154 - SIMULTANEOUSLY T TRAINING IT IMPROVES ADAPTATIONS NEURAL IN BEGINNING IN THE PRACTICAL ONE OF PHYSICAL EXERCISE

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INTRODUCTION

The association of the resisted exercises and aerobic exercises in one same session or period of training is understood for simultaneously training (GUEDES, 2004).

As one of the very methods used in studies that seek to understand the behavior of neural some variables, the Eletromiography of periphery (EMG) thet can be defined as the technique of capturing the potential electricity generated in the muscles, therefore, enables the study of the neural muscle function from the detection of the electrical activity generated and expressed by Signal Middle Retified (RMS) that has with the micro measure (V) has a breakthrough of current studies. (POLLOCK, 2000).

The main research approaches the hypothesis of that the simultaneously training would provoke a inhibition of associated the acute and chronic adaptativa reply to one second activity as, for example, the neural effect, the enzymatic, endócrinas adaptations and neuromusculares (FLECK, KRAEMER, 1999).

In this direction, some authors had suggested that the competing training could harm the development of the force, hipertrofia and muscular power due to difference of neural adaptations (BELL, 2000; FLECK, KRAEMER, 1997).

Fleck, Kraemer, (1997); suggests that the main effect the neural level would be demonstrated by the increase of the level of muscular co-activation and by the reduction of the capacity of activation of the motor units in the resisted exercise.

Other authors had evidenced that the force was harmed by the lesser degree of hipertrofia reached with the competing training, caused for a negative supercompensation (BELL, 2000; LEVERITT, 1999; Kraemer, 1995)

However, Abernethy, (1993); Mc Carthy, (2002) in its studies, will not find interference positive or negative on the force and the hipertropy, the same it did not happen with the power that suffered negative interference from the aerobic exercise. On the other hand, studies exist that they indicate that the competing training would not harm the development of the aerobic capacity, and that it can until improved adaptations in the as so efficien.

To explain the negative effect the force simultaneously literature has presented three possible mechanisms, being: the effect chronic, in which some of the adaptations caused for the two forms of training would be antagonistic, the acute effect, in which the aerobic training would harm the degree of tension developed in the resisted exercise, and the effect of the Overtraning, where the high volume of training and the inadequate recovery would provoke a fatigue state (CAETANO et al, 2005).

Population and sample

The population of the present study was formed by colleges student of the masculine sex, voluntary, beginning in the practical one of musculação.

The sample totalized 12 males, divided in two called groups: Specific training group (TF) with n = 6, average of age 28,5 years (+9,46), simultaneously Training: (TC) with n = 6 with age average 28,5 years (+8, 63). All individuals had agreed voluntary participating of the study, signing a term of informed assent. The use of the images (photos) was assented by means of individual declaration of each male.

The experimental protocol was approved by the Committee of ethics in Pesquisa (CEP) of the University of the South Extremity Catarinense - (UNESC) in result to involve human beings. The procedures had been lead according to specific resolution of the National Advice of Health (nº 303/00).

Coleccting data

To obtain data on the activation and muscle co-activation muscle used to be an EMG and EMG biofeedback-System where the subjects performed a series of repetitions of the exercise of maximum elbow flexion with 70% of the maximum load, it is evaluating the level electrical activity of muscle agonist and antagonist through Eletromiografia surface (EMG) with Bipolar configuration, analyzing the record of the biceps and triceps muscles of the right arm for interpretation of Signal Retified Foundation (RMS), V).

Data Antropométricos, skin folds of the tricepsexpressed in micro Voltz and biceps circumference of the arm and contracted form obtained using a plicometro Brand Cescorf and a tape measure Brand Cardiomed following the standardization of Petroski, (2003). For the testing of force on maximum proposed by Baechele, (1992), and the year resisted during the training were used bar 6 of 8 kg and rings of 1 kg to 10 kg Righetto used the tracking volume and the training was intesidade performed with twelve stopwatches and six frequencímetro Brand polar.

Search Procedures

The subjects were subjected to the evaluation morpho performing measures Antropométricas, test of strength for maximum, EMG surface at the beginning and end of the training program.

The protocols were training period of 4 weeks totaling seven sections of training, where: group TF, made specific strength training, the groups TC took first the aerobic exercise following the exercise resisted.

The exercise was conducted aerobic walk and run continuously monitored by the Fc. Max. Taking as a basis for calculating the proposed Karvonem, and the exercise was conducted resisted flexion of the elbow in a position orthostatic.

Table 1 - **Protocol of training**

	Week	Exercise	Volume	Intensity	Exercício	Séries	Repetitions
				Interval	Intensity		
1ª	Aeróbc	20	60%	Força	8	10 a 12	2min	60%
2ª	Aeróbc	25	60%	Força	7	8 a 10	2min	65%
3ª	Aeróbc	30	65%	Força	6	6 a 8	2,5min	70%
4ª	Aeróbc	30	65%	Força	5	4 a 6	3min	80%

Analysis of data

The data so analyzed using SPSS statistical program 11-0.5 results comparing pre-training and post-training checking their behavior through descriptive measures, average and the standard deviation with level of statistical significance of $p < 0.05$.

Results

Table 2 - Comparison of the 0 variable circumference (cm), somaório (?) of the folds of tríceps (TR) and the biceps (BC) (mm), maximum force (Kgf), activation and muscular co-activation in RMS (mV), daily pay training and after-training

	Treining simultaneously x Treinamento Forçe			
	bifor-training		afyer-treining	
Variable	(TC). average	(TF) average	(TC). average	(TF) average
Maximum força	23,84 (± 5,34)	28,48 (±4,27)	26,63 (±5,61)	30,57 (±4,16)
Activation	1478,15 (±1423,83)	868,54 (±297,73)	1548,11 (±1177,16)	811,44 (±247,13)
Co-activation	236,11 (± 364,47)	54,23 (±12,89)	209,22 (±384,97)	58,58 (±19,53)
Circunferce	31,80 (±4,05)	31,16(±2,48)	31,96±4,13)	31,25 (±2,58)
? folds(TR, BC)	18,58 (±7,45)	16,00 (±5,46)	18,75 (±7,42)	16,00 (±5,46)

The results demonstrate that the maximum force with average values daily bifor-training of (TC) 23,84 (+ 5,34) e (TF) 28,48 (+4,27) and after-training (TC) 26,63 (+5,61) with significance (p > 0,92) e (TF) 30,57 (+4,16) with significance (p>0,67) presenting average differences of (2,79 TC) Kgf and (2,09 TF) Kgf demonstrating that (TC) it got greater average difference, however, such results had not presented significance statistics suggesting itself that resulted significant they could be reached with periods of bigger training.

As observed for Mendes et al., (2005) thet verify the impact of eight weeks of training with weights TF on the muscle force where it submitted 23 men and 15 women to a program of TF for the different muscle groups during eight weeks consecutive. The individuals had presented profits in the absolute force where the results had pointed that the period of eight weeks of TF seemed to be enough to promote significant modifications in the muscular force.

Another study carried through for Hakkinen et al., (1998), using eletromiography analyses, verified the muscular activation and the co-activation of the antagonistic muscles of men and women folloied during six months of TF. The partial results had jointly indicated that after eight weeks of (TF) already significant increase in the total muscle activation had occurred (EMG), with the reduction in the co-activation of the antagonistic muscles in both the groups, resulting in increases accented in the levels of muscle force.

The average increases of the force demonstrated by the group TC do not corroborate with Leveritt and Abernethy, (1999) that they had verified attenuation of the force with application of protocol TC in inferior members in the agachamento exercise, after an intermittent activity carried through in the cycle ergometer above of 70% of the Fc Max. with in one exactly group with isolated tests. The force test consisted of three maximum repetitions until the fatigue with load of 80% of 1RM. In the condition control it presented resulted 13,83 respectively (+5,71), 8,83 (+2,99), 11,17 (+4,45), in test the 8,17 (+3,6), 10,17 (+2,99), 10,17 (+5,71), 8,83 (+3,54). It had significant reduction in I number it of maximum repetitions of the test condition compared with the condition has controlled where the authors had concluded that the acute fall in the force production after the aerobic exercise could compromise the development of the force.

This analysis suggested that TC carried through with white zones of training that predominate same energy substratum source, utilizan members with effective participation in both the exercise forms, requesting both predominantly staple fibre conscription type 2 not apropriate when it is desired to develop the force.

The levels of muscle activation had presented different behavior in both the groups, where the muscular activation with average values daily bifor-training of group (TC) 1478,15 (+1423,83) and after-training (TC) 1548.11 (+1177,16) had demonstrated an increase of the levels of activation with the applied training. Already the group (TF) the muscular activation with average values daily pay-training 868,54 (+297,73) and after-training 811,44 (+247,13) demonstrated a reduction of the activation levels.

When if it compares the force level daily bifor-training of both groups (TC) 23,84 (+ 5,34) e (TF) 28,48 (+4,27) with the activation levels daily bifor-training (TC) 1478,15 (+1423,83) e (TF) 868,54 (+297,73) we observe that bigger levels of force daily bifor-training gotten by group (TF) 28,48 (+4,27) were presented folloied of lesser levels of activation (TF) 868,54 (+297,73) when compared with group (TC) 1478,15 (+1423,83), where can be suggested that bigger values of agonista activation necessarily do not reflect greaters potential of force when compared different individuals.

However when we observe the values after-training where it stops maximum force (TC) 26,63 (+5,61) activation 1548.11 (+1177,16) and maximum force (TF) 30,57 (+4,16) activation 811,44 (+247,13) we observe that both the manifestations can reflect in force increases, either for increase or reduction of the activation. levels.

In such a way, we suggest an interpretation different of Abernethy, (1993) that it verified in its studies a reduction in the levels of activation in extensores of the elbow with training of force and aerobic resistance in colleges student associating the attenuation as responsible mechanism for the reduction of the force potentials.

Suggesting itself that with the reduction what would occur would be the improvement of the synchronism of the motor units, and for the increase, an improvement in the size of the conscription would occur, that is, would start to enlist greater numbers of motor units, proving itself in this study that the improvement in the synchronism would present greater trend more significantly to improved adaptations in the as so efficien the profits of comparative force to the increase of the conscription.

However, the degree of initial treining of the groups must also be considered, where the group (TF) for having presented bigger values daily pay-training would explain a less significant improvement. Therefore according to Zakharov (1992) how much bigger the degree of treining of the individual, minor is the potential of advance with the physical training.

The changeable muscle co-activation presented modifications in both the groups represented for the average values daily bifor-training of (TC) 236.11 (+ 364,47) e (TF) 54,23 (+12,89) and after-training of (TC) 209,22 (+384,97) e (TF) 58,58 (+19,53) demonstrating to a reduction of 26,86 RMS in the group (TC) and an increase of 4,35 RMS group (TF), proving bigger trend the contraction of the antagonistic muscle to the group (TF) and a trend to a reduction in the contraction of the antagonistic muscle to the group (TC) being able itself to suggest that the simultaneously training presented more good resulted for reduction ofthe co-activation being able to justify the biggest trend for the increase of the force.

In such a way, we find in our studies different data literature as cited for Leveritt, 1999; Hakkinen (1998) that they affirm to occur a reduction of the levels of co-activation with the force training, however, in its protocols, the antagonistic muscles had been trained.

The anthropometry data represented by the changeable a circumference with average values daily pay-training of group (TF) 31,16 (+2,48) and after-training 31,25 (+2,58) with level of significance (p > 0,85) e (TC) daily pay-training 31,80 (+4,0) and after-training 31,96 (+4,13) with level of significance (p > 0,84). In the same way, the 0 variable (?) biceps/tríceps represented by the average values of the group (TF) daily pay-training of 16,00 (+5,46) and after-training 16,00 (+5,46) with TC and level of significance (p > 1,00) daily pay-training 18,75 (+7,42) after training 18,58 (+7,45) with level of significance (p > 0,96) do not demonstrate alterations corroborating with other authors who the initial increase of the force occurs mainly for neural factors.

Conclusion

The results suggest that the TC empowers increases in strength similar to the TF, where both forms of training provides

activation in different settings, and the TC increases the recruitment of motor units and the timing of TF improves.

The group showed a reduction in TC Co-activation, suggesting that aerobic exercise not dampened the development of between muscle coordination, as shown better results when compared to the group TF

It highlights the need of carrying out further studies seeking to evaluate the effects of co-activation using protocols that train the muscle antagonist and with periods of training over 08 weeks seeking greater statistical significance for better understanding of the behavior of neural effects of the gains strength since in our studies this variable not contributed to gains in strength in the group TF shown by increases in RMS antagonist and the current literature indicates how positive factor for enhanced strength with this form of training.

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SIMULTANEOUSLY T TRAINING IT IMPROVES ADAPTATIONS NEURAL IN BEGINNING IN THE PRACTICAL ONE OF PHYSICAL EXERCISE

ABSTRACT

The main research regarding the simultaneously training that associates the aerobic exercise to the resisted exercise in the same section of training this investigates neural and morphology adaptations. This study to has as its main objective analyze the effect of the simultaneously training in the activation and muscle co-activation when compared with the specific Force Training. It study was formed by 12 males: group Training Force (TF) n = 6, average age 28,5 years (+9,46); group Simultaneously Training: (TC) n = 6, average age 28,5 years (+8, 63), For collection of data used circumference of the arm, (?) (DC) of tríceps and biceps, test of relative force, Eletromiophy de periphery For treatment of the data SPSS 11-5 with significance was used statistics (p<0,05). Results: 1) Maximum force daily pay-training (28,48 TF) kgf (+4,27); (TC) 23,84 kgf (+5,34); after-training (30,57 TF) kgf (+4,16); (TC) 26,63 kgf (+5,61) demonstrated the average increases of the force in both 2 groups) muscle activation daily pay-training (TF) 868,54 (mV) (+1423,83); (TC) 1478,15 (mV) (+1423,83); after-training (TF) 811,44 (mV) (+247,13); (TC) 1548.11 (mV) (+1177,16); it swoweed increases in the conscription of the group (TC) and improved in the synchronism of conscription in the group (TF). 3) co-activation daily pay-training (TF) 54,23 (mV) (+12,89); (TC) 236.11 (mV) (+364,47); after-training (TF) 58,58 (mV) (+19,53); (TC) 209,22 (mV) (+384,97); it presented reduction only in the group (TC). Conclusion: The results suggest that the simultaneously Training improved adaptations in the as so efficient as the Training of Force; Group (TC) presented better neural adjustments represented by the reduction in the co-activation.

KEYWORD: Resisted Exercise, Aerobic Exercise, Eletromiophy for Perifery

T SIMULTANÉMENT ELLE AMÉLIORE LA FORMATION DES ADAPTATIONS EN DÉBUT DE NEURONES DANS LA PRATIQUE DE L'EXERCICE PHYSIQUE

RESUMÉ

Les principaux axes de recherche concernant la formation qui associe simultanément l'exercice aérobie résisté à l'exercice dans la même section de la formation de neurones cette enquête et de la morphologie des adaptations. Cette étude a pour objectif, qui est son principal analyser l'effet de la formation simultanément à l'activation des muscles et la coopération lors de l'activation par rapport à la Force de formation spécifiques. Il a été formé par 12 hommes: Formation de groupe Force (TF) N = 6, âge moyen 28,5 ans (+9,46); Simultanément, la formation de groupe: (TC) N = 6, âge moyen 28,5 ans (+ 8, 63), pour la collecte des données utilisées circonférence du bras, (?) (DC) et du biceps tríceps de test de relative vigueur, de la périphérie Eletromiophy Pour le traitement des données SPSS 11-5 a été utilisé avec signification statistique (P <0,05). Résultats: 1) la force maximale salaire journalier de la formation (28,48 TF) kg (+4,27); (TC) 23,84 kg (+5,34); Après la formation (30,57 TF) kg (+ 4,16); (TC) 26,63 kg (+5,61) a démontré la moyenne des augmentations de la force dans les deux groupes 2) l'activation des muscles salaire journalier de formation (TF) 868,54 (mV) (+1423,83); (TC) 1478,15 (mV) (+1423,83); Après la formation (TF) 811,44 (mV) (+247,13); (TC) 1548.11 (mV) (+1177, 16); Il swoweed augmentations de la conscription du groupe (TC) et à l'amélioration de synchronisme de la conscription dans le groupe (TF). 3) l'activation de la coopération salaire journalier de formation (TF) 54,23 (mV) (+12,89); (TC) 236.11 (mV) (+364,47); Après la formation (TF) 58,58 (MV) (+19,53); (TC) 209,22 (mV) (+384,97); Elle a présenté réduction seulement dans le groupe (TC). Conclusion: Les résultats suggèrent que l'amélioration de la formation simultanée des adaptations dans le efficace ainsi que la formation de la force; Groupe (TC) a présenté une meilleure neuronaux ajustements représentée par la réduction de l'activation de la coopération.

MOTS CLÉS: Se Exercise, Aerobic Exercise, Eletromiophy pour Perifery

ENTRENAMENTO SIMULTÂNEO POTENCILIZA ADAPTACION NEURAL EN INDIVIDUOS INICIANTES EN LA PRÁCTICA DE EJERCICIO FÍSICO

RESUMEN

Investigaciones atuales encerca del entreinamento simultaneo que asocia los ejercicio aerobio e resistido en una misma sección de entreinamento buscan investigar adaptaciones nervios y morfologicas. Se objetivó en este estúdio verificar el efecto del entreinamento simultaneo en la activación y co-ativacion muscular cuando comparado al entreinamento Fuerza específico. La amuestra fue formada por 12 del sexo masculino: grupo de entreinamento Fuerza (TF) n = 6, promédio de edad 28,5 años (+9,46); grupo entreinamento simultaneo: (TC) n = 6, promédio de edad 28,5 años (+ 8, 63). Para la coleta de se utilizó la circunferencia del brazo, (?) (DC) del tríceps y bíceps, prueba de fuerza relativa, Eletromiofia de superfici Para el tratamiento de los datos se utilizó SPSS 11-5 con significacia estadística (p. <0,05). Resultados: 1) Fuerza máxima pre-entreinamento (28,48 FF) kgf (+4,27); (TC) 23,84 kgf (+5,34); poste-entreinamento (30,57 FF) kgf (+ 4,16); (TC) 26,63 kgf (+5,61) demuestró aumentos medianos de la fuerza en ambos los grupos; 2) Activación muscular pre-entreinamento (TF) 868,54 (mV) (+1423,83); (TC) 1478,15 (mV) (+1423,83); poste-entreinamento (TF) 811,44 (mV) (+247,13); (TC), 1548.11 (mV) (+1177, 16); demuestró en el reclutamiento del grupo (TC) y la mejora nel sincronismo de reclutamiento en el grupo (TF). 3) Co-aticacion pre-entreinamento (TF) 54,23 (de mV) (+12,89); (TC), 236.11 (de mV) (+364,47); poste-entreinamento (TF) 58,58 (mV) (+19,53); (TC) 209,22 (mV) (+384,97); Presentó reducción solamente en el grupo (TC). Conclusión: Los resultados sugeren que el entreinamento simultaneo potencializó adaptaciones en fuerza tan eficientes quanto el entreinamento fuerza especifico; el grupo (TC) presentó mejores ajustes neuronales representados por la reducción en la co-activación.

PALABRA CLAVE: Resistido Ejercicio, Ejercicio Aeróbio, Eletromioia de Superfici

TREINAMENTO CONCORRENTE POTENCIALISA ADAPTAÇÃO NEURAL EM INDIVÍDUOS INICIANTES NA PRÁTICA DE EXERCÍCIO FÍSICO.

RESUMO

Pesquisas atuais a respeito do treinamento concorrente que associa os exercícios aeróbio e resistido em uma mesma seção de treinamento buscam investigar adaptações neurais e morfológicas. Objetivou-se neste estudo verificar o efeito do treinamento concorrente na ativação e co-ativação muscular quando comparado ao treinamento de força específico. A amostra foi formada por 12 sujeitos do sexo masculino: grupo Treinamento Força (TF) n = 6, idade média 28,5 anos (±9,46); grupo Treinamento Concorrente: (TC) n = 6, idade média 28,5 anos (±8, 63), Para coleta de dados utilizou-se circunferência do braço, (?) (DC) do tríceps e bíceps, teste de força relativa, Eletromiografia de Superfície. Para tratamento dos dados utilizou-se SPSS 11-5 com significância estatística (p<0,05). Resultados: 1) Força máxima pré-treinamento (TF) 28,48 kgf (±4,27); (TC) 23,84 kgf (±5,34); pós-treinamento (TF) 30,57 kgf (±4,16); (TC) 26,63 kgf (±5,61) demonstrou aumentos médios da força em ambos os grupos 2) ativação muscular pré-treinamento (TF) 868,54 (V) (±1423,83); (TC) 1478,15 (V) (+1423,83); pós-treinamento (TF) 811,44 (V) (±247,13); (TC) 1548,11 (V) (±1177,16); demonstrarou aumentos no recrutamento do grupo (TC) e melhora no sincronismo de recrutamento no grupo (TF). 3) co-ativação pré-treinamento (TF) 54,23 (V) (±12,89); (TC) 236,11 (V) (±364,47); pós-treinamento (TF) 58,58 (V) (±19,53); (TC) 209,22 (V) (±384,97); apresentou redução apenas no grupo (TC). Conclusão: Os resultados sugerem que o Treinamento Concorrente potencializou adaptações na força tão eficientes quanto Treinamento de Força específico; O grupo TC apresentou melhores ajustes neurais representados pela redução na co-ativação.

PALAVRAS-CHAVE: Exercício Resistido, Exercício Aeróbio, Eletromiografia de Superfície.