

#### 44 - ALTERATIONS IN THE CREATINE KINASE CONCENTRATIONS DERIVING OF THE TRAINING OF COMBAT IN ATHLETE OF KUNG FU.

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#### INTRODUCTION

The martial arts have exerted great influence in the human being have millenia. With the coming of masters of martial arts for ocidente in the decades of 20, 30 and 40 these had conquered adepts, in the most diverse occidental nations . Today, the easiness in if training martial arts are high . In view of this great expansion of the martial arts and the entrance of some of these in the olimpic universe, the science of the training starts to study the physiological effect and biochemists of these practical in the human being . Amongst the diverse modalities of martial arts, kung fu has its prominence as a martial modality, that since 1950, comes suffering modifications with intention from if becoming a Olimpic modality, being then called Kung fu-Wushu . Kung fu-Wushu possesss an enormous fan of combat techniques, being that the combat of the Kung fu-Wushu called Sanshou. The main techniques sanshou of it, are: 1.Chuan: fist techniques (punchs); 2. Jiao: techniques of legs (kicks); 3. Shuai: techniques of grappling (falls) .

The science of the porting training modern spear hand of diverse ways for evaluation, lapsing and control it training , being the tests: Not-invasive, that the physical mensuração of valences and capacities say respect, such as: force, flexibility, VO2máx., among others. The invasive tests that supply important data concerning the organic answers, subsidizing the taking of adjusted decision more, a time that, given invasive as given hematologics and biochemists, they indicate trully as the organism of the athlete perceives the training.

The technology if has shown indeed important in what it refers to the inquiries of the true effect of the physical activity and the training on the diverse systems that form the organism . However, for trustwother results regarding the effect of the training it is advisable that invasive techniques are used, that is, sanguine examinations, among others, searching to mensurar and to interpret given biochemists .

The exercise all corresponds to a great challenge the human organism , the homeostas in addition on account of the exercise cause almost instantaneous modifications as the increase of the cardiac Frequency, of the temperature, hemodinamics alterations and clearly, biochemists , being these modifications called acute effect of the exercise. In the present time diverse marking biochemists have been used wide for the science of the exercise for invasive measurement of the acute effect of the training and as to assist in the taking of decisions how much to the maintenance or modification of the training strategies .

Creatine kinase, also known as CK or PCK or more necessarily the muscular enzyme creatine kinase is a specific enzyme of staple fibres of the skeleton muscles and cardiac . In case of increase of its concentrations in the peripheral circulation it has indication of possibility of injuries and or alterations in the permeability of the membrane of muscular staple fibres, being that, in general the modification of the permeability of the membranes occurs for injuries, deriving of great efforts, traumas, for poisonings . As they tell Torres, Carvalho e Duarte , the total CK is an excellent pointer of injury of the skeleton muscles.

The total CK is the first enzyme to have its levels raised in case of muscular injury, reaching the biggest concentrations and coming back to normality before the excessively marking biochemists . The more miofibrils injury, bigger will be the plasmatic concentration of the CK .

The total CK can be classified in: the CK-MM (muscle) found in the skeleton muscles, the CK-BB (brain) found specifically in the brain and the CK-MB that found exclusively in the cells of the cardiac skeleton muscles, being this last excellent marker biochemist for infarte acute of the myocardium, whereas the CK-MM is found in individuals with muscular injury, shock, surgeries or injury for muscular effort .

The measurement of data biochemists such as the creatine kinase (CK), among others supplies many answers concerning the effect of the training on the systems, in the case of the marker above cited, the system skeleton muscle .

On the other hand, the analysis biochemist can identify situations as teciduais injuries, and still, serve as subsidy for the control of 0 variable of the training as the intensity . Before the cited information however, the present study it had for objective to investigate the alterations of the deriving concentrations of CK of a session of training of sanshou.

#### MATERIALS AND METHODS

A 20 individuals of the masculine sort had participated of this study, chosen of random form between the athletes sanshou with at least one year of experience in competitions, with register in the Association International Chan Lee kung fu-RIO DE JANEIRO, tied with the Federacy of Kung fu of the State of Rio De Janeiro, with age of  $22.42 \pm 4,4$  years (MEDIUN  $\pm$  SD), weight  $67,07 \pm 8,6$  kg, stature  $170,7 \pm 5,3$  cm and percentage of fat  $10.42$  fat of  $\pm 3,3$ , healthful ones, that they had not presented no type of injury or opportunist illness for at least one month before the experimental protocol. They had not made use of dietary supplement, medicines or esteroids, presented in the examination, beyond characteristic biochemists and controlled hematologics. The participants had been informed on the procedures of the experience and the possible discomforts associates to the study at the moment who had signed the term of assent for participation of the research and approved by the committee of ethics of institution of superior level. For the collection, preservation, transport, measurement and analysis of the data biochemists a specialized laboratory was contracted.

The individuals had suffered the first one collect to 6hs after one jejum of 12 hours, configuring this, the initial state of the athletes (rest). After the first one collects the athletes had had one desjejum, elaborated for a nutritionist, being this composition for: An apple, a banana, a sandwich (bread sliced with cheese and ham), a yoghurt small e a refreshment of guaraná. Such desjejum was elaborated in accordance with the specific necessities of the sport. One hour after desjejum if initiated the

training under protocol applied sanshou to it that it had for base the system of combat training, following as norteador axle the studies carried through for Guimarães et al , Cordeiro, Guimarães e Baptista , e the lines of direction of the Brazilian Confederation of Kung fu Wushu (CBKW) and of the International Wushu Federation (Iwuf) . The exercises had been carried through in maximum intensity being reflected of this the concentrical imperfection and or loss of the effectiveness in the movements. The protocol if developed below as:

Heating: 10 minutes of race submaximal, of exercises of arms with 15 the 25 repetitions an allonge and, a series series abdominal with 40 the 50 repetitions for acquittal:

Main part: Intermittent race (with speed variation), suffering intervals for the accomplishment from - exercises of arms varied until the concentrical imperfection; abdominal (varied) until happening the loss of effectiveness; sessions of specific attacks (XUANGFEIJAO, TENGKONG BALIAN, as IWUF; blows of fists against apparatus for this end (focus gloves); kicks against apparatus for this end (focus for kicks) and combat properly said, totalizing 40 minutes uninterrupted of specific training under the combat method

2. Accomplishment of the second collection;

3. It votes to the calm: Soft trot during 5 minutes and 5 minutes of static allonge, totalizing 10 minutes in return to the calm. With intention to prevent hemodinamics distortions caused by the dehydration, in elapsing of all the protocol it had offers of water, being is offered in the following way: To each 15 minutes of training were offered 250 ml of water. After the collections and analysis of the blood, the CK concentrations had been analyzed by test t of student, where the averages had been compared.

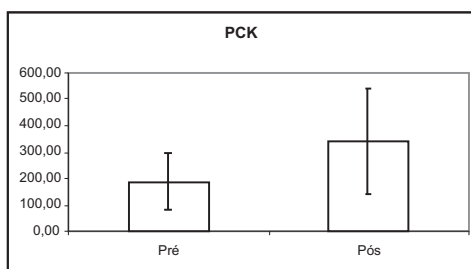
## RESULTS

The combat training promoted modifications in level biochemist, in the CK concentrations.

Table 1: Behavior of the CK

| DATA    | INITIAL          | END (Average)    | SIGNIFICANCE (p) |
|---------|------------------|------------------|------------------|
| CK(u/l) | *157,000±104,120 | *218,000±198,090 | 0,005            |

The CK concentrations had presented, an increase of approximately 38% (graphical 1).



Graph 1: CPK daily pay and after-training

Graphical representation of the behavior of the CK between the moments daily pay and after-training

The CK is one of the marking biochemists more indicated to mensured the aggression level skeleton muscle . The same authors affirm that high plasmatics concentrations of this marker indicate that it had extensive injury of the fabric muscular. However, the CK is directly on to the volume and the intensity of the exercise . In the present study the CK levels had gone up reasonable well in reply to the combat training. Probably such increase is closely on to the used volume and the intensity in this experimental protocol. Another factor that can have induced such increase would be the proper combat, a time that, the combat of sanshou is of contact being necessary that the blow really makes right the adversary , such situation can have contributed the increase of this marking biochemist. Leaving of the premise that the inferior members are white of powerful kicks, that are directed in special to the thighs (and in lesser ratio the legs). These kicks can be brandished in such a way medial how much laterally and are effected with the previous face of the tibia, configuring a harmful impact to the muscles, medial (expository) and laterals (vast lateral).

As the exercise if presents as it estresse, being this mechanic, physiological and many times psychological the actual damages for one and another one are alternated in diverse situations. The amounts of CK found in this study, evidence the presence of stress mechanic and physiological generated for the deriving muscular injuries of some successive contractions as well as for the deriving impacts it sanshou of it .

## CONCLUSION AND RECOMMENDATIONS

One concludes that the training promotes modifications in the CK concentrations. Such training possesss high intensity and the muscular system is most requested and responsive, in view of the answers of the CK. That is, well trained athletes only can be submitted to such training with relative security.

He was evidenced that proportionate the muscular activity for the training conducts the magnitude of the answers biochemists. The marking biochemists who are carreados by the blood signal and activate other systems, thus configuring a "sistemic synergy", unchaining a cascade of physiological events.

One also sends regards that new studies come to be carried through with other practitioners of sanshou, of other States. That they establish N bigger, that can in such a way be studied the combat practitioners (Sanshou), how much the practitioners of forms (Tao lu). It is presented as interesting that the feminine sort can come also to be studied, thus if they can create the profiles biochemists for this population, aiming at a referenes for the health and performance. Finally, a protocol without the combat properly said sends regards, so that if it can to measure trully how much the training can be harmful to the muscles without the suffered blows can intervine in the concentrations of this marking biochemist.

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**ALTERATIONS IN THE CREATINE KINASE CONCENTRATIONS DERIVING OF THE TRAINING OF COMBAT IN ATHLETE OF KUNG FU.**

**ABSTRACT**

To study the physiological effect and biochemists generated for the training if they have presented as a latent necessity of the modern porting training. The Sanshou is the modality of combat of the Kung fu-wushu, where the regulation allows punch, kicks and fall. In the present study the amounts of creatine kinase had been measure (CK) in rest and immediately after a session of training of sanshou under the approach of the combat. A 20 individuals of the masculine sort had participated of this study, chosen of random form between the athletes sanshou with at least one year of experience in competitions, with register in the Association International Chan Lee kung fu-RIO DE JANEIRO, tied with the Federacy of Kung fu of the State of Rio De Janeiro, with age of 22.42 ± 4,4 years (MEDIUN ± SD), weight 67,07 ± 8,6 kg, stature 170,7 ± 5,3 cm and percentage of 10.42 fat of ± 3,3, healthful ones, that they had not presented no type of injury or opportunist illness for at least one month before the

experimental protocol. Statistical the considered level of significance was of  $p < 0,05$ . The CK concentrations had presented, an increase of approximately 38% demonstrating that the training of sanshou is of great intensity causing muscular damages modifying the permeability of the membrane of muscular staple fibres.

**WORD-KEY:** Sanshou, training, biochemist

#### **MODIFICATIONS DANS LES CONCENTRATIONS DE CREATINO QUINASE ORIGINAIRES DE LA FORMATION DE COMBAT DANS DES ATHLÈTES DE KUNG FU.**

##### **RÉSUMÉ**

Étudier les effets physiologiques et les biochimistes produits par la formation ils s'ont présenté comme une nécessité latente de la formation sportive moderne. Le Sanshou est la modalité de combat du Kung fu-wushu, où le règlement permet des socos, repoussements et arremessos. Dans présente étude ont été des mensuradas les quantités sériques de creatino quinase (CK) dans repos et immédiatement après une session de formation de sanshou sous l'approche du combat. Ils ont participé de cette étude 20 personnes du type masculin, choisis de forme aléatoire entre les athlètes sanshou avec pour le moins une année d'expérience dans des concurrences, avec registre à l'Association International Chan Lee kung fu-RJ, attachés à la Fédération de Kung fu de l'État de Rio de Janeiro, avec âge de  $22.42 \pm 4,4$  ans (MEDIUN  $\pm$  SD), poids  $67,07 \pm 8,6$  kg, stature  $170,7 \pm 5,3$  cm et pourcentage de graisse de  $10.42 \pm 3,3$ , saine, qu'ils n'ont présenté aucun type de blessure ou maladie opportuniste par pour le moins un mois avant le protocole expérimental. Statistiquement le niveau d'importance considéré a été de  $p < 0,05$ . Les concentrations de CK ont présenté, une augmentation approximativement de 38% en démontrant que la formation de sanshou est de grande intensité en causant des dommages musculaires en modifiant la perméabilité de la membrane des fibres musculaires.

**MOTS-CLÉ:** Sanshou, formation, biochimiste

#### **ALTERACIONES EM LAS CONCETRACIONES DE CREATINO KINASE ADVINDAS DEL ENTRENAMIENTO DE LA PELEA DE KUNG FU**

##### **RESUMEN**

Estudiar los efectos fisiológicos y bioquímicos generados por el entrenamiento ha se presentado como una cosa necesaria al entrenamiento deportivo de hoy. El Sanshou es la modalidad de pelea del Kung fu-wushu, donde el reglamento consiente los golpes de mano, pie y las quedas. En el presente estudio fuerán estudiadas las cantidade de creatino kinase (CK) en el reposo y inmediatamente despues de un entrenamiento de sanshou en el metodologia del combate. Participaran de esto estudio 20 varones, seleccionados de fuerma aleatória dentre los practicantes de sanshou con el mínimo de 1 año de entrenamiento competitivo, con registro em La Asociación International Chan Lee Kung fu- del Rio de Janeiro, ligado a la Federación de Kung fu del Estado del Rio de Janeiro, con edad de  $22.42 \pm 4.4$  años (MEDIUN  $\pm$  SD), peso  $67.07 \pm 8.6$  kg, altura  $170.7 \pm 5.3$  cm y percentual de grasa de  $10.42 \pm 3.3$ , saludables, que no presentaran ninguno tipo de lesión o enfermedad por el menos de uno mes antes del teste. El nivel de significancia considerado se quedo em  $p < 0,05$ . Las concentraciones de CK presentaran, un aumento de 38% presentando el entrenamiento de sanshou es de grande intensidad llevando a danos muculares alterando la permeabilidad de la membrana de las fibras muculares.

**PALABRAS-CLAVE:** Sanshou, entrenamiento, bioquímica

#### **ALTERAÇÕES NAS CONCENTRAÇÕES DE CREATINO QUINASE ORIUNDAS DO TREINAMENTO DE COMBATE EM ATLETAS DE KUNG FU.**

##### **RESUMO**

Estudar os efeitos fisiológicos e bioquímicos gerados pelo treinamento têm se apresentado como uma necessidade latente do treinamento desportivo moderno. O Sanshou é a modalidade de combate do Kung fu-wushu, onde o regulamento permite socos, chutes e arremessos. No presente estudo foram mensuradas as quantidades séricas de creatino quinase (CK) em repouso e imediatamente após uma sessão de treinamento de sanshou sob o enfoque do combate. Participaram deste estudo 20 indivíduos do gênero masculino, escolhidos de forma aleatória entre os atletas sanshou com pelo menos um ano de experiência em competições, com registro na Associação International Chan Lee kung fu-RJ, vinculados à Federação de Kung fu do Estado do Rio de Janeiro, com idade de  $22.42 \pm 4.4$  anos (MEDIUN  $\pm$  SD), peso  $67.07 \pm 8.6$  kg, estatura  $170.7 \pm 5.3$  cm e percentual de gordura de  $10.42 \pm 3.3$ , saudáveis, que não apresentaram nenhum tipo de lesão ou doença oportunista por pelo menos um mês antes do protocolo experimental. Estatisticamente o nível de significância considerado foi de  $p < 0,05$ . As concentrações de CK apresentaram, um aumento de aproximadamente 38% demonstrando que o treinamento de sanshou é de grande intensidade causando danos musculares alterando a permeabilidade da membrana das fibras musculares.

**PALAVRAS-CHAVE:** Sanshou, treinamento, bioquímica