

Performance Evaluation of Elite Water Ski Air and Wakeboard Athletes' Agility and Stability

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Abstract: Wakeboard water ski is a challenging sport for coaching athletes at the provincial, national, and international levels. Outstanding athletes become an important human resource in global competition, requiring complex physical skills, especially in agility and body stability. This study examined the agility and stability of elite water ski and wakeboard athletes, involving 28 samples (16 men, 12 women) using the purposive sampling method. Data collection was carried out through an 8x5 meter shuttle run test for agility and the main stability test, with a score of 1-5. Data analysis was conducted using SPSS version 25, through descriptive (mean and standard deviation) and inferential (t-test) analysis with a significance of 0.05. The results showed the average agility of female athletes was 3.25 seconds, while men were 3.11 seconds, with a small difference. For primary stability, men recorded an average of 4.95 m, higher than women. In general, men and women have almost equal agility and balance, but there are significant differences in their level of effort. The findings are useful for coaches and sports scientists in designing training programs, as well as for measuring the readiness of water ski and wakeboard athletes to compete at the highest level. Further studies are recommended to consider other psychological, social, and physical factors to improve the achievements of Indonesian athletes.

Keyword : *water ski, wakeboard, performance, agility, and core stability*

Introduction

Particularly in the sports of water ski and wakeboard, sports have difficulty massing and coaching athletes who excel at the regional, national, and international levels. A valuable human resource that the nation may utilize to its advantage to protect itself at the provincial, national, and international levels is athletes. Athletes with higher-caliber accomplishments are in more demand as human resources. In the current era of globalization, athletes must compete with their rivals by employing greater techniques and qualified physical performance.

To expand the number of athletes, athletes should work to enhance the standards of psychological and physical techniques, including instruction, leadership, tactics, competence, motivation, outstanding physical condition, and other components like social variables (Bompa & Buzzichelli, 2018). To successfully increase the athlete's performed and expected mass, consistent and stable



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training must be prepared in a way that does not alter from one measurement time to the next.

Providing an enjoyable training plan, especially for physical exercise, is one strategy that can help. Improving athlete performance is not an easy task. to motivate athletes to train (Brown, 2008; Corresponding et al., 2020; Esteban-Cornejo et al., 2014; Harries et al., 2018), and to motivate athletes to perform their best. If an athlete is to perform at their best, the coach should also pay attention to their motor abilities and biomotor gifts, such as ultimate agility and balance (Ayan et al., 2019; Sena et al., 2018). Considering that every athlete has a varied level of motor abilities and that every workout calls for a unique kind of drive. Additionally, when describing the curriculum, the coach must move from simple to difficult. for the athletes to gain from the training program as it is being carried out.

Ideal water skiers and wakeboarders can perform better when certain physical, technical, tactical, and psychological factors are taken into account (Bass et al., 2013; Nugroho et al., 2021). These components cannot be separated because of their interdependence. Every competitor must comprehend and successfully handle their physical and psychological limitations. To learn how to water ski and wakeboard, an athlete needs to have a certain set of general physical abilities, including stamina, strength, quickness, and flexibility. Additionally, they must possess particular psychological qualities like drive, self-assurance, and focus.

A technological approach that takes athletes' physical condition into account is necessary at the elite athlete level to compete with other nations. The success of water ski and wakeboard is not just driven by strong breeding and breeding. Since water ski and wakeboard are quantitative sports, it is possible to precisely assess and predict each component that affects performance and the achievement of training objectives before the competition.

In these circumstances, balance, or a person's ability to maintain posture in both static and dynamic conditions, is crucial (Silfies et al., 2015). In this balancing act, reflex time, response time, and moving speed should all be taken into account (Greene et al., 2019). Additionally, balancing exercises are frequently combined with exercises for agility, speed, and flexibility (Ozmen, 2016). When the body is at rest or in motion, the ability to maintain or regulate the neural system of the muscles allows them to work more efficiently (Ahmed et al., 2022). Included is the balance element, which plays a crucial role in determining how the body moves and the position itself. beginning with various physical motions such as squatting, standing, walking, leaping, and others (Fachrezzy et al., 2021; Modi & Bhatt, 2017)(Acar & Eler, 2019; Wilczyńska et al., 2021). Another crucial component of exercise activity is balance. There are two portions to the balance. The ability to shift from one place or space to another while maintaining balance is known as dynamic equilibrium. The body's ability to retain equilibrium while at rest is known as static balance.

a group of intricately crafted physical characteristics, among them agility. When referring to agility (dexterity), the ability to coordinate motor system (muscle) motions, skills, and movements is sometimes used interchangeably (Stepinski et al., 2020). Agility interacts with other qualities including reaction, speed, strength, flexibility, and movement/muscle skills when something reacts. The ability to switch between several positions in the arena is a sign of agility. Additionally, a person is said to be agile if they have good coordination and the capacity to switch positions fast.

A coach should be able to impart a variety of fundamental motion techniques, game- and sport-specific tactics, and strategies while also assisting athletes in internalizing the virtues of leading a healthy lifestyle (sportsmanship, honesty, cooperation, etc.). Its execution includes components of the physical, mental, intellectual, emotional, and social nature rather than taking the form of theoretical, typical classroom training. To reach the intended outcome, the exercise should incorporate both theory and practice.

The goal of coaching is to assist athletes in achieving their current athletic goals since they have always been linked to the pride and dignity of the nation and serve as ambassadors for its advancement in the sports world. Peak performance in sports must, of course, be attained through methodical, planned efforts made with structured direction. To seek sporting accomplishments at the international level and enhance professional services for the development and enhancement of sports in Indonesia, one must have a thorough understanding of various sciences and technologies, as well as those that support and use them.

A state known as preparedness in training should be noticed before the exercise. Athletes who are not ready for training will not achieve their optimum performance levels. To determine whether an athlete is ready to start training, coaches must first take action, such as paying attention, encouraging athletes, tracking readiness development, and observing physical and technical skills. This focus is crucial for athletes who will take part in a branch skill exam of some kind.

In training sessions, an athlete who has adequately prepared for unexpected events is frequently seen (Acar & Eler, 2019). An athlete's aptitude and desire for achievement will have an impact on how well they perform in competition. These factors need to be appropriately taken into account if athletes are to compete at the highest levels on the national and international stages. An athlete must therefore follow numerous coaching techniques, work out frequently, and receive encouragement from other athletes in good physical shape if they want to attain the greatest outcomes. Athletes' physical condition is a crucial necessity in highly competitive sports like water ski and wakeboard.

An athlete water ski dan wakeboard who lacks the necessary agility and balance will have a difficult time giving it his all and achieving the needed outcomes. The instructor must take some

steps to enable participants to concentrate on the physical aspects of the exercise as it is being done.

Method

The primary elite water ski and wakeboard athletes' agility and stability were evaluated using tests and observations as part of the descriptive research method utilized in this study (Sugiyono, 2017). The study population included all of the top water ski and wakeboard competitors who are members of DKI Jakarta. 28 athletes from the DKI Jakarta Province, 16 men and 12 women, who competed in water ski and wakeboard, served as the sample for this study. The FIK UNJ East Jakarta Laboratory, Jl., where this study was conducted. In 2022, Pemuda No. 10 Rawamangun. The sampling strategy utilized in this study involves purposive sampling, namely by paying attention to sample characteristics, following a minimum training duration of one year or more after joining the DKI Jakarta Provincial Water Ski and Wakeboard

Measurements and tests were used to acquire the data. The main stability test and an 8 by 5-meter shuttle run were used to assess agility, and the outcome is expressed as a score in units 1, 2, 3, 4, and 5. Separate tests for water ski and wakeboard were used to assess the agility and core stability of men and women. The purpose of the study was to compare the physical demands placed on the two groups based on sex.

The following methods were used in this study: The test was conducted at the FIK UNJ Laboratory Jl. Rawamangun, Pemuda No. 10, East Jakarta. (i) In the initial phase, researchers test and gauge dynamic balance and agility. (ii) Data are categorized and categorized by researchers. Equipment for measuring is utilized based on the peculiarities of water ski and wakeboard. Trainers of the Indonesian Water Ski and Wakeboard Teams provided information, which was then gathered and analyzed using SPSS version 25. SD is a common data format. Normality tests are performed to ensure the distribution of data produced from test results and measurement data.

Results And Discussion

Measurements and testing were used to gather empirical data on important performance evaluations, gender-specific agility and stability, elite athletes, water skiers, and wakeboards. The data is further investigated utilizing frequency descriptive analysis to determine crucial agility and stability performance. Figure 1 presents a summary of the frequency descriptive analysis estimates for elite wakeboard and water ski.

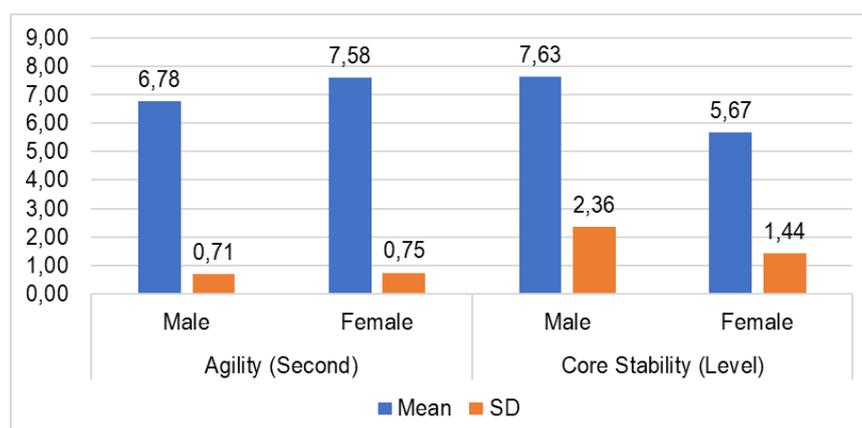


Figure 1. Result Frequency descriptive analysis

The average agility time for men was 6.78 seconds, while the average time for women was 7.58 seconds, according to Figure 1 on the performance of agility and main balance of elite water ski and wakeboard athletes. The standard deviations were obtained at 0.71 and 0.75, respectively. (ii) The main stability was obtained by the average value for the boys at 7.63 levels and for the princesses at 5.67, while the standard deviations were obtained at 2.36 and 1.44, respectively. Following the discovery of the frequency descriptive value, a data normality test was performed in Table 1 with a significant threshold of 0.05.

Table 1. Results of the Kolmogorov-Smirnov Z normality test

Variable	agility		Balance	
	Male	Female	Male	Female
Test Statistic	.365	.340	.292	.261
Asymp. Sig. (2-tailed)	.000	.000	.001	.002

Data normality analysis using the Kolmogorov-Smirnov Z (KS-Z) test on all data groups produced findings that were greater than the value of = 0.05, as shown in Table 1. Thus, it may be said that the study's sample originated from a population with a regularly distributed population. This result means that the study's proposed hypotheses can be tested using parametric statistical analysis. Once the criteria for the test are met, a hypothesis test is conducted. The results of the hypothesis test to ascertain the significance of the difference between an elite male and female water ski and wakeboard athletes in terms of performance, agility, and main stability are shown in Table 2.

Table 2. Recapitulation of the t-test for significance

Variable	t_{count}	Sig.	t_{table}	
			5% (0,05)	10% (0,1)
Agility in male and female	3.352	0.006	1.746	
Balance male and female	2.200	0.008		

The results of a t-test study of the major agility and stability of elite water skiers and wakeboards are shown in Table 2. The t_{count} values of 3.352 and 2.200 and the t_{table} (11(10);0.05) of 1.699 were obtained, respectively, with significant levels of 0.006 and 0.008 significantly below = 0.05. Based on these findings, it can be said that H_0 was rejected and H_1 was accepted for the t-test between agility and ultimate stability of elite water skiers and major male and female wakeboarders. Therefore, it may be said that there is a big difference. As a result, the coefficient, which was determined using a sample of 28 elite athletes, can be generalized or applied to the entire population of these athletes.

The analysis of the t-test correlation coefficient in Table 2 above led to the determination that the t_{count} value is 36,879 and the t_{table} (11(10);0.05) is 1.699. These results led to the conclusion that H_0 and H_1 were accepted because of the large correlation coefficient (t-test) between the physical fitness pretest and posttest. As a result, it can be said that the primary elite competitors in water ski and wakeboard perform significantly differently in terms of their agility and stability. This shows that the coefficient can be extrapolated or applied to the full population of elite athletes after being applied to a sample of 28 athletes.

Discussion

The study's key finding relates to how well elite wakeboarders and water skiers perform in terms of agility and stability for each gender category. In competitions for water ski and wakeboard, racing divisions have been separated by gender. Male competitors performed with an average agility time of 3.11 seconds, while female athletes averaged 3.25 seconds, according to testing procedures and data analysis. Agility in water ski and wakeboard refers to the ability to change directions fast while moving quickly. The ability to handle sports in general and deal with environmental challenges in daily life is referred to as general agility (agility movement). Exceptional agility is the ability to perform athletic feats that are not required in other sports. While the direct applications of agility in water ski and wakeboard include 1) coordinating multiple movements (at once), 2) assisting with the mastery of high technique, 3) efficient, effective, and economical movement, and 4) assisting with orientation to the environment. Agility is crucial for performing fundamental water ski and wakeboard techniques including turning and snaking when controlling water ski and wakeboard.

The findings of this study are consistent with those of Ahmed et al., (2022) who found that core stability has a substantial impact on balance and agility and that there is a small but positive association between core stability and upper limb strength, which is crucial for the game of badminton. Then, according to research by Zouhal et al., (2019) after 6 weeks of neuromuscular training, which included two sessions per week as part of a warm-up routine, the agility performance of elite soccer players dramatically improved. Additionally, during body rotation, both sides of the body display

improvement. As a result, in the training program, practitioners are instructed to focus on both directions of the round. Additionally, according to the findings of the Makhlof et al., (2018) study, both training groups with a mix of balance and resistance training significantly improved on all indicators across the board. It is advised that young athletes incorporate balance training into their exercise regimen and advance to agility as part of their strength and explosive power training.

The body parts bordered by the diaphragm, abdominal wall, pelvis, and lower back as well as their capacity to maintain bodily stillness while moving are the key balance in elite water skiers and wakeboarders. The main muscles involved are the transverse abdominis, internal and external obliques, quadratus lumborum, and diaphragm. The diaphragm, the human body's primary breathing muscle, is crucial for preserving the balance required to lift and move. The activity of muscles that contract collectively in the abdominal cavity (that is, internal organs) supports the spine and pelvis as it is moving.

Agility is typically demonstrated by the capacity to move swiftly, change direction and position, avoid player contact, and avoid other players on the field. the ability to move fast and alter course or position in reaction to external conditions. Another aspect that affects how agile elite water skiers and wakeboarders are during practice and competition is the ability to coordinate the body's movement system in response to the environment and situations faced. Agility includes the capacity to control a situation, react swiftly, and control swift movements.

Conclusions

According to the findings of this study, elite male and female water skiers and wakeboarders execute with significantly different levels of agility and stability, although these variations have minimal practical impact. Despite fewer samples being gathered from female athletes, there was no difference. There is no doubt that each gender uses different amounts of energy. The information can be ethically used by coaches and sports scientists to create training schedules and evaluations to enhance the ultimate agility and stability performance of elite water skiers and wakeboard athletes. The ability to compete at the highest level can also be determined using this criterion for elite water skiing and wakeboard athletes. Given that the energy output exerted by athletes is influenced by gender characteristics, coaches are strongly encouraged to pay attention to the significance of specific test norms between male and female athletes to improve essential agility and stability performance. This is based on the results of tests for core stability and the shuttle run, which show the differences between the major outputs of agility and stability. When tests and assessments about the athlete's performance in the training process are necessary, the athlete's

strengths and limitations as well as the training phase are taken into consideration.

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Author Contribution

Conceptualization & methodology: Uzizatun Maslikah; investigation : Fahmy Fachrezzy; writing–original draft preparation: Iwan Hermawan.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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