IMPROVING PHYSICAL FUNCTION BY FOCUSING ON SPORTS ARCHERY TRAINING

APRIMORAMENTO DA FUNÇÃO FÍSICA PELO FOCO NO TREINAMENTO COM ARCO ESPORTIVO

MEJORA DE LA FUNCIÓN FÍSICA CENTRÁNDOSE EN EL ENTRENAMIENTO DEL ARCO DEPORTIVO

Original Article
Artigo Original
Artículo Original

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ABSTRACT

Introduction: Physical training of high-level archers is a very critical point. It is now known that the ultimate goal of athletes' training is to achieve a good competitive state in their physical training. This has revealed that the relationship between athletes' attention stability and their performance in archery competitions also needs to be explored. Objective: Analyze the fitness training methods for Chinese archers. In addition, this paper also explores the relationship between attention and performance in competitions. Methods: By random sampling method, 24 archery athletes were investigated. They were divided into three groups: A, B, and C. Group A represented excellent scores (8), group B with good scores (8), and group C with average scores (8). Statistical methods were used to analyze and infer the data. Using the SPSS program, mathematical statistics were performed to objectify the data collected. Results: Athletes in group A had the greatest increase in attention after training, showing statistical significance (P<0.01). The comparison between groups B and C also showed statistical significance (P<0.01). Significant differences were found in the stability of attention between the experimental and control groups. Conclusion: The sport bow practice method can effectively improve athletes' concentration. This training method showed a significant effect on improving archers' attention and concentration. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Athletes; Physical Education and Training; Attentional Control; Physical Fitness.

RESUMO

Introdução: O treinamento físico dos arqueiros de alto nível é um ponto muito crítico e atualmente sabe-se que o objetivo final do treinamento dos atletas é alcançar um bom estado competitivo em seu treinamento físico. Isso tem revelado que a relação entre a estabilidade da atenção dos atletas e seu desempenho nas competições com arco também precisa ser explorada. Objetivo: Analisar os métodos de treinamento de aptidão física para os arqueiros chineses. Além disso, este documento também explora a relação entre a atenção e o desempenho nas competições. Métodos: Pelo método de amostragem aleatória investigou-se 24 atletas de arco e flecha. Eles foram divididos em três grupos: A, B, e C. O grupo A representando excelentes resultados (8); O grupo B com boas notas (8), e o grupo C com notas médias (8). Utilizou-se métodos estatísticos para analisar e inferir os dados. Utilizando o programa SPSS, foram realizadas as estatísticas matemáticas para objetivar os dados coletados. Resultados: Os atletas do grupo A tiveram o maior aumento na atenção após o treinamento, apresentando significância estatística (P<0,01). A comparação entre os grupos B e C também apresentou significância estatística significativa (P<0,01). Foram encontradas diferenças significativas na estabilidade da atenção entre os grupos experimental e controle. Conclusão: O método de prática com arco esportivo pode efetivamente melhorar a concentração dos atletas. Este método de treinamento apresentou um efeito significativo na melhoria da atenção e concentração dos arqueiros. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

Descritores: *Atletas; Educação Física e Treinamento; Controle de Atenção; Aptidão Física.*

RESUMEN

Introducción: La preparación física de los arqueros de alto nivel es un punto muy crítico y hoy en día se sabe que el objetivo final del entrenamiento de los deportistas es alcanzar un buen estado competitivo en su preparación física. Esto ha revelado que la relación entre la estabilidad de la atención de los atletas y su rendimiento en las competiciones de tiro con arco también debe ser explorada. Objetivo: Analizar los métodos de entrenamiento físico de los arqueros chinos. Además, este trabajo también explora la relación entre la atención y el rendimiento en las competiciones. Métodos: Mediante un método de muestreo aleatorio se investigaron 24 atletas de tiro con arco. Se dividieron en tres grupos: A, B y C. El grupo A, que representa resultados excelentes (8); el grupo B, con buenos resultados (8), y el grupo C, con resultados medios (8). Se utilizaron métodos estadísticos para analizar e inferir los datos. Utilizando el programa SPSS, se realizaron estadísticas matemáticas para objetivar los datos recogidos. Resultados: Los atletas del grupo A tuvieron el mayor aumento de la atención después del entrenamiento, mostrando significación estadística (P<0,01). La comparación entre los grupos B y C también presentó significación estadística (P<0,01). Se encontraron diferencias significativas en la estabilidad de la atención entre los grupos experimental y de control. Conclusión: El método de

práctica del arco deportivo puede mejorar eficazmente la concentración de los deportistas. Este método de entrenamiento mostró un efecto significativo en la mejora de la atención y la concentración de los arqueros. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

Descriptores: *Atletas; Educación y Entrenamiento Físico; Control Atencional; Aptitud Física.*

DOI: http://dx.doi.org/10.1590/1517-8692202329012022_0628 Article received on 11/01/2022 accepted on 11/25/2022

INTRODUCTION

Physical training for archers is essential. Although the coaches have a precise understanding of the physical training of archers, there is still no perfect physical training system in the academic world. There is also some disconnect between physical training and technical instruction. The organization and teaching methods of physical training cannot meet the reform's needs. Some athletes are not physically fit for the Olympic Games. Archer's deep physical training can improve archery skills and the overall quality of athletes. This paper takes the data of archers as the research object.[1] This paper discusses the relationship between attention stabilization and archery performance in archery. Studies have found a significant correlation between exercise concentration and archery performance. Steady attention can effectively predict the results of archery competitions.

METHOD

Research objects

This paper investigates the correlation between archery's stability and its archery performance. In this paper, 24 athletes were tested in archery by random sampling. Athletes in Group A achieved excellent results (8). Athletes in group B had good results (8), and athletes in group C had average results (8). This paper makes a statistical analysis of the test results of a training center for two years. This article found that every athlete achieved a 100% test result.

Investigation method

Each athlete was subjected to stable exercises using static and dynamic methods in the experimental group. This ensures that the arrow and the person are coordinated under a steady breathing condition. The specific practice plan adopts standardized archery movements and postures to ensure stability.[2] In this paper, a variety of different exercise methods are used for mechanical energy stretching training. This article predicts each athlete's practice hits and understands how each movement plays. This article records the training strengths and weaknesses of athletes. This paper requires recording the feeling and strength of each arm position after the incorrect adjustment of the archery link at the moment the arrow string is connected to draw the bow. The control group continued to maintain the original archery position. In this paper, the selected athletes were surveyed using a questionnaire after collecting and consulting professional psychologists. The analysis of the experimental data in this paper concludes.

Concentration EEG feature algorithm

This response is characterized by classical correlation. The classical correlation analysis method mainly analyzes the global correlation of two types of different parameters.[3] This paper applies it to signal preprocessing and feature extraction. A representative weighting factor L_Q, L_P for the two variables X, Y. This value is derived from the classical correlation analysis method. Its most significant representative factor is λ after two different linear combinations. Scholars use the canonical correlation factor λ to construct a representative eigenvector of the $SSVEP$ signal pattern. $SSVEPS$ defines multiple wires. They are mutable sets Q:

$$Q = \begin{bmatrix} C_1 \\ C_2 \\ \vdots \\ C_e \end{bmatrix} \quad (1)$$

C_j represents the signal of channel j. A total of e channels. The reference signal D is a multi-dimensional signal composed of sine and cosine signals, which is related to the excitation frequency g_j

$$P = \begin{bmatrix} \sin(2\pi k_1 g_1 t) \\ \cos(2\pi k_1 g_1 t) \\ \sin(2\pi k_2 g_2 t) \\ \cos(2\pi k_2 g_2 t) \\ \vdots \end{bmatrix} \quad (2)$$

k_j is the most significant resonance sequence for each target. If multiple resonance components react powerfully, then several corresponding sine and cosine signals can be added to the reference signal in this paper.[4] In this paper, formula (3) is used to perform a classical correlation analysis on the brain wave Q and the reference wave P. This maximizes the correlation between their parameters $R = L^T_Q Q$ and $D = L^T_Q P$.

$$\max_{L_Q L_P} \lambda(R, D) = \frac{Z[R^T D]}{\sqrt{Z[R^T R] Z[D^T D]}} = \frac{Z[L_Q^T Q P^T L_P]}{\sqrt{Z[L_Q^T Q Q^T L_Q] Z[L_P^T P P^T L_P]}} \quad (3)$$

The one-dimensional R wave signal in the EEG is composed of the $SSVEP$ characteristics of the e channel.

$$P(\mu) = | FFT(R, K) |^2 / K \quad (4)$$

K represents the data used for FFT conversion. $FFT\ (Q,K)$ represents the Fourier transform of the data at point K. This paper uses the average energy level $\overline{P}$ of 4.3-40 Hz $P(\mu)$ as the divisor. In this way, the energy level of each target frequency band is corrected.[5] This paper modifies the energy at each target frequency to form the eigenvector $[p_1, p_2, p_3 \cdots]$. Then this paper uses Fisher's classification for feature classification.

Statistics method

In this paper, the data are summarized and counted using the statistical method.[6] This paper uses SPSS software to make statistics to make the obtained data more objective.

Ethical Compliance

Research experiments conducted in this article with animals or humans were approved by the Ethical Committee and responsible authorities of Taiyuan Normal University, Xinzhou Teachers University and Shanxi University following all guidelines, regulations, legal, and ethical standards as required for humans or animals.

RESULTS

Analysis of Archery Score Data

Each group took an archery practice and a concentration test in this experiment. The results are shown in Table 1. From the test results, the archers in Group A got the best score at the fastest time.[7] This team has a small margin of error in the overall score. The athletes in Group B performed well overall. The best strategy score is the group C athlete. Some athletes make mistakes when shooting arrows, resulting in deviations in the total score.

Archery attention

Table 1 shows that the attention of the athletes in group A has greatly improved before and after training, and there is statistical significance between the two (P<0.01). The comparison between groups B and C also had significant statistical significance (P<0.01). The proposed archery practice method effectively improves athletes' concentration.[8] The training method of group A had a significant effect on the improvement of attention stabilization level.

Table 2 shows the differences in the steady increase of attention between the experimental and control groups in the groups of different regions.[9] Athletes can significantly improve the stability of archery by using different exercises. Athletes must use appropriate training methods to improve their archery skills. T is an independent sampling inspection. p is the significant probability.

Table 1. Changes in attentional stability of athletes before and after the test.

District athletes	Before training	After training	T value	P value
Class A athlete's experimental group	6.98±1.39	9.24±1.56	6.4421	0.0008
Category an athlete control group	8.86±1.29	9.15±1.78	0.5916	0.8063
Class B athletes' experimental group	9.86±0.99	8.24±1.39	3.0547	0.0011
Category B athletes control group	6.98±1.39	8.45±1.83	0.6242	0.6768
Class C athletes' experimental group	9.95±1.53	9.24±1.35	2.6768	0.0016
Category C athlete control group	6.98±1.39	7±1.4	0.6147	0.6337

Table 2. Stable attention development of athletes before and after the test.

Group		Test Group	Control group
Athlete growth	Mean	3.684	0.295
	Standard deviation	0.96	0.116
Category B Athlete Growth	Mean	3.526	0.284
	Standard deviation	0.989	0.095
Category C Athlete Growth	Mean	3.253	0.263
	Standard deviation	0.032	0.074
T value		7.152	4.583

DISCUSSION

Developing physical fitness training for archers takes a certain amount of time. Athletes must also turn it into a competitive skill after completing their physical training goals. According to Chinese characteristics and seasonal characteristics of archery, this paper divides the physical training of athletes into three stages: strengthening physical training, maintaining physical training, and supplementing physical training.[10] Physical training should be intense in winter and spring, far away from the arena. Training time lasts 12-16 weeks. Athletes perform physical conditioning exercises in the first 2-3 weeks, consolidation exercises in the middle 8-10 weeks, and consolidation exercises in the last 2-3 weeks. The purpose of the strengthening period is to enhance physical fitness. An athlete's strengthening during this period can disrupt the balance of the body. This allows the body to have a more significant response. Athletes at this stage should minimize the impact of physical training on technique. Athletes in the post-strengthening stage should perform a 2-week tapering exercise to relieve fatigue.

The physical training of athletes during the competition should focus on maintaining the balance between physical fitness and technique. The improvement or decline of physical fitness will harm the development of technology. During the maintenance period, the physical training volume of athletes decreased significantly.[11] The data reaches 40%~50%. Physical training is the key to improving your physique. The mental burden of athletes in archery is relatively high, and the physical fitness level is relatively low. This characteristic makes it necessary for high-level archers to carry out appropriate physical training. Physical training loads for high-caliber archers are moderate. An athlete's strength training can't just change the strength training he is accustomed to. Even if the athlete needs to increase the intensity of the training, the short-term physical training should be significantly reduced. Especially the training of the shoulder girdle and upper body. The particularity of archery results in relatively low intensity of physical training and a relatively large load.

The main characteristics of archery technology are stable movements, precise details, and decisive completion. This places great demands on the concentration of athletes when completing technical movements. Concentration is the key to determining the completion of the action.[12] Athletes lose control of their bodies when their attention is concentrated in one place. When the concentration is high, the body reacts and reduces the sensitivity to force. This can affect the body's overall response and reduce the game's effect. Concentrating for extended periods also makes the brain more prone to brain fatigue. Athletes must pay full attention when shooting and scoring. Because of the score, it is easy for an athlete to focus on the goal and thus reduce the exercise of self-control.[13] Athletes are more focused on chasing points. The athlete must release his archery skills when the scope reaches the aiming area. This puts you in a relaxed state of mind without paying attention to the game's outcome. The athlete is only thinking about the next shot at the moment. The athlete must concentrate fully during the finishing phase of the technical movement. In this way, the difference in concentration of the athletes when completing the scoring system is not significant. Athletes often need more energy to focus on the movement of their bodies during untargeted and nighttime exercises. They pay more attention to their bodies when they can't see the target. This allows you to control your focus better.

CONCLUSION

An archer's attention distribution significantly impacts training completion and competition performance. According to the above research results combined with the actual situation of the actual exercise, this paper formulated a set of teaching plans suitable for the actual training of archers. This makes the training methods of archers truly standardized and effective.

All authors declare no potential conflict of interest related to this article

AUTHORS' CONTRIBUTIONS: Each author made significant individual contributions to this manuscript. Jinglong Geng and Jing Wang: writing and data analysis; Ting Wang and Xiao Yan: article review and intellectual concept of the article.

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