**Journal of International Conference Proceedings (JICP)**
**Vol. 8 No. 1, pp. 558-567, June, 2025**
**E-ISSN: 2621-993X P-ISSN: 2622-0989**
**https://ejournal.aibpmjournals.com/index.php/JICP/index**

# The Relationship Between Physical Condition with Suplex Throwing Ability of Wushu Sanda Athletes

**Anisa Febriani[1], Nur Amin[1*], Guntur Ratih Prestifa Herdinata[1], Ika Nilawati[1], Norlaila Azura Kosni[2], Rio Noviansyach Sutomo[1]**
[1]Universitas Ngudi Waluyo, Semarang Regency, Central Java 50512, Indonesia
[2]Universiti Teknologi MARA, Pahang Branch, Selangor 40450, Malaysia
*Corresponding Email: nuramin@unw.ac.id

## ARTICLE INFORMATION

**Publication information**

**Research article**

**HOW TO CITE**
Febriani, A., Amin, N., Herdinata, G. R. P., Nilawati, I., Kosni, N. A., & Sutomo, R. N. (2025). The relationship between physical condition with suplex throwing ability of Wushu Sanda athletes. *Journal of International Conference Proceedings, 8*(1), 558–567.

**DOI:**
**https://doi.org/10.32535/jicp.v8i1.3926**



Received: 26 April 2025
Accepted: 27 May 2025
Published: 28 June 2025

## ABSTRACT

Wushu Sanda is a modern martial art that evolved from traditional Chinese martial arts. One of its core techniques, the suplex throw, requires explosive movement to lift and slam an opponent backward, which demands strength, balance, coordination, and proper technique. This study aimed to examine the relationship between physical condition and the ability to perform suplex throws among Wushu Sanda athletes. A quantitative correlational research design with a cross-sectional approach was employed. The sample consisted of 15 athletes selected using purposive sampling. Research instruments included mats, stopwatches, whistles, measuring scale boards, single bars, slam dummies, and hand dynamometers. Data were analyzed using univariate, bivariate, and multivariate methods with SPSS. The results revealed significant relationships between arm muscle strength ($p = 0.01$) and leg muscle power ($p = 0.02$) with suplex throwing ability. In contrast, no significant relationships were found for arm muscle endurance ($p = 0.07$), back muscle endurance ($p = 0.38$), and flexibility ($p = 0.06$). In conclusion, physical condition, particularly arm muscle strength and leg muscle power, was significantly associated with suplex throwing performance in Wushu Sanda athletes.

**Keywords:** Athletes; Physical Condition; Suplex Throw; Wushu Sanda

**Journal of International Conference Proceedings (JICP)**
**Vol. 8 No. 1, pp. 558-567, June, 2025**
**E-ISSN: 2621-993X P-ISSN: 2622-0989**
**https://ejournal.aibpmjournals.com/index.php/JICP/index**

## INTRODUCTION

Wushu Sanda is a modern combat sport derived from traditional Chinese martial arts and developed into a standardized competitive discipline. Unlike traditional Wushu, which emphasizes philosophical values, Sanda integrates striking and grappling techniques, including punches, kicks, and throws. Among these, the suplex throw is one of the most technically demanding and highly rewarding maneuvers in competition. Executing a suplex requires explosive movement where the athlete lifts and slams the opponent backward, combining muscle strength, balance, coordination, and technical precision (Singh et al., 2019). As a decisive move, the suplex not only contributes significant points but also provides a psychological advantage over opponents.

The effectiveness of such techniques is closely linked to the athlete's physical condition. Sports science defines physical condition as comprising several main components: muscular strength, endurance, agility, balance, flexibility, and coordination (Bompa & Buzzichelli, 2015). In the suplex, back, core, and leg strength are critical for lifting the opponent, while coordination and balance ensure control during body rotation. Flexibility reduces the risk of injury and enhances the range of motion (Rahman & Islam, 2020). When these elements are lacking, even technically skilled athletes may fail to execute throws successfully, leading to performance decline and increased injury risk.

Field observations and preliminary studies at several Wushu Sanda clubs in Indonesia reveal that many athletes with good technical skills struggle to execute suplex throws in real matches. This issue is often linked to weak physical conditioning, which undermines explosive movements and competitive effectiveness (Maifitri, 2018). These findings highlight the importance of training programs that not only emphasize technical mastery but also integrate physical conditioning tailored to specific techniques. Without such integration, athletes risk underperforming in competition despite adequate technical knowledge (Dellaserra et al., 2014).

Globally, research in combat sports has increasingly demonstrated the interdependence between physical attributes and technical execution. Studies in judo, wrestling, and karate confirm that athletic performance is not solely determined by skill but also by strength, endurance, flexibility, and power (Harsono, 1988; Bompa & Buzzichelli, 2015). For example, Yudistira (2020) reported that physical conditioning significantly correlates with throwing success in judo, while Murdiansyah (2022) showed that arm and back strength, together with flexibility, play a key role in wrestling throws. Biomechanical analyses further emphasize the importance of explosive leg power in initiating and completing complex throwing maneuvers (Singh et al., 2019). Despite this evidence, few studies have systematically investigated these aspects in Wushu Sanda, particularly in relation to the biomechanics of the suplex.

This lack of research creates a significant gap, especially as Wushu Sanda continues to grow in popularity and professionalism at the regional and international levels. Athletes now compete not only in local tournaments but also in global events such as the Asian Games, which demands scientifically based training programs. Coaches are increasingly required to rely on sports science to optimize athlete preparation. Understanding how physical condition relates to specific techniques like the suplex provides a concrete foundation for designing targeted training regimens and improving overall performance outcomes.

Theoretically, this study contributes to the literature by filling the gap in empirical research on the relationship between physical conditioning and technical performance in

Wushu Sanda. Unlike other martial arts where such studies are more established, Sanda remains relatively underexplored. Practically, the results can guide coaches in prioritizing strength and power training, developing evidence-based conditioning strategies, and informing talent identification and evaluation processes.

In conclusion, the suplex throw in Wushu Sanda exemplifies the critical connection between physical conditioning and technical execution. Addressing the limited research in this area, the present study seeks to analyze the relationship between athletes' physical condition and their ability to perform suplex throws. By doing so, it aims to advance sports science knowledge while offering practical recommendations for athlete development and coaching strategies in Wushu Sanda.

## LITERATURE REVIEW

Wushu Sanda, also known as Sanda or Sanshou, is a modern competitive sport derived from traditional Chinese martial arts. It emphasizes free fighting by combining striking and grappling techniques, including punches, kicks, sweeps, and throws. Unlike traditional Wushu routines that focus on performance artistry, Sanda highlights combat practicality, with points awarded not only for clean strikes but also for successful takedowns and throws (Singh et al., 2019). Among these, the suplex is regarded as an advanced throwing technique with a high degree of difficulty. Adapted from wrestling and judo, the suplex requires an athlete to lift the opponent backward and slam them to the ground in accordance with competition rules. Executing this maneuver demands a precise combination of core, back, and leg strength, as well as high levels of coordination and balance to ensure both effectiveness and safety (Lei & Lv, 2022).

The suplex has strategic significance in Wushu Sanda competitions because of its high scoring potential and psychological impact on opponents. Athletes who can successfully perform this maneuver demonstrate not only technical mastery but also superior physical conditioning. However, this technique also carries substantial risk when performed without adequate strength, stability, or flexibility. Improper execution may lead to failed attempts, counterattacks from opponents, or injury to the performing athlete. Hence, mastering suplex techniques requires integration of technical drills with comprehensive physical conditioning programs (Hardyanti, 2022).

Physical conditioning is widely regarded as the foundation of athletic performance, particularly in martial arts where dynamic and complex movements are essential. The main components of physical condition relevant to throwing techniques include muscular strength, endurance, agility, balance, flexibility, and coordination. Muscular strength enables the athlete to lift and control opponents, endurance supports performance across prolonged matches, agility and coordination ensure efficient body mechanics during throws, flexibility reduces the risk of muscle strain and improves range of motion, and balance provides stability during explosive and rotational actions (Bompa & Buzzichelli, 2015; Maifitri, 2018). When these components are developed together, athletes can achieve both technical precision and competitive resilience.

Training that focuses on enhancing these physical components has been shown to improve the quality of throwing techniques. Harsono (1988) emphasized that muscle strength and endurance play crucial roles in the successful application of power-based techniques such as slams and takedowns. Studies in other combat sports provide strong evidence supporting this argument. For example, Yudistira (2020) reported a significant correlation between physical conditioning and the mastery of throwing techniques among judo athletes, where muscular strength and endurance directly determined the efficiency

of throws. Similarly, Murdiansyah (2022) found that arm and back muscle strength, combined with flexibility, contributed significantly to the throwing efficiency of wrestling athletes. These findings suggest that throwing techniques across combat sports share a common dependence on well-developed physical conditioning.

Biomechanical research further supports this argument. Singh et al. (2019) highlighted the role of leg drive and hip extension as crucial in generating the force necessary for executing successful throws in Sanda. The importance of explosive lower-body power is echoed in studies of wrestling and judo, where vertical jump performance and plyometric training were strongly linked to throwing success (Maifitri, 2018). In taekwondo and karate, agility and flexibility were shown to enhance kicking performance, indirectly reinforcing the broader argument that physical attributes shape technical efficiency across martial arts. Although each discipline has unique tactical requirements, the interdependence between conditioning and technique is a consistent theme across combat sports.

Another important aspect is nutrition, which complements physical training by providing the energy and recovery capacity needed for intense conditioning programs. Amin (2018) highlighted that balanced nutritional intake directly influences the maintenance of optimal physical condition, particularly for athletes requiring both strength and endurance. Without adequate dietary support, the benefits of physical training cannot be maximized. This underscores the multidimensional nature of athletic preparation, where technical, physical, and nutritional elements must all be aligned.

Despite the growing body of literature in combat sports, there remains a lack of focused studies on Wushu Sanda, especially concerning the biomechanics of advanced techniques like the suplex. Most available research still centers on judo and wrestling, while empirical studies on Sanda are relatively limited. This gap is particularly significant because, although Sanda borrows techniques from other combat sports, its unique rules and scoring system may alter the physical and technical demands placed on athletes. Consequently, research specifically addressing the relationship between physical condition and throwing techniques in Wushu Sanda is necessary to provide sport-specific evidence (Najafian Razavi & Rezaei, 2023).

Building on this foundation, the present study investigates the relationship between physical condition and suplex throw performance among Wushu Sanda athletes. By drawing from existing research in related sports and focusing on the unique demands of Sanda, this study contributes both to academic knowledge and to the practical application of sports science in martial arts training and coaching.

## RESEARCH METHOD

This study employed a quantitative correlational design with a cross-sectional approach to analyze the relationship between physical condition and the ability to perform suplex throws among Wushu Sanda athletes. The research sample consisted of 15 athletes from Wonogiri District, Central Java, Indonesia, selected purposively based on criteria including a minimum of one year of continuous training, participation in competitions, and no recent major musculoskeletal injuries. Data were collected using standardized instruments such as mats, stopwatches, whistles, measuring scale boards, single bars, slam dummies, and hand dynamometers. Arm muscle strength was assessed using a hand dynamometer with three maximal grip trials, leg muscle power was measured through a vertical jump test, arm endurance was evaluated using a pull-up test, back endurance was assessed with a back-up test, and flexibility was measured using a sit-

and-reach box supported by bridge observations (Amin, 2018). Suplex throw performance was determined using a one-minute slam dummy test, in which athletes executed as many proper suplexes as possible within the allotted time. All tests were carried out under standardized conditions, preceded by structured warm-ups, and supervised by certified coaches to ensure both safety and accuracy, with adequate rest intervals provided between assessments to minimize fatigue effects. Data analysis was conducted using SPSS, beginning with univariate analysis to describe athlete characteristics, followed by bivariate analysis to test relationships between each variable and suplex performance, and multivariate analysis to determine the combined contribution of strength, endurance, power, and flexibility. A significance level of $p < 0.05$ was applied to evaluate statistical findings, ensuring reliable and valid results for comparison with previous combat sports studies.

## RESULTS

### Overview of Research Subjects

**Table 1.** Overview of Research Subjects (N =15)

| Construct | Min. | Max. | M | SD |
|---|---|---|---|---|
| Aged | 13 | 19 | 16 | 3 |
| Arm muscle strength | 31.48 | 52.62 | 40.68 | 7.06 |
| Leg muscle power | 35 | 70 | 55.86 | 10.45 |
| Arm muscle endurance | 3 | 14 | 8 | 4.16 |
| Back muscle endurance | 42 | 97 | 69.67 | 14.61 |
| Flexibility | 23 | 42 | 31 | 6.39 |
| Suplex | 8 | 15 | 11 | 2.25 |

Source: Processed Data (2025)

Table 1 presents the descriptive statistics of the research subjects, which consisted of 15 Wushu Sanda athletes from Wonogiri Regency. The age of participants ranged from 13 to 19 years, with a mean age of 16 years (SD = 3). This indicates that the sample included athletes across pre-junior, junior, and senior levels, reflecting a relatively wide age distribution. The variation in age occurred due to the limited number of Wushu Sanda athletes available in the region, necessitating the inclusion of athletes from different developmental stages.

In terms of the physical condition components, the average arm muscle strength was 40.68 (SD = 7.06), which falls within the moderate category. Leg muscle power showed a mean score of 55.86 (SD = 10.45), categorized as good, indicating that the athletes generally possess strong lower-body explosive capacity. Arm muscle endurance had an average of 8 repetitions (SD = 4.16), which can be classified as moderate, while back muscle endurance recorded a mean score of 69.67 (SD = 14.61), also considered moderate to good. Flexibility averaged 31 (SD = 6.39), reflecting a moderate level of joint mobility among the athletes. Finally, suplex performance, measured through the one-minute slam dummy test, had a mean of 11 repetitions (SD = 2.25), showing that most athletes were able to execute the technique with moderate proficiency.

These findings suggest that while the athletes demonstrated relatively good lower-body power, other components such as arm strength, endurance, and flexibility were not as well developed. This imbalance highlights the need for more targeted training programs that emphasize both upper-body conditioning and flexibility to complement the existing strengths of the athletes. The results of this study are in line with research conducted by Arsyandi et al. (2025) showed that wushu athletes in Central Java, Indonesia had

physical conditions (arm muscle strength, speed, agility, balance) in the poor category, endurance in the moderate category and endurance in the good category.

**The Relationship Between Physical Condition and Suplex Throws**

**Table 2.** Result of Relationship Between Physical Condition and Suplex Throws

| Component | Suplex Throws | | | Total | P Value |
|---|---|---|---|---|---|
| | Exelent | Good | Moderate | | |
| Arm Muscle Strength | | | | | 0.01* |
| Moderate | 3 | 6 | 6 | 15 | |
| Leg Muscle Power | | | | | 0.02* |
| Exelent | 2 | 2 | 3 | 7 | |
| Moderate | 1 | 4 | 3 | 8 | |
| Arm Muscle Endurance | | | | | 0.07 |
| Good | 1 | 1 | 1 | 7 | |
| Moderate | 2 | 5 | 5 | 8 | |
| Back Muscle Endurance | | | | | 0.38 |
| Exelent | 3 | 6 | 6 | 15 | |
| Flexibility | | | | | 0.06 |
| Exelent | 3 | 6 | 5 | 14 | |
| Moderate | 0 | 0 | 1 | 1 | |

Note. * Significant by Chi-Square test (p value <0.05)

Table 2 shows the results of the Chi-Square test examining the relationship between components of physical condition and suplex throw performance. The analysis indicated a significant association between arm muscle strength and suplex throws (p = 0.01), as well as between leg muscle power and suplex throws (p = 0.02). These findings suggest that athletes with higher levels of upper-body strength and lower-body power are more likely to perform suplex techniques effectively.

On the other hand, no significant relationships were found between suplex throw performance and arm muscle endurance (p = 0.07), back muscle endurance (p = 0.38), or flexibility (p = 0.06). This indicates that while these components contribute to general athletic performance, they may not play a decisive role in the successful execution of technically demanding maneuvers such as the suplex.

Overall, the results emphasize that strength-related components, particularly arm strength and leg power, are more influential determinants of suplex performance compared to endurance and flexibility. These findings are consistent with the notion that explosive strength is a key factor in the biomechanics of throwing techniques in combat sports.

**The Relationship Between Arm Muscle Strength and Leg Muscle Power with Suplex Throws**

**Table 3.** Regression Results Between Arm Muscle Strength and Leg Muscle Power with Suplex Throws

| Component | R Square | Std. Error of the Estimate | P Value |
|---|---|---|---|
| Arm Muscle Strength<br>Leg Muscle Power | 0.961 | 0.38817 | 0.01* |

Note. * Significant by Anova test (p value <0.05)

Table 3 presents the results of the multiple regression analysis examining the influence of arm muscle strength and leg muscle power on suplex throw performance. The findings show that both variables were significantly associated with the ability to execute suplex

throws (p = 0.01). The regression model produced an R Square value of 0.961, indicating that arm muscle strength and leg muscle power together explained 96.1% of the variance in suplex performance, while the remaining 3.9% was attributed to other factors not measured in this study.

The descriptive analysis further highlighted variations among athletes. Participants with higher grip strength scores demonstrated greater stability and control during the initiation phase of the suplex, whereas those with stronger leg power displayed more explosive lift-off during execution. These results suggest that although endurance and flexibility are relevant to overall physical preparedness, they are not direct determinants of successful suplex performance. Instead, the findings reinforce the sport-specific importance of upper- and lower-body strength, particularly muscular strength and explosive power, as decisive factors in supporting the biomechanics of advanced throwing techniques in Wushu Sanda.

## DISCUSSION

Arm muscle strength is a vital component in executing a suplex throw, as it enables athletes to maintain a firm grip on the opponent during the throwing phase, preventing escape. Similarly, leg muscle power is essential for generating the force required to lift and propel the opponent. Athletes with insufficient leg power are less likely to perform effective throws, underscoring the contribution of both upper- and lower-body strength to the success of the suplex technique. Muscle strength plays a critical role not only in initiating but also in controlling the lifting and throwing phases. These findings are consistent with the theory of Bompa and Buzzichelli (2015), who emphasized the importance of developing sport-specific strength in contact sports as the foundation for functional weight training programs, particularly in Wushu Sanda. Optimal physical activity also requires proper nutritional intake. Amin (2018) argued that adequate intake is necessary to support athletic performance, with carbohydrates serving as a primary energy source. Chia seeds, for example, contain high energy content that is easily absorbed by the body and can support energy availability during training and competition (Lisnawati et al., 2023; Lestari et al., 2021).

Evidence from previous studies further reinforces the role of muscle strength in throwing techniques. Murdiansyah (2022) demonstrated that arm strength, abdominal muscles, back muscles, and flexibility collectively explained 56.66% of the variance in shoulder throw performance among wrestling athletes in East Java. Similarly, Ratnasari (2006) found that back muscle strength significantly influenced the speed of shoulder throw movements in wrestling athletes from Semarang, indicating that greater back muscle strength improves technical execution. These studies confirm that both upper- and lower-body muscle groups contribute substantially to the success of throwing techniques across combat sports.

The findings of the present study also align with Hardyanti (2022), who emphasized that physical condition is a key determinant of performance in Wushu Sanda, especially in strength-dependent techniques. However, the non-significant role of flexibility and endurance in this study contrasts with research by Lei & Lv (2022), who found that flexibility contributed to technical efficiency in wrestling. This difference may be explained by the biomechanical characteristics of the suplex, which relies more on explosive strength than on endurance or flexibility. From a practical standpoint, the results suggest that training programs for Wushu Sanda athletes should place greater emphasis on strength and power-oriented conditioning, while endurance and flexibility training may serve as complementary rather than primary focuses. Such targeted approaches are

expected to enhance athletes' ability to perform suplex throws effectively and safely, ultimately contributing to improved performance in competition.

## CONCLUSION

This study concludes that there is a significant relationship between physical condition, specifically arm muscle strength and leg muscle power, and the ability to perform suplex throws ($p < 0.05$). Multiple regression analysis indicated that these two variables jointly contributed 96.1% to suplex throw performance, while the remaining variance was influenced by other unmeasured factors. These findings highlight the decisive role of upper- and lower-body strength in supporting the biomechanics of complex throwing techniques. From a practical perspective, the results provide important insights for coaches and practitioners, suggesting that training programs should prioritize targeted strength and power development to optimize athlete performance in Wushu Sanda. Beyond its practical contributions, this research also strengthens the theoretical foundation of sports science in combat sports, confirming that explosive strength is a critical determinant of technical success. Future studies are recommended to expand the sample size, involve athletes at national and international levels, and conduct comparative analyses with related martial arts such as wrestling and judo, thereby enhancing the generalizability and applicability of the findings.

## LIMITATION

The main limitation of this study lies in the relatively small sample size, which consisted of only 15 athletes, thereby restricting the generalizability of the findings. In addition, the participants were not professional athletes but rather individuals at the amateur level, which may not fully represent the performance characteristics of elite Wushu Sanda practitioners. Future research is recommended to involve a larger and more diverse sample, including athletes from different competitive levels, in order to strengthen the validity and applicability of the results.

## ACKNOWLEDGMENT

The researcher would like to thank the athletes and coaches who have agreed to be the subjects of this research and are willing to conduct the research cooperatively. The researcher would also like to thank the parties who have provided material assistance in implementing this research.

## DECLARATION OF CONFLICTING INTERESTS

The authors have declared no potential conflicts of interest concerning the study, authorship, and/or publication of this article.

## REFERENCES

Amin, N. (2018). *Buku ajar: Gizi olahraga*. Surabaya: UNUSA Press.

Arsyandi, F. E., Amin, N., Aristiyanto, A., Setyawan, F. E., Herdinata, G. R. P. (2025). Profil Kondisi Fisik Atlet Wushu Sasana Satria Pandanaran Semarang. *Sports Collaboration Journal*, 3(1), 11-16. https://doi.org/10.35473/scj.v3i1.3827

Bompa, T. O., & Buzzichelli, C. (2015). *Periodization training for sports* (3rd ed.). Champaign, IL: Human Kinetics.

Dellaserra, C. L., Gao, Y., & Ransdell, L. (2014). Use of integrated technology in team sports: a review of opportunities, challenges, and future directions for athletes. *The Journal of Strength & Conditioning Research*, *28*(2), 556-573. https://doi.org/10.1519/JSC.0b013e3182a952fb

Hardyanti, I. (2022). Analisis Kondisi Fisik Atlet Wushu Sanda Akademi Wanoro Seto Surabaya. *Jurnal Prestasi Olahraga*, *5*(2), 25-31.

Harsono, M. S., & Drs, M. S. (1988). Coaching dan aspek-aspek psikologis dalam coaching. *Direktorat Jendral Pendidikan Tinggi: Jakarta*.

Lei, Z., & Lv, W. (2022). Feature extraction-based fitness characteristics and kinesiology of Wushu Sanda athletes in university analysis. Mathematical Problems in Engineering, 2022(1), 5286730. https://doi.org/10.1155/2022/5286730

Lestari, Y. N., Farida, E., Amin, N., Afridah, W., Fitriyah, F. K., & Sunanto, S. (2021). Chia seeds (*Salvia hispanica* L.): Can they be used as ingredients in making sports energy gel? *Gels, 7*(4), 267. https://doi.org/10.3390/gels7040267

Lisnawati, N., Amin, N., & Lestari, Y. N. (2023, January 24). Sport drink containing maltodextrin to improve physical performance of soccer athletes. *AIP Conference Proceedings, 2586*(1), 060012. https://doi.org/10.1063/5.0107861

Maifitri, F. (2018). Pengaruh latihan beban menggunakan bench press terhadap daya ledak otot lengan atlet karate. *Majalah Ilmiah UPI YPTK*, 139-148. https://doi.org/10.35134/jmi.v25i2.39

Murdiansyah, B. N. (2022). Kontribusi kekuatan otot lengan, otot perut, otot punggung dan fleksibilitas punggung pada waktu yang dilakukan dalam bantingan pundak team gulat putera. *Jurnal Multidisiplin Ilmu, 1*(5), 781–789.

Najafian Razavi, M., & Rezaei, M. (2023). Comparison of biomechanical models for roundhouse kicking in skilled martial arts students of taekwondo and Wushu (Sanda). Journal of Sport Biomechanics, 9(3), 220–232. https://doi.org/10.61186/JSportBiomech.9.3.220

Rahman, M. H., & Islam, M. S. (2020). Stretching and flexibility: A range of motion for games and sports. *European Journal of Physical Education and Sport Science*, *6*(8). http://dx.doi.org/10.46827/ejpe.v6i8.3380

Ratnasari, N. F. (2006). *Hubungan antara kekuatan otot tungkai dan kekuatan otot punggung dengan kecepatan bantingan pinggang pada atlet gulat Kota Semarang tahun 2006*. [Undergraduate thesis, Universitas Negeri Semarang].

Singh, D., Jaseja, H., & Pal, R. (March, 2019). Biomechanical analysis of throwing techniques for velocity and accuracy. Journal of Physical Education Research, Volume 6, Issue I, 13-23.

Yudistira, A. H. (2025). Survei Kondisi Fisik Atlet Judo Puslatcab Kabupaten Pasuruan Usia 16-18 Tahun. *Journal of Innovation and Teacher Professionalism*, *3*(1), 107-116. https://doi.org/10.17977/um084v3i12025p107-116

## ABOUT THE AUTHOR(S)

**1st Anisa Febriani**
Anisa Febriani is a wushu athlete from Central Java and a student in the Sports Science Department/Health Faculty, Universitas Ngudi Waluyo, Indonesia. She is the first author of this article, anisaafebriani77@gmail.com

**2nd Nur Amin**
Nur Amin is a lecturer who actively conducts research in the field of sports science, Sports Science Department/Health Faculty, Universitas Ngudi Waluyo, Indonesia, sports science and sports nutrition background, ORCID ID: 0000-0001-8124-6157, nuramin@unw.ac.id

**3rd Guntur Ratih Prestifa Herdinata**
Guntur Ratih Prestifa Herdinata is a lecturer who actively conducts research in the field of sports science, Sports Science Department/Health Faculty, Universitas Ngudi Waluyo, Indonesia, sports education background, ratihprestifa@unw.ac.id

**4th Ika Nilawati**
Ika Nilawati is a lecturer who actively conducts research in the field of sports science, Sports Science Department/Health Faculty, Universitas Ngudi Waluyo, Indonesia, sports science background, ORCID ID: 0009-0006-4601-1479, ikanilawati@unw.ac.id

**5th Norlaila Azura Kosni**
Norlaila Azura Kosni is a senior lecturer who actively conducts research in the field of sports science, Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Malaysia, sports performance analysis and talent identification and development background, ORCID ID: 0000-0002-1729-8398, norlailaazura@uitm.edu.my

**6th Rio Noviansyach Sutomo**
Rio Noviansyach Sutomo is a wushu athlete from Central Java and a student in the Sports Science Department/Health Faculty, Universitas Ngudi Waluyo, Indonesia, rionoviansyachs@gmail.com