14 - THE FLEXIBILITY EVALUATION - CONSTRUCT THE REFERENTIAL TABLE TO KR BENCH

ROSEMARY RAUCHBACH; SILVANO KRUCHELSKI.
Secretaria Municipal do Esporte e Lazer/Programa Curitibativa - Curitiba - Paraná - Brasil.
Rauchbach88@hotmail.com; silvanokr@pop.com.br

INTRODUCTION

Muscular strength is the physical capability that determines the amplitude of the joint movements without causing some injury to it. It is considered as an important component of physical fitness to health and performance too (Achour Júnior, 1999). The lack of Muscular strength throughout the life can allow the gradual installation of muscular shortenings, that limit the joint amplitude of movement, causing lumbar harm-position, back pains, among others problems, intervening with the normal course of the life, reducing the work capacity, and leading to the aging without quality (Rauchbach, 2005). Flexibility change with the age and the physical activity level, the sedentary people and the oldest usually has less flexibility, mobility and muscular elasticity (Nahas, 2001). The women are more flexible than men and flexibility also varies between people and even though the person (Achour Júnior, 1999). The flexibility evaluation is a habitual practice to supply some information to control results of the exercises during of different training programs (Chagas & Bhering, 2004), as well as allows identifying to muscular shortenings, directing the specific intervention through the activities destined to the recovery and maintenance of the health. There are different instruments and forms to evaluate the flexibility, and the tests to be divided in three distinct groups: angle, non-dimensional and linear tests (Marins & Giannichi, 1998).

The angle tests have the result expressed in angles and can be measured by different instruments, as “goniometros” and “flexometros”. Considered as direct system of measurement, that respects the individual aspect of flexibility and it is specific for each joint. The non-dimensional tests have the main characteristic to compare the movements' interpretation with the leaf answer sheet, determining the amplitude of movement grade. However these tests can spend much time and its application is limited in population studies (Farias Júnior & Barros, 2004). The linear tests are considered an indirect technique for the flexibility measurement, its characteristics are the results expressing in a distance scale (normally in centimeters), taking as initial reference a previous body or joint position before the movement. The “seat and reach” linear test, created by Wells & Dillon is the more spread and used, mainly in population studies, but also its results receive some critical (Farias Júnior & Barros, 2004). According to Guedes & Guedes (1997), some adaptations had been made to the proposal initial of Wells & Dillan in the attempt to offer a level measure more reproducible, therefore the same ones can be influenced by the length and width of the corporal segments and by the height.

To show of these observed differences, Kruchelski & Rauchbach (2005) had considered an adaptation to the “bench of Wells”, the instrument was constructed with intention to keep the same characteristics of the evaluation, the easily construction and low cost. The main orientation for the creation of this proposal, “KR bench” according to authors, was motivated by the perception of that some people start the test in the “bench of Wells” without reaching it or finding the test without to able to reached it (beginning fixed point), didn't start of its self referential. This difficulty was observed in the test application of Curitibativa Program, that it motivated them to search a form to evaluate of the flexibility in considerable groups that included of different kind of body composition and varieties race, that were observed mainly in the south of Brazil, even so they believe that these differences also meet in all the regions of the Country.

KR Bench (figure 1) consists of an instrument composed for a wooden box-base (30x30x30 cm) with a mobile wooden part of 42 cm height that slides on a platform (60 cm) centered on the box-base; there is a lateral mobile ruler in this platform to the end measurement.

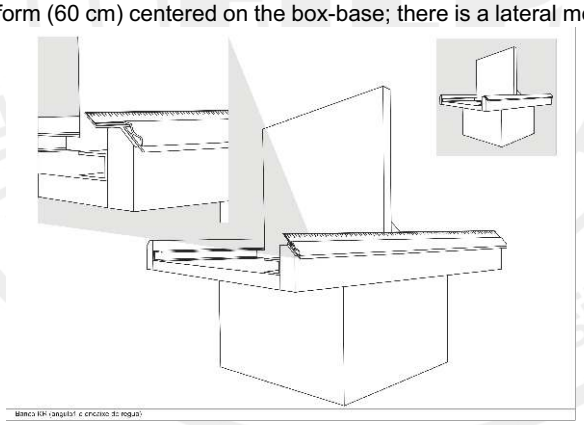


Fig.1 KR bench

To carry out the test with KR bench, initially, the person is located seated, leans the head, the spine and the hip in a wall or support, making an angle of 90 degrees with the legs that must be kept extended. Then he extends the arms ahead, parallels to the base, fixing the shoulders throw ahead, the hands touching the tip of the fingers in the mobile wooden part, without losing the contact with the wall or support. This position is fixed as zero point in the measurement mobile ruler. After this procedure, the person pushes the mobile wooden part in the point next to the platform, trying to reach the point more far possible in wooden box (for three times), and his better resulted is written down in centimeters, observing the reach of zero point to the gotten index. The shoulders fixed throw ahead in the beginning of the test is justified for; there are some many people have alterations because kept this joint fixed for the chronic muscles contraction, and also, for the test characteristic, in which the shoulders finish ahead when the person tries to reach the most distant point, thus the result of the test is super valuing, inducing the errors.



Fig.2 The test

OBJECTIVE

The purpose of this study was to construct the referential table for the flexibility evaluation instrument - KR Bench. 534 people had been evaluated for the construction of the instrument - KR Bench; some aspects had been observed which interviews in the flexibility evaluation, as the age, the body composition and the height. To eliminate the distortions presented in the sample, where people with different heights and distance of displacements had been classified in the same level, the authors had suggested a study with an expressive number of people evaluations to create a classification table, separating the individuals for height, sex and age. In such a way, it was considering, that same grade reached for people of different heights, represent proportionally different performances of flexibility (Kruchelski & Rauchbach, 2005).

THE TABLE CONSTRUCTION

The referential table was constructed through 4159 evaluations, 3062 women and 1097 men. Physical Education teachers of Curitiba City Hall carried through the collect of data, they was enabled to use the protocol of KR Bench. The evaluations that had been part of this study were made in monthly events and into the Sports Centers enclosed on 9 regional of the City, through for the Curitibativa Program, contemplating in such a way individuals classified in all the levels of physical activity. It was considered as variable of control for construction of the table: sex, age and height. Flexibility is influenced from the gender and change inversely to the age advance, that it justifies contemplating these aspects in the proposal of the present study. The Option for built a classification table segmenting it in height levels, finds endorsement in the fact of that how much bigger the height, indistinctly of gender, independent of the age, the greater and express are the results found for Kruchelski & Rauchbach (2005) research.

The data had been analyzed through the descriptive statistics, where if it considered average, median and standard deviation, they are distributing from gender, 6 classes of age (10 - 10 years) and 3 height levels (10 - 10 cm). The classification proposal in the table considers the performance average of sample in each one of the segments above cited. Due to sample to be representatively great the averages and median had presented corresponding values. The results below of the average, but inside of the shunting line standard deviation had been considered with “reasonable” classification and below of this parameter as “weak”. Results above of the average, but inside of the shunting line standard deviation had been considered with “good” classification and above of this parameter as “very good”. The statistical treatment adjusted to the results in accordance with the line of data trend.

KR Bench, flexibility level - year and height, women

Height	Level	18 - 29 year	30 - 39 year	40 - 49 year	50 - 59 year	60 - 69 year	70 year +
up to1,50m	weak	up to 19	up to 18	up to 16	up to 15	up to 13	up to 11
	reasonable	19,1 - 26	18,1 - 25	16,1 - 24	15,1 - 22	13,1 - 20	11,1 - 18
	good	26,1 - 33	25,1 - 32	24,1 - 31	22,1 - 30	20,1 - 28	18,1 - 26
	very good	33,1 +	32,1 +	31,1 +	30,1 +	28,1 +	26,1 +
>1,50 m - 1,60 m	weak	up to 19	up to 18	up to 17	up to 16	up to 14	up to 13
	reasonable	19,1 - 26	18,1 - 25	17,1 - 25	16,1 - 24	14,1 - 22	13,1 - 20
	good	26,1 - 34	25,1 - 33	25,1 - 32	24,1 - 31	22,1 - 29	20,1 - 28
	very good	34,1 +	33,1 +	32,1 +	31,1 +	29,1 +	28,1 +
>1,60 m	weak	up to 21	up to 20	up to 18	up to 16	up to 15	up to 14
	reasonable	21,1 - 28	20,1 - 27	18,1 - 26	16,1 - 24	15,1 - 23	14,1 - 22
	good	28,1 - 35	27,1 - 34	26,1 - 33	24,1 - 32	23,1 - 31	22,1 - 30
	very good	35,1 +	34,1 +	33,1 +	32,1 +	31,1 +	30,1 +

KR Bench, flexibility level - year and height, men

Estatura	Classificação	18 - 29 year	30 - 39 year	40 - 49 year	50 - 59 year	60 - 69 year	70 year +
up to 1,60 m	weak	up to 15	up to 14	up to 13	up to 12	up to 10	up to 8
	reasonable	15,1 - 24	14,1 - 23	13,1 - 22	12,1 - 21	10,1 - 17	8,1 - 15
	good	24,1 - 30	23,1 - 29	22,1 - 28	21,1 - 27	17,1 - 23	15,1 - 20
	very good	30,1 +	29,1 +	28,1 +	27,1 +	23,1 +	20,1 +
>1,60 m - 1,70 m	weak	up to 16	up to 15	up to 14	up to 13	up to 11	up to 9
	reasonable	16,1 - 24	15,1 - 23	14,1 - 22	13,1 - 21	11,1 - 18	9,1 - 15
	good	24,1 - 31	23,1 - 30	22,1 - 29	21,1 - 28	18,1 - 24	15,1 - 21
	very good	31,1 +	30,1 +	29,1 +	28,1 +	24,1 +	21,1 +
>1,70 m	weak	up to 17	up to 16	up to 15	up to 14	up to 12	up to 10
	reasonable	17,1 - 25	16,1 - 24	15,1 - 23	14,1 - 22	12,1 - 19	10,1 - 16
	good	25,1 - 33	24,1 - 32	23,1 - 31	22,1 - 29	19,1 - 26	16,1 - 22
	very good	33,1 +	32,1 +	31,1 +	29,1 +	26,1 +	22,1 +

DISCUSSION

The proposal of this study was to offer a support instrument for the flexibility evaluation, allowing comparisons between people or samples with the use of a classification table that takes in account the variable: sex, age and height. The technological advances in the field of flexibility evaluation had been considered, and the contribution left here will be able to assist in studies with great populations and few resources, where it's needs rapidity evaluation of this physical quality so strong to the health related.

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Rua: Castro Alves, 832 apto 6/B - Batel, Curitiba/PR CEP: 80240 270
Telefones: (41) 3244 1242 res. (41) 3321 2710 com. (41) 9972 1900
rauchbach88@hotmail.com; rosemaryrauchbach@yahoo.com.br

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ABSTRACT:
The purpose of this study was to construct the referential table for the flexibility evaluation instrument - KR Bench. There were evaluating 4159 people, 3062 women and 1097 men. The data had been analyzed through the descriptive statistics, and distribution from gender, 6 classes of age (10 - 10 years) and 3 height levels (10 - 10 cm). This KR bench instrument and its classification table will be able to assist in studies with large populations and few resources, respecting the gender, age and height differences.
KEY WORDS: evaluation instrument; classified table; flexibility.

ÉVALUATION DE LA FLEXIBILITE - CONSTRUCTION DU TABLEAU REFERENTIEL POUR LA BANQUE KR

RESUMÉ:
L'objectif de cette étude a été construire à un tableau de référence pour l'instrument d'évaluation de la flexibilité - la Banque KR. Ont été évalués 4159 personnes (3062 femmes et 1097 hommes). Les données ont été analysées à travers la statistique descriptive, où il s'est considéré moyenne, moyenne et détour étalon, en rendant possible la séparation des personnes pour genre, 6 classes d'âge (10 dans 10 ans) et 3 bandes de stature (tous les 10 cm). Cet instrument, la Banque KR et son tableau de classement pourront assister dans des études avec grandes populations et peu de ressources, et où il ait besoin de rapidité dans l'évaluation de cette qualité physique, en respectant les différences en ce qui concerne le genre, l'âge et la stature.
MOTS CLEF: instrument d'évaluation; tableau de classement; flexibilité.

LA EVALUACIÓN DE LA FLEXIBILIDAD - CONSTRUIR LA TABLA DE REFERENCIA AL BANCO DEL KR

RESUMEN:
El propósito de este estudio era construir la tabla de referencia para el instrumento de la evaluación de la flexibilidad - banco del KR. Allí evaluaban a 4159 personas, a 3062 mujeres y a 1097 hombres. Los datos habían sido analizados a través de la estadística descriptiva, y de la distribución del género, de 6 clases de la edad (10 - 10 años) y de 3 niveles de la altura (10 - 10 centímetros). Este instrumento del KR del banco y su tabla de clasificación podrán asistir a estudios con las poblaciones grandes y pocos los recursos, respetando las diferencias del género, de la edad y de la altura.
PALABRAS CLAVES: instrumento de la evaluación; tabla clasificada; flexibilidad.

AVALIAÇÃO DA FLEXIBILIDADE - CONSTRUÇÃO DA TABELA REFERENCIAL PARA O BANCO KR

RESUMO:
O objetivo deste estudo foi construir uma tabela de referência para o instrumento de avaliação da flexibilidade - Banco KR. Foram avaliados 4159 indivíduos sendo 3062 mulheres e 1097 homens. Os dados foram analisados através da estatística descritiva, onde se considerou média, mediana e desvio padrão, possibilitando a separação dos indivíduos por gênero, 6 classes de idade (10 em 10 anos) e 3 faixas de estatura (de 10 em 10 cm). Esse instrumento, banco KR e sua tabela de classificação poderão auxiliar em estudos com grandes populações e poucos recursos, e onde se necessite de rapidez na avaliação desta qualidade física tão fortemente relacionada à saúde, respeitando as diferenças no que se refere ao sexo, idade e estatura.
PALAVRAS-CHAVE: instrumento de avaliação; tabela de classificação; flexibilidade.