pre-experimental (Sahir, 2022). The sample was divided into two groups, the treatment group was given core exercises while the control group was given regular physical exercises. The training was carried out 16 meetings with details of 5 meetings a week for 4 weeks.

Participants

Population is defined as the whole of individuals, objects, or events that are the main subject of investigation in a study(Candra Susanto et al., 2024). The population in this study amounted to 20 shooting athletes in the city of Banjarbaru. The sample was divided into two groups, the treatment group consisted of 5 females and 5 males while the control group consisted of 4 females and 6 males. The research was conducted at the Banjarbaru City Shooting Range in the afternoon, namely at 16.00 – 18.00.

Sampling Procedures

The sample for this study was obtained using the total sampling method, whereby all individuals in the population were included as research subjects (Aiman et al., 2022). Total sampling is a sampling technique in which all members of the population are included as samples. This method is typically applied when the population size is relatively small, usually fewer than 30 individuals.

Materials and Apparatus

Research, of course, requires a measuring tool used to collect data from the research object. Instruments in quantitative research are very influential because by using the right instruments they will be able to measure the variables that will be observed by the researcher (Ardiansyah et al., 2023). In this study, the author only prepared stopwatches, paper, and pens to be used in data collection. The instrument used in the study entitled The Effect of Core Training on the Balance of Shooting Athletes in the City of Banjarbaru is the Standing Stork Test.

Procedures

The Standing Stork Test is a widely used method for evaluating an individual's balance ability(Mackenzie, 2008). The standardized procedure for administering the test is as follows:

- The participant stands in a relaxed position with both feet flat on the ground.
- Both hands are placed firmly on the hips.
- One leg is lifted, and the toes of the raised foot are positioned against the knee of the supporting leg.
- Upon the tester's verbal cue, "Ready, go," the participant raises the heel of the supporting foot, balancing on the toes.
- At this point, the stopwatch is started by the tester.
- The participant is instructed to maintain the position for as long as possible, ensuring the heel does not touch the ground and the raised foot remains in contact with the supporting knee.
- The time duration for which balance is maintained is recorded.
- The test is repeated for each participant, with three trials conducted per individual to ensure accuracy and reliability.

Design or Data Analysis

This research adopts a pretest-posttest control group design, comprising two groups: an experimental (treatment) group and a control group(Sugiyono, 2020). The experimental group underwent core training exercises, including planks, side planks, mountain climbers, plank-to-push-up movements, and related activities, whereas the control group engaged solely in standard physical training routines.

Table.1 pretest-posttest control group design

Experiment Groups	**T**	**X**	**T**
Control group	T		T

This study utilized three forms of data analysis. The normality test was employed to examine whether the data were drawn from a normally distributed population, while the homogeneity test was conducted to determine whether two or more sample groups belonged to populations with equal variances. Lastly, the paired t-test was applied as a method of hypothesis testing for dependent data sets, where measurements are taken from the same subjects under different conditions (Nuryadi et al., 2017).

RESULT

The data normality test uses *the Kolmogorov-Smirnov Test* and *Shapiro Wilk*, to determine whether the data is normally distributed or not. based on the results of the normality test conducted using the SPSS Version 25 application. Significance values of 0.181 and 0.109 were obtained for the experimental group while 0.200 and 0.406 were obtained for the control group. This value is greater than the significance level used, which is >0.05. Thus, it can be concluded that the residual is distributed normally.

		Kolmogorov-Smirnov			Shapiro-Wilk		
N_gain_persen	Group	statistic	df	Sig.	statistic	df	Sig.
	Eksperiment group	.221	10	.181	.873	10	.109
	Control group	.193	10	.200	.926	10	.406

Figure 1. Normality test results

The data homogeneity test on the bound variable obtained a significance value of 0.670 which is greater than >0.05. This means that the data has a homogeneous variance. This shows that the homogeneity assumption is met, so that statistical analysis can be validly continued.

		Levene Statistic	df1	df2	Sig.
keseimbangan	Based on Mean	.221	1	18	.644
	Based on Median	.034	1	18	.857
	Based on Median and with adjusted df	.034	1	16.729	.857
	Based on trimmed mean	.187	1	18	.670

Figure 2. Homogeneity test results

The T-test was conducted using SPSS Version 25 and resulted in a significance value of 0.000, which is less than 0.05. This indicates that there is a significant effect between the variables being tested.

	Mean	Std.Deviation	Std.Error Mean	t	df	Sig. (2-tailed)
Pretest-posttest	-7.55000	6.47648	1.44818	-5.213	19	.000

Figure 3. T-test results

Table 2. Descriptive Athlete Balance (*Pretest and Posttest*)

Balance	**Group eksperimen**		**Group control**	
	Prestest	posttest	prestest	posttest
Total	245	370	281	307
Average	25	37	28	30
Standard deviation	9	10	10	9
Percentage	24%	37%	28%	30%

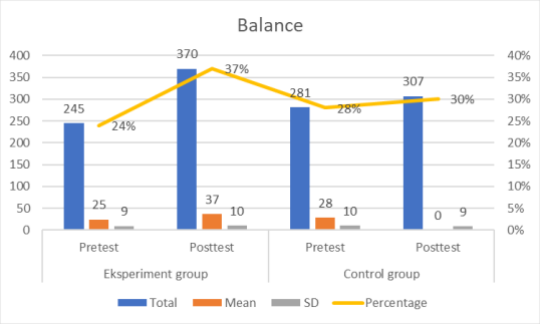

Figure 4. Pretest and posttest *balance combined bar graph*

DISCUSSION

Based on the results of the research that has been carried out, core training has been proven to have an influence on improving the balance of shooting athletes in the city of Banjarbaru. These findings are further validated by statistical tests, which show normal and homogeneous data distribution, along with a significant improvement in balance scores following core training, as evidenced by a significance value of 0.000 ($p < 0.05$). These findings align with theoretical perspectives emphasizing the critical role of core stability in supporting balance and postural control during physical movement. If an athlete has a poor physical condition, then he will have difficulty doing sports activities and experience excessive fatigue (Amirudin & Abdillah, 2020).

Core exercises not only aim to strengthen key muscles such as the abdominal and lower back muscles, but also plays a role in increasing physical freshness by including the muscular system produced to participate in sports activities (Indah, 2020). Balance allows the nervous system to efficiently regulate muscle coordination, which in turn improves the efficiency of movement in sports. In the context of shooting sports, the ability to maintain a stable posture is essential to reduce body vibration and improve shot accuracy. Study by (Yu et al., 2025) It also confirms that core stability has a more important role than just muscle strength in supporting effective biomechanical function.

Furthermore, research by (Cao et al., 2024) indicates that a complex core training program is able to improve muscle strength and shooting accuracy in athletes, who have similar body stability needs to shooting. This shows that core training can improve athletes' performance in various sports that require high balance and posture control. Thus, it is recommended that coaches and sports program managers in the city of Banjarbaru consider the systematic and continuous integration of core training in their training routines, in order to optimize the overall performance of athletes.

CONCLUSION

Based on the research findings and the results of the data analysis, It can be concluded that there is an effect of core training on balance that has never been applied to shooting athletes in the city of Banjarbaru. Such training effectively strengthens essential supporting muscles namely the abdominal, lower back, and hip muscles which are fundamental in maintaining posture and balance during shooting activities. Optimal body stability is crucial for shooting athletes, as it allows for sustained proper posture and minimizes extraneous movements during the aiming and shooting phases.

Thus, the implementation of a regular and structured core training program can be an effective strategy to support the performance of shooting athletes, especially in terms of body stability.

REFERENCES

Aiman, U., M.Pd., K. A. S. H. M. A. Ciq. M. J., Suryadin Hasda, M. P. Z. F., M.Kes. Masita, M. P. I. N. T. S. K., & M.Pd. Meilida Eka Sari, M. P. M. K. N. A. (2022). Metodologi Penelitian Kuantitatif. In *Yayasan*

Penerbit Muhammad Zaini.

Amirudin, A., & Abdillah, S. (2020). *Analysis of Physical Conditions of Aerobic Endurance or VO2Max*. *407*(Sbicsse 2019), 117–119. https://doi.org/10.2991/assehr.k.200219.033

Anjasmara, B., Widanti, H. N., & Mulyadi, S. Y. (2021). Kombinasi Calf Raise Exercise dan Core Stability Exercise Dapat Meningkatkan Keseimbangan Tubuh pada Mahasiswa Jurusan Fisioterapi Poltekkes Kemenkes Makassar. *Physiotherapy Health Science (PhysioHS)*, *3*(1), 46–52. https://doi.org/10.22219/physiohs.v3i1.17162

Ardiansyah, Risnita, & Jailani, M. S. (2023). Teknik Pengumpulan Data Dan Instrumen Penelitian Ilmiah Pendidikan Pada Pendekatan Kualitatif dan Kuantitatif. *Jurnal IHSAN : Jurnal Pendidikan Islam*, *1*(2), 1–9. https://doi.org/10.61104/ihsan.v1i2.57

Bahri, M. F., Hidayatullah, F., Handayani, H. Y., & Purwoto, S. P. (2023). Pengukuran Kemampuan Fokus dan Relaksasi Pada Atlet Cabang Olahraga Ketepatan (Menembak Dan Panahan) Dengan Newrosky Brainwave. *JTIKOR (Jurnal Terapan Ilmu Keolahragaan)*, *8*(1), 29–35. https://doi.org/10.17509/jtikor.v8i1

Candra Susanto, P., Ulfah Arini, D., Yuntina, L., Panatap Soehaditama, J., & Nuraeni, N. (2024). Konsep Penelitian Kuantitatif: Populasi, Sampel, dan Analisis Data (Sebuah Tinjauan Pustaka). *Jurnal Ilmu Multidisplin*, *3*(1), 1–12. https://doi.org/10.38035/jim.v3i1.504

Cao, S., Wang, Z., Guo, J., Geok, S. K., Sun, H., & Liu, J. (2024). The effects of plyometric training on physical fitness and skill-related performance in female basketball players: a systematic review and meta-analysis. *Frontiers in Physiology*, *15*. https://doi.org/10.3389/fphys.2024.1386788

Christanto, D. A., Adiputra, N., Lesmana, S. I., Sutjana, D. P., Muliarta, M., & -, W. (2017). Penambahan Latihan Core Stability Pada Program Pelatihan Atlet Dayung Untuk Peningkatan Kecepatan Mendayung. *Sport and Fitness Journal*, *5*(3), 40–47. https://doi.org/10.24843/spj.2017.v05.i03.p06

Dewi, P. C. P., & Palgunadi, I. K. A. (2021). Pengaruh Latihan Core Stability terhadap Keseimbangan Atlet Panahan Usia 7-11 Tahun. *Jendela Olahraga*, *6*(2), 59–67. https://doi.org/10.26877/jo.v6i2.7529

Federation, internation shooting spot. (2019). OFFICIAL STATUTES, RULES AND REGULATIONS. *Sustainability (Switzerland)*, *11*(1), 1–14.

Gunawan Pratama, I. (2020). Pengaruh Latihan Sirkuit Menggunakan Core Stability Static Exercise Terhadap Keseimbangan dan Daya Tahan Otot

Perut. *BRILIANT: Jurnal Riset Dan Konseptual*, *5*(1), 44–50. http://dx.doi.org/10.28926/briliant.

Halimatussa'diyah, L., & Jannah, M. (2019). Hubungan Antara Regulasi Emosi dengan Konsentrasi pada Atlet Ukm Mnembak Unesa. *Jurnal Penelitian Psikologi*, *6*(3), 1–7.

Indah, E. P. (2020). Sistem Olahraga Prestasi Di Indonesia Dan China. *Riyadhoh : Jurnal Pendidikan Olahraga*, *3*(1), 15. https://doi.org/10.31602/rjpo.v3i1.3105

Kamseno, S., Sujiono, B., & Apriyanto, T. (2018). Upaya Peningkatan Kemampuan Menembak Air Rifle 10 Meter Dengan Berlatih Keseimbangan Pada Siswa Latihan Lanjutan Menembak (Llm). *Jurnal Ilmiah Sport Coaching and Education*, *2*(2), 75–85. https://doi.org/10.21009/jsce.02202

Khotijah Rahma, S. (2023). Pengaruh Pelatihan Core Stability terhadap Keseimbangan dan Kekuatan Otot Perut Atlet Putra Ekstrakurikuler Pencak Silat. *Jurnal Ilmu Keolahragaan Undiksha*, *11*(3), 320–327. https://doi.org/10.23887/jiku.v11i3.65939

Mackenzie, B. (2008). *101 Tests D'Évaluations*.

Mumtaz, A., Purnama, P., & Siantoro, G. (2024). *JPO : Jurnal Prestasi Olahraga SHOOTING (MID-RANGE JUMP SHOT) ATLET BOLA BASKET PUTRA SMA*. 380–385.

Nuryadi, Astuti, T. D., Utami, E. S., & Budiantara, M. (2017). DASAR-DASAR STATISTIK PENELITIAN. In *Sibuku Media*.

Pramita, I., Darmawijaya, I. P., & Endarwati, L. M. D. E. (2022). Pengaruh Pemberian Core Stability Exercise Terhadap Keseimbangan Dinamis Pada Anak Usia 5-6 Tahun Di Paud Gianyar. *Journal of Innovation Research and Knowledge*, *2*(4), 2085–2096.

Pranoto, N. W., Sari, A. P., Syaffitri, M., & Fauziah, V. (2025). *Konsentrasi Akurasi Memanah Pada Atlet Panahan*. *10*(1).

Pristianto, A. (2020). *Perbandingan Kombinasi Bergantian Senam Lansia Dan Latihan Core Stability Dengan Hanya Senam Lansia Terhadap Peningkatan Keseimbangan Statis Lansia*. *June*.

Putra, A. (2017). Kontribusi Power Otot Tungkai Dan Keseimbangan Tubuh Secara Terhadap Kemampuan Jump Shoot Atlet Bola Basket Smp Negeri 1 Pasaman. *Whana Didaktika*, *15*(1), 1–11. https://jurnal.univpgri-palembang.ac.id/index.php/didaktika/article/view/1118

Riyadi, D., Sartono, H., & Komarudin, K. (2019). Pengaruh Metode Latihan Imagery terhadap Kosentrasi dan Keterampilan Bermain Sepakbola. *Jurnal Kepelatihan Olahraga*, *11*(1), 43–50. https://doi.org/10.17509/jko-upi.v11i1.16825

Rochmad, Z., & Irawan, R. (N.D.). *Peningkatan Kemampuan*

Menembak Dengan Latihan Wall Squad Pada Atlet Menembak Silver Bullet Indonesia Zulfikar Habibur Rochman Roy Januardi Irawan. 7–14.

Sahir, Syafrida Hafni Sahir. (2022). *Metodologi Penelitian*.

Sugiyono. (2020). *Metodologi Penelitian Kuantitatif, Kualitatif Dan R & D*.

Widiastuti, C. (2013). Core Stability Exercise. *Div Fisioterapi*, 1–9.

Yu, T., Xu, Y., Zhang, Z., Sun, Y., Zhong, J., & Ding, C. (2025). The Impact Of Core Training On Overall Athletic Performance In Different Sports: A Comprehensive Meta-analysis. *BMC Sports Science, Medicine and Rehabilitation*, *17*(1). https://doi.org/10.1186/s13102-025-01159-6

Zulvikar, J. (2016). Pengaruh Latihan Core Stability Statis (Plank dan Side Plank) dan Core Stability Dinamis (Side Lying Hip Abduction dan Oblique Crunch) Tterhadap Keseimbangan. *Journal of Physical Education Health and Sport*, *3*(2), 96–103. http://journal.unnes.ac.id/nju/index.php/jpehs