RELATIONSHIP BETWEEN UNBALANCED CORE STRENGTHENING AND INJURIES IN DANCESPORT ATHLETES

RELAÇÃO ENTRE O FORTALECIMENTO DESBALANCEADO DO CORE E AS LESÕES NOS ATLETAS DE DANÇA ESPORTIVA

RELACIÓN ENTRE EL FORTALECIMIENTO DESEQUILIBRADO DEL CORE Y LAS LESIONES EN LOS ATLETAS DE BAILE DEPORTIVO

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ABSTRACT

Introduction: The set of muscles in the lumbo-pelvic-hip complex is called the core. The core is located in the body's center of gravity. Dancesport require aligned trunk movements and permanent stabilization between the spine and pelvis. Despite few studies, the relationship between unbalanced core strengthening and injuries in dancesport is investigated. Objective: Study the relationship between unbalanced core strengthening and muscle strength in dancesport athletes. Methods: An experiment was conducted with 60 students from dance schools. They were randomly divided between an experimental group and a control group, with 30 people each. Each group included 15 males and 15 females. The experimental group used unilateral core stability training. The control group used traditional core stability training. Results: The results showed that the quality of action improved significantly after core strength training (P <0.05), but there was no significant difference between the two groups. Conclusions: Core strengthening can improve balance ability in athletes. There was no statistical difference between the training, with similar positive balance ability and explosion strength effects in the athletes. ***Level of evidence II; Therapeutic studies - investigation of treatment results.***

Keywords: Dancing; Postural Balance; Wounds and Injuries.

RESUMO

Introdução: O conjunto de músculos no complexo quadril-pélvico-lombar é chamado de core. O core está localizado no centro de gravidade corporal. A dança esportiva exige movimentos de tronco alinhados, além da permanente estabilização entre coluna e pélvis. Apesar de haverem estudos escassos, é possível existir alguma relação entre o fortalecimento desequilibrado do core com as lesões na dança esportiva. Objetivo: o objetivo foi estudar a relação entre o fortalecimento desequilibrado do core com a força muscular nos atletas de dança esportiva. Métodos: Foi realizado um experimento com 60 alunos de escolas de dança. Eles foram divididos aleatoriamente entre um grupo experimental e um grupo controle, com 30 pessoas cada. Cada grupo incluiu 15 homens e 15 mulheres. O grupo experimental utilizou o treinamento de estabilidade do core unilateral. O grupo de controle usou o treinamento de estabilidade do core tradicional. Resultados: Os resultados mostraram que a qualidade da ação melhorou significativamente após o treinamento de força central (P <0,05), mas não houve diferença significativa entre os dois grupos. Conclusões: O fortalecimento do core pode melhorar a capacidade de equilíbrio nos atletas. Não houve diferença estatística entre os treinamentos, com efeitos positivos de capacidade de equilíbrio e força de explosão semelhantes nos atletas. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

Descritores: *Dança; Equilíbrio Postural; Ferimentos e Lesões.*

RESUMEN

Introducción: El conjunto de músculos del complejo lumbopélvico se denomina core. El core se encuentra en el centro de gravedad del cuerpo. La danza deportiva exige movimientos alineados del tronco, además de la estabilización permanente entre columna y pelvis. Aunque hay pocos estudios, es posible que exista alguna relación entre el fortalecimiento desequilibrado del core y las lesiones en los deportes de danza. Objetivo: El objetivo fue estudiar la relación entre el fortalecimiento desequilibrado del core y la fuerza muscular en atletas de danza deportiva. Métodos: Se realizó un experimento con 60 alumnos de escuelas de danza. Se dividieron al azar entre un grupo experimental y un grupo de control, con 30 personas cada uno. Cada grupo incluía 15 hombres y 15 mujeres. El grupo experimental utilizó un entrenamiento de estabilidad del core unilateral. El grupo de control utilizó el entrenamiento tradicional de estabilidad del core. Resultados: Los resultados mostraron que la calidad de la acción mejoró significativamente después del entrenamiento de fuerza central (P <0,05), pero no hubo diferencias significativas entre los grupos. Conclusiones: El entrenamiento de la fuerza del core puede mejorar la capacidad de equilibrio en los atletas. No hubo diferencias estadísticas entre los entrenamientos, con efectos positivos similares de la capacidad de equilibrio y la fuerza explosiva en los atletas. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

Descriptores: *Dispepsia; Sistema Digestivo; Deportes; Trastornos de Ansiedad.*

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INTRODUCTION

Sports dance has a high incidence of sports injury, but the problem of muscle force imbalance in the core area has not attracted people's attention. Core stability training can enhance the ability of athletes, such as balance, stability and so on. This is a very important determinant for a dancesport athlete.[1] Rotation, rapid movement, changes in the center of gravity need to have good stability and balance to maintain. Core stability training helps the dancer stabilize the center of gravity, improve the balance and stability of the torso, and keep the torso in position during movement. Sports dance is a two-person dance. From the point of action points of coordination between two people, some scholars believe that sports dance should strengthen the training of core strength. Partners borrow from each other and become a whole in the dance process, that is, the mutual giving of strength has become a major feature of sports dance. Not only to maintain their own body shape and dance movements, but also to provide a fulcrum for the partner to help the partner complete dance movements, in which the coordination and strength should be just right.[2] Core stability training can reduce the incidence of sports injuries, prolong the sports life of athletes, and enable athletes to reach a higher level.[3] However, there is no detailed and accurate method to avoid and alleviate the imbalance of core muscle strength in training. Studies have shown that Giverso C conducted a questionnaire survey on 136 students majoring in sports dance in Xi 'an University of Physical Education, and the result showed that the injury rate was 33.3%, and the injury rate of female students accounted for 62.2%. With the increase of age, the injury rate showed a trend of decline, with the highest proportion of ankle injuries, followed by knee and waist injuries.[4] Sopher R S conducted a questionnaire survey on dancessport athletes in Germany's top league, and found that the incidence of chronic disease injuries was high, and almost all injuries occurred in the training process. Female dancers have more injuries than male dancers. Muscle strain is the most common injury of male dancers, while the most common injury of female dancers also includes bone and joint injuries, among which two-thirds of injuries are caused by external reasons such as site and movement, and one-third of injuries are caused by personal reasons.[5] Zhang J conducted an investigation on standard dancers, and the results showed that the knee joint was the most serious injury site, followed by the lower back. Because of the strain of muscles caused by long-term repetitive movements, dancers developed chronic sports injuries.[6]

METHOD

Subjects

The experimental objects of this study are 60 dancesport athletes from Hebei Zhongyi Shengkun Dance Training School.

Research Methods

Select the asymmetric action in FMS test to test. Asymmetrical movement test results of the left and right side of the score difference <1, the age of 17-19 years old, no previous sports training experience, no sports diseases, no spinal deformity, can normally participate in and complete the content of dancesports training. Screening boy 30, female 30 as subjects in the class for training at the same time, to pass through the computer serial number selection of subjects by gender random way, to 30 boys and 30 girls grouped into experimental group A1 class 15, 15 girls (boys), A2 class control group (15 boys, girls 15) experiments. There was no significant difference in age, height and weight of subjects. (Table 1)

Shedding standards :1, acute sports injury, resulting in unable to train; 2. Drop out of school; 3, the physical ability to complete the training.

The experimental group and the control group received sports dance training according to the training plan of the training school at the same time, while the control group received previous core strength training at the same time. Both the subjects and the trainer were not clear about the training purpose of the experiment. A total of 12 weeks, 4 times a week, 60 minutes training intervention each time. According to the degree of completion of the training plan, the training plan should be adjusted to ensure that the subjects can complete the training plan.[7] Before the experiment, there was no difference between the experimental group and the control group. (Table 2)

Table 1. Basic information of athletes.

Group	Gender	N	Age (years)	Height (cm)	Weight (kg)
The experimental group	male	15	18. 63±0.51	178±3.20	60.13±4.76
	female	15	18. 5±0.53	164.13±2.29	48.88±1.95
The control group	male	15	18.88±0. 64	176.75±5.07	55.8±5.81
	female	15	18. 38±0.51	166.25±2.37	50±2.76

Table 2. Dominant condition of athlete's hand and foot Unit: person.

		The left hand	The right hand	The left foot	The right foot
The experimental group	male	1	14	4	11
The control group	female	0	15	4	11
	male	2	13	4	11
	female	1	14	1	14

Experimental data collection

Due to the large number of participants at the time of data collection, the subjects were divided into 6 teams with 10 participants in each team, and one team was tested at each time, so the trial period was long. The subjects were tested while the others were trained. Emg test was performed simultaneously with standing on one leg with eyes closed, FMS functional screening and psoas muscle burst test. One operator performed EMG data test, one subject performed the test, and the other subject prepared emG film. Another tester was grouped to test and record the other three indicators.[8]

Core stability test scheme

The core stability implementation plan was formulated by conducting preliminary experiments on athletes by referring to core stability training related literature and sports dance training related literature. The program takes three weeks as a training cycle, and gradually increases the training load and training content according to the degree of completion of the athletes. Warm up for 10 minutes before each workout and stretch and relax for 10 minutes after. On Monday, Wednesday, Friday and Saturday at 7:30 p.m. according to the course schedule. The training was carried out at 8:30.

RESULTS

Before the intervention, the average amplitude data of external abdominal oblique muscle, erector spine muscle and gluteus maximus muscle were statistically analyzed, and the average amplitude data of external abdominal oblique muscle in the right plate were statistically analyzed. Other actions in four of the muscles and there is no significant difference after statistics analysis, but from the emg average amplitude of the numerical point of view there is a certain gap, in the center of the in situ transformation action, the external oblique muscle, shaft sma, quadriceps average amplitude values on the right side is slightly higher than the left, glutes average amplitude values on the left side of the slightly higher than the right, after statistics analysis, there were no significant differences. The average amplitude of the right external

oblique muscle and quadriceps femoris was slightly higher than that of the left side, and the average amplitude of the left erector spine muscle and gluteus maximus was slightly higher than that of the right side, with no significant difference after statistical analysis. [9] In the left plank movement, the average amplitude of the left external oblique muscle, erector ridge muscle and gluteus maximus muscle was significantly higher than that of the right side through statistical analysis, while that of the left quadriceps muscle was higher than that of the right side, but there was no significant difference after statistical analysis. (Figure 1)

Independent sample T-test was conducted according to the data measured on the quality performance of the two groups of students before the experiment. The comparison results are shown in Table 3. The scores of the experimental group and the control group were basically the same before the experiment (P>0.05), with no significant difference, so the two groups of students can conduct experimental comparative study.[10]

As can be seen from the data in the table, the quality of yunli somersault movements in both the control group and the experimental group was improved after the test, and the improvement range was significantly different (P<0.O1). At the same time, we also compared the results of the two groups after 6 months of experiment, and the results of the two groups showed a highly significant difference (P<0.O1), indicating that the improvement of the pilates core training effect of the experimental group was better than the general strength training effect of the control group.

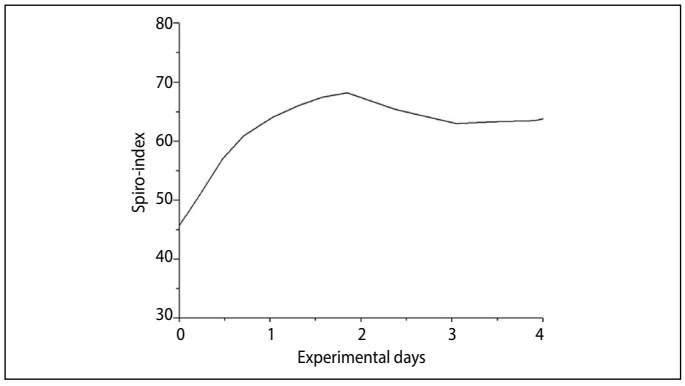

Figure 1. Muscle strength is affected.

Table 3. Comparison between the experimental group and the control group before and after the motion quality experiment.

	Before the trial	After the test	t	p
The experimental group	4.63±0.06	4.97±0. 05	- 24.98	P<0.01
The control group	4.64±0.06	4.74±0.05	-15. 00	P<0.01

DISCUSSION

Sports dance project for athletes have higher demand to the strength of the core area, on the one hand, core area as a whole, guarantee the power transmission from the feet, between the date of completion of the body and coordination, as the center of the dance movements, on the one hand, core muscles in the dance movements of isometric contraction and shorten the contraction, the muscle function is also changing in the process of dancing. Therefore, the methods of core stability training also have different degrees of influence on the core muscle strength of athletes.

According to the analysis of the movement, there is no obvious difference between the left and right sides in the static and dynamic movements. Experimental activation single muscle, to activate certain muscles when unilateral training, compared with double chain movement, is not affected by gravity, habits, etc, may double chain movement with the weight of the subjects, make power muscle change, change on both sides of the same muscle activation degree at the same time, as well as the Angle of varying degrees of muscle activation. Focus on muscle activation degree also plays a very important role, in the double chain, the participants will be easily skew towards strong side, the power to produce deviation, with the increase of muscle strength, the gap between strong and weak side side will be bigger and bigger in general is athletic level is not high, has had little impact on its body.

CONCLUSION

Compared with double chain core training, single chain core training has a smaller and stable influence on the difference between left and right sides of dancesport athletes, while double chain core training has a tendency to gradually enlarge the difference between left and right sides. After 12 weeks of training, sports dancers began to move asymmetrically. No matter single chain training or double chain training, there is no significant difference in the increase of waist strength and balance ability of sports dancers, only there is a difference between the left and right sides of the core area.

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