# 158 - INDICATORS OF FLEXIBILITY IN ATHLETES OF SUMÔ OF DIFFERENT CATEGORIES OF BOTH SEXES.

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## INTRODUCTION

From the creation of the Olympic Games for the Greeks the search for improvements in the athletes' income and of great teams it is a long and inexhaustible search. Along this day the sporting training is going by several periods (greek, empiricism, systemization, beside scientific and scientific), and the first three if they based on the sensation and in practice for the practice, as means of maximizing the sporting acting. The beside scientific and scientific periods appeared little by little to complete the empiric existence being used of studies more deepened on the human physiology, the biochemical actions and if using of a periodizing and organized systemization with base in physical exams.

The sporting training started to contemplate the improvement certain physical qualities (it forces, resistance, flexibility, agility and coordination) for ends of physical acting, as well as he/she left the only perspective of the income for a wider inclusion of access to the leisure and the health and of full right to the citizenship (TUBINO & BASTOS, 2003).

For the collective and individual sports the specificity of the training has if tornado a very important factor and the flexibility has if shown as component decisive for the martial sports. The same ones depend on great movement width to minimize the lesions and to maximize the blows and projections used in the fight.

The flexibility interferes directly in the width of the movement and the lack of the same in this type of sporting modality can intervene in the acting. The importance of the flexibility increases when we worked with sports in that movements exist executed in the ends of the width to articulate (FARINATTI, 2000; PLATONOV & BULATOVA, 2003)

The sumô, in his/her origin, gets confused with the mythological origin of Japan. The sumô was not just a sport, but a form of foreseeing the crops would be good. That sport arrived in Brazil with the Japanese immigrants in the beginning of the century 20, and the first championship was accomplished in 1914. However, they still don't meet in the literature relevant information to the practicing athletes' of that modality flexibility. In that way, the present study search to do indications about the flexibility in athletes of sumô of different categories of both sexes.

## METHODOLOGY

### Subject

They participated in the study 37 athletes being 21 men (19 ± 7 years) and 16 women (18 ± 4 years). The athletes had an experience of training of sumô of 18 months. In the period of the collection of data the athletes met participating in the 1st Shape Londrinense and Paranaense of Sumô. The procedures adopted in this study assisted the norms of the resolution 196/96 of National Council of Health for researches in human beings.

### Anthropometric

The body mass was measured in a platform scale, mechanics, marks Filizola, accurately of 0,1 kg, and the stature was obtained in a metal estadiômetro coupled in the own scale accurately of 0,5 cm, in agreement with the procedures described by GORDON, CHUMLEA & ROCHE, 1988. All of the individuals were measured and heavy barefoot, just dressing a swim trunk for the men and cotton top/pents for the women. The index of body mass (IBM) it was certain for the quotient body mass/stature$^2$, being the body mass express in kilograms (kg) and the stature in meters (m).

### Test of seat-and-reaching

It was accomplished with the aid of a wood box especially built for this purpose, with dimensions of 30,5 X 30,5 X 30,5 cm, tends the superior part 56,5 cm of length glides, in the which was fastened the measure scale that presented a zero width to 50 cm, in such a way that the value 23 coincided with the line where the appraised accommodated their feet. The procedures followed the standardizations described by AAHPERD (1988). Three attempts were given to each athlete, being written down the largest value reached by the sportsman.

### Statistical treatment

The test of Shapiro-Wilk was used to confirm the normality of the variables. Variance analysis (ANOVA) it was used for the comparisons among the sexes (masculine vs. feminine) in the different categories (category takes vs. medium category), following for the test post hoc of Scheffé when $P<0,05$ for it analyzes of the data. The data were treated through the statistical package Statistica version 5.0.

## RESULTS

Information regarding the general characteristics of the sample are presented in average values and standard deviation (table 1).

**Table 1. General characteristics of the sample.**

**Table 1. General characteristics of the sample.**

| | MEN | | WOMEN | |
|---|---|---|---|---|
| | LIGHT (n: 14) | MEDIUM (n: 7) | LIGHT (n: 11) | MEDIUM (n: 5) |
| Age (years) | 18ÿ4 | 21ÿ8 | 17ÿ3 | 21ÿ5 |
| Body Mass (kg) | 69,0ÿ9,9 | 94,5ÿ9,5 | 54,8ÿ8,8 | 73,8ÿ9,6 |
| Stature (m) | 1,72ÿ0,1 | 1,74ÿ0,1 | 1,59ÿ0,1 | 1,68ÿ0,0 |
| IBM (kg/mÿ) | 23,1ÿ2,1 | 31,1ÿ2,5 | 21,5ÿ2,7 | 26,2ÿ3,3 |

The Information on the indicators of flexibility in athletes of sumô of different categories of both sexes are presented on average and deviation pattern (Table 2). Both categories didn't present significant differences in the flexibility. Significant alterations regarding the sex were found in the indicators of analyzed flexibility ($p < 0,05$), which demonstrated to have the sex larger feminine flexibility when compared to the masculine sex, any category in that these struggled. No other significant modification was verified in none of the investigated effects when compared amongst themselves or in the analysis of the interaction among sex X category.

**Table 2. Indicators of flexibility in athletes of sumÿ of different categories of both sexies.**

| Variables | Men | Women | Effects | F | *P* |
|---|---|---|---|---|---|
| Flexibility (cm) | | | ANOVA | | |
| Category Light | 27ÿ9 | 34ÿ10 | Sex | 5,29 | 0,03 |
| Category Medium | 27ÿ5 | 33ÿ6 | Category | 0,02 | 0,88 |
| | | | Sex X Category | 0,00 | 0,98 |

**DISCUSSION**

The sumô is not outside only the shock of two men of great corporal mass trying to push each other of an I circulate high. It is yes a contact sport, dated of 730 a.c that needs great force and muscular explosion, of good levels of flexibility which he/she has as main objective to unbalance the opponent through blows and pushes seeking to lean any part of the opponent's body in the soil, or to raise putting him/it outside of the dohiô (fight arena).

This sport is divided in amateur (national and international) and professional (international), and the professional's fight doesn't last more than 15 to 20 seconds and there is no division for weight. Already in the amateur to four divisions for weight: lightweight adult (55 to 85 kg), I weigh medium (85 to 115 kg), heavy weight (above 115 kg) and absolute weight (without weight limit); and four categories for age: the mini-little (up to 5 years), little (5 to 13 years), infantile (14 to 16 years) and juvenile (17 to 18 years), because in the amateur the fights can have duration of up to 20 minutes at the most being interrupted every five minutes when there is not a winner.

Inside of the sumô the flexibility is something very demanded. For WERLANG (1997), the flexibility is an integral physical quality of the physical fitness for the health and the solemnity-income, being important so much for the athlete as for the sedentary. In Japan the sumô athletes begin his/her training about the five to six years of age. Traditionally these athletes accomplish two basic exercises: the shiko (exercise in which the fighter seeks to elevate the highest sidelong possible his/her leg staying in foot and after that he brings the leg for the soil assuming a position of 90th degrees with the knees) and the matawari (exercise in that the fighter moves away the legs and it projects his/her thorax to the soil).

These exercises are repeated everyday (one at two hours) in I begin him/it of all of the trainings along his/her career as professional. After this training period that the fighter can learn other exercises of the sumô, such a practice is used so that it maintains their good levels of flexibility for all his/her sumotori career (as it is calling the sumô fighter).

For RODRIGUES & CARNAVAL (1985) the objectives of the training of the flexibility are: to improve the muscular elasticity; to increase the mobility to articulate; to facilitate the transport of energy; to increase the mechanical capacity of the muscle; to allow a more economical use of the mechanical energy; to avoid muscular lesions; to reduce the impact shock in the contact sports and in the falls; to increase the width of the inherent movements to the activity; to promote the muscular relaxation; to offer the possibility and capacity to the athlete of improving with larger technical speed.

CASTRO (2001) he/she suggests the constant practice of exercises of flexibility trying to give emphasis in the muscular groups more requested during the sporting practice. Respecting the beginning of the specificity, the exercises to maintain or to increase the flexibility would be applied to foresee shortenings and possible contract for optimization of the muscular acting.

Like this, the flexibility is important for the athlete to improve the quality of the movement, to accomplish athletic abilities with great movement widths and to reduce the risks of lesions muscle-articulate (ACHOUR Jr., 1997).

It is worth to stand out that in Brazil the sumô still in the he/she became professional and that the amateur athletes don't receive any remuneration type. The technical and physical trainings accomplished here try to assume the same conditions and systemizations used in Japan.

In the present study, the sex demonstrated to be the decisive factor in the men's flexibility and practicing women of sumô. This can be explained in parts due to the sex to be one of the decisive factors of the flexibility, have seen that the women present woven less dense than the men, facilitating like this a larger mobility to articulate.

The presented data are only, because in this sport few are the studies and trainings focused in scientific concepts for improvement of the acting of the flexibility.

These data we send that the sumô athletes can better more their levels of flexibility adopting a training more systematized and closer of scientific concepts and no so close of the empiricism encounter now.

**CONCLUSION**

The modality sumô demands efforts, predominantly, of muscular force and potency. Incentives of that nature tend to unchain processes of muscular hipertrofy, which, they can limit the mobility to articulate of the athletes.

It was verified that as much the masculine athletes as feminine they don't possess differences in the flexibility in the different weight categories. The same cannot be verified when compared the sexes, where the feminine sex demonstrated larger values when compared to the men.

In that way, the results of the present study suggest that in sumô athletes the sex demonstrates to be a decisive factor in the independent flexibility of the category in that the athlete participates.

Key-Word: sumô, flexibility, test of seat-and-reaching

**REFERENCES**

AAHPERD. Physical Best. Reston, VA: American Alliance for Health, Physical Education, Recreation and Dance, 1988.

ACHOUR JÚNIOR, A. Estabilidade Músculo - Articular. Revista Brasileira de Atividade Física e Saúde - V.2, N.5, p.76-83, 1997.

CASTRO, R. Treinamento da flexibilidade: Uma Abordagem Metodológica. Revista Baiana de Educação Física, V.2, N.3, 2001.

RODRIGUES, A. J, CARNAVAL,J. A, Tubino, M. G. T., Bastos, E. F, In DACOSTA, LAMARTINE (ORG.). Atlas do esporte no Brasil. Rio de Janeiro: CONFEF, 2006.

FARINATTI, P. T. V. Flexibilidade e Esporte: Uma revisão da Literatura. Revista Paulista de Educação Física. São Paulo. 14(1): 85-96. Jan./Jun. 2000.

GORDON, C.C.; CHUMLEA, W.C.; ROCHE, A.F. Stature, recumbent length and weight. In: Lohman, T.G.; Roche, A.F.; Martorell, R. (eds). Anthropometric standardizing reference manual. Champaign, Illinois, Human Kinetics Books, 1988, p.3-8.

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**INDICATORS OF FLEXIBILITY IN ATHLETES OF SUMÔ OF DIFFERENT CATEGORIES OF BOTH SEXES**

The characteristics of the athletes' of several modalities flexibility are, most of the time, very different, tends in view the specific demands of each sport, among them the sumô. That sport arrived in Brazil with the Japanese immigrants in the beginning of the century 20, and the first championship was accomplished in 1914. The present study search to do indications about the flexibility in athletes of sumô of different categories of both sexes. They participated in the study 37 athletes being 21 men (19±7 years) and 16 women (18±4 years). In the period of the collection of the data the athletes met participating in the 1st Shape Londrinense and Paranaense of Sumô. Initially measured stature anthropometric were accomplished (EST) in cm and body mass (MC) in kg, through a metal estadiômetro, with scale of 0,5 cm and of a scale FILIZOLA with scale of 0,1 kg. The index of body mass was calculated being considered the reason of MC (kg) for the square of EST (m²). To measure the flexibility the test it was used of seat-and-reaching. The procedures followed the standardizations described by AAHPERD (1988). The test of Shapiro-Wilk was used to confirm the normality of the variables. Analyze of variance (ANOVA) it was used for the comparisons among the sexes (masculine vs. feminine) in the different categories (category takes vs. medium category), following for the test post hoc of Scheffé when *P*<0,05 for it analyzes of the data. The data were treated through the statistical package Statistica version 5.0. They were found statistical differences when confronted men and women in the two appraised categories, being the sex (F=5,29 and *P*=0,03) the decisive factor in the indicators of flexibility. The results of the present study suggest that in sumô athletes the sex demonstrates to be a decisive factor in the independent flexibility of the category in that the athlete participates.

Key-Word: sumô, flexibility, test of seat-and-reaching

**INDICATEURS DE FLEXIBILITÉ DANS ATHLÈTES DE SUMÔ DE CATÉGORIES DIFFÉRENTES DES DEUX SEXES**

Les caractéristiques des athlètes de plusieurs flexibilité des modalités est, la plupart du temps, très différent, soigne dans vue les demandes spécifiques de chaque sport, parmi eux le sumô. Ce sport est arrivé au début au Brésil avec les immigrés Japonais du siècle 20, et le premier championnat a été accompli en 1914. La recherche de l'étude présente faire des indications au sujet de la flexibilité dans athlètes de sumô de catégories différentes des deux sexes. Ils ont participé à l'étude 37 athlètes qui sont 21 hommes (19±7 années) et 16 femmes (18±4 années). Dans la période de la collection des données les athlètes ont rencontré participer à la 1ère Forme Londrinense et Paranaense de Sumô. Les antropométricas de la taille initialement mesurés ont été accomplis (EST) dans centimètre et masse du caporal (MAÎTRE DES CÉRÉMONIES) dans kg, à travers un estadiômetro du métal, avec échelle de 0,5 centimètre et d'une échelle FILIZOLA avec échelle de 0,1 kg. L'index de masse corporelle a été calculé que l'existence a considéré la raison de MAÎTRE DES CÉRÉMONIES (kg) pour le carré d'EST (m²). Para mesurer la flexibilité l'épreuve il a été utilisé de siège et atteindre. Les procédures ont suivi les standardisations décrites par AAHPERD (1988). L'épreuve de Shapiro-Wilk a été utilisée pour confirmer la normalité des variables. Analysez de désaccord (ANOVA) il a été utilisé pour les comparaisons parmi les sexes (masculin contre féminin) dans les catégories différentes (la catégorie prend contre catégorie moyenne), suivre pour l'hoc du poteau de l'épreuve de Scheffé quand P <0,05 pour lui analysent des données. Les données ont été traitées à travers le paquet statistique Statistica version 5.0. ils ont été trouvés des différences statistiques quand a affronté des hommes et des femmes dans les deux catégories estimées, en étant le sexe (F=5,29 et P=0,03) le facteur décisif dans les indicateurs de flexibilité. Les résultats de l'étude présente suggèrent que dans les athlètes du sumô le sexe démontre pour être un facteur décisif dans la flexibilité indépendante de la catégorie dans que l'athlète participe.

Mot clef: sumô, flexibilité, épreuve de siège et atteindre

**LOS INDICADORES DE FLEXIBILIDAD EN ATLETAS DE SUMÔ DE CATEGORÍAS DIFERENTES DE AMBOS SEXOS**

Las características de los atletas de varios flexibilidad de modalidades es, la mayoría del tiempo, muy diferente, tiende en la vista las demandas específicas de cada deporte, entre ellos el sumô. Ese deporte llegó al principio a Brasil con los inmigrantes japoneses del siglo 20, y el primer campeonato era cumplido en 1914. La búsqueda del estudio presente para hacer las indicaciones sobre la flexibilidad en atletas de sumô de categorías diferentes de ambos sexos. Ellos participaron en el estudio 37 atletas que son 21 hombres (19±7 años) y 16 mujeres (18±4 años). En el período de la colección de los datos los atletas se encontraron participando en la 1 Forma Londrinense y Paranaense de Sumô. Los antropométricas de la estatura inicialmente moderados eran cumplidos (EST) en el centímetro y masa del corporal (el MAESTRO DE CEREMONIAS) en el kg, a través de un estadiômetro de metal, con la balanza de 0,5 centímetro y de una balanza FILIZOLA con la balanza de 0,1 kg. El índice de masa corpórea era calculado siendo considerado la razón de MAESTRO DE CEREMONIAS (el kg) para el cuadrado de EST (el m²). Para para medir la flexibilidad la prueba se usó de asiento-y-alcanzar. Los procedimientos siguieron las estandarizaciones descritas por AAHPERD (1988). LA prueba de Shapiro-Wilk fue usada para confirmar la normalidad de las variables. Analice de variación (ANOVA) se usó para las comparaciones entre los sexos (masculino contra el femenino) en las categorías diferentes (la categoría toma contra la categoría elemento), siguiendo para el poste de la prueba hoc de Scheffé cuando P <0,05 para él analizan de los datos. Los datos se trataron a través del paquete estadístico Statistica versión 5.0. ellos se encontraron las diferencias estadísticas cuando confrontó a los hombres y mujeres en las dos categorías estimadas, mientras siendo el sexo (F=5,29 y P=0,03) el factor firme en los indicadores de flexibilidad. Los resultados del estudio presente sugieren que en atletas del sumô el sexo demuestre para ser un factor firme en la flexibilidad independiente de la categoría en que el atleta participa.

Palabra-importante: el sumô, la flexibilidad, la prueba de asiento-y-alcanzar,

**INDICADORES DE FLEXIBILIDADE EM ATLETAS DE SUMÔ DE DIFERENTES CATEGORIAS DE AMBOS OS SEXOS**

As características da flexibilidade de atletas de diversas modalidades são, na maioria das vezes, muito diferentes, tendo em vista as exigências específicas de cada esporte, entre eles o sumô. Esse esporte chegou ao Brasil com os imigrantes japoneses no início do século 20, e o primeiro campeonato foi realizado em 1914. O presente estudo procura fazer indicações sobre a flexibilidade em atletas de sumô de diferentes categorias de ambos os sexos. Participaram do estudo 37 atletas sendo 21 homens (19 7 anos) e 16 mulheres (18 4 anos). No período da coleta dos dados os atletas se encontravam participando do 1º Torneio Londrinense e Paranaense de Sumô. Inicialmente foram realizadas medidas antropométricas de estatura (EST) em cm e massa corporal (MC) em kg, por meio de um estadiômetro de metal, com escala de 0,5 cm e de uma balança FILIZOLA com escala de 0,1 kg. O índice de massa corporal foi calculado considerando-se a razão da MC (kg) pelo quadrado da EST (m²). Para mensurar a flexibilidade foi utilizado o teste de sentar-e-alcançar. Os procedimentos seguiram as padronizações descritas pela AAHPERD (1988). O teste de Shapiro-Wilk foi empregado para confirmar a normalidade das variáveis. Analise de variância (ANOVA) foi utilizada para as comparações entre os sexos (masculino vs. feminino) nas diferentes categorias (categoria leve vs. categoria médio), seguida pelo teste *post hoc* de Scheffé quando *P*<0,05 para analise dos dados. Os dados foram tratados por meio do pacote estatístico Statistica versão 5.0. Foram encontradas diferenças estatísticas quando confrontados homens e mulheres nas duas categorias avaliadas, sendo o sexo (F=5,29 e *P*=0,03) o fator determinante nos indicadores de flexibilidade. Os resultados do presente estudo sugerem que em atletas de sumô o sexo demonstra ser um fator determinante na flexibilidade independente da categoria em que o atleta participe.

Palavras-chave: sumô, flexibilidade, teste de sentar-e-alcançar