45 - WARMING UP EVALUATION WITH PASSIVE/STATIC FLEXIBILTY IN ARTISTIC GYMNASTICS

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1. INTRODUCTION

The warming ups are all procedures that, before a sporting load, either for training or competition, serve as a preparation for an ideal psycho and coordinative-kinaesthetic state, as well as for the prophylaxis of injuries.

Thus, through significant warming ups guided for the sport modality, better initial conditions for the neuromuscular capacity, organic and psycho-intellectual performance must be obtained, which also acts in the direction of an ideal prophylaxis of injuries (WEINECK, 1991).

The warming up activities, combined with flexibility elements, contributes for a good interaction where the performance of the athletes and students improves with the good application of the flexibility elements.

2. TYPES OF WARMING UP

According to INGJER & STROMME (1979), the warming up activities can vary of several ways. In this work, three main forms are considered: passive warming up, general warming up and specific warming up.

The passive warming up is obtained through external stimulation, that objectify the increase of the temperatures of the body and the skin, as well as physiological reactions that are associated with the removal of heat. The effectiveness of this type of warming up in the performance of the athletes is not proven.

In the general warming up, the temperature of the muscle is increased in a way that is more effective than that of the passive warming up. The physiological benefits related to the increase of temperature of the muscle and to the circulation are secondary. It would have little effect in a performance improvement. The main benefit of the general heating is the probable reduction in wound potential and the possibility to attain a better rhythm.

The specific warming up can produce benefits in performance if the activities simulate actions and intensities original to the sporting gestures. The physiological reactions that also imitate those of the competitive effort need to be reached. The specific warming ups can be more effective if done after the accomplishment of a general warming up.

3. THE WARMING UP AND THE PHYSIOLOGICAL VARIATIONS

In result of activities demands, there are physiological alterations that must be balanced since the warming up sessions. SHELLOCK (1983) emphasizes that the physiological variations, in their ideal levels, provide a better performance of the athletes in the competition. In this case, a cardiac reply in the warming up will occur, being increased and adjusted for the physical work, sending a bigger flow of blood to the muscles, with a better offer of nutrients. The nervous course of the impulses more requested are also increased, as well as the sensibility of the receptors of the nerves.

The amount and intensity of the type of the endurance worked in the warming up, structured in short and intense periods, must be low and with a duration short enough as not to lead to the perception of the effort made or the fatigue of the athlete (DE BRUYN-PREVOST & LEFEBVRE, 1980).

According to BRADFORD (1956), the warming up activities are used in the following ways:

· To reduce muscular pains and risk of injuries.
· To increase the flow of blood in the muscles
· To speed up the production of energy in the muscles
· To increase the temperature of the body and of the muscles
· To increase gradually the cardiac beatings.

Regarding the flexibility, it is defined as the physical quality responsible for the voluntary performance of a movement of maximum angular amplitude, for a joint or set of joints, inside of the morphologic limits and without the risk of provoking injury (DANTAS, 1989).

According to MORAES (2005), any sport modality is easier of being practiced when the athlete is more flexible and when two well distinct phases in the stretching of a muscular group are used. The body possesses a powerful sensorial system that works as an alarm and defense not to let one go beyond one's limits. They are the proprioceptors that are linked with the central nervous system and produce answers of involuntary contraction or muscular relaxation when necessary.

In the first case, the muscular spindles contract the muscle involuntarily when we force it beyond its limits. If the spindles did not exist, a person could stretch a muscle continuously to the point of tearing it like a rubber band. In the second case, the relaxation of the muscle is achieved through the Golgi Tendon Organs. As the name suggests, these are located in the joints and send messages to the marrow when the integrity the articulations is in danger because of the state of the muscle. The reply of the marrow is the relaxation of the antagonistic muscular system. In synthesis, the muscular spindles and the Golgi Tendon Organs are the defense mechanisms that do not allow a person to go beyond his/her limits.

4. PASSIVE/STATIC METHOD OF FLEXIBILITY

The static/passive training considers the slow stretching to the limit of pain, praising the maintenance of the same position during 15 or 20 seconds. Scientific evidence does not exist to recommend longer times. This method respects the action of the muscular spindles that little by little let the agonist muscles to stretch and the antagonists to relax. This method has the advantage of providing a better pain control, being easy to apply, and normally not causing after pains and injuries. (MORAES, 2005)

According to DANTAS (1989), the passive method, based in static positions, was inspired in yoga and is 20 % more efficient than the active method. It is identified as more adjusted for three reasons:

· The possibility of tissue damage that exists in the active method is reduced
· It presents a lower energy expense
· It is capable of reducing or preventing muscular pain and residual muscular pain

5. METHODOLOGY

5.1. SELECTION OF SAMPLES

The sample population was composed of eight students, with ages between twelve and fourteen years-old, of both genders, all practitioners of Artistic Gymnastics at EsEF/UFRGS, in Porto Alegre, Brazil. The lessons were developed in the period of approximately one month, with three meetings per week, on Mondays, Wednesdays and Fridays. The collection of data was done voluntarily.

5.2. PROCEDURES

A pre-test was carried out at the Laboratory of Research in Exercise (LAPEX), EsEF/UFRGS, with the presence of the 8 students for the accomplishment of the Flexibility Tests. At the end of the lessons, a post-test was carried out in the same place. All the eight students were evaluated in the same way, making two passive/static movements. In the first one, they were sitting down with the knees extended and hip flexion (piked movement). The coxofemoral joint with the knee joint were analyzed as anatomic points of reference and quantified in grades. In the second one, the students' flexibility was measured with legs abduction, in dorsal decubit position and hip flexion. The frontal split opening was measured with the support of a goniometer on the pubic region.

5.3. WARMING UP MODEL

The warming up activities were done for 15 minutes in all the meetings in the beginning of the of Artistic Gymnastics training. The activities of passive/static flexibility were guided by two students of Physical Education. The warming up sessions had variations in the passive/static exercises with great concentration in the inferior members.

5.4. COLLECTION OF DATA

The data chosen for the evaluation of the flexibility of the students was: age, race and sex. The data collected can be seen in Table 1 below, where M corresponds to the gender male and F, to the gender female.

Table 1: Sample Students of Artistic Gymnastics

SAMPLE	GENDER	AGE	RACE
STUDENT M1	Male	12	White
STUDENT M2	Male	12	White
STUDENT M3	Male	13	Black
STUDENT M4	Male	14	White
STUDENT F1	Female	14	White
STUDENT F2	Female	13	Black
STUDENT F3	Female	12	Black
STUDENT F4	Female	13	Black

6. RESULTS AND DISCUSSION

The results of this paper were obtained through the analyses of the goniometer data in degrees, in the pre and post-tests carried out with the students. The data collected and represented in angular units was used in the computation of the arithmetic mean in the groups: male and female in the piked movement and the frontal split, for both pre and post-test. Figure 1 shows a graph presenting these results.

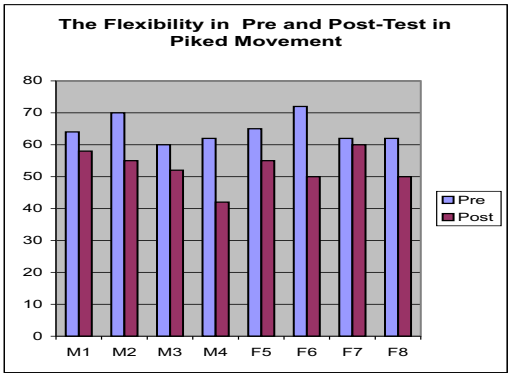

Figure 1: Comparison of the pre and post-test in the piked movement.

Figure 2 compares the results obtained for the frontal split position, where it is possible to observe an increase in the flexibility of the athletes.

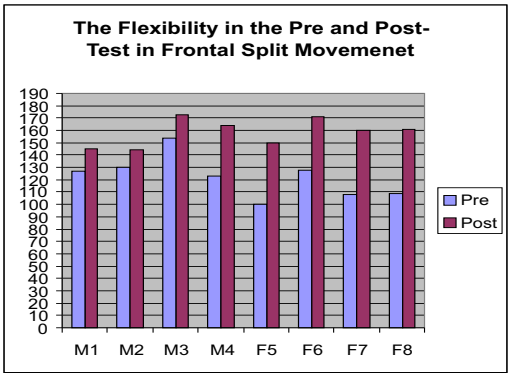

Figure 2: Comparison of the pre and post-test in the frontal split movement.

The arithmetic average computed from the collection of data in the pre and post-test are presented below:

- Piked Pre-Test
  Average M: 64°
  Average F: 65°
  Total Average: 64,5°
- Piked Post-Test
  Average M: 52°
  Average F: 54°

Total Average: 52,5°
- Frontal Split Pre-Test
  Average M: 133,5°
  Average F: 111°
  Total Average: 122,5°
- Frontal Split Post-Teste
  Average M: 156,5°
  Average F: 160,5°
  Total Average:158,5°

The following improvements were verified between the pre and post-test:
- Piked Exercise for males: 12°
- Piked Exercise for females: 11°
- Frontal split for males: 23°
- Frontal split for females: 49,5°
- General piked exercise: 12°
- General frontal split: 36°

These results enabled us to deduce that through the warming up with passive/static flexibility it is possible to get a satisfactory increase in the flexibility of artistic gymnastics students. The evaluation of the data allowed us to observe a significant difference in the measure of inferior members joint amplitude.

7. CONCLUSION

In this paper an evaluation of a warming up model of passive/static flexibility was presented, aiming at an adequate preparation for the artistic gymnastics practices and a better performance in the execution of the exercises. From the experiments carried out and the results obtained, it was possible to conclude that the training with passive/static flexibility is of utmost importance for adolescent gymnasts between twelve and fourteen years-old, of both genders, in relation to the gains in flexibility in the inferior members, both for the hip flexion movements (piked movement) and legs abduction (frontal split).

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WARMING UP EVALUATION WITH PASSIVE/STATIC FLEXIBILTY IN ARTISTIC GYMNASTICS

In this paper an evaluation of a warming up model of passive/static flexibility is presented, with the main goal of a good preparatory work for sport practices and a high performance in exercise execution. Eight students from twelve to fourteen years-old, of both genders, have participated in the experiment, carried out at the Artistic Gymnastics Gym at UFRGS. The students were evaluated through two movements. In the first one, they were sitting down with the knees extended and hip flexion (piked movement). The coxofemoral joint with the knee joint were analyzed as anatomic points of reference and quantified in grades. In the second one, the students' flexibility was measured with legs abduction, in dorsal decubit position and hip flexion. The frontal split opening was measured with the support of a goniometer on the pubic region. The warming up model, with variation in the passive/static execution and great concentration in the legs, was made for fifteen minutes in the beginning of all activities, in a period of one month with twelve meetings. One Pre-Test and one Post-Test was performed in both elements, in separated female and male groups. In all the results an increase in the students' flexibility could be observed. The improvements verified were of 12° in the piked exercise for males, 11° in the piked exercise for females, 23° in the frontal split for males, 49,5° in the frontal split for females, 12° in the general piked exercise and 36° in the general frontal split.

The results let us conclude that the application of the passive/static method provides a significant increase of the inferior members amplitude.

Key words: Flexibility, Artistic Gymnastics, Warming up.

ÉVALUATION DE L'ÉCHAUFFEMENT AVEC FLEXIBILITÉ PASSIVE/STATIQUE EN GYMNASTIQUE ARTISTIQUE

En cet article l'évaluation d'un modèle d'échauffement de flexibilité passive/statique est présenté, avec le but d'établir un bon travail préparatoire pour les pratiques sportives en gymnastique artistique. Huit étudiants entre douze e quatorze ans, des deux genres, ont participé de l'expérience exécutée dans le gymnase de gymnastique artistique à l'Université Fédérale de Rio Grande do Sul (UFRGS). Les étudiants ont été évalués par deux mouvements. Dans le premier, ils ont été assis avec les genoux étendues (position carpée). L´articulation coxofemoral avec l´articulation de genou a été analysée et quantifiée comme point de référence anatomique. Dans le second mouvement, les étudiants ont été placés avec l'abduction des jambes, en position de decubit dorsale (se couchant) et flexion des hanches. L'ouverture grand écart latéral à travers de l'appui du goniomètre sur la région pubienne a été mesurée. Le modèle d'échauffement avec variation des exécutions passives/statiques et grande concentration sur les jambes a été fait avec la durée de quinze minutes dans tous les commencements d'activité, dans une période d'un mois, pour un total de douze rencontres. Un pré-test et un pos-test ont été

faits pour les deux éléments dans les groupes féminins et masculins séparement. Dans tous les résultats, une augmentation de la flexibilité a été observée. Les résultats ont montré une augmentation de 12° au mouvement carpé chez les garçons, 11° au mouvement carpé chez les filles, 23° au grand écart latéral chez les garçons, 49,5° au grand écart latéral chez les filles, 12° au mouvement carpé en général, et 36° au grand écart latéral en général. Les résultats nous laissent conclure que l'application de la méthode d'échauffement passive/statique permet une augmentation d'amplitude de jambes de manière significative.

Mots-clefs : Flexibilité, Gymnastique Artistique, échauffement.

EVALUACIÓN DEL CALENTAMIENTO COM FLEXIBILIDAD PASIVA/ESTÁTICA EN LA GIMNASIA ARTÍSTICA

En este trabajo es presentada una evaluación de un modelo de calentamiento de flexibilidad pasiva/estática, visando un buen trabajo de preparación para las prácticas del deporte y el rendimiento en las ejecuciones de los ejercicios. Ocho alumnos en la faja de edad de doce a catorce años, de ambos sexos, han participado del experimento realizado en el Gimnasio de Gimnasia Artística de la UFRGS. Los estudiantes han sido evaluados por medio de dos movimientos. En lo primero, han hecho sentados con las rodillas extendidas e flexión de las caderas (movimiento carpado). Se han analizado como puntos anatómicos de referencia las articulaciones de la coxo-femoral con la articulación de la rodilla y cuantificación en grados. En el segundo, con la abducción de las piernas, en decúbito dorsal y flexión de caderas. Se han analizado la abertura del spagat frontal a través del apoyo del goniómetro en la región púbica. El modelo de calentamiento, con variaciones en las ejecuciones pasivas/estáticas y gran concentración en los miembros inferiores, ha sido realizado con duración de quince minutos en todos los comienzos de las actividades, en un período de un mes en el total de doce encuentros. Han sido realizados un pre-test y un post-test en los dos elementos en el grupo femenino y masculino separadamente. En todos los resultados se han observado un aumento en la flexibilidad. Los aprovechamientos observados han sido de 12º en el ejercicio carpado masculino, 11º en el carpado feminino, 23º en el spagat frontal masculino, 49,5º en el spagat frontal femenino, siendo en el general (masculino y femenino) 12º en el carpado y 36º en el spagat frontal. Los resultados nos llevan a concluir que la aplicación del método pasivo/estático permite aumentar significativamente la amplitud de los miembros inferiores.

Palabras claves: Flexibilidad, Gimnasia Artística, Calentamiento.

AVALIAÇÃO DO AQUECIMENTO COM FLEXIBILIDADE PASSIVA/ESTÁTICA NA GINÁSTICA OLÍMPICA

Neste trabalho é apresentada uma avaliação de um modelo de aquecimento de flexibilidade passiva/estática, visando um bom trabalho preparatório para as práticas do desporto e o rendimento nas execuções dos exercícios. Oito alunos, na faixa etária de doze a catorze anos, de ambos os sexos, participaram do experimento realizado no Ginásio de Ginástica Olímpica da UFRGS. Os estudantes foram avaliados através de dois movimentos. No primeiro, sentados com os joelhos estendidos e flexão de quadril (movimento carpado). Analisaram-se como pontos anatômicos de referência as articulações da coxofemoral com a articulação do joelho e quantificação em graus. No segundo, com abdução de pernas, em decúbito dorsal e flexão de quadril. Analisou-se a abertura do espacat de frente através do apoio do goniômetro na região púbica. O plano de aquecimento, com variações nas execuções passivas/estáticas e grande concentração nos membros inferiores, foi realizado com duração de quinze minutos em todos os inícios das atividades, num período de um mês no total de doze encontros. Foram realizados um pré-teste e um pós-teste nos dois elementos no grupo feminino e masculino separadamente. Em todos os resultados foi observado um aumento na flexibilidade. Os aproveitamentos observados foram de 12° no exercício carpado masculino, 11° no carpado feminino, 23° no espacat de frente masculino, 49,5° no espacat de frente feminino, 12° no geral em carpado e 36° no espacat de frente. Os resultados nos levam a concluir que a aplicação do método passivo/estático permite aumentar significativamente a amplitude dos membros inferiores.

Palavras-chave: Flexibilidade, Ginástica Olímpica, Aquecimento.