EFFECTS OF RAPID STRETCHING ON EXPLOSIVE POWER OF THE LOWER EXTREMITY IN LONG JUMP ATHLETES

EFEITOS DO ALONGAMENTO RÁPIDO NO PODER EXPLOSIVO DA EXTREMIDADE INFERIOR DOS ATLETAS EM SALTO EM DISTÂNCIA

EFECTOS DE LOS ESTIRAMIENTOS RÁPIDOS EN LA POTENCIA EXPLOSIVA DE LAS EXTREMIDADES INFERIORES DE LOS ATLETAS EN SALTO DE LONGITUD

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ABSTRACT

Introduction: The long jump is characterized by a high degree of combination of speed and strength. It belongs to the group of fast power items dominated by physical conditioning. To achieve good results in long jump, it is necessary to have good physical conditioning. Objective: In order to explore the effect of compound fast stretch training on the explosive power of lower limbs of athletes in long jump. Methods: Athletes from a certain city were selected as the research objects of the experiment, with a total of 100 people, and were divided into groups by random drawing, there were 50 people in the control group and 50 people in the experimental group, who received rapid stretching compound training. Results: After collecting the independent samples, statistical analysis was performed with T-test, the results showed confidence of P=0.09, higher than 0.05, indicating that there is no significant difference in the special performance of long jump between the two groups of students, the mean score of students in the experimental group was 0.13 meters higher than the control group. Conclusions: Rapid training composed of relaxation and contraction can effectively improve the special quality in long jump students. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Athletes; Muscle Stretching Exercises; Lower Extremity.

RESUMO

Introdução: O salto em distância é caracterizado por um alto grau de combinação de velocidade e força. Pertence ao grupo de itens de energia rápida dominados pelo condicionamento físico. Para alcançar bons resultados no salto à distância, é necessário ter bom condicionamento físico. Objetivo: A fim de explorar o efeito do treinamento composto de alongamento rápido sobre o poder explosivo dos membros inferiores dos atletas em salto à distância. Métodos: Atletas de uma determinada cidade foram selecionados como objetos de pesquisa do experimento, com um total de 100 pessoas, e foram divididos em grupos por sorteio aleatório, havia 50 pessoas no grupo controle e 50 pessoas no grupo experimental, que receberam treinamento composto de alongamento rápido. Resultados: Após a coleta das amostras independentes, efetuou-se análise estatística com Teste-T, os resultados mostraram confiança de P=0,09, superior a 0,05, indicando que não há diferença significativa no desempenho especial do salto em distância entre os dois grupos de alunos, a pontuação média dos alunos no grupo experimental foi 0,13 metros maiores que a do grupo controle. Conclusões: O rápido treinamento composto de relaxamento e contração pode melhorar efetivamente a qualidade especial nos alunos de salto em distância. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

Descritores: *Atletas; Exercícios de Alongamento Muscular; Extremidade Inferior.*

RESUMEN

Introducción: El salto de longitud se caracteriza por un alto grado de combinación de velocidad y fuerza. Pertenece al grupo de ítems de potencia rápida dominados por el acondicionamiento físico. Para conseguir buenos resultados en salto de longitud, es necesario tener una buena condición física. Objetivo: Explorar el efecto del entrenamiento de estiramiento rápido compuesto sobre la potencia explosiva de los miembros inferiores de los atletas en salto de longitud. Métodos: Se seleccionaron atletas de una determinada ciudad como objetos de investigación del experimento, con un total de 100 personas, y se dividieron en grupos por sorteo, había 50 personas en el grupo de control y 50 personas en el grupo experimental, que recibieron un entrenamiento de estiramiento rápido compuesto. Resultados: Después de recoger las muestras independientes, se realizó el análisis estadístico con la prueba T, los resultados mostraron una confianza de P=0,09, superior a 0,05, lo que indica que no hay diferencias significativas en el rendimiento especial de salto de longitud entre los dos grupos de alumnos, la puntuación media de los alumnos del grupo experimental fue 0,13 metros superior a la del grupo de control. Conclusiones: El entrenamiento rápido compuesto de relajación y contracción puede mejorar eficazmente la calidad especial en los alumnos de salto de longitud. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

Descriptores: *Atletas; Ejercicios de Estiramiento Muscular; Extremidad Inferior.*

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INTRODUCTION

In recent years, although the development of the long jump has made great progress in theory, there are still many problems in the actual teaching and competition process, mainly reflected in the following points. The backwardness of the long jump training concept, including the theory of achievement, the lack of long-term systematic training, the eagerness to achieve success, each participating team usually starts training a month or two before participating in the competition, resulting in uneven levels of each participating team and low quality of the competition.[1] The training methods are backward, and most coaches lack professional long jump training methods and experience, resulting in only blindly arranging single technical movements and physical exercises during training, lack of flexible, diverse and targeted combination exercises and actual combat drills for training topics, athletes are not motivated to train, the training effect is poor, and the level of long jump is slow to improve.[2] The training of the overall physical quality of the athletes is ignored, in the past long jump training, the physical training method of running in circles is generally used, it just blindly develops the endurance quality of athletes, while ignoring the development of other comprehensive physical qualities including speed, strength, agility, coordination, and explosiveness, it often leads to the lack of the advantages of athletes' overall physical quality, and occupies the lower part in the physical confrontation of the game.[3]

Based on this, the experimental subjects were divided into two groups to conduct teaching experiments respectively, the experimental group was trained by the selected fast-stretching compound training intervention method in the special preparation activities, and the control group was trained in the special preparation activities according to the conventional teaching design.

Experimental subjects and methods

Questionnaire survey method

The first is to determine the fast-stretching compound training method and its means, through the investigation and interview with experts and senior coaches, and then determine the targeted training methods, this plays a very critical role in the implementation: the second is to determine the index of lower extremity explosive power assessment, which will be beneficial to the effective implementation of later experiments.[4,5]

Experimental method

A total of 100 athletes from a city were selected as the research objects, and the experimental grouping was carried out by random drawing lots, there were 50 people in the control group and 50 people in the experimental group. The experimental subjects in both groups were all girls, and they had not received fast-stretching compound training.

Mathematical Statistics

Use spss21.0 and Excel2003 to input, organize and statistically analyze the obtained data, the selected 20 athletes were randomly divided into two groups for independent sample t-test, in order to avoid statistically significant differences, after the experiment, changes within groups were analyzed by paired-samples t-test and between-groups by independent-samples t-test, the results of the analysis were made into tables and graphs using excel software. If the statistical processing result $P < 0.05$, it proves that the two groups of data tested after the experiment have significant differences, if $P < 0.01$, it is proved that the two groups of data after the experiment have very significant differences, if $P>0.05$, it is proved that there is no significant difference between the two groups of data after the experiment.[6-8]

Experimental results

In the continuous 10-week teaching, the control group used traditional practice methods to practice special preparation activities, the experimental group used the selected fast-stretching compound training methods to practice special preparation activities, after the experiment, the five indicators of the two groups of athletes were tested, and the results are shown in Figure 1.

As can be seen from Figure 1, the T value of the 30-meter timed running of the two groups of athletes after the experiment was 0.202, the P value was 0.84, the P value is greater than 0.05, indicating that there is no significant difference in the 30-meter time running performance between the experimental group and the control group after the experiment; After the experiment, the T values of the standing triple jump, the 6-step approach-run five-level stride jump, the 6-step approach-run five-level single-leg jump, and the 10-step approach-take-off-leg long jump test scores of the two groups of athletes were all negative values, the P values were all less than 0.05, indicating that the two groups of athletes had significant differences in the four performances of standing triple jump, 6-step approach-five step jump, 6-step approach-run five-level single-leg jump, and 10-step approach-up take-off leg long jump, in addition, the fast-stretching compound training can promote the special quality of athletes in the long jump, which is better than the traditional teaching and training methods.[9]

The experimental group in the long jump teaching, use fast-stretching compound training for special preparation activities, the purpose is to improve the special quality level of athletes in long jump. After the experiment, the specific strength index of the group was tested and compared with the test scores before the experiment. The comparison results are shown in Figure 2.

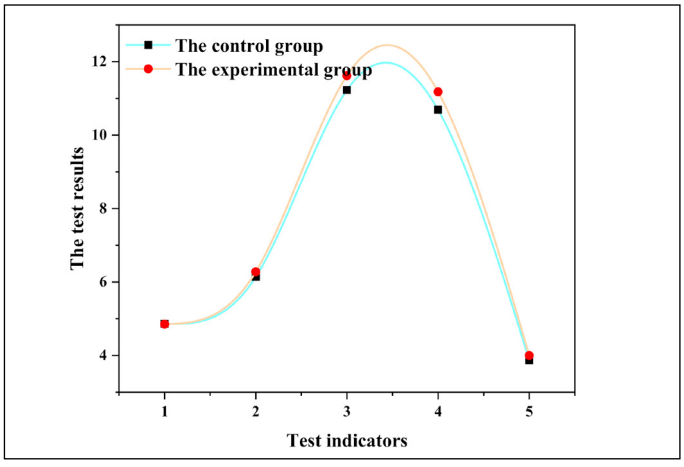

Figure 1. The test results of the special quality indicators of the two groups of students after the experiment.

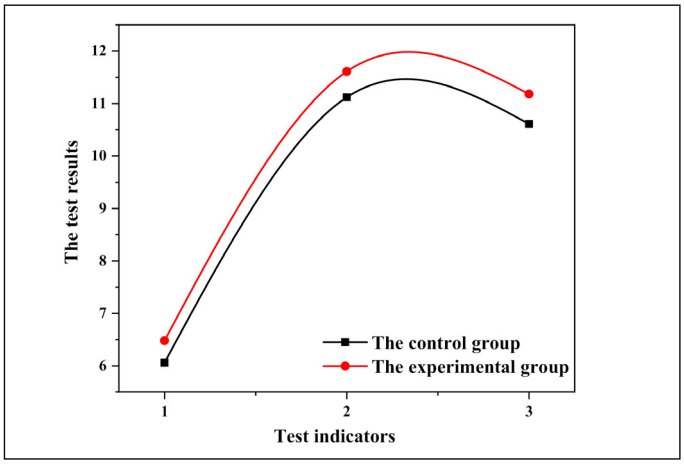

Figure 2. Comparison of the test scores of the special strength index before and after the experiment in the experimental group.

In Figure 2, the test results of the special strength indicators of the experimental group before and after the experiment are given, as can be seen from the figure, the scores of the three test indicators have improved, the average score before the standing triple jump experiment is 6.06 meters, and the score after the experiment is 6.28 meters, the increase was 3.63%; The average score before the 6-step approach and the 5-step jumping experiment was 11.12 meters, and the average score after the experiment was 11.61 meters, an increase of 4.41%; The average score of the 6-step run-up five-level single-leg jump test was 10.61 meters before the experiment, and the average score after the experiment was 11.18 meters, an increase of 5.37%.With very significant differences, it has been proved that fast-stretching compound training can very well help athletes improve the specific strength of long jump. After the experiment, the special strength index test data of the two groups of athletes were analyzed by SPSS, after the experiment, the test data of the special strength indicators of the two groups of athletes were tested whether there was any difference.[10] The specific results are shown in Figure 3.

It can be seen from Figure 3 that after the experiment, the performance of the experimental group in the special strength test items was significantly better than that of the control group. After the experiment, the average score of standing triple jump in the control group was 6.14±0.18 meters, the average score of 6-step approach-run five-level stride jump was 11.23 meters, and the average of 6-step approach-run five-level single-leg jump was 10.69 meters; After the experiment, the experimental group established an average triple jump score of 6.28 meters, an average of 6-step approach-run five-level stride jumps of 11.61 meters, and a 6-step approach-to-level five-level single-leg jump score of 11.18 meters. It shows that compared with the traditional teaching and training methods, the rapid expansion and contraction training can better improve the students' special strength quality, and has obvious advantages.[11]

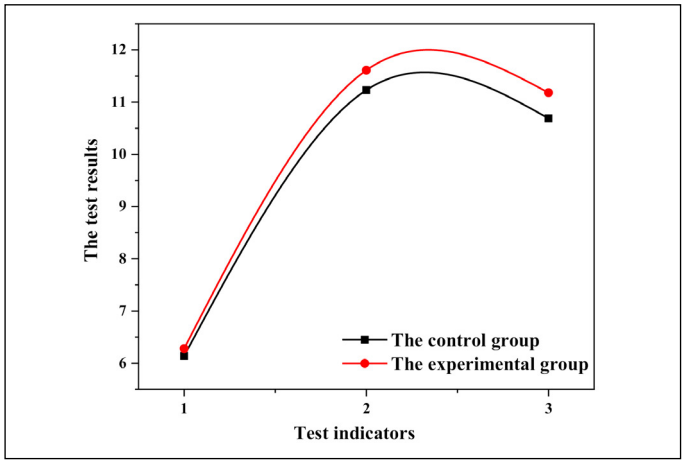

Figure 3. Comparison of the results of the special strength test between the control group and the experimental group after the experiment.

After the experiment, the students in the two groups were tested for their special performance in the long jump, each student had three chances to try the jump, and the best score was taken and recorded. The specific score is shown in Figure 4.

After the independent sample T test, the results showed that P=0.09, which was greater than 0.05, indicating that there was no significant difference between the two groups of students in the stand-up long jump, the experimental group is better than the control group in the special score, and the average score of the experimental group is 0.13 meters higher than that of the control group, this shows that compared with the traditional teaching and training methods, the fast-stretching compound training has better effects in improving the students' special performance in the long jump, although the difference is not significant, it is still significant.

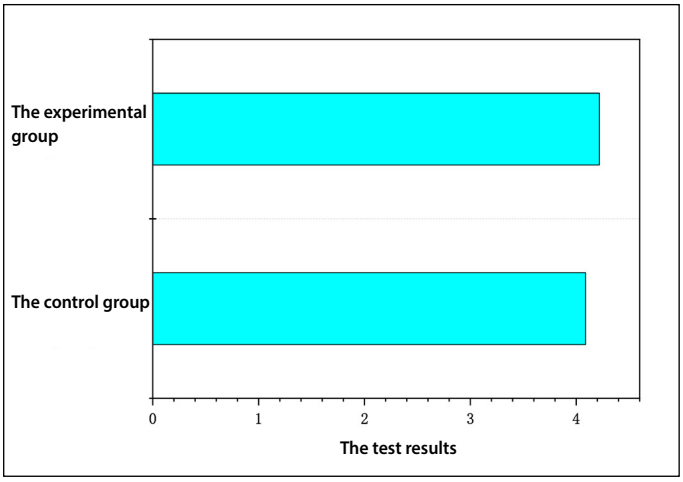

Figure 4. Comparison of the special scores of the two groups of students.

CONCLUSION

After the experiment, the test results of the physical fitness index of the stand up long jump in the experimental group have increased, and the test results before and after the experiment have no significant difference in the special speed index, however, in terms of special strength indicators and special jump indicators, there are significant differences between the two groups of students, and the fast-stretching compound training can effectively improve the students'special quality of the stand-up long jump. Fast-stretching compound training can use muscle elasticity and stretch reflex mechanisms, mobilize more motor units to make muscles produce greater contractile force, thereby promoting the improvement of specific strength quality, at the same time, by accelerating the take-off speed after the foot touches the ground, promote the improvement of athletes' special jumping quality.

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

AUTHORS' CONTRIBUTIONS: Each author made significant individual contributions to this manuscript. TL and XW: writing and performing surgeries; JW and BZ: data analysis and performing surgeries and article review; JX: intellectual concept of the article.

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