87 - CHANGES IN LUNG FUNCTION IN DIFFERENT CONDITIONS OF EQUILIBRIUM IN CLASSICAL DANCERS

LUCIANA ROCHA MAGALHÃES PAIVA
UNIVERSIDADE DO ESTADO DO PARÁ/BELÉM/ PARÁ/BRASIL
lucianamagalhaes.ef@hotmail.com

doi: 10.16887/85.a2.87

1. INTRODUCTION

The dance was born with the man who always tried to dance on festive and / or religious situations, but ballet, as is its importance today, emerged in Italy in the mid-fifteenth century, more precisely in 1489 at the wedding of the Duke of Milan with Isabel Aragon. Soon after, the ballet was taken to France by Catherine de Medici in terms of her marriage to Henry II. France then became the great stage of world ballet Around 1830 began the period of Romantic ballet, with masterful creations of "La Sylphide" and "Gisele". At the end of the Romantic era, the world center of the ballet moved from Paris to St. Petersburg, Russia. And after the 1st World War, has expanded to London, New York, England and Brazil, where it was presented for the first time in Rio de Janeiro (Caminada, 1999).

Dancer to occur in a good performance in the ballet, will keep a technique and constant improvement of performance in view of the perfection of movement. There for this one conservation levels of physical qualities, requiring specific jobs for the correct and harmonious realization. With this view, the entire exercise to be completed will be combined with the breath: taxpayer system for maintaining the internal environment of the body in relation to the external environment, in which the movements of contraction and expansion are directly linked to the breathing process that contribute to the muscular work, support and balance, key factors to a ballerina.

For Davies et al (2002), the human breath is a circular process with oxygen from the air being captured and brought into the cells of the body from one side of the circuit; while the carbon dioxide is driven in the opposite direction on the other side of the circuit. The mechanics of breathing is optimized for neural control of breathing pattern, so that the work of breathing is minimized at any level of ventilation work involving the respiratory muscles, which perform mechanical strength against the chest wall and the lung elasticity against the resistance of the airway, the gas flow.

With the above concept, one sees the influence of respiration in humans as a way of life and for carrying out its activities. Then, the classical dancer is directly dependent on the development of breathing movements and the quality of the dance.

Therefore, the approach of breath, as influencing factor in the physical quality of a ballerina, is required for work with global objectives in terms of understanding the movement in his body, aiming at an improved quality dance ballet, as well as life.

- Breathing in ballet

To Sampaio (2001) is important ballet be considered not only an art, a sport with more general and specific training, contributing to a body knowledge, with physical demands that go great together: strength, power, flexibility, cardiorespiratory fitness and neuromuscular coordination.

Ballet in the correct application of breathing can effectively collaborate to work, where every time you open your arms is important to inspire and expire when you close them, getting a clearer coordination, helping to understand the movement. Poor breathing causes substantial declines in quality of dance, because the wear of the dancer becomes larger due to the tension of muscles and increasing the imbalance.

Before the technique is essential to understand the movement from the inside out, without separating the body of the mind. Conscious breathing is essential in this process, making it ideal flow without letting it suspend it or block it to have a significant improvement in the quality of the dance, the other physical exercises and quality of life (Dantas, 2003).

- Balance at the ballet

Balance is a skill much in demand for classical dancer, achieved with technique and training. The balancing requires the development of body alignment, ie, a good posture; requiring strength, stamina and good muscle, tone from all specific jobs where every deviation from the ideal position of your body should match the effort of recovery (FAIR, 1998).

As Gallahue & Ozmun (2005) balance is the ability of an individual to keep unchanged the posture of your body, when it is placed in various positions. The stability implies the ability to control body movements that value in the balance. And, when analyzed from the perspective of equilibrium always involves the stability element.

The three types of balance in ballet are paramount, such as static balance (EB) working isometric strength, muscular endurance and flexibility (FAIR, 1998). An example of static equilibrium is the arabesque position, defined as one of the key positions in ballet.

Coded by Blasis, the arabesque is known since the eighteenth century, being conducted with the body profile, to try to create the longest possible line relying only on one leg while the other is extended behind a right angle (90 °) or above, in sneakers half tip or toe shoes, with arms in various positions harmonics. Especially the 1st arabesque on pointe, that besides the body be kept upright, supported on one leg in a vertical position, one that is extended at a right angle to the supporting leg; your shoulders are kept straight in the direction with the same arm of the supporting leg stretched forward and with her palm down the line. The fingers are in line with the center of the space between the eyes and the rear arm is slightly lowered, so that both arms are straight-shaped or "L" (an arm in the front and one side) (Pavlova, 2000).

The dynamic equilibrium (DB) is used all the time, whether for work in half an edge or tip, either by exercise of pirouettes and jumps. The example of dynamic equilibrium is highlighted in échappê, French term meaning movement or slipping away, where there is a symmetrical displacement of both feet, starting from a closed to an open position. Highlighting Échappê Sur Les pointes, ie the escape is performed on toe shoes, which is set in the implementation of the 5th échappê starting position (position of feet is held in front of one another with the anterior region of one foot lying with the back of the other foot) in demi-plié (small knee flexion) spreading her legs for the 2nd position (open side) at the tip. The foot should slip quickly to open at the same time and same position. Upon reaching the open position, the knees should remain rigid. Then, the dancer then back to 5th position demi-plié (Pavlova, 2000).

In Leal (1998), the recovered balance (RB) is proportionally linked to dynamic, defined as the ability to recover the posture of the dancer at the end of some movement; following the example of the end of Échappê Sur Les Pointes.

2.METHODOLOGY

To obtain results that are based on work on "Changes in Lung Function in Different Conditions of Equilibrium in

Classical Dancers," was held in the city of Belém (PA), a study of field research was quantitative, aiming at the performance of the functions lung on different types of balance and qualitative aiming to improve the performance of the dancers in class and in spectacles.

The research site was in the Exercise Physiology Laboratory at the University of Fisioclínica Amazon - UNAMA. The area chosen for the study population consisted of classical dancers having satisfactory, ie, have good technical achievements of the movements in balance in pointe shoes; practicing ballet in two dance schools in the city of Bethlehem, were randomly selected for the sample twenty-six women aged 17-26 years and ballet practice time between 12-19 years.

To conduct the survey instrument used the spirometer, which measures lung volumes and flows, such as: tidal volume (VT), expiratory reserve volume (ERV), inspiratory reserve volume (IRV), Respiratory Frequency (RF), inspiratory capacity (IC), minute volume (VE) and Vital Capacity (VC). Being branded Vitatrace model VT130; in which pulmonary measurements were taken through the spirometer in six stages:

The 1st time the dancer performing a 1st arabesque position that works in static equilibrium, then performing the process to measure CV, delimited by a deep inspiration followed by a maximal expiration in the pipe that was attached to the buccal cavity, with the ballerina with use of a nose clip (partially closed nose).

The 2nd time the dancer performing the same position, however the procedure was different; the dancer met with the coupled pipe from the start, so that normal breathing execute within a given time and then carried out a deep breath and was eliminated with a maximum expiration, this process is media-VC, ERV, IRV, RF, CI and VE.

The 3rd and 4th time the dancer performing in dynamic equilibrium step Échappê Sur Les Pointes in second place in the 20 series, while exercising. The 3rd time the process was done to measure CV and the 4th time the process to check the values of VC, ERV, IRV, RF, CI and VE.

The 5th and 6th time to obtain the recovered balance was used again Échappê Sur Les Pointes; this time measuring the results as follows: the 5th time is found the value of CV after completion of a series échappês 16, and 6 times the measurement of VC, ERV, IRV, RF, CI and VE happen from the eighth échappê following until the sixteenth, the series finale, when performing a deep breath and releases with a maximum expiration.

All data were presented as graphs and tables and statistically analyzed using the statistical package BioEstat 3.0 (Ayres, 2003), where we used descriptive statistics to characterize the sample and the analysis of variance test with a significance level ≤ 0.05 compared to the differences in various kinds of balance.

3. RESULTS AND DISCUSSION

Following the results obtained in the study, together with appropriate discussions and interpretations about the same are presented.

Table 01 - Descriptive statistics of age and the parameters of the training.

Parameter	Age	Ballet time	Sneaker Time	Sessions/month
Avarage	19.5	14.42	8.33	21.00
S.Deviation	3.51	2.69	3.39	6.87

Source: Author, 2014.

The analysis of Table 01 allows us to state that the study group is relatively homogeneous for the parameters of Age and Time of ballet training, while it is quite heterogeneous for the parameters of time using sneaker tip number of monthly training sessions. These aspects make relative difficulty of the inferences and generalizations for the study group.

Sampaio (2001) states that the ballet is essential to be considered not only as art, but as training that requires a knowledge of your entire body; because different physical demands require a combination of strength, power, flexibility, cardiopulmonary fitness and neuromuscular coordination.

For mounting a training, a daily program of classes in ballet bar and center in pointe shoes it is important; because, in a functional standpoint, dancing on point be the most demanding job, and the skill decreases according to their physical capabilities; considering, sneakers, inappropriate material to be used (FAIR, 1998).

Considering the preceding paragraph, the research showed significance, because of differences in monthly trainings, the number of classes and the end time of the use of pointe shoes and influences the performance of the subjects tested.

Table 02 - Descriptive statistics for the parameters of lung function in relation to the type of balance.

Parameter	Tidal Volume			Respiratory Frequency			Minute Volume			Inspiratory Reserve Vol			Expiratory Reserve Vol			Inspiratory Capacity			Vital Capacity		
	E.B.	D.B.	R.B.	E.B.	D.B.	R.B	E.B.	D.B.	R.B.	E.B.	D.B.	R.B.	E.B.	D.B.	R.B.	E.B.	D.B.	R.B.	E.B.	D.B.	R.B.
Average	0.85	1.12	1.03	30.50	45.33	49.12	28.80	47.38	49.62	1.05	1.30	0.75	1.08	1.02	1.18	1.90	2.23	1.78	2.92	3.11	2.49
S.Deviation	0.34	0.38	0.32	12.47	20.41	21.78	20.33	21.59	24.09	0.23	0.16	0.30	0.39	0.44	0.25	0.35	0.32	0.60	0.52	0.60	0.59

Source: Author, 2014.

The analysis of Table 02 allows us to state that the study sample is very heterogeneous regarding the evaluated parameters, which can be perceived by the high standard deviation for the parameters. This phenomenon makes it difficult to generalize for all subjects in the sample.

Table 03 - Analysis of variance of a criterion to the different parameters for each type of equilibrium.

ANOVA	F	P
Tidal Volume	0.9401	0.5851
Respiratory Frequency	1.6656	0.2213
Minute Volume	1.6104	0.2317
Expiratory Reserve Volume	0.2884	0.7567
Inspiratory Capacity	1.6945	0.2161
Vital Capacity	1.8211	0.1948
	–	**0.0043**

Inspiratory Reserve Volume	EB/DB		EB/DB		EB/DB	
	Q	p	Q	p	Q	P
	2.5877	>0.05	3.1053	>0.05	5.6930	**<0.01**
					α ≤ 0.05	

Source: Author, 2014.

As seen in Table 03, we accept the null for the parameters of tidal volume, respiratory frequency, minute volume, expiratory reserve volume, inspiratory capacity and vital capacity hypothesis, allowing us to conclude that there were no

statistical differences in these parameters between different equilibrium conditions.

For the parameter of inspiratory reserve volume, it can be seen in Table 03 that rejects the null hypothesis and accept the alternative hypothesis, concluding that the type of equilibrium interferes with statistical significance in the parameter in question. Therefore, there was a significant decrease in dynamic equilibrium between the parameter and the recovered balance.

As Mc Ardle et al (1998) state that some of the pulmonary function measurements are sensitive indicators of obstructive lung diseases; but in normal people doing some kind of training measurements are of little use in the sense of predicting fitness or exercise performance where the values fall into the normal range, as the parameters of VC, RR, VE, VRE, CI CV and the three equilibrium conditions rose the null hypothesis, ie, when the dancers performed the test, the inspired or expired volume during the respiratory cycles were almost unchanged in equilibrium conditions, came up with this, issues ballet that remains in the inspired air lock; logo for the execution of the movements the dancers store air. As the ballet presents intermittent levels of moderate to intense activity, responses to lung function are related.

Example: To make a static equilibrium, the dancers performed the 1st arabesque, he was not running from a dance poses or as large in terms of choreography, so it would be presenting energy expenditure. The dancers just had positioned themselves and aid their arms, which contributed to better support and the use of the breath to be little required. Differentiating itself from a stage performance that would take into account the emotional factor and the increased demand for air referent. According to the descriptions of Sampaio (1997), when making an arabesque the important thing is to create the longest possible line, so there should be a back muscle work muscles relating to this region, can resist the physical fitness and maintain a greater support in facilitating execution performance balance. The subjects had good muscle, from its physical constraints tone and so performed the exercise without much requirement of pulmonary function due to the contribution of the back support.

During the dynamic balance and retrieved, the parameters for these Êchappé Sur Les pointes, little or no ordered, maximum expiratory volume after maximal inhalation (CV) and a maximum current at the end of expiration expiration (ERV), i.e., exercise was being measured was not necessary for a great force exhalation to the air that was just stored, calling into question again the air lock.

However, the inspiratory reserve volume showed a degree of significance; in which the dancers to perform the Échappê Sur Les Pointes and retrieved in a dynamic equilibrium, obtained a decrease in maximal inspiration at the end of a current inspiration, that is, the kind of balance interfered with the ability to inspire and trying a higher entry air in the lungs would result in loss of balance.

Many dancers in performances of dynamic and recovered to reach equilibrium state of fatigue by developing extremely exhausting movements due suspend or block your breath, not going to work together and even before running a good technique is crucial to understand the movements and physical abilities requested.

Research subjects showed changes in their results most of VRI, why not counted with the aid of arms or as support nor the breathing process, ie open arms inspire and close arms expires.

According to Sampaio (2001) it is possible to compare the results because accomplish Échappê Sur Les Pointes stability decreases due to perform in pointe shoes, in which the body is erect, increasing the anterior-posterior angle of the foot relative to gravity due be reduced under a support base, creating more muscular effort exceeding normal ranges of motion and increasing the effort to support.

4. CLOSING REMARKS

Given the results of this study aimed to understand the factors that were the "Changes in Lung Function in Different Conditions of Equilibrium in Classical Dancers" reached the following conclusions are: staged static, dynamic and recovered balances for relations parameters as VC, ERV, IC, VC, VE and RR significance was low, ie, the chance to draw the balance with the use of these measures lung was zero at that point considering the processes performed in the tests, the dancers garnered a number of enough to demand that the respiratory system was ordering the executions of the exercises, and how important and influential factor in the process where the classical dancers were tested, with the subjects without emotional influences, such as a contest or submission of an air spectacle.

Also yielded a significant event in the VRI parameter in dynamic equilibrium stages and recovered representing a shortfall in demand for air for a maximum inspiration due to a normal inspiration; therefore, it is understood that the inspired air is usually not enough to keep breathing movements in dynamic and recovered equilibrium, and that an attempt to capture inspired in their maximum degree air occur loss of balance.

During the research some questions were resolved, but the study of ballet is vast and many issues need to be studied and questioned, as the biological needs and physiological responses to specific forms of ballet, which include factors like choreography, impact, cadence, variations of limb movements (positions of the arms and legs) and can be related to physical fitness, kinesiology, biomechanics, nutrition, psychology, among others. Basis of study which are depth, contribute to the dancers, teachers, scholars and researchers in the area of these branches.

It is with great pleasure that I present this study to be not only the source, but a search that brings information in order to raise questions, encouraging the pursuit of further studies to deepen and contribution in performance and performance of the dancers.

5.REFERENCES

Caminada, Eliana. History of Dance: Cultural Evolution. Rio de Janeiro (RJ): Sprint 1999.

DANTAS, Estélio H M, The Practice of Physical Education. 5th edition. Rio de Janeiro (RJ): Shape, 2003.

DAVIES, Andrew; Blakeley, Asa G.H .; KIDD, Cecil. Human physiology. Porto Alegre (RS): Artmed, 2002.

GALLAHUE, David L. & Ozmun, John C. Understanding Motor Development: Infants, Children, Teens and Adults. 3rd edition. São Paulo (SP): Phorte, 2005.

LEAL, Marcia. Physical Preparation in Dance. Rio de Janeiro (RJ): Sprint 1998.

McArdle, William D.; KATCH, Victor L .; KATCH, Frank I. Exercise Physiology: Energy, Nutrition and Human Performance. 4th edition. Rio de Janeiro (RJ): Guanabara Koogan 1998.

Pavlova, Anna. New Dictionary of Ballet. Rio de Janeiro (RJ): Nordic, 2000.

Sampaio, Flavio. Essential Ballet. 3rd edition. Rio de Janeiro (RJ): Sprint 2001.

CHANGES IN LUNG FUNCTION IN DIFFERENT CONDITIONS OF EQUILIBRIUM IN CLASSICAL DANCERS.

ABSTRACT

The study "Changes in Lung Function in different conditions of Equilibrium in Classical Dancers", aimed to analyze the influence of the processes of breathing phases in balance and support the dancer. For this research we carried out a field study

was quantitative, aiming the performance of pulmonary function and quality with the purpose of improving the performance of the dancers in class and in spectacles; and the process of data collection obtained with classical dancers from two schools of the city of Bethlehem, aged 17-26 years and ballet practice time between 12 and 19 years; with the spirometer measures lung instrument were verified through Spirometry testing in the Laboratory of Exercise Physiology from the Fisioclínica/ UNAMA, in order to obtain tidal volume, expiratory reserve volume, inspiratory reserve volume, inspiratory capacity, minute volume, respiratory rate and vital capacity in different positions in the classical equilibrium conditions. He introduced us hypotheses outcomes null and alternative hypotheses, which raised questions about the existence of the air lock when the dancers dance to set up a classic pose or to continue the movement. Concluding that certain lung measures influence on breathing and performance of classical dancer. During some research questions were identified and resolved; however, the study and research in relation to the ballet is still very broad and many issues need to be questioned, tested and studied, fostering the growth of research in this area and contributing to greater acquisition and spread of knowledge.

KEYWORDS: Classical ballerina. Breath. Balance

CHANGEMENTS DANS LA FONCTION LUNG DANS DIFFERENTES CONDITIONS D'EQUILIBRE DANSEURS CLASSIQUES.

RÉSUMÉ

L'étude modifications de la fonction pulmonaire dans différentes conditions d'équilibre danseurs classiques, visant à analyser l'influence des processus de phases de respiration dans l'équilibre et soutenir la danseuse. Pour cette recherche, nous avons réalisé une étude de terrain a été quantitative, visant la performance de la fonction pulmonaire et la qualité dans le but d'améliorer la performance des danseurs en classe et à lunettes; et le processus de collecte de données obtenues avec des danseurs classiques de deux écoles de la ville de Bethléem, âgés de 17-26 ans et le temps de pratique de ballet entre 12 et 19 ans; avec l'instrument de poumon de spiromètre mesure a été vérifiée par des tests de spirométrie dans le laboratoire de physiologie de l'exercice de l'Université de Fisioclínica Amazon / UNAMA, afin d'obtenir le volume courant, volume de réserve expiratoire, le volume de réserve inspiratoire, la capacité inspiratoire, volume par minute, la fréquence respiratoire et la capacité vitale dans des positions différentes dans les conditions d'équilibre classiques. Il a présenté les résultats nous hypothèses hypothèses nulle et alternative, qui ont soulevé des questions quant à l'existence de la serrure de l'air lorsque les danseurs dansent à mettre en place une pose classique ou de poursuivre le mouvement. Concluant que certaines mesures du poumon influence sur la respiration et la performance de la danseuse classique. Au cours de certaines questions de recherche ont été identifiés et résolus; Cependant, l'étude et la recherche en ce qui concerne le ballet est encore très large et de nombreuses questions doivent être remis en question, testé et étudié, en favorisant la croissance de la recherche dans ce domaine et de contribuer à une plus grande acquisition et la diffusion des connaissances.

MOTS-CLÉS: ballerine classique. Souffle. balance

CAMBIOS EN FUNCIÓN PULMONAR EN DIFERENTES CONDICIONES DE EQUILIBRIO EN BAILARINES CLÁSICOS.

RESUMEN

El estudio "Los cambios en la función pulmonar en diferentes condiciones de equilibrio en bailarines clásicos, tuvo como objetivo analizar la influencia de los procesos de las fases de respiración en equilibrio y apoyar a la bailarina. Para esta investigación se realizó un estudio de campo fue cuantitativo, con el objetivo de la realización de la función pulmonar y la calidad con el propósito de mejorar el desempeño de los bailarines en clase y en los espectáculos; y el proceso de recolección de datos obtenidos con bailarines clásicos de dos escuelas de la ciudad de Belén, de entre 17 a 26 años y el tiempo de práctica de ballet entre 12 y 19 años; con el instrumento de pulmón espirómetro mide fueron verificadas a través de pruebas de espirometría en el Laboratorio de Fisiología del Ejercicio de la Universidad de Fisioclínica Amazonas / UNAMA, con el fin de obtener el volumen corriente, volumen de reserva espiratorio, volumen de reserva inspiratoria, capacidad inspiratoria, volumen minuto, la frecuencia respiratoria y la capacidad vital en diferentes posiciones en las condiciones de equilibrio clásicos. Introdujo nosotros hipótesis los resultados hipótesis nula y alternativa, que plantearon preguntas acerca de la existencia de la esclusa de aire cuando los bailarines bailan para establecer una pose clásica o para continuar el movimiento. Concluyendo que determinadas medidas pulmonares influencia en la respiración y el rendimiento de bailarina clásica. Durante algunas de las preguntas de investigación fueron identificados y resueltos; Sin embargo, el estudio y la investigación en relación con el ballet sigue siendo muy amplia y muchas cuestiones necesitan ser cuestionado, probado y estudiado, fomentar el crecimiento de la investigación en este ámbito y contribuir a una mayor adquisición y difusión del conocimiento.

PALABRAS CLAVE: Bailarina clásica. Aliento. Equilibrio

ALTERAÇÕES NA FUNÇÃO PULMONAR NAS DIFERENTES CONDIÇOES DE EQUILÍBRIO EM BAILARINAS CLÁSSICAS.

RESUMO

A pesquisa “Alterações na Função Pulmonar nas diferentes condições de Equilíbrio em Bailarinas Clássicas, teve como objetivo analisar a influência dos processos da respiração em fases de equilíbrio e sustentação da bailarina. Para essa pesquisa realizou-se um estudo de campo do tipo quantitativo, visando o desempenho das funções pulmonares e qualitativo com intuito de melhorar a performance das bailarinas nas aulas e nos espetáculos; sendo o processo da coleta dos dados obtidas com bailarinas clássicas de duas escolas da cidade de Belém, com idades entre 17 a 26 anos e tempo de prática de ballet entre 12 a 19 anos; foram verificadas medidas pulmonares com o instrumento Espirômetro, através do teste de Espirometria no Laboratório de Fisiologia do Exercício da Fisioclínica da Universidade da Amazônia/ Unama, com intuito de obter o volume corrente, volume de reserva expiratório, volume de reserva inspiratória, capacidade inspiratória, volume minuto, frequência respiratória e capacidade vital em diferentes posições clássicas nas condições de equilíbrio. Apresentou-se nos resultados hipóteses nulas e hipóteses alternativas, o que gerou questionamentos sobre a existência do bloqueio de ar quando as bailarinas dançam para configurar um pose clássica ou para dar continuidade ao movimento. Concluindo que determinadas medidas pulmonares influenciam na respiração e no desempenho da bailarina clássica. Durante a pesquisa alguns questionamentos foram identificados e solucionados; no entanto, o estudo e a pesquisa no que se refere ao ballet ainda é muito amplo e muitos temas necessitam ser questionados, testados e estudados, fomentando o crescimento da investigação nessa área e contribuindo para uma maior aquisição e propagação do conhecimento.

PALAVRAS-CHAVE: Bailarina clássica. Respiração. Equilíbrio