21 - EFFECTS OF PLYOMETRIC TRAINING DYNAMIC FORCE IN YOUNG PRACTITIONERS OF FUTSAL

RAFAEL FREITAS SANTOS SILVA[1]
ADELMO FRANCISCO MARIANO JUNIOR[1]
CEZIMAR CORREIA BORGES[1]
PAULO JOSÉ CARNEIRO PERFEITO[2]
MICHELE DO COITO RUZICKI [3]
[1.] FESG-FAFICH, Faculdade de Goiatuba, GOIÁS, BRASIL
[2.] Centro Universitário Unieuro, Brasília, Distrito Federal, Brasil
[3.] GESPORTE – UnB, Ministério do Esporte, Brasília, Brasil
rafaelfreitas_personal@yahoo.com.br

INTRODUCTION

Nowadays many children are getting into sports training in general. We know that physical activity, when practiced safely, brings numerous benefits to the child movement (NADALIN e NOVACK, 2011).

When it comes to physical training, regardless of its applicability, whether for performance in sports, recreational, health and esthetics, the methods and techniques of planning and execution are the targets of constant discussion and discussed with great emphasis on the everyday practices of professionals physical education, as are several key issues in science research in sports training. So-called "physical valences" applied to sports performances have been improved by many coaches across the method "plyometric" (MP).

Known as training or training of elastic elasticity, the MP has the purpose of developing maximum force, operates mainly in the lower limbs and can also be used to train member superiors (BARBANTI, 1986).

Plyometric exercises are defined as those that activate the eccentric-concentric cycle of skeletal muscle, leading to its potential mechanical, elastic and reflex. This cycle refers to the activities concentric preceded by an eccentric action, whose purpose is to increase the explosive force of muscle by the elastic energy storage in the pre-stretching and re-use during concentric contraction, in addition to activating reflex miotatic (PIRES e NAVARRO, 2010).

Some authors divide plyometrics in four basic forms: simple (less complex jumps), shock (jumping from higher planes to lower and depths), additional load (weight) and special equipment (weight machines). In this context, the types of hops used in the method plyometric training are basically three: horizontal jumps, where the athlete your body projected horizontally (jumping forward), vertical jump, with impulses up and on the spot, and jumps in depth that promote reactive power, where the athlete "fall" of a certain height, and cushion the fall after the other place (s) jump (s) (ALMEIDA e ROGATTO, 2007).

In according Dantas (2003), the motors skills and strength (power), travel speed, agility (described below), among others, are much required, where athletes need to perform "specific movements and powerful" characterized by explosive force.

With teenagers practicing soccer, especially in competitions at school level studies are scarce in this sense, the objective of this study was to evaluate the effects of plyometric training in youth 13 to 14 years in the development of lower limb strength (explosive force), agility and speed through six weeks of training.

METHODOLOGICAL PROCEDURES

This work meets the standards and guidelines of Resolution 196/96 of the National Health arranged for research involving humans. Study volunteers signed an informed consent form (Appendix I) about the risks and benefits of participating in the research.

Sample

Evaluated in this study were 18 students, school practitioners of the sport of indoor soccer in a project initiation school sports, with a mean age of 14.28 ± 0.61 years and mean height of 173.39 ± 7.10 cm and with feet percent 12,37 ± 1,41.

The volunteers were subjected to 6 (six) weeks of plyometric training, being held two times a week over 6 weeks with a volume of 15 minutes during the training of futsal, which included some plyometric exercises which lasted about five minutes for each group method specific plyometric exercise. As horizontal jumps through cones, vertical jumps and jump in depth. This last step of using a 40 cm where the student "badly" cushioning the fall and another training session it uses the same procedure, but to "hang" of time after the fall makes the damping more jumps. The stipulated time was 40 cm (BARBANTI, 1986).

The evaluation of students' height was measured at baseline and this must be measured the distance from the vertex to the region plantar (ROCHA, 1998). As this research did not have the stadiometer, we adapted a tape measure to the nearest 0.1 cm.

To evaluate the speed, we chose to test the "square" (ROCHA, 1998).

To check the speed of the test used was tested to 30 meters throw (ROCHA, 1998).

The vertical jump test was performed on a wall scaled up to 400 cm.

Since the horizontal push test was conducted with the individual standing, the zero mark on the scale of 400 cm, drawn on the floor.

Maximal dynamic strength of the lower limbs was evaluated by means of the 1 repetition maximum (1RM) on a leg extension machine multifunctional ACADMIX ® brand (MOURA, et. al. 1997).

The statistical analysis was performed using SPPS 13.0 software using descriptive statistics and correlation Person with a significance level * p <0.05 and ** p <0.01.

RESULTS

The results showed significant differences in testing for explosive strength in both lower limbs horizontal jump (table 2) and vertical jump (Table 3) after 6 weeks of plyometric training, as statistically significant (p = 0.000 and 0.013 respectively) compared to the average in the group of students before and after the intervention with the training protocol developed.

	Horizontal Jump (cm) pre-training	Horizontal Jump (cm) post-training	P value
MEAN , SD	187,68 ± 28,48	204,20 ± 21,87	0,000

Table 02 - Power of the lower limbs verified the horizontal jump

	Vertical Jump(cm) pre-training	Vertical Jump(cm) post-training	P value
MEAN , SD	29,28 ± 8,72	36,30 ± 6,45	0, 013

Table 03 - Power of the lower limbs verified the vertical jump.

We also noticed a significant difference in the agility test (square test) (p = 0.01), where tested moving from the initial cone to cone diagonally, running diagonally across the square, passing the last cone the clock is locked at the end of two attempts is recorded the fastest time in seconds and hundredths of seconds (GAYA e SILVA, 2007).

	Time (sec.) pre-training	Time (sec.) post-training	P value
MEAN, SD	7,20 ± 0,27	7,08 ± 0,27	0,01

Table 04 - Time in the agility test "test square".

When researching the method improves the speed of plyometric tested, we observed a significant difference in test 30 meters (Table 05), although not statistically different (p = 0.453).

	Time (sec.) pre-training	Time (sec.) post-training	P value
MEAN, SD	4,52 ± 0,38	4,48 ± 0,33	0,453

Table 05 - Time on speed test "test of 30 meters."

In the test of strength (Table 06) performed on a machine ACADMIX ® (leg extension) found that there was a significant difference, however there is an improvement in maximum strength of the lower limbs (p = 0.000).

	Maximum Load (kg) pre-training	Maximum Load (kg) post-training	P value
MEAN, SD	58,0 ± 13,66	68,2 ± 14,49	0,000

Table 06 - Strength in the 1RM test in leg extension.

Analyzing the correlation (r Person) between two variables (Table 07), the increase in lower limb strength (maximum force in the leg extension) as confounder was more significant for the increase after training in the horizontal jump and speed (r = 0.264 and -0.229 respectively), although not statistically significant (p <0.01) for the variables investigated.

	Horizontal Jump	Vertical Jump	*Agility	*Speed
MAXIMUM STRENGTH (Leg Extension)	0,264	0,210	-0,084	-0,229
P value	0,341	0,453	0,767	0,412

Table 07 - Values of correlation (r Person) between variables.

(*) As recorded negative values of reduced time (s)

DISCUSSIONS

The physical performance in many sports and the median income for every citizen has been studied in various scientific disciplines. The attempt is to determine its base and its components to allow them to increase effectiveness, and determine the best means of his developed (PIRES e NAVARRO, 2010).

The plyometric method, where athletes use sequence of jumps in training in a particular sport, there is a recent method. The Plyometrics refers to exercises that enable a muscle to achieve maximum strength in less time possible (DINTIMAN, 1999). But studies are performed to verify that this type of specific training is of good value are scarce.

Thus, data from this study could establish parameters of muscle function through tests of strength, agility and speed in which students practice soccer at the school level and can serve as references for future comparisons. In the group of students who took part in the research found significant differences in all tests. In the test of horizontal thrust which achieved a statistically significant difference (p = 0, 000) and the vertical jump test also statistically significant improvement (p = 0, 013), or, most improvements were evaluated in two tests, found in a similar study in 2010, where seven of the six participants in this study had an increase in the values of the horizontal thrust on the test without the help of the upper and 4 increased their values in the test with the help of upper limbs in relation to the comparison pre-and post- training (PIRES e NAVARRO, 2010).

Already in a less recent, 2004, no significant results were found in the test impulse horizontal8. The study aimed to clarify the effects of a training program jumps to 8 weeks with a frequency of 3 times per week with 13 players from a team of volleyball. The tests were used to jump and reach test (vertical jump) and horizontal impulse test, the findings from the jump and reach test was an improvement of 4% over the initial test, the test has no horizontal thrust no improvement.

Analyzing the speed tests (30 meters launched) and agility test (test box), we found that there was no statistically significant difference in the speed of the students after six weeks of plyometric training (p = 0.453), but agility was tested but a significant improvement (p = 0.001) and realize that this incorporation of the plyometric training of physicists in the sport of indoor soccer was also of great value, because the travel speed in indoor soccer is hardly important to the short field of play , has the agility, speed is changing direction is of great importance (GOMES, 2009). These findings were similar in a 2007 study where the authors investigated the effects of the method on the plyometric strength, agility and speed movement (ALMEIDA e ROGATTO, 2007). One researcher reported that the oldest "speed shows the strongest genetic determinant of all the physical performance, and can only be increased by 15% to 20%" (WEINECK, 1991).

BIBLIOGRAPHIC REFERENCES

1.ALMEIDA, G. Trentino de; ROGATTO, G. Puggina. Efeitos do método pliométrico de treinamento sobre a força explosiva, agilidade e velocidade de deslocamento de jogadoras de futsal. Revista Brasileira de Educação Física, Esporte, Lazer e Dança, v. 2, n. 1, p. 23-38, mar. 2007.

2.BARATA, Neyber Joaquin Fontes; GONÇALVES, Leila Castro; BARBOSA, Luis Carlos Acácio; CARNEIRO, Roseane Monteiro dos Santos; PINTO, Ricardo Figueiredo. Perfil de aptidão física dos alunos que praticam futsal. Revista Digital Fiep Bulletin, V. 80 – Special Edition – Article I, 2010.

3.BARBANTI, Valdir José. Treinamento físico: bases científicas. São Paulo: CRL Baleiro, 1986.

4.BOMPA, T. O. Treinamento de potência para o esporte. São Paulo: Phorte, 2004.

5.COSTA, Claiton Frazzon. Futsal: Aprenda a Ensinar. Florianópolis, SC: Visual Books, 2003.

6.DANTAS, E. H. M. A prática da preparação física. 5. ed. Rio de Janeiro: Shape, 2003.

7.DINTIMAN, George Blough. WARD, Robert D. TELLEZ, Tom. Velocidades no esporte. São Paulo: Manole, 1999.

8.FERRÃO, Marta Filipa Alves. Efeitos do treinamento pliométrico na capacidade se salto vertical e horizontal em jovens púberes. Dissertação de Licenciatura. Desporto da Universidade do Porto, 2009.

9.GARCÍA, J.E.; Aparicio, F.; OLIVEIRA, J.; Rodriguez, C. El Efecto Acumulado de un Programa de Entrenamiento de Saltos en Jugadoras de Voleibol de Cadetes Mayores. Revista Digital. Buenos Aires. Vol. 10. Num. 69. 2004.

10.GAYA, Adroaldo; SILVA, Gustavo. Manual de aplicação de medidas e testes, normas e critérios de avaliação. Projeto esporte Brasil. PROESP-BR. Porto Alegre, Julho, 2007.

11.GOMES, Antonio Carlos. Treinamento desportivo: Estruturação e periodização. 2ª Ed. Porto Alegre: Artmed, 2009.

12.GOULART, Natália B. A.; ANTUNES, Amanda H.; SCHMITZ, Vanessa T. B. et.al. Treinamento pliométrico: métodos de avaliação, benefícios a diferentes modalidades esportivas e comparação com outros tipos de treinamento. Rev. Arquivos em Movimento, Rio de Janeiro, v.7, n.1, p.86-103, jan./jun.2011.

13.MOURA, J.A.R.; ALMEIDA, H.F.R.; SAMPEDRO R.M.F. Força Máxima Dinâmica: Uma Proposta Metodológica para Validação do teste de Peso Maximo em Aparelhos de Musculação. Ver Kinesis 1997;18: 23-50.

14.NADALIN, Andre Luiz; NOVACK, Luis Fernando. Correlação entre variáveis antropométricas e desempenho físico de atletas de futsal sub-13. Revista Digital Fiep Bulletin, V. 81 – Special Edition – Article I, 2011.

15.PIRES, Patrícia.; NAVARRO, Antonio Coppi. O treinamento de 4 semanas de pliometria promove a melhoria no teste de impulsão horizontal na equipe adulta de voleibol masculino da universidade salgado de oliveira (universo). Revista Brasileira de Prescrição e Fisiologia do Exercício, São Paulo, v.4, n.21, p.287-294. Maio/Jun. 2010. ISSN 1981-9900.

16.ROCHA, Paulo Eduardo Carnaval Pereira da. Medidas e avaliações em ciências do esporte. Rio de Janeiro: SPRINT, 1998 – 3ª Ed.

17.SAMPAIO, Priscila Rangel. Eficácia dos métodos pliométrico e power training no desempenho do salto vertical em voleibolistas infantil e infanto-juvenil. Revista Digital Fiep Bulletin, V. 81 – Special Edition – Article I, 2011.

18.WEINECK, J. Biologia do Esporte. 1. ed. São Paulo: Manole, 1991.

Mailing Address:
Av João V. de Araújo, 462, São Januário
Centralina / MG, CEP 38390-000
Phone: (34) 3267-1856 / (34) 9999-3420.
rafaelfreitas_personal@yahoo.com.br

EFFECTS OF PLYOMETRIC TRAINING DYNAMIC FORCE IN YOUNG PRACTITIONERS OF FUTSAL

ABSTRACT

Plyometric training is aimed at the development of muscular power using the stretch-shortening cycle (CAE), which can be evaluated through the execution of specific jumps. To ascertain the effects of plyometric training in young people 13 to 15 years in the development of lower limb strength (explosive force), agility and speed through six weeks of training, underwent a plyometric training program, characterized by leaps vertical, horizontal and depth. The plyometric program was conducted in 15-minute sessions for 6 weeks 2x/week preceded by a physical workout. At the beginning and the end of the study were assessed vertical jump, the horizontal jumping, agility, and speed of displacement and maximum force with an MRI test. The speed of the tested non-significant improvement at the end of six weeks of plyometrics. It was concluded that plyometric training improved overall strength and agility of soccer players and has proved an important tool for physical training.

KEYWORDS: shock training, explosive strength, agility

EFFETS DE LA FORCE ENTRAINEMENT PLIOMETRIQUE DYNAMIQUE EN PRATICIENS DES JEUNES DE FUTSAL

RÉSUMÉ

La formation plyométrique visant le développement de la puissance musculaire en utilisant le cycle étirement-raccourcissement (CAE), qui peut être évaluée grâce à l'exécution de sauts précis. Pour connaître les effets d'entraînement pliométrique de jeunes de 13 à 15 ans dans le développement de la force des membres inférieurs (force explosive), l'agilité et la vitesse à travers six semaines de formation, a subi un programme de formation pliométrique, caractérisé par des sauts verticaux, horizontaux et de profondeur. Le programme de pliométrie a été menée en séances de 15 minutes pour 6 semaines 2x/semaine précédée par une séance d'entraînement physique. Au début et la fin de l'étude ont été évalués saut vertical, le saut horizontal, l'agilité et la vitesse de déplacement et la force maximale avec un test d'IRM. La vitesse de la testées non significatives d'amélioration au bout de six semaines de pliométrie. On a conclu que l'entraînement pliométrique meilleure résistance globale et l'agilité des joueurs de football et a révélé être un outil important pour l'entraînement physique.

MOTS-CLÉS: la formation de choc, la force explosive, l'agilité

EFECTOS DE LA FUERZA DE ENTRENAMIENTO PLIOMÉTRICO DINÁMICA EN JÓVENES PRACTICANTES DE FÚTBOL SALA

ABSTRACTO

El entrenamiento pliométrico está dirigido al desarrollo de la fuerza muscular con el ciclo de estiramiento-acortamiento (CAE), que puede ser evaluado a través de la ejecución de saltos específicos. Comprobables a los efectos del entrenamiento pliométrico en jóvenes de 13 a 15 años en el desarrollo de la fuerza de las extremidades inferiores (fuerza

explosiva), la agilidad y por la velocidad y seis semanas de entrenamiento, se sometió a un programa de entrenamiento pliométrico, que se caracteriza por saltos verticales, horizontales y de profundidad. El programa de entrenamiento pliométrico se llevó a cabo en sesiones de 15 minutos durante 6 semanas 2x/semana precedida por una sesión de ejercicios físicos. Al principio y al final del estudio se evaluaron de salto vertical, el salto horizontal, agilidad y velocidad de desplazamiento y fuerza máxima con el año de prueba de resonancia magnética. La velocidad de la mejora no significativa prueba al final de seis semanas de ejercicios pliométricos. Conclusión de que era el entrenamiento pliométrico mejora de fuerza y agilidad de los jugadores de fútbol y el año ha demostrado ser importante herramienta para el entrenamiento físico.

PALABRAS CLAVE: entrenamiento de choque, la fuerza explosiva, agilidad,

EFEITOS DO TREINAMENTO PLIOMÉTRICO NA FORÇA DINÂMICA EM ADOLESCENTES PRATICANTES DE FUTSAL

RESUMO

O treinamento pliométrico tem por objetivo o desenvolvimento da potência muscular através da utilização do ciclo alongamento-encurtamento (CAE), que pode ser avaliado por meio da execução de saltos específicos. Objetivando verificar os efeitos do treinamento pliométrico em jovens de 13 a 15 anos, no desenvolvimento da força de membros inferiores (força explosiva), agilidade e velocidade por meio de seis semanas de treinamento, foram submetidos a um programa de treinamento pliométrico, caracterizado por saltos verticais, horizontais e em profundidade. O programa de pliometria foi realizado em sessões de 15 minutos 2x/semana durante 6 semanas precedidos de um treino físico. No início e ao final do estudo foram avaliadas a impulsão vertical, a impulsão horizontal, a agilidade, e a velocidade de deslocamento e a força máxima com o teste de 1 RM. A velocidade dos testados não obteve melhora significativa ao final das seis semanas de pliometria. Concluiu-se que o treinamento pliométrico melhorou a força em geral e a agilidade de jogadores de futsal e se mostrou uma ferramenta importante para o treinamento físico.

PALAVRAS-CHAVE: Treinamento de choque, força explosiva, agilidade