ATHLETES' REACTION CAPACITY IN THE PERFORMANCE DURING A VOLLEYBALL COMPETITION

CAPACIDADE DE REAÇÃO DOS ATLETAS NO DESEMPENHO DURANTE A COMPETIÇÃO DE VÔLEI

CAPACIDAD DE REACCIÓN DE LOS DEPORTISTAS EN EL RENDIMIENTO DURANTE COMPETICIÓN DE VOLEIBOL

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Yuanting Liu[1]
(Physical Education Professional)

1. Physical Education College of Zhengzhou University, Department of Sports Training, Zhengzhou, Henan, China.

Correspondence:
Yuanting Liu
Zhengzhou, Henan, China. 450044.
tintin2022@126.com.

ABSTRACT

Introduction: Volleyball is a technical and team game where individual physical conditioning of the athletes has a fundamental role in the competition. The maintenance of this physical conditioning includes the optimization of physical function and the gain of body resistance. The ability to respond in front of a defensive game in the game of volleyball is one of the main keys to determining their defensive skills and overall defensive level. Objective: Investigate the reflexes of volleyball players during an athletic competition match. Methods: This was done by analyzing the avoidance rate and reaction time of 14 volunteers, volleyball players. The experimental method quantitatively measured the individuals' defense ability and reaction time. Finally, the statistical correlation test was used to obtain the correlation between the two results. Results: The practice time with games had a more significant impact on the performance of volleyball players. The players' cut-off point is limited to the lowest level. Their peaks have little effect on the defense rate of volleyball. Ball height shows that the index has a very good relationship with defensive ability. Conclusion: Reaction time in volleyball can be used to judge the level of player defense and select the most appropriate players for each moment of competition. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Volleyball; Game Theory; Athletic Performance; Athletes.

RESUMO

Introdução: O vôlei é um jogo técnico e de equipe onde condicionamento físico individual dos atletas tem um papel fundamental na competição. A manutenção desse condicionamento físico inclui a otimização da função física e o ganho da resistência corporal. A capacidade de resposta em frente a uma partida defensiva no jogo de vôlei é uma das principais chaves para determinar suas habilidades defensivas e o nível defensivo geral. Objetivo: Investigar os reflexos dos jogadores de vôlei durante uma partida de competição atlética. Métodos: Para isso, analisa-se a taxa de prevenção e o tempo de reação de 14 voluntários, jogadores de vôlei. Utilizou-se o método experimental para medir quantitativamente a capacidade de defesa dos indivíduos e o tempo de reação. Por fim, utilizou-se o teste de correlação estatística para obter a correlação entre os dois resultados. Resultados: O tempo de prática com jogos teve um impacto mais significativo no desempenho dos jogadores de vôlei. O ponto de corte dos jogadores é limitado ao nível mais baixo. Seus picos têm pouco efeito na taxa de defesa do vôlei. A altura da bola demonstra que o índice tem uma ótima relação com a capacidade defensiva. Conclusão: O tempo de reação no vôlei pode ser usado para julgar o nível de defesa dos jogadores e selecionar os profissionais mais adequados para cada momento da competição. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

Descritores: *Voleibol; Teoria do Jogo; Desempenho Atlético; Atleta.*

RESUMEN

Introducción: El voleibol es un juego técnico y de equipo en el que el acondicionamiento físico individual de los deportistas tiene un papel fundamental en la competición. El mantenimiento de este acondicionamiento físico incluye la optimización de la función física y la ganancia de la resistencia corporal. La capacidad de respuesta ante un juego defensivo en el juego del voleibol es una de las principales claves para determinar sus habilidades defensivas y su nivel defensivo general. Objetivo: Investigar los reflejos de los jugadores de voleibol durante un partido de competición. Métodos: Para ello, se analiza la tasa de evasión y el tiempo de reacción de 14 voluntarios, jugadores de voleibol. Se utilizó el método experimental para medir cuantitativamente la capacidad de defensa y el tiempo de reacción de los individuos. Por último, se utilizó la prueba de correlación estadística para obtener la correlación entre los dos resultados. Resultados: El tiempo de práctica con juegos tuvo un impacto más significativo en el rendimiento de los jugadores de voleibol. El punto de corte de los jugadores se limita al nivel más bajo. Sus picos tienen poco efecto en el ritmo de la defensa del voleibol. La altura del balón muestra que el índice tiene una muy buena relación con la capacidad defensiva. Conclusión: El tiempo de reacción en el voleibol puede utilizarse para juzgar el nivel de defensa de los jugadores y seleccionar a los profesionales más adecuados para cada momento de la competición. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

Descriptores: *Voleibol; Teoría del Juego; Rendimiento Atlético; Atletas.*

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INTRODUCTION

The volleyball player's responses were mainly complex. The reaction ability of volleyball players is mainly determined by the movement of the volleyball, the flying position of the volleyball, and the speed of the volleyball. According to the survey, volleyball players are not as strong as sprinters. A volleyball player's defensive starting reaction ability is the key to determining individual defensive skills and overall defensive level.[1] The choice of response is an integral part of the defense. It is an index reflecting the degree of excitation and reaction speed of neuromuscular tissue. Volleyball players must have good judgment and adaptability to achieve excellent results in competition. To be a good volleyball player, you have to have good reflexes. Reaction speed is an essential part of speed quality, and it is a good criterion when choosing a reaction. The athlete's reaction time and reaction rate in the sports field is the concerns of athletes, coaches, and sports researchers.

METHOD

Research objects

This paper selects 14 volleyball players. This study takes the defense ability and the correlation as the research object.[2] In this study, the experimental method was used to analyze the defense and defense capabilities quantitatively. This paper obtained the correlation coefficient by a statistical correlation test.

Research methods

Measurement of selective reaction time

In selecting the reaction, this paper uses the program application E-prime to carry out the measurement. This program consists of 10 trials of practice and 30 trials of formal testing.[3] This article has a total of 40 trial tests. The modified program will automatically generate a data file when the test is completed. This paper lists the recorded test data.

Defense performance test

We have adopted the continuous defense method of high platform catch here. A smasher smashes the ball on the opposing 4-position platform. The smasher must slam the ball in position 6 and smash the ball within a certain distance to smash the ball. At the 6th position, the subject defended the opponent's smash. Twenty direct smashes per person.[4] Every defensive setter will try to respond as much as possible. At the same time, this article videotaped the players' defense and the setter receiving the pass.

The Magnus Effect

Dynamic equations can be listed from a force analysis:

$$\rho\mu^2\cos\theta = -\lambda\frac{d\mu_x}{dt} \quad (1)$$

$$-\lambda v + \rho v^2\sin\theta + m\rho v^3\cos\theta = \lambda\frac{d\mu_y}{dt} \quad (2)$$

$$\mu = \mu_x + \mu_y \quad (3)$$

Θ refers to the angle between the speed and the level of the volleyball in a certain period. In this differential equation, since μ is a quadratic element, an analytical solution cannot be obtained. To get the analytical solution, we satisfy it with the equivalent λ_1 method:

$$F = \lambda v^2 = \lambda_1 v \quad (4)$$

$\lambda_1 = \lambda v$. This paper can obtain an analytical solution by reducing this equation once. Rate v is not constant. It changes over time.[5] Our study's initial velocity and duration were short, and gravity caused the ball to accelerate. The resistance of the air slows it down.

$$\lambda_1 = \lambda v_0 \quad (5)$$

Mathematical Statistics

At the end of the experiment, we obtained five sets of data.[6] The content includes quantitative data on defensive ability, reaction selection data, ball feel data, ball age data, and spiking effect data. In SPSS13.0 software, this study carried out correlation analysis on the quantitative data of defense capability and other data.

There is no need for a code of ethics for this type of study.

RESULTS

A total of 14 participants participated in this study. The 14 items include defensive effect, selection reaction time, ball feel, ball age, and spiking effect. Where the reaction time is the sum of 28 short-range trials,[7] at the same time, the examiner will stand beside the smasher and count the number of effective smashes when testing the defense. If there is no spike, a spike will be added. This article keeps this number at 20.

It can be seen from Table 1 that the untested spiking effect coefficient through regression analysis is 0.0859303. Its role is much smaller than other projects.[8] The relationship between the two is not very good in terms of ball age, and it has not been tested by t. This shows that the age of the ball has little effect on the experimental results. Spikes also have little impact on external forces.

This paper obtains four numerical values by analyzing the experimental data. The first and second values have the most significant impact on defense. It can be seen from the column on the effect of spiking that the effect of spiking will not have much impact on the defense of volleyball.[9] The effect of spiking will also be limited. From the regression equation, it can be found that the defensive performance of the ball is significantly affected when the reaction is chosen. In this paper, the defense ability is stronger than the defense when choosing the response. When choosing the reaction, this thesis can use it as the basis for selecting volleyball.

All data groups were subjected to a t-test after equation regression. P values were all above 0.1. (Table 2) This indicates that the ball age and the spiking effect have little influence on the test results. The correlation

Table 1. Statistics of test results for each indicator.

Numbering	Defensive effect	When choosing a reaction	Ball feel	Ball age	Spike effect
1	19.79	11.74	9	0.33	34.94
2	12.82	9.96	7	0.33	34.65
3	25.76	8.19	10	4.40	35.20
4	23.22	91.01	9	3.30	39.60
5	17.14	11.20	7	0.33	35.83
6	14.43	8.68	5	0.33	40.92
7	7.01	9.64	7	0.33	40.48
8	13.36	10.61	4	0.33	39.60
9	9.39	8.97	9	0.33	37.40
10	19.49	8.01	8	1.10	39.60
11	26.06	9.71	10	0.55	38.50
12	23.29	9.82	8	0.33	37.73
14	23.85	9.29	10	0.33	37.29

Table 2. Correlation test between each data and defense effectiveness.

Year-on-year projects	When choosing a reaction	Ball feel	Ball age	Spike effect
Coefficient	0.4890	0.4954	0.1488	0.0945
P>|t|	0.5346	0.1045	0.1276	1.0593

between the first and second P-values is very close to the experimental prediction. The p-values were more significant than 0.1 for choice reaction and catch defense. Each player's ball feel and defensive ability have a lot to do with each other. Many scholars believe that reaction time is the leading indicator.[10] There is little research on volleyball in academia. This dissertation combines defensive capabilities and reaction time in volleyball. Careful consideration of various factors and the use of scientific methods excluded the influence of these factors on the test results. If you can incorporate both of these questions into your experiment, you can achieve your goals. The athlete's reflexes in the quick-reaction event will improve as the technique improves. Defenders react faster as they receive the ball faster and faster. Because most subjects were just starting to play volleyball, the defense against volleyball was not very good. Athletes will perform better in volleyball training if their reflexes are quicker. This requires a lot of experiments to prove.

DISCUSSION

Volleyball players are not as quick as sprinters in pure reflexes. It's not that the volleyball player's nerves are sluggish. The volleyball player's muscles contract more slowly than the sprinters. However, in the real volleyball game, the reaction speed of track and field players is far less than that of volleyball players. This is mainly because they have not yet fully mastered a range of reaction skills. How fast the muscles contract determines the ability to respond to fast movements.[11] The athlete's comprehensive reflection ability is determined by the athlete's response to the stimulus signal. In volleyball training, the athlete's reflexes can be enhanced through repeated practice. This can improve the athlete's central nervous system skills and physical fitness.

Responsive behavior is a response to rapid change.[12] At the same time, this is also integrating external stimuli through thought. The athlete's mastery of the response action can enhance the athlete's psychological response. Because the offense and defense of volleyball are all completed in a "moment," players must judge the opponent's passing direction in a brief period and pay attention to the opponent's attacking intent and changes in the wrist.[13] Athletes need to actively observe the opponent's defense and convert their defensive position into thinking material. Athletes need to respond accordingly based on their own experience. When the opponent is attacking, the athlete should pay attention to the connection between the player and the ball. This article can press or tap to deduct that line. If the smasher plays well with the ball in the air, the defender should move his position on what he has to do.

The emotions of volleyball players are most easily affected by a variety of subjective and objective factors and the inherent characteristics of the sport itself. The regular performance of the mind in the competition depends on the athlete's emotional and will quality. The athlete's task in competitive sports is to defeat the opponent.[14] During this process, the athlete's body is under enormous pressure. The athlete's score and battle are often changing rapidly, and the athlete's success and failure often change quickly. Every action, every success, and mistake of an athlete will bring him a different impression and view. These intricate facts, combined with the athlete's game expectations, create a complex set of emotional experiences. These emotional changes will significantly impact an athlete's competitive ability. And the athlete's emotional stability and self-control also depend on the athlete's willpower. Volleyball is also physically demanding. Therefore, players in volleyball must have sufficient perseverance to achieve better results.

CONCLUSION

After the t-test, it was found that the P-value of each data value of the athletes exceeded 0.1. In this paper, it can be considered that the subject's ball age and spiking effect have little effect on the test results. Although the correlations of the two P-values were close to those predicted by the experiment, the P-value for the defensive performance selection response to spiking was more significant than 0.1. Each athlete's ball feels coefficient has a great relationship with the defensive ability.

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