

ABDOMINAL CORE STRENGTH TRAINING IN YOUNG STUDENTS



ORIGINAL ARTICLE
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TREINAMENTO DE FORÇA DO CENTRO ABDOMINAL EM JOVENS ESTUDANTES

ENTRENAMIENTO DE FUERZA DEL NÚCLEO ABDOMINAL EN ESTUDIANTES JÓVENES

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ABSTRACT

Introduction: Recent studies point out that strength training with load may substantially help athletes' strength, while strength training with moderate load may improve motor coordination. **Objective:** Investigate the current status of abdominal core strength training in young people, surveying the current problems. **Methods:** Students from a particular province were selected for the investigation. We performed tests, comparisons, and analyses of results on the abdominal core strength of the exercises practiced in sports schools to provide better support for amateur training. The Abdominal Octopole Strength Bridge Test uses overcoming one's weight. **Results:** Boys accounted for 59.04% of abdominal core strength, while girls accounted for only 22.50%, with most of them at their average level of 40.00%. The proportion of girls with low scores is also higher (26.25%); in boys, the deficient proportion is 8.77%. **Conclusion:** There is a significant difference in the abdominal core strength of the students. The expectation of a difference between male and female students not being very large contrasted with the reality, suggesting that girls need to pay attention to abdominal core strength training during training. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Abdominal Core; Resistance Training; Students.

RESUMO

Introdução: Estudos recentes apontam que o treinamento de força com carga possa ajudar os atletas a aumentarem sua força substancialmente, enquanto o treinamento de força com carga moderada possa melhorar a capacidade de coordenação motora. **Objetivo:** Investigar a situação atual do treinamento de força do centro abdominal nos jovens, levantando os problemas atuais. **Métodos:** Selecionou-se os estudantes de uma determinada província para a investigação. Foram executados testes, comparações e análises de resultados sobre a força do centro abdominal dos exercícios praticados nas escolas esportivas, afim de viabilizar um melhor suporte para o treinamento amador. Foi utilizado o Teste de Ponte Abdominal Octopole de Força utiliza o método de superar o próprio peso. **Resultados:** Os rapazes responderam por 59,04% da força do centro abdominal, enquanto as meninas responderam por apenas 22,50% com a maioria delas em seu nível médio de 40,00%. A proporção de meninas com notas baixas também é maior (26,25%), nos rapazes a proporção deficiente é de 8,77%. **Conclusão:** Há uma diferença significativa na força do centro abdominal dos estudantes. A expectativa de uma diferença entre estudantes do sexo masculino e feminino não ser muito grande contrastou-se com a realidade, sugerindo que as meninas precisam prestar atenção ao treinamento da força do centro abdominal durante o treinamento. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Centro Abdominal; Treinamento de Força; Estudantes.

RESUMEN

Introducción: Estudios recientes señalan que el entrenamiento de fuerza con carga puede ayudar a los deportistas a aumentar su fuerza de forma sustancial, mientras que el entrenamiento de fuerza con carga moderada puede mejorar la capacidad de coordinación motora. **Objetivo:** Investigar la situación actual del entrenamiento de la fuerza del núcleo abdominal en los jóvenes, planteando los problemas actuales. **Métodos:** Para la investigación se seleccionaron estudiantes de una determinada provincia. Realizamos pruebas, comparaciones y análisis de resultados sobre la fuerza del núcleo abdominal de los ejercicios practicados en las escuelas deportivas, con el fin de proporcionar un mejor apoyo al entrenamiento de los aficionados. La prueba del puente de fuerza Octopole abdominal utiliza el método de superación del propio peso. **Resultados:** El 59,04% de la fuerza del núcleo abdominal correspondió a los chicos, mientras que las chicas sólo representaron el 22,50%, y la mayoría se situó en un nivel medio del 40,00%. La proporción de chicas con puntuaciones bajas también es mayor (26,25%), mientras que en los chicos la proporción deficiente es del 8,77%. **Conclusión:** Existe una diferencia significativa en la fuerza del núcleo abdominal de los estudiantes. La expectativa de que la diferencia entre alumnos y alumnas no fuera muy grande contrastó con la realidad, lo que sugiere que las chicas deben prestar atención al entrenamiento de la fuerza del núcleo abdominal durante el entrenamiento. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptor: Núcleo Abdominal; Entrenamiento de Fuerza; Estudiantes.



INTRODUCTION

Strength training with heavier load can help athletes increase strength, while strength training with moderate load can improve the ability of the athlete's nervous system to regulate muscles, and improve muscle coordination.¹ The strength training of heavy competitive sports athletes can be divided into special strength training, basic strength training, core strength training and so on. Among them, core strength training is an indispensable and important part of the training of heavy competitive sports, which can effectively improve the actual combat ability of athletes. For example, in boxing, the process of punching by a boxer consists of three actions: Lower limbs kicking on the ground, trunk twisting, and punching. The trunk can play a role in communicating the strength of the upper and lower limbs, and at the same time, it can also generate power, it is the core part of the athlete. The rapid contraction and rotation of the torso can improve the strength and speed of the upper body hitting, if athletes want to do the twisting action of the trunk, they need to improve their core strength.²

METHOD

Test equipment

The eight-level abdominal bridge test is simple and easy to perform, and has strong operability in grassroots amateur training work. The experimental equipment is: Stopwatch, yoga mat, etc.³

Test method

The "eight-level abdominal bridge method" was used to test the athletes' comprehensive core strength ability and record the results. As the most basic core area strength test method, the eight-level abdominal bridge test is divided into eight levels and eight movements, one for each level, a total of eight movements, and the difficulty of the movements gradually increases from the first level to the eighth level, the last group goes back to the starting state.⁴ The eighth-level action is completed in a total of 3 minutes, and the full score is 100 points, each action is completed with different points, if it is not completed, it will not be scored, the actions are continuous and uninterrupted, the basic elbow support action should make the shoulders, trunk, waist and hips, and legs on the same plane. The specific actions and scoring criteria are shown in Table 1.⁵

Record the performance of the athletes who have finished the test, for later quantitative evaluation.

Table 1. Design scheme of eight-level web bridge test method.

Action name	Action description	Score
First class belly bridge	The starting action is to lie on a prone bridge, with elbows bent on the ground, hold for 1 minute	1 point
Secondary web bridge	Keeping the abdominal bridge, the right arm stretches forward and is independently supported by the left arm for 15 seconds	3 points
three-level web bridge	Keeping the abdominal bridge, the left arm stretches forward and is independently supported by the right arm for 15 seconds	5 points
four-level belly bridge	Return to the starting position, lift your right leg back and stretch your left leg alone, hold for 15 seconds	6 points
Level 5 belly bridge	Return to the starting position, lift your left leg backwards, and support your right leg alone, hold for 15 seconds	10 points
Six-stage abdominal bridge	Hold the abdominal bridge, lift the right hand and keep the left leg flat for 15 seconds	15 points
Seven-stage abdominal bridge	Hold the abdominal bridge, lower right hand and left leg, then raise left hand and right leg, hold for 15 seconds	25 points
Eight-level abdominal bridge	Return to the starting position and hold for 30 seconds to complete the test	35 points

Test Design

After consulting a large number of documents and actual research and training the core training methods commonly used in teaching, determined and designed and completed the eight-level web bridge test method.^{6,7} The specific method is as follows: The "eight-level abdominal bridge test" consists of eight continuous movement movements, the initial movement is to lie on the prone to form a bridge, and use the elbows to support the ground, it takes 3 minutes to complete the eighth level. Comparing the athletes before and after the number of movements and the number of seconds in the experiment, quantitative testing and statistical work to complete the core strength.

Statistical analysis

Using SPSS17.0 statistical software, the students' results of the "eight-level abdominal bridge method" were grouped and counted by project, gender, and athletic ability category, and analyzed and compared to obtain the current status of the core strength of amateur training athletes.⁸

Investigation and analysis on the status quo of core strength of amateur training athletes

Core strength training is an important part of sports training, which can improve the core stability of athletes, so as to achieve the purpose of improving athletes' athletic ability, preventing and recovering from injuries.⁹ Investigate the status quo of youth core strength training in Province A and find and discover the current problems, so that grassroots coaches attach great importance to it, in order to promote the development of sports training in adolescents, improve the rate of success, and reduce injuries caused by premature specialization, it is one of the key issues of amateur training in our province. The author will try to find out the above problems by testing, comparing and analyzing the core strength of sports school athletes in province A, so as to provide better services for amateur training.

Test objects

This test mainly selected 246 students to participate, including 246 Miaozhi (166 males and 81 females). The age of the students is between 13 and 17 years old, mainly in the 14-16 age group, and the average training period is 3.5 ± 2.26 years.¹⁰ The sports items of these students are relatively complete, covering all the specialties of the provincial sports schools, including sprint, mid-run, long-distance running, javelin, discus, shot put, long jump, rowing, basketball, volleyball, football, badminton, tennis, classical wrestling, free wrestling, Chinese wrestling, weightlifting, judo, karate, taekwondo, boxing, Sanda, Wushu, Tai Chi, etc. a total of 24 sports.

Ethical Compliance

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

RESULTS

Core strength test results of athletes

The results of the students' eight-level abdominal bridge test are divided into 8 levels, one level for each action, and the number of completed actions (levels) is counted, the results are shown in Table 2.

The statistical results in Table 2 show that: There were 166 male subjects and 81 female surnames, the number of core strength completed mainly concentrated in 5, 6, and 8 movements, the number of boys who completed 8 movements reached 59.04%, however, only 22.50% of girls completed 8 movements, showing a very significant difference, in the comparison of the number of boys and girls who

Table 2. Statistics on completion of core strength test.

	Number of boys		Number of girls	
complete 1 action	4	2.14%	5	6.25%
complete 2 actions	1	0.6%	5	6.25%
Complete 3 actions	6	3.62%	5	6.25%
Complete 4 moves	4	2.41%	6	7.5%
Complete 5 moves	26	15.66%	32	40%
Complete 6 moves	18	10.84%	8	10%
Complete 7 moves	9	5.42%	2	2.5%
Complete 8 moves	98	59.04%	18	22.5%

completed the 5 movements, the completion rate of girls was 40.00%, which was much higher than that of boys (15.66%), and there was also a very significant difference.

Overall, the core strength of boys is stronger than that of girls, and the completion status of boys is significantly differentiated, basically in the status quo of three-polarization, 59.04% of boys can complete 8 movements, 15.66% of the boys can complete 5 movements, other completions account for a small proportion, and those with poor core strength (1-4 movements) accumulate up to 8.77%; Judging from the test results of girls, in addition to the number of people who completed 5 movements and 8 movements, other completions are relatively average, and the core strength of girls is also uneven.

Statistics of grade distribution of core strength of athletes

From the statistics in Table 3 and Figure 1, 59.04% of boys' core strength can reach the top, while girls only accounted for 22.50%, most of the girls' core strength level was at the medium level (40.00%), in addition, the proportion of girls in poor grades is also larger (26.25%), while that of boys is only 8.77%, which suggests a significant difference in the core strength of students, in addition to physiological reasons, the focus should be on finding more reasons for training, and physical reasons cannot be used to cover up training reasons.

As shown in Figure 1, 49.03% of the students reached the excellent standard, and 14.98% reached the good standard, there are 23.48% who reach the medium standard, and 14.58% who have poor core strength. It shows that the core strength of most students is relatively good, and it is necessary to find out the reasons for those who are in a weak position.

DISCUSSION

The eight-pole abdominal bridge test of core strength uses the method of overcoming one's own weight, the gap between boys and girls should not be very large, but the fact is very large, suggesting that girls need to pay attention to core strength training in training, there can be no slack thoughts. There should be a lot of room for improvement in the core strength of girls, which will become one of the important factors for the improvement and breakthrough of the sports level and competition

Table 3. Statistics on the distribution of students' core strength levels (166 males and 81 females).

Core strength level	Male	Female	Total
Difference	8.77%	26.25%	14.58%
middle	15.66%	40%	23.48%
good	16.5%	12.5%	14.98%
excellent	59.04%	22.5%	49.03%

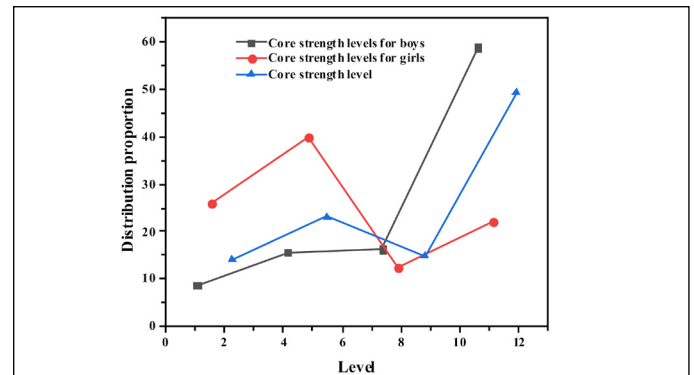


Figure 1. Distribution of students' core strength levels.

performance of girls in provincial sports schools and amateur training. The level of core strength of students is uneven, and the core strength of different students of the same project is also very different. For example, the core strength of volleyball, weightlifting, classical wrestling, and judo projects accounts for less than 50% of the excellent core strength, so it must be highly valued in training.

CONCLUSION

Through actual research and analysis, the research shows that: Problems in specific training were found, male and female athletes showed great differences in core strength, and female athletes were significantly weaker than men; There is a big difference between the test results of different sports; the core strength of amateur athletes is different, and the core strength of girls is weaker than that of boys; There was no significant difference between male and female students in the abdominal bridge test of overcoming their own weight.

ACKNOWLEDGMENT

The study was partly supported by 2019 Pingdingshan College Youth Scientific Research Fund Project: Pingdingshan City College Students' Physical Exercise and Physical Fitness Test Results and Correlation Research (No.: PXY-QNJJ-2019018).

The author declare no potential conflict of interest related to this article

AUTHORS' CONTRIBUTIONS: Each author made significant individual contributions to this manuscript. Wenlong LI: writing and data analysis.

REFERENCES

- Ren Y, Li J. The Conception of Application of Computer Virtual Reality Technology in Sports Training. *J Phys Conf Ser.* 2021;1861(1):012110.
- Tong W, Li B. A systematic decision making for functional training in competitive sports training. *J Intell Fuzzy Syst.* 2020;40(2):1-11.
- Artemyeva H, Moshenska T, Panshyna A, Medvediev Y. Methodology for improving the body balance of athletes in acrobatic rock'n'roll at the stage of preliminary basic training. *Slobozhanskyi Herald Of Science and Sport.* 2020;8(1)11-16.
- Cheban Y, Plokhikh V. Emotional and volitional component of competitive attitude of rowing athletes. *Sci Educ.* 2020;20(2):22-31.
- Lutter C, Tischer T, Cooper C, Frank L, Hotfiel T, Lenz R, et al. Mechanisms of Acute Knee Injuries in Bouldering and Rock Climbing Athletes. *Am J Sports Med.* 2020;48(3):730-8.
- Biletska Y, Papakina V, Danko N, Grigorova-Berenda L. Development of nutrition methodology for athletes in a pandemic condition. *Technology Audit and Production Reserves.* 2021;2-3(58):37-9.
- Ioannides C, Apostolidis A, Hadjicharalambous M, Zaras N. Original Article Effect of a 6-week plyometric training on power, muscle strength, and rate of force development in young competitive karate athletes. *J Phys Educ Sport.* 2020;20(4):1740-6.
- Shynkaruk O, Ulan A, Bondar A, Iakovenko O, Strohanov S, Pavlenko I, et al. Left-Handed and Right-Handed Fencers in the International Sports Arena: Specifics of Their Competitive Activity and Features of Identification. *Teor Metod Fiz Vihov.* 2020;20(2):59-67.
- Yakovlev S, Vakhnin NA. Information technologies as segment of training process in combat sports. *Teor Prak Fiz Kult.* 2020;20(4):31-2.
- Djellaoudji A, Kador F, Boussouf K, Hammoudi N, Laouamri S, Berrahal M, et al. The electrocardiographic peculiarities of Algerian competitive athletes in the region of Sétif. *Arch Cardiovasc Dis Suppl.* 2020;12(1):151.