Global Journals LaTeX JournalKaleidoscope™
Artificial Intelligence formulated this projection for compatibility purposes from the original article published at Global Journals. However, this technology is currently in beta. *Therefore, kindly ignore odd layouts, missed formulae, text, tables, or figures.*

Teaching Classical Ballet : educational features and health conditions Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while performing the ballet

Dr.Palumbo C.[1]

[1] University of Salerno-Italy

Received: 23 March 2011 Accepted: 21 April 2011 Published: 5 May 2011

Abstract

Many neurophysiological and biomechanics studies researched the importance of the foot as main receptor of the postural system, highlighting the importance of the podalic afferents in the regulation and control of the body both in static and dynamic positions. Hence, a specific study of the dancers? feet shows the complexity of their anatomical structure stimulated by many stresses which can produce some pathological changes. The dancer?s foot is a specific field of research since the foot is a strong, steady, precise and powerful structure which is highly sensitive and fast and which is constantly stimulated according to the muscular work required by the dance at loads that affect the capsular ligaments. Moreover, the performances required by the dance demand complex, static, dynamic, and, in some cases, ?extreme? conditions from the foot. In fact, unlike ordinary actions such as walking, running and jumping, the classical ballet demands an alternation of the bipodalic and monopodalic stances and a redistribution of the load of the body at the level of the arch of the foot; so the foot is constantly required to ensure conditions of equilibrium and at the same time to test the limits of its biomechanical structure.

Index terms—

1 INTRODUCTION

Fokine, who was the first choreographer of the Ballets Russes and a forerunner of the neoclassical style, stated: "To judge a dancer, all you have to do is to see how he uses his feet ?" Posture has a main role in the classical ballet, since it is essential to put all the parts of the body in the right position. Specifically, its anatomical supports are the following ones:

? forefoot, arch of the foot and heel ? coxo-femoral and sacroiliac joints ? spine

2 ? blades

The right position is given by the exact relation among the above mentioned elements, which should be perfectly balanced and linked by an ideal line which starts from the occiput and goes down till the heels. The head should be hold up high and be on the same vertical line of the feet. Moreover, it is important that the trunk is always hold up and stretched out, with the shoulders down and the neck stretched. The right position of the body expects the trunk to be upright and stiff, thanks to a counter-notation movement (back tilt) of the pelvis, and a consequent reduction of the width of all the physiological curves of the rachis and a horizontal position of the pelvis itself.

According to this theory, the horizontal position of the pelvis allows the coxo-femoral joint to move more freely, since the head of the thigh-bone can widen the rotation inside the acetabulum. This introduces a new factor, the en dehors, which completes the right position of the body of a ballet dancer. The French word dehors means "outside" and it refers to a 90°extra-rotation position of the coxo-femoral joints and of the whole lower limbs. Anyway, this position, which fixes the direction of the movements and the main positions of this technique, can be also a natural talent of the ballet dancer and so it can be considered a bent.

There is an extension of all joints of the foot in the execution of the tip; in this case the most important role is played by the tibio-talar, involved in the formation of the "neck of the foot ". The plantar flexion in fact leads to the alignment of the bones of the foot so that the weight is unloaded only along an imaginary "kneemalleolus-metatarsal head-foot fingers" axis.

Many neurophysiological and biomechanics studies (Bricot, B., 1998Villeneuve, P.,2010) showed the importance of the role of the foot as main receptor of the postural system and the importance of the podalic afferents while regulating and controlling the posture. In static conditions, the foot rests on the ground mainly with the head of the first metatarsal, on the fifth metatarsal and on the back M alcaneal tuberosity.

these points you should download, respectively, 33%, 17% and 50% of the body's weight.The posture of a person depends on a specific muscle activity known as "postural". This activity is mainly carried out by the extensor muscles of the lower limbs, the muscles of the trunk and those of the neck. It aims at maintaining the projection on the floor of the center of gravity of the subject within the bearing surface (polygon). The maintenance of the orthostatic posture also requires the integration of visual, proprioceptive, labyrinthine and foot information.Many experimental protocols use stabilometry as a method of measuring postural equilibrium in man. Stabilometry records the coordinates of the center of pressure (COP) on a platform on which the subject is in an orthostatic position. Starting from these coordinates, it is possible to calculate many different parameters which Chiari, Rocchi and Cappello (2002) have classified into three different categories: a) The first one includes the most common parameters in literature which consider the space and time features of COP. For example, it is possible to calculate the type of postural balance and the needed energy to maintain it, the COP area, distances, the speed, etc. Moreover, it is possible to calculate the COP average position in terms of a fixed reference or relation to anthropometric data (for example, the size of the polygon, Kirby, Price e MacLeod, 1987). b) The second category consists of parameters such as the specific type of the frequency (Fast Fourier Transform: FFT). c) The third one represents the stochastic parameters **??**Collins e De Luca, 1993). Hence, the second and third categories allow to evaluate the dynamic aspect of the control of the orthostatic posture. The study of the dancer's foot has to consider complex elements, because of the many stresses the foot anatomic structure receives and the many pathological changes that might rise. In fact, the dancer's foot is a strong, steady, particularly sensitive, fast and exact structure, which is constantly stressed during the exploitation of its capsule-ligamental structure according to the required strong muscular work.Actually, unlike other motor activities, such as walking, running or jumping, it is evident that during the classical ballet the foot has to continuously change its trim, repeatedly and almost cyclically going from bipodalic stances to monopodalic ones; in this way it distributes the load on the arch of the foot. These changes of the balance, causing muscle-skeletal imbalances, constantly undermine not only the foot but also several areas of the body.The research studied the dancers of the Ballet School of the San Carlo Theatre of Naples. The course attended by the students provides an eight levels program; besides the study and the practice of the ballet, there are other subjects such as solfeggio, the history of the music, the history of the dance, gym, athletic training, modern dance, character dance, Spanish dance, pas de deux and physio-technique. The student's training starts with a tree time a week course which lasts 1.30 hour a day for the preliminary students. First class students attend a 1.30 hour training daily course 5 times a week. Seventh and eighth courses students attend a 3 hours training daily course 6 times a week.The training schedules a two phases lesson, during the first phase there are bar exercises. These exercises gradually help the joints mobility, the strength of the legs and the feet, the motor control and the movements coordination. The second phase of the training schedules exercises to be performed in the center and new elements of the allegro, tours, aplomb and jump elevation and ballon are gradually introduced.

Therefore it is a kind of training which demands highly concentrated physical activities, which become more and more demanding as years go. The training program, which during the seventh and eighth year courses has to reach an excellent technical and performing perfection, diversifies the male and female technical activities starting from the second year course. This different kind of training is carried out through some specific exercises, that is the study of the tips for the women, starting from the second year course (11/12 years old), and the jumping technique for the men. It is useful to highlight that the female dancers make greater efforts because they use the pointe shoes. These shoes expose them to continuous trauma and their use may cause aches and dysmorphology of the foot, because of the poor distribution of the load and the support, with consequences borne by the rachis and the lower limbs.

The required performance, the strong technique and the severe and systematic training techniques, make the dance a highly competitive sport activity.The subject can get a great advantage from this activity which, especially when practiced since a very young age, can develop in a harmonious way the muscular system, increasing the joints mobility and giving tonicity and suppleness to the muscular system. (Morris N.R. Van de Wetering A.W., De Rooij and. Sabapathy S., 2009).The research studied the possible relationship between the biomechanic conditions demanded by the technique of the ballet and by the possible changes of the plantar support, analysing

any possible effect on the posture. The survey also meant to highlight any significant difference between the plantar support of the female and male students.

3 II.

4 METHODS

The protocol of the research has been previously set thanks to the joint action of the researchers of the University of Salerno and the management of the Ballet School, which promoted and download, respectively, On Teaching Classical Ballet: educational features and health conditions. Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while performing the ballet.

shared the aims of the survey.The adopted procedural choices scheduled the following: 1) A specific agreement between the two bodies;

2) The group of research of the University of Salerno and the teachers of the San Carlo Theatre shared the use of the technology aimed at a descriptive study about the possible relationship between the foot structure and the practice of the ballet technique, studying the students of the Ballet school of the San Carlo Theatre of Naples.

In our case, the area of application covered the simple and fast static analysis of the load distribution, in order to fix the functionality of the foot in young dancers performing the classical ballet as a high competitive sport.

The actions performed at the school to carry out the experimental phase have been :

1) Setting up an integrated plan Ballet School of the San Carlo Theatre-University to share the aims, the methodologies and the procedures of the research. 2) Setting up an information sheet to collect data on the age, anthropometric data, the diet, the lifestyles and the type of sport practiced by students. 3) Analysis of the plantar support through a practical and prompt system of analysis : PDM -Platform of multi-functional strength.

It seems worthwhile to underline that the sharing of the research project has provided a first opportunity for comparison among the researches, the teachers and the director of the school in order to discuss about the organizational and executive methods of the research and obtain specific information about the training of the subjects observed. A later meeting with the students has been organized to obtain personal anthropometric information (parameters of structure, age, sex, height). The criteria of inclusion have been:

? absence of dimorphism.

? standard weight and height, ? postural treatment performed during sports training.

On the basis of the data collected, it has been expected the following: III.

5 SAMPLE

The research has been carried out on a survey of 31 students of the Ballet School of the San Carlo Theatre, of whom 23 students (aged between 10 and 11) belonged to the first course, and 11 students (aged between 17 and 20) attended the seventh and eighth Teaching Classical Ballet: educational features and health conditions. Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while performing the ballet.

courses.Twenty-three students of the first course have been studied (eight males and fifteen females) with an average age of about 11,2 years. With regard to the seventh and eighth courses, eleven students have been studied (three males and eight females), with an average age of about 18,9 years.

IV.

6 INSTRUMENTS

The group of research carried out a Stabilometric and Posturometric Examination on the group of control. The evaluation has been performed with a postural MULTIFUNCTION MEASUREMENT PLATFORM, Zebris FDM 153X60.5X2.1 cm (L x W x H), which works with 8064 capacitive sensors arranged in a next-generation matrix of 144 by 56 cm.

This platform provides a method that measures the distribution of plantar pressure in the upright position, during both the static phase (position of attention) and walking, providing graphical images and numerical values.The examination is carried out to identify the shape, the pressure, the surface, the acceleration of the foot and ground contact time to better assess any abnormal movement and areas of overload. The study of the posture and the gait highlights how the load distribution on the plantar surface may vary according to the structural characteristics of the subject and how it can be influenced by possible alterations of different bone segments (tarsus and metatarsus, tibia, femur, pelvis).

The application areas cover a quick and simple dynamic analysis of the rolling and a static analysis of the distribution of loads. This analysis can easily be used to determine the functionality of the foot because: -It can register an unlimited number of tests and the calculation of the average value will automatically appear in the "Report ".

7 -

The system records the ground reaction forces during the foot-ground contact.

8 -

The development of the load distribution can be displayed in 2 and 3 dimensions charts and in a color scale.

-Up to 4 simultaneous tracks facilitate the direct comparison between the left and the right side and the comparative analysis in terms of interest.

- First course students:It

The following four doses have been given:

Teaching Classical Ballet: educational features and health conditions. Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while performing the ballet.

1.

9 2.

3.

10 4.

11 5.

? The first one, at T0 time, i.e. before the lesson and at the beginning of the course, in bi-podalic position and with open eyes; i.

ii.

VI. 3. The forces are always balanced on the left and right forefoot and on the left and right hind-foot. 4. The support on the hind-foot is higher than that on the forefoot. 5. The average support forces are steady on each of the four points (left and right forefoot and on the left and right hind-foot).

12 EMERGED DATA

I

6. The values of the force on the left foot (forefoot and hind-foot) are highly concentrated around the mean value of the sport gesture with closed eyes. It shows a low variability of the behavior.

2. The force on the forefoot and the hind-foot is almost constant in each of the four cases.

13 I course

Histograms of the Ellipse Area, COP Length, Left Forefoot, Right Forefoot, Left foot and Right Hind-foot variables

14 VII. RESULTS

Teaching Classical Ballet: educational features and health conditions. Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while performing the ballet.

15 VIII course

Histograms of the Ellipse Area, COP Length, Left Forefoot, Right Forefoot, Left foot and Right Hind-foot variables

Teaching Classical Ballet: educational features and health conditions. Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while performing the ballet.

Teaching Classical Ballet: educational features and health conditions. Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while performing the ballet.

Teaching Classical Ballet: educational features and health conditions. Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while performing the ballet.

16 Key: A = I Course B= VIII Course

Comparing the values of the first course with those of the eighth course and analysing the following table of the p. values, it can be stated the following: 1. There are no significant differences between the first course and the eighth one with regard to the Area of the Ellipse (AE) and the mean of the forces (MF) both on the left and the right foot. This is true for the bipodalic support both with the open and the closed eyes. Hence, the attendance in the courses doesn't significantly modify the AE and the MF. 2. The length of the COP is different in the first and eighth course as regard as the support both with open and closed eyes, and the difference goes beyond the 99,9% (i.e., there is less than 0,1% probability to make mistake in admitting that the values are different). The study carried out in the following eight years of the course significantly changes the length of the COP..

17 During the bipodalic support with open eyes,

between the first and the eighth course there are significant differences at 95% for both the forefoot and the hindfoot, and in both cases both for the left and the right foot (there is less than 5% probability to make a

mistake if it is assumed that the values are different). 4. During the bipodalic support with open eyes, between the first and the eighth course there are significant differences at 95% for both the right forefoot and the right hind-foot. 5. During the bipodalic support with closed eyes, between the first and the eighth course there are significant differences at 99% for both the left forefoot and the left hind-foot (in this case, there is less than 1% probability to make a mistake if it is assumed that the values are different). 6. The influence of the study carried out during the following eight years of the course, involves more significant changes on the left foot rather than on the right one.

18 CORRELATIONS

The following important correlations have been identified: -A high force on the left forefoot implies a high force on the right forefoot and vice versa, a low force on the right and left hindfoot, particularly in the case of the bipodalic stance.

-Increasing the length of the COP increases the Area of the Ellipse, particularly during the sport activity.

X.

19 CONCLUSION

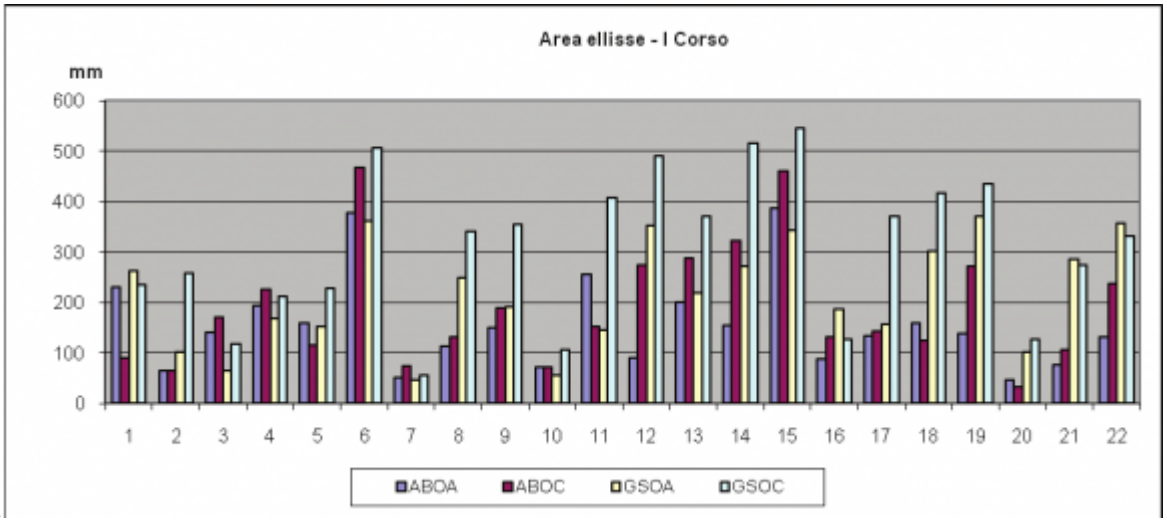
The survey meant to examine the relationship between the technique of the classical ballet and the possible appearance of abnormalities of the plantar support and the possible effects of these changes on the posture. The survey also meant to highlight every significant difference between the plantar support of both the female and male students. It should be clear, indeed, that the female dancer does greater efforts due to the technical features and to the pointe shoes, which expose her not only to frequent and sudden injuries; moreover, their use may also cause dysmorphism and foot pains, poor load distribution and support, with effects borne by the spine and the lower limbs.

The results showed: ? In the first year students, the support on the hind-foot is greater than that on the forefoot, while the eighth year students stand more on the forefoot than on the hind-foot. This might mean that the constant study would tend to encourage an adequately distributed support over the whole foot. Teaching Classical Ballet: educational features and health conditions. Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while performing the ballet. [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11]

[1] July 2011 © 2011 Global Journals Inc. (US)
[2] July 2011 © 2011 Global Journals Inc. (US)
[3] July 2011 © 2011 Global Journals Inc. (US)
[4] July 2011 © 2011 Global Journals Inc. (US)
[5] July 2011 © 2011 Global Journals Inc. (US)
[6] July 2011 © 2011 Global Journals Inc. (US)
[7] July 2011 © 2011 Global Journals Inc. (US)
[8] July 2011 © 2011 Global Journals Inc. (US)
[9] July 2011 © 2011 Global Journals Inc. (US)
[10] July 2011 © 2011 Global Journals Inc. (US)
[11] July 2011 © 2011 Global Journals Inc. (US)


Global Journals Inc.
Global Journal of Human Social Science

Figure 1: ?



11

Figure 2: Course 1 . 1 .

V. RESEARCH PLAN

a) Time, subjects and methods of implementation of the protocol:
The subject was positioned to evaluate the static standing position without shoes, with only the socks on.
Tests
Plumb test and a bipodalic Romberg test
1. head in neutral position with eyes to infinity (no staring point: drawings, etc.)
2. upper limbs lowered and along the trunk and thighs
3. aligned feet, tips slightly apart, heels almost together
4. the person is not allowed to speak or make any voluntary movement during the test.
5. it always begins with open eyes, then, it goes on with the eyes closed.
Plumb test and a monopodalic Romberg test
1. head in neutral position with eyes to infinity (no staring point: drawings, etc.)
2. arms crossed in the chest;
3. the supporting leg is bent of about 30 degrees and the other is slightly bent;
4. the person is not allowed to speak or make any voluntary movement during the test.
5. it always begins with open eyes, then, it goes on with the eyes closed.
Test of the technical movement:
head in neutral position with eyes to infinity (no staring point: drawings, etc.)
upper limbs lowered and along the trunk and thighs
getting the first "en de hors" position with the with heels jointed and the points of the toes turned 180 degrees.
the person is not allowed to speak or make any voluntary movement during the test.
it always begins with open eyes, then, it goes on with the eyes closed.
Duration of the test
The literature generally indicates that the length of the test is 30" both with the eyes open and closed for the bipodalic stance test and 10" both with the eyes open and closed for the monopodalic stance test. The team of the researchers, considered the main technical

- It records the ground reaction forces during

Sport Activity with Open Eyes

size means
AE Different
MF (sx e dx) Different (both with open and closed eyes
Lungh. COP The same
AvSx The same
AvDx The same
RpSx The same
RpDx The same

Sport Activity with Closed Eyes

size means
AE Not Comparable Data Because Of The Differe

MF (sx e dx) The same
Lungh. COP The same
AvSx The same
AvDx The same
RpSx The same
RpDx The same

VIII. CLUSTERING IX.

According to the general features of the stances, it has been possible to split the students of the first group into subgroups with a 30 distance in each of the four cases:

Bipodalic Stance with Open Eyes

AvamSx AvamDx RetropSx RetropDx P_Value Tables To Compare The Values Between The I Course And

Cluster 2 45.5 Cluster 3 24.5 36.3 54.5 75.5 63.7 24.5

Bipodalic Stance with Open Eye 75.5

size AE Bipodalic Stance with Closed Eyes means The same (both with open and closed eyes) MF (sx e dx)

RpDx Sport Activity with Open Eyes Different (both with open and closed eyes)

AvamSx AvamDx RetropSx RetropDx Bipodalic Stance with Closed Eyes Cluster 1 37.6 40.8 62.4 59.2

Cluster 2 37.6 size 62.4 means 59.2 40.8

Cluster 3 22.6 AE 77.4 The same (both with open and 24.88

MF (sx e dx) Lungh. COP Different (both with open and closed eyes) The same (both with open and closed

AvSx AvamSx AvamDx RetropSx RetropDx Different (both with open and closed eyes)

[Note: i vi viii About 64.7% of Chinese entrepreneurs interviewed declared that they had only Portuguese clients (Oliveira, 2005: 117). ix For further details, see: Chan and Cheung (1985:149), Waldinger et al. (1990: 142) and Light and Gold (2000: 119). x See: Chan and Cheung, (1985:149), Portes (1999:58).]

Figure 5:

? In the eighth year students the force on the forefoot tends to strongly reduce while going from the bipodalic support to the sport gesture (and vice versa on the hind-foot). This might mean that the en dehors study improves an adequately distributed support over the whole foot. ? The length of the COP is different in the first and eighth course (both for the open and closed eyes support) and the difference is beyond 99,9% (i.e. there is a probability of less than 0,1% to make mistake if it is assumed that the values are different).

The study carried out during the following eight years of the course changes the length of the COP very significantly, improving a lot the centre of gravity of the studied subjects. ? The influence of the study carried out during the eight year course shows greater changes on the left foot rather than on the right one. This might be due to the fact that the activities tend to favour the use of both the parties of the body in a symmetrical way, while performing all the routine activities. ? During the sport gesture with open eyes there is a significant differences at 95% with regard to the Area of the Ellipse of the first and eight year course and this might mean that the influence of the study done during the eight years of the course implies changes on the motor control abilities.

The results of the survey highlighted, indeed, a possible relationship between the motor activity of the ballet and the features of the support on the foot. The research opens up further studies on the modelling and characterizing features of the practice of the academic ballet technique, because the quality of the body's movement, even in the air phase, depends on the control and on the refinement of the support of the lower limb.

[Becchetti and Parodi] , S Becchetti , V Parodi .

[Kapandji ()] , A Kapandji . *Fisiologia articolare* 1994. II. (Monduzzi editore)

[Parisi and Rigatti ()] , M Parisi , D Rigatti . 1998. p. 15.

[Macchi et al. ()] , C Macchi , Molino Lova , R Cecchi , F . 2008.

[(1997) I muscoli, funzioni e test] *(1997) I muscoli, funzioni e test*, (Roma, Verducci Editore)

[Kostrovickaja (ed.) ()] *100 Lezioni di danza classica dal I all'VIII corso*, V S Kostrovickaja . Roma. Di Giacomo Editore (ed.) 1986.

[Lohman ()] 'Applicability of body composition techniques and constants for children and youths'. T G Lohman . *Exerc Sport Sci Rev* 1986. 14 (1) p. .

[Vincenzini ()] *Aspetti preventivi e rieducativi della ginnastica correttiva, Perugia -Margiacchi-Galeno Editrice*, O Vincenzini . 2000.

[Attività fisica dieta e salute Firenze. Le Lettere pag] 'Attività fisica dieta e salute'. *Firenze. Le Lettere pag* p. .

[Tribastone and Tribastone ()] *Compendio di educazione motoria preventiva e compensativa, Roma, Società di stampa sportiva*, F Tribastone , P Tribastone . 1985.

[Franklin ()] *Dynamic alignment through imagery*, E Franklin . 1996. Human Kinetics Europe.

[Franklin ()] *Dynamic alignment through imagery*, E Franklin . 1996. Human Kinetics Europe.

[Campbell et al. ()] 'Evaluation of energy expenditure in women using Tritrac accelerometers'. K Campbell , P Crocker , Mckenzie D Field . *Med Sci Sports Exerc* 2002. 34 (10) p. .

[Vaganova (ed.) ()] *Il metodo Vaganova. I principi fondamentali del balletto classico*, A Vaganova . Roma.Di Giacomo Editore (ed.) 1934.

[Basso ()] 'L'arte della danza e del balletto'. A Basso . *Torino:Utet* 2005. 5 p. 395.

[Bricot ()] *La reprogrammation posturale globale*, B Bricot . 1998. Sauramps Medical, France.

[Delsarte ()] 'Le leggi del teatro'. F Delsarte . *Roma. Bulzoni. 10. Einsingbach T. Et All* 1994. 1988.

[Lanzetta ()] *Manuale di traumatologia dell'apparato locomotore*, A Lanzetta . 1992. Milano Masson Editore.

[Monti ()] M Monti . *La biomeccanica delle funzioni rachidee come sintesi dell'organizzazione muscolare legamentosa e vertebrale*, 1997. XV p. .

[Collins and Et De Luca ()] 'Open-loop and closedloop control of posture : A random walk analysis of center-of-pressure trajectories'. J J Collins , C J Et De Luca . *Experimental Brain Research* 1993.

[Villeneuve and Weber ()] *Posturologie clinique. Tonus, posture et attitudes*, P Villeneuve , B Weber . 2010. Milano, Masson.

[Lanska and Goetz ()] 'Romberg's sign'. D J Lanska , Goetz . *Neurology* 2000. 55.

[Parodi and Martinelli ()] 'Ruolo della prevenzione, educazione e rieducazione motoria'. V Parodi , E Martinelli . *La ginnastica propriocettiva: principi e applicazioni nella rieducazione*, (Vicenza) 2008. 2002.

[Morris et al. ()] 'Sensitivity of an armband device for measuring changes in energy expenditure during exercise'. N R Morris , A W Van De Wetering , M De Rooij , S Sabapathy . *Am J Respir Crit Care Med* 2009. 2009. 2009. American Thoracic Society. 179 p. A3846. (ATS)

[Chiari et al. ()] 'Stabilometric parameters are affected by anthropometry and foot placement'. L Chiari , L Rocchi , A Cappello . *Clinical Biomechanics* 2002.

[Bland and Altman ()] 'Statistical methods for assessing agreement between two methods of clinical measurement'. J M Bland , D A Altman . *Lancet* 1986. 1 p. .

[Testa ()] *Storia della danza e del balletto*, A Testa . 2005. (Roma. Gremese Editore)

[Sachs ()] *Storia della danza. Milano*, K Sachs . 2006. (Il Saggiatore)

[Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while perf *Study of the plantar stance of the students of the school of Classical Ballet of the San Carlo Theatre of Naples (Italy) while performing the ballet*, (Teaching Classical Ballet: educational features and health conditions)

[Pivetta and Pivetta ()] *Tecnica della ginnastica medica, scoliosi, Potenza*, S Pivetta , M Pivetta . 2002. (Ermes edizioni)

[Harr ()] 'Teoria dell'allenamento'. D Harr . Roma. Società Stampa Sportiva 1977.

[Raimondi ()] 'Teoria metodologia e didattica del movimento'. P Raimondi . *Et All* 2003.

[Kirby et al. ()] 'The influence of foot position on standing balance'. R L Kirby , N Price , D A Et Mac Leod . *Journal of Biomechanics* 1987.

[Chen and Bassett ()] 'The technology of accelerometry-based activity monitors: current and future'. K Chen , D Bassett . *Med Sci Sports Exerc* 2005. 37 (11) . (Suppl.)

[Fruin and Rankin ()] 'Validity of a multisensor armband in estimating rest and exercise energy expenditure'. M L Fruin , J W Rankin . *Med Sci Sports Exerc* 2004. 36 (6) p. .

[Hendelman et al. ()] 'Validity of accelerometry for the assessment of moderate intensity physical activity in the field'. D Hendelman , K Miller , M C Baggett , E Debold , P Freedson . *Med Sci Sports Exerc* 2000. 32 (9) p. . (Suppl)