

EFFECTS OF CORE STABILITY TRAINING ON SPECIFIC STRENGTH IN WRESTLERS



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EFEITOS DO TREINAMENTO DE ESTABILIDADE DO CORE SOBRE A FORÇA ESPECÍFICA EM LUTADORES

EFFECTOS DEL ENTRENAMIENTO DE LA ESTABILIDAD DEL CORE EN LA FUERZA ESPECÍFICA EN LUCHADORES

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ABSTRACT

Introduction: Boxing is characterized by a high degree of combination of strength and skill and belongs to the sports group of enduring strength and skill combined with long-term continuous whole-body strength output to achieve good results in competition. Therefore, athletes pay more attention to the skills they use all the time, and it is very important to master the techniques correctly and reasonably distribute physical strength accurately. **Objective:** Explore the effect of core stability training on the specific strength of wrestlers. **Methods:** 12 top junior level athletes of a provincial women's wrestling team as research objects, 12 people in total, and randomly divided into control and experimental groups with six people. **Results:** After the test, the data changes in the experimental group were highly significant compared to before and after the experiment ($P < 0.01$). The data changes between the experimental and control groups were significantly different before and after the experiment ($p < 0.05$), showing that the special strength of core stability training fighters has a small increase. **Conclusion:** Core stability training is useful for the specific strength of wrestlers. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Postural Balance; Athletes; Strength, Muscle.

RESUMO

Introdução: O boxe é caracterizado por um alto grau de combinação de força e habilidade, e pertence ao grupo esportivo de força duradoura e habilidade combinado com a saída contínua de força contínua do corpo inteiro, a longo prazo, para obter bons resultados na competição. Portanto, os atletas prestam mais atenção às habilidades dos atletas no uso de técnicas a todo o instante, e é muito importante dominar corretamente as técnicas e distribuir razoavelmente força física com precisão. **Objetivo:** Explorar o efeito do treinamento de estabilidade do core sobre a força específica dos lutadores. **Métodos:** 12 atletas de nível júnior de primeira linha de uma equipe de luta feminina provincial como objetos de pesquisa, 12 pessoas no total, e aleatoriamente dividida em grupo de controle e grupo experimental com 6 pessoas em cada grupo. **Resultados:** Após o teste, as alterações de dados, quando comparados ao antes e depois do experimento no grupo experimental, foram altamente significativas ($P < 0.01$). As mudanças de dados entre o grupo experimental e o grupo controle foram significativamente diferentes antes e depois do experimento ($p < 0.05$), mostrando que a força especial dos lutadores de treinamento de estabilidade central tem um pequeno aumento. **Conclusão:** O treinamento de estabilidade do core mostrou-se útil para a força específica dos lutadores. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Equilíbrio Postural; Atletas; Força Muscular.

RESUMEN

Introducción: El boxeo se caracteriza por un alto grado de combinación de fuerza y destreza, y pertenece al grupo de deportes de fuerza y destreza duraderas combinadas con la producción continua de fuerza de todo el cuerpo a largo plazo para obtener buenos resultados en la competición. Por lo tanto, los atletas prestan más atención a las habilidades de los atletas en el uso de las técnicas todo el tiempo, y es muy importante dominar las técnicas correctamente y distribuir razonablemente la fuerza física con precisión. **Objetivo:** Explorar el efecto del entrenamiento de la estabilidad del core en la fuerza específica de los luchadores. **Métodos:** 12 atletas de alto nivel de un equipo provincial de lucha femenina como objetos de investigación, 12 personas en total, y divididas aleatoriamente en grupo de control y grupo experimental con 6 personas en cada grupo. **Resultados:** Después de la prueba, los cambios en los datos comparados antes y después del experimento en el grupo experimental fueron altamente significativos ($P < 0,01$). Los cambios de datos entre el grupo experimental y el grupo de control fueron significativamente diferentes antes y después del experimento ($p < 0,05$), lo que demuestra que la fuerza especial de los combatientes de entrenamiento de la estabilidad del core tiene un pequeño aumento. **Conclusión:** Se ha demostrado que el entrenamiento de la estabilidad del núcleo es útil para la fuerza específica de los luchadores. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptorios: Equilibrio Postural; Atletas; Fuerza Muscular.



INTRODUCTION

The concept of “core strength training” was first proposed in the 1990s, at that time, this concept was mainly applied to the rehabilitation measures of athletes after sports injuries, it is really widely used in the field of sports training after entering the 21st century.¹

Kang MS explained the concept of core strength in the article “Discussion on the Training of Core Strength in Physical Education.”² Kumar V believes: Core strength can not directly provide energy for the athlete’s various technical movements, but to maintain the stability of the athlete’s body and to ensure the force of other movements.³ This interpretation helps us further our understanding of core strength and core strength training. Nuhmani S explained the word “core” in core strength training from the perspective of sports anatomy in “Analysis of “Core Strength” and Related Concepts: “Core” refers to the spine, hip joints, pelvis and other parts of the human body, these parts are used to connect the upper and lower limbs of the human body, core strength training refers to the training of the muscles of the spine, hips, and pelvis.⁴ SaNnicandro I in “Research on Core Strength Training for Swimming” proposes: Core strength refers to the strength, stability and balance training of the core muscles of the human body, and the training tasks in the early stage of core strength training are mainly stability training, the purpose of training is to mobilize the participation of deep muscle groups in the trunk, which is also the basis for improving human strength, speed and agility.⁵

To sum up, Samson A’s explanation of core strength training, most of them have studied from several perspectives, such as the definition of the core part of the human body, the concept of core strength and the method of core strength training, core is defined as: The human lumbar spine, pelvis, and hip joints are connected to the whole body and the muscle groups attached to them, as well as the smaller muscle groups that are deeper in these parts.⁶

Experimental subjects and methods

Questionnaire survey method

The questionnaire design includes a questionnaire for the selection of core stability training movements, an outline of an interview with experts on strength training in wrestling events, and an expert questionnaire for the primary selection of special strength indicators for female wrestlers in a province. By distributing the questionnaires, and finally collecting the questionnaires, all the questionnaires were statistically analyzed and the data were organized. As shown in Table 1.

9 copies of the questionnaire were distributed, 9 copies were returned, and 9 copies were valid, with a recovery rate of 100% and an effective rate of 100%.

Mathematical statistics

The test indicators before and after the experiment were tested by paired T test, and the data results were expressed as mean ± standard deviation ($\bar{x} \pm SD$), $p > 0.05$ means that the difference is not significant, $0.01 < P \leq 0.05$ means the difference is significant, and $P \leq 0.01$ means the difference is highly significant.^{7,8}

Experimental method

It can be seen from Table 2 that, after the experiment, the p-values of the test indicators of the experimental group and the control group changed, among which the p-values of the high-flip index ($p = 0.968$)

Table 1. Questionnaire distribution and recovery form.

content	Positive height	Deputy high	Intermediate coach	total
Number of copies issued	1	4	4	9
Recycled copies	3	2	4	9
number of valid copies	2	3	4	9

and the squatting index ($p = 0.121$) were both greater than 0.05, ($p > 0.05$ means no significant difference), which means that there is no significant difference between these two indicators before and after the experiment, that is to say, 8 weeks of core stability training did not play a significant role in these two indicators, however, from the data in Table 3, the experimental data of the high clean performance (80.51 ± 11.37) and the holding squatting performance (93.43 ± 6.13) of the experimental group were better than those of the control group (80.81 ± 14.61 , holding squatting performance (80.81 ± 14.61), 86.67 ± 6.83), that is to say, to a certain extent, core stability training has a certain impact on the performance of these two indicators. In addition, the p of squat index ($p = 0.038$), bench press index ($p = 0.036$), sit-up index ($p = 0.023$), back index ($p = 0.024$), and 30s squatter index ($p = 0.017$) values are less than 0.05, ($p < 0.05$ means there is a significant difference), indicating that these five indicators are all significantly different, in other words, core stability training has played a direct role in these five indicators, it is beneficial to improve the performance of these indicators.⁹

It can be clearly seen from Table 3 that, the p-values of the stand-up index ($p = 0.043$) and the sit-up index ($p = 0.203$) were all higher than 0.05, indicating that there was no significant difference between the two indexes before and after the experiment.¹⁰ However, as can be seen from Table 4, the performance of the power clean index increased from the pre-experiment (75.11 ± 16.21) to the post-experiment (80.44 ± 11.31), and the sit-up score increased from the pre-experiment (32.64 ± 2.77) to post-experimental (33.61 ± 1.51), the scores have improved significantly. There were significant differences in the p-values of the back up ($p = 0.022$), squatting ($p = 0.041$), 30s squatting ($p = 0.008$), bench press ($p = 0.003$), and squatting ($p = 0.001$) indicators, among them, the squat index ($p = 0.001$) and the bench press index ($p = 0.003$) also had highly significant differences ($p < 0.01$) before and after the experiment. This

Table 2. Analysis of various test indicators in the experimental group and the control group after the experiment.

index	test group	control group	P value
high flip	80.51 ± 11.37	80.81 ± 14.61	0.968
Squat	91.03 ± 5.14	83.33 ± 6.05	0.037 ▲
bench press	63.10 ± 8.27	52.17 ± 7.08	0.036 ▲
Sit-ups	33.57 ± 1.41	31.33 ± 1.51	0.023 ▲
back up	54.47 ± 1.13	52.00 ± 1.89	0.024 ▲
squat	93.43 ± 6.13	86.67 ± 6.83	0.121
30s tumbler	14.17 ± 1.27	12.17 ± 1.22	0.017 ▲

Note: Comparison before and after the experiment: * $P < 0.05$, ** $P < 0.01$; Comparison between the experimental group and the control group: ▲ $P < 0.05$, ▲▲ $P < 0.01$.

Table 3. Significance analysis of each index in the experimental group before and after the experiment.

index	test group	control group	P value
high flip	75.11 ± 16.21	80.44 ± 11.31	0.043
Squat	84.67 ± 6.05	91.33 ± 5.54	0.001**
bench press	54.50 ± 8.46	63.00 ± 8.37	0.003**
Sit-ups	32.64 ± 2.77	33.61 ± 1.51	0.203
back up	51.50 ± 1.05	54.67 ± 1.63	0.022*
squat	89.17 ± 4.92	93.33 ± 6.83	0.041*
30s tumbler	9.50 ± 0.84	14.67 ± 1.37	0.008*

Note: Comparison before and after the experiment: * $P < 0.05$, ** $P < 0.01$; Comparison between the experimental group and the control group: ▲ $P < 0.05$, ▲▲ $P < 0.01$.

Table 4. Data analysis of bench press indicators.

group	number of people (n)	bench press (M±SD)	
		Before experiment	After the experiment
test group	6	54.50 ± 8.46	63.01 ± 8.31 ▲**
control group	6	50.16 ± 7.77	52.13 ± 7.04

Note: Comparison before and after the experiment: * $P < 0.05$, ** $P < 0.01$; Comparison between the experimental group and the control group: ▲ $P < 0.05$, ▲▲ $P < 0.01$.

incidences that, core stability training before and after the experiment, it has played a different role in improving the performance of the athletes in the experimental group in the specific strength and quality indicators.¹¹ As shown in Figure 1.

As mentioned in the previous section, there was no significant difference in the indicators between the experimental group and the control group before the experiment, now, before and after the experiment in the control group and the experimental group, the data changes between the groups and the data changes within the group are analyzed. It can be clearly seen from Figure 1 that the bench press performance was significantly improved before and after the experiment. The data in Table 4 show that, the score of the control group increased from (50.16±7.77) to (52.13±7.04), and the score of the experimental group increased from (54.50±8.46) before the experiment to (63.01±8.31) after

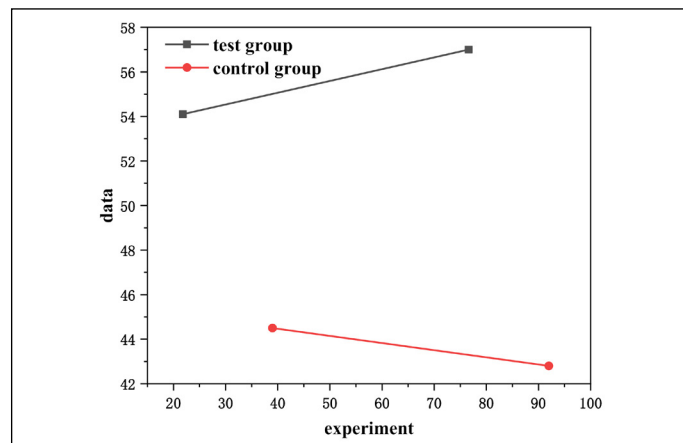


Figure 1. Data analysis of bench press indicators.

the experiment, it can be clearly seen that the improvement in the control group is smaller than that in the experimental group. And after the experiment, the performance of the experimental group (63.01±8.31) was higher than that of the control group (52.13±7.04), which indicated that the core stability training played a certain role in improving the performance of the bench press index. From the further analysis of significance, the data changes before and after the experiment in the experimental group were highly significant ($P < 0.01$), the data changes of the experimental group and the control group were significantly different before and after the experiment ($p < 0.05$), which further indicated that the core stability training played a role in improving the performance of the bench press index.

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

CONCLUSION

Through the longitudinal comparison between the same group and the horizontal comparison between the groups, experimental data show that, the core stability training experiment has improved the performance of each index of the athletes in the experimental group to varying degrees. This means that to a certain extent, the improvement of the athlete's strength quality index may be due to the role of core stability training to a certain extent. Experimental results show, core stability training is an effective method to improve the specific strength of athletes in this wrestling event. By comparing the data before and after the experiment, it can be proved that, core stability training is effective for wrestler-specific strength training programs.

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

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