

A REVIEW ON THE CHANGES OF THE EVALUATION SYSTEM AFFECTING ARTISTIC GYMNASTS' BASIC PREPARATION: THE ASPECT OF CHOREOGRAPHY PREPARATION

Olyvia Donti¹, Anastasia Donti², Kalliopi Theodorakou¹

¹ Faculty of Physical Education and Sport Science, University of Athens, Greece

² Hellenic Gymnastics Federation, Federal Coach of Women's Team

Review article

Abstract

The Code of Points, the International Gymnastics Federation document directing gymnasts' training process in every Olympic Cycle, evaluates artistic gymnastics performances. The aim of this study was twofold: first to examine the most important changes of the Code of Points since 1996, affecting gymnasts' basic preparation and in particular the changes concerning choreography. Second, this paper aimed to review the relevant literature on the topic of choreography preparation in artistic gymnastics and to analyze finalists' performances in official competitions, thus exploring the contribution of choreography preparation in gymnasts' difficulty score. For the purpose of the present study Women's Artistic Gymnastics Codes of Points since 1996 were analyzed. In addition, the content of the finalists performances on floor exercises and balance beam in the Olympic Games of London 2012, World Championship in Antwerp, 2013 and European Championship in Moscow 2013 were also analyzed. The results of this study demonstrated that basic preparation of artistic gymnasts is an ongoing process, structured on the principles of "profile elements" and virtuosity of execution. Gymnasts' basic preparation focuses on choreography as a means of faultless execution and at the same time choreography preparation provides a new direction of developing difficulty while slowing down the "acrobatization" and preserving the aesthetic quality of the sport.

Keywords: *technique, execution, artistry.*

INTRODUCTION

Artistic gymnasts' preparation is a long-term process based on the concepts of early sport specialization and high training load (Arkaev & Sutsilin, 2004). This long-term process includes anticipating the standards of the sport in the years to come (Rozin, 1997). Therefore, for coaches and specialists, it is necessary to make a prognosis of the future demands of the sport given by the International Federation of

Gymnastics (F.I.G) rules -Code of Points- and the international tendencies as observed in official competitions and literature (Terekhina, 1997).

Code of Points is the F.I.G document that provides the means of evaluating gymnastics exercises at all level competitions and at the same time is guiding coaches and gymnasts in the content and the structure of the training process (Code of

Points of Women's Artistic Gymnastics; W.A.G, 2013-16). Over the last decade, the Code of Points has changed substantially directing a new system of artistic gymnastics preparation. For the current Olympic cycle, 2013-2016, the final score of every artistic gymnastics performance is the sum of the scores of difficulty, execution, composition and artistry given by two panels of judges. The focus of the new rules is artistry, stressing the need to reshape a gymnast's routine into an artistic performance. The composition of a routine is based "on the movement vocabulary of the gymnast, as well as the choreography of those elements and movements, that is the mapping out of the body's movements over space and time in harmony with the selected music" (Code of Points of Women's Artistic Gymnastics; W.A.G, 2013-16, section 13, p.1). These demands are the result of a long-term choreography and dance preparation starting from a young age and continuing throughout a gymnast's career. Previous research examined the issue of choreography preparation in artistic gymnastics (Borissenkko, 2000; Gula, 1990; McDermott, 2009; Morel, 1987) and in other "aesthetic sports" –rhythmic gymnastics, ice-skating, aerobic, synchronized swimming- as it was considered to be important for the overall quality of performance (Karpenko, 1976; 2003; Lissitskaia, 1984, Lissitskaia & Zaglada, 1997; Morel, 1987; Rumba, 2013).

The evaluation system of Women's Artistic Gymnastics -Code of Points- is significantly affecting gymnasts' basic technical preparation since optimal basic preparation is considered to be the foundation of gymnastics elements (Smolevski & Gaverdofski, 1999) structuring athletes' future technical development and overall performance (Arkaev & Sutsilin, 1997). However, to the authors' knowledge, there is not any research in artistic gymnastics in the current Olympic cycle, examining how the changes of the Code of Points are reflected in gymnasts' basic preparation and integrated

in the long-term training schedule of gymnasts.

Analyzing the performance of elite athletes is advancing understanding of the training and competition parameters with a view to improve future outcomes. The performance of athletes in Olympic Games and World Championships allows exploring the tendencies of the sport and provides additional and accurate information to coaches and gymnasts. In the current Olympic cycle, there is no study regarding both, theoretical considerations on gymnastics performance and applied perspective examining competition parameters. Therefore, the aim of the present study was twofold: first, to examine the most important changes of the rules since 1996, affecting gymnasts' basic preparation and in particular the changes concerning artistry and choreography. Second, this paper aimed to review the relevant literature on the topic of choreography preparation in artistic gymnastics and examine its importance for gymnasts' preparation.

METHODS

The methodology of this paper includes: a) a review of the changes of Women's Artistic Gymnastics Code of Points since 1996 until today in order to depict the most critical changes of the rules directing basic gymnasts' preparation b) a review of the relevant literature on the topic of choreography preparation in artistic gymnastics, its content and artistic criteria and c) registration of the finalists' performances on balance beam and floor of the three major F.I.G official competitions (Olympic Games of London 2012, World Championship in Antwerp, 2013 and European Championship in Moscow 2013) ~~from~~ by the authors (FIG-judges since 1987, category II) in order to examine the contribution of gymnastics elements in the athlete's difficulty score.

Changes in Women Artistic Gymnastics Code of Points

The establishment of the F.I.G rules of 1996 excluded the compulsory routines from the official competitions. As a result, the Olympic Games of Sydney (2000) were the first in the history of gymnastics where gymnasts competed only in optional exercises. Compulsory exercises were characterized by faultless execution of basic elements and were believed to contribute in the formation of a “gymnastic school” of movements since they included elements of low difficulty but representing different structural technical groups (Aleksperov, et al. 1985). They were also considered as the most objective and common for all gymnasts criterion of ranking because judges made specific deductions for typical mistakes in low difficulty, basic elements (Aleksperov, et al. 1985). However, they were not spectacular and easy to understand for the media and the audience consequently, they were excluded from competition. As a result, the stress of the competition was transferred to the optional performances and a serious increase of the difficulty level was immediately noticed: new elements were executed, a new category of E-value difficulty -the highest in that Olympic cycle- appeared in the Code of Points, and the prohibition of the repetition of an element (an element should be executed only once in order to receive difficulty value, bonification, and/or connection value) were the most important changes. In 2000, the highest difficulty value was E, in 2004, a new category of G difficulty value was added and currently, there are two new difficulty value categories, H and I. The evolution of difficulty in gymnastics is considered to be an expected process comprising an increase in the number and the connections of difficult elements performed in an exercise, as well as an increase in the difficulty of the technical structure of the elements (Terekhina, Titov, & Turisheva, 1991; Turisheva, 1986).

Another decisive modification of the rules was the change of gymnasts’ age limit (Women’s Artistic Gymnastics Code of Points, 1996) in order to compete to official F.I.G competitions (Olympic Games, World Championships). Until 1996, 15 years old female gymnasts had the right to participate to official competitions and in the World Championship preceding and serving as qualification for the Olympic Games, 14 years old gymnasts had also the right to take part. Thus, once athletes achieved a high level of performance they had the right to compete at an international level. This was considered as a negative tendency imposing an extreme training load in a very young age: systematic training was starting from a very young age (5-6 years old) and was scheduled on a daily basis (20-25 hours a week) for approximately 250-300 days a year (Smolefski & Gaverdofski, 1999). For athletes competing internationally, the training load was even higher and in some cases, for talented athletes aiming to take part in major competitions, the process of training was intentionally accelerated (Rozin, 1997). By the age of 15-16 years, young gymnasts had already been training and competing for a decade. During this critical stage of development, young gymnasts experienced rapid physiological, neurologic, and psychological growth, and participation in competitive gymnastics placed excessive physical and psychological load on them (Tofler, Stryer, Micheli, & Herman, 1996). Currently due to the minimum age-limit of 16 years, gymnasts competing internationally are becoming “older”. According to the F.I.G report (Newsletter 34, December 2013) in 2007, the average age of gymnasts was 18.27 years, and in the World Championship of 2013, it has become 19.16 years of age. The extension of the duration of the available training years is a favorable condition for all the parameters affecting gymnasts’ well being and for the coaches to redefine athletes’ technical skill development according to international standards.

The judging system has also changed in 2000 and every competition is evaluated by

two panels of judges. Currently, there are two judges-panels: Difficulty-Panel judges (D-Panel) are evaluating the technical difficulty, the connection value of the elements, the composition requirements and they keep a control score for execution. Execution-Panel judges (E-Panel) are making deductions for technical faults and artistry. Evidently, the quality of execution is a decisive factor for the score that a gymnast can achieve. Especially between leading athletes representing traditionally “gymnastic” countries, who have a very high level of difficulty in their competitive exercises and original and innovative composition, the factor of execution is of paramount importance in order to win or lose (Terekhina, 1997).

The abolishment of “ten” (10) as the maximum score (Code of Points 2005-2008) and the introduction of a “world record” philosophy in gymnastics -since the score that a gymnast can take nowadays in competition has no upper limit- was considered as a determining factor for the content of gymnastics exercises. This change of the rules resulted in a rapid development and concentration of difficulty in the competitive routines (unpublished observations). As a result, discussions were held among specialists about what is more important in gymnastics, difficulty, execution or the aesthetic components of a composition and towards which direction gymnastics would evolve.

The intention of the new Code of Points of 2013-16 was to offer a viewpoint focusing on composition, artistry and choreography of gymnastics performance. Taking the position that aesthetic aspects should contribute in the final score of a gymnast, specific criteria and respective deductions were established for the artistry of performance, the composition and the choreography on floor and balance beam as well as for the body posture, and leg position in all the apparatuses. In addition, from the eight elements that should be included in the difficulty score of an exercise on balance beam and floor, minimum three should be leaps, jumps,

turns, or balances; hence elements that are the result of a long-term choreography preparation. This new direction gives the gymnasts the possibility to choose elements from other than acrobatics technical groups that fit their individual capacities. In addition, the score on uneven bars or vault is very often defined by deductions in body alignment, relaxed feet, precision and balance, all skills that are based on choreography preparation. Choreography deductions can be small (0.10p) or medium (0.30p) and are added up each time a mistake appears. In a sport where the winner is decided from a difference of tenths of a point, the gymnast with the most adequate level of choreography preparation has the better chance for success.

The changes in the evaluation system of artistic gymnastics, affect the content and the structure of the training process. Some changes enhanced difficulty evolution of the routines, while others focused on execution. At the moment, the demands of the rules are high difficulty, faultless execution and at the same time aesthetic composition and choreography, in an attempt to highlight the aesthetic value of the sport.

Choreography preparation in artistic gymnastics

Choreography preparation is the process of learning and improving the basic principles, movements and elements of classical dance (Lobjanidje, 1980) and it is introduced in artistic gymnastics from the art of classical ballet. During its application in the training system of gymnasts, choreography preparation has acquired special characteristics and athletic direction (Lissitskaia, 1984). According to the definition of Karpenko (2003), choreography is a form of expressing the inner world of a gymnast, her special characteristics and capacities. However, the traditional methods of dance classes were developed many years ago aiming to produce highly skilled and artistically expressive dancers-not gymnasts (Gula, 1990). Keeping this in mind, it is important

to distinguish which elements of the art form are essential to the gymnast's performance. The main differences between gymnasts and dancers are in the methods of training the gymnast to dance and in the necessity for an economical -in time consuming- dance instruction (Gula, 1990). It is a common belief that it takes ten years of daily professional classes to create a dancer (Lawson, 1984). In contrast, 10 years old gymnasts should be able to execute difficult leaps, jumps and turns on the beam and floor exercises and at 16 years of age a gymnast's level of choreography preparation should reach the high standards required to cope with the demands of international level competition. In addition, the teaching goals and the basic dance principles of choreography have a different direction in gymnastics (Gula, 1990). Through acquiring a conscious and controlled movement, the aim of choreography preparation in artistic gymnastics is to demonstrate artistry, expressiveness, musicality, personal style and faultless execution of the gymnastics elements on floor and beam (Savelieva, 1996).

In her research, Borissenko, (2000) demonstrated that in the content of choreography preparation in artistic gymnastics, co-exist elements of special technical preparation (general skills of gymnastics "education" and style), special physical preparation (development of coordination capacities such as static and dynamic balance, rhythmic abilities, spatial and temporal orientation, and specific endurance), psychological preparation (kinetic memory, imagination, attention span and mental processing of movements), and aesthetic preparation of the gymnasts (development of expressiveness, dancing interpretation of the music, and general movement education). Borissenko (2000) concluded that the role of choreography in the preparation of gymnasts is critical thus being in line with previous research in former Eastern Europe supporting the notion that choreography classes affect all the aspects of gymnasts' preparation and

consequently, gymnast's scores in the all-around (Lissitskaja, 1984; Morel, 1987, Lissitskaja & Zaglada, 1997).

For the evaluation of choreography preparation in competition, the international gymnastics community is using the criteria of the Code of Points. However, during competition it is the level of preparation – *preparedness* (Zatsiorski, 1995)- that is evaluated and not the process of preparation. Therefore, in order to define the level of dance preparation in training in the different gymnastics disciplines several systems of choreography criteria have been proposed; these criteria are founded on the basis of creating movement patterns and principles from classical ballet (Borissenko, 2000; Karpenko, 1976; Lazarenko, 1978). The most recent system is the system proposed by Borissenko (2000) that is composed of two groups of criteria: the first group has a technical direction and consists of criteria that evaluate the level of dance education of the gymnasts' movements and the quality of elements' execution. In other words, all the movements that are executed in the choreography and all the gymnastic elements are judged for their technical adequacy. The second group has aesthetic and artistic direction, and evaluates rhythmic, and dance interpretation of the music, expression, personal style, inspiration and originality of the composition. According to Borissenko (2000), the most important aesthetic criteria that a composition should fulfill are expressiveness, originality and showmanship. Expressiveness is defined as the capacity of a gymnast to express emotions through movements, by creating with her body beautiful lines in a logical succession according to the "theme" of the choreography and the music (Plehanova, 2006). Original in artistic gymnastics is the composition that apart from traditional or classical forms of movements includes new elements or new ways of connecting elements or a new way to correlate the body of the gymnast and the apparatus (Borissenko, 2000). Finally, as showmanship is defined as the capacity of a

gymnast to give a certain style to the performance and to contact emotionally with the audience (Borissenko, 2000).

Performance analysis of the qualifiers in the finals of official F.I.G competitions

According to Women's Artistic Gymnastics Code of Points (2013-16), gymnasts should be able to execute elements from five and six different structural technical groups on the balance beam and floor exercises respectively. These elements represent a broad variety of

acrobatic and gymnastic elements contributing to the difficulty score of a gymnast. In order to examine the contribution of gymnastics elements in the difficulty score of artistic gymnasts, the performances of the qualifiers in apparatus finals were registered and analyzed. In particular, the performances of the gymnasts qualifying for Competition III in the Olympic Games in London (2012), (Table 1) the World Championship in Antwerp (2013) (Table 2) and the European Championship in Moscow (2013) (Table 3) were analyzed.

Table 1. *Difficulty values of acrobatic and gymnastic elements of the finalists on floor exercises and balance beam in Olympic Games-London 2012.*

Floor exercises		
Participants	Acrobatic elements	Gymnastic elements
Afanasyeva (RUS)	1F, 1E, 1D, 2C	3D
Wieber (USA)	1H, 1E, 2D, 1C	1D, 2C
Raisman (USA)	1F, 2E, 1D, 1C	2D, 1C
Ponor (ROM)	1F, 2E, 1D	1E, 1D, 2C
Mitchell (AUS)	2E, 2D	3D, 1C
Ferrari (ITA)	1H, 1E, 1D, 1C	4D
Mustafina (RUS)	2E, 2D, 1C	1D, 2C
Izbasa (ROM)	3E, 1D	2D, 2C
Average difficulty score (in points)	2.01p	1.29p
Difficulty score	3.30p	
Percentage of acrobatic and gymnastic elements in the difficulty score	60.91%	39.01%
Balance Beam		
Sui (CHN)	1F, 2E, 2D	1E, 1D, 1C
Ponor (ROM)	1G, 3D, 1C	1E, 1D, 1C
Deng (CHN)	2E, 3D	1E, 1D, 1C
Iordache (ROM)	1F, 1E, 3D	2D, 1C
Afanasyeva (RUS)	5D	1D, 2C
Douglas (USA)	1F, 1E, 2D, 1C	1E, 1D, 1C
Komova (RUS)	1G, 1F, 3D	1D, 2C
Raisman (USA)	1G, 1E, 3D	1D, 2C
Average difficulty score (in points)	2.28p	1.11p
Difficulty score	3.39p	
Percentage of acrobatic and gymnastic elements in the difficulty score	67.26%	32.74%

As can be seen the contribution of gymnastic elements to the difficulty score of a gymnast varies from 32.74% to 45.50%, representing a parameter of paramount importance in the ranking of the gymnasts.

DISCUSSION

The aim of this study was to examine the most important changes in Women's

Artistic Gymnastics Code of Points since 1996, affecting gymnasts' basic preparation and in particular the changes concerning artistry and choreography. The relations between the changes of the evaluation system and the content of basic preparation of gymnasts will enable further understanding of the evolution of artistic gymnasts' preparation. Furthermore, a literature review on the topic of

choreography preparation in artistic gymnastics, examined its components, criteria and importance. Lastly, a registration of the content and the difficulty score of the finalists in the official F.I.G competitions allows exploring the tendencies of the sport.

Basic technical preparation is the process of learning and improving the technique of basic skills representing different structural technical groups of a specific quantity, quality of execution, and increasing difficulty according to the gymnast's age, stage and individual capacities (Smolevski & Gaverdofski, 1999). For coaches and specialists it is important to consider that basic technical preparation should have long-term characteristics and should be planned according to the international tendencies of gymnastics evolution and the anticipation of the technical development of the sport, as also reflected in the changes of the Code of Points (Arkaev, 1997; Rozin, 1997). In other words, it is not only about the decision of *what* the gymnasts should learn but also *how* they should learn it in order to be successful after 6-8years training when the time comes to win or lose. However, what was noticed in previous Olympic cycles - even in the competitive routines of high-level gymnasts- was that coaches ~~used~~ used to lead their athletes towards "comfortable" elements and combinations that gave high difficulty and elevated starting value in the exercise, without considering the structure group and the technical profile of these elements and the stage of development of the athlete (Terekhina, 1997, Savelieva, 1997). Therefore, basic preparation was lead into a limited pattern, not depending on the perspective of the evolution of the athlete and not enabling the athlete to adapt to the future demands of the sport. This negative tendency, threatened the overall level of performance and it was even stronger in national and age-group competitions (Donti, 2000).

However, Arkaev, (1994) in his research on "global preparation" (all types of preparation, such as physical, technical,

tactical and theoretical integrated in order to achieve maximum competitive performance) of the Russian national team pointed out that optimal basic preparation is not limited to young age but it is an ongoing process continuing throughout a gymnast's career and adapting to the demands of the sport in every Olympic Cycle. This process should be structured on the principles of execution of "profile elements" and "virtuosity" of execution even of basic skills (Arkaev & Rozin, 1994; Arkaev & Sutsilin, 2004). "Profile elements" are considered the elements that if correctly executed, they form the technical basis for learning more difficult and complex elements from the same element group (Smolevski & Gaverdofski, 1999). According to gymnastics experts, learning "profile" elements from all the elements groups is enabling the gymnasts to adapt to future evolution of difficulty with the least possible effort (Arkaev & Sutsilin, 2004).

Virtuosity is the main factor characterizing the level of technical execution of gymnastics elements, expressed by high competition score, artistry, individual style and precision (Arkaev & Rozin, 1994). However, in the basis of "virtuosity" is lying the execution of basic gymnastics elements with technical parameters of more difficult elements (Arkaev & Sutsilin, 2004). It is a common knowledge that it takes years of preparation to learn a stretched salto backward on floor exercises but if correctly executed, it takes weeks to learn a double salto (unpublished observations).

A condition of achieving a high level of quality of execution is systematic and adequate choreography preparation (Borissenko, 2000; Karpenko, 2003). In addition, choreography preparation is the means of learning and improving different techniques of gymnastics elements (jumps, leaps, turns, balances) which are critical for the final score that a gymnast can take. The results of this study demonstrated that the contribution of gymnastics elements in the difficulty score of competitive routines of elite gymnasts is varying from 32.74% to

45.50%. In particular, on floor exercises, since the Olympic Games of London (2012) to the European Championship of Moscow (2013), the tendency of using more gymnastic and choreography elements is obvious, mainly to the leading athletes who are adequately prepared to execute faultlessly both, high-risk acrobatic skills and difficult gymnastics elements. On the other hand, on the balance beam, due to the increased necessity for stability, and to avoid a fall, gymnasts choose more “secure” gymnastic skills and combinations. This score represents the actual tendency of slowing down the process of “acrobatisation” of the sport and at the same time, it preserves the aesthetic quality, the measure and the showmanship of gymnastics sports.

REFERENCES

- Alekperov, C.M., Allaxverdiev, F.A., Ivanov, B.B., Kicelev, V.I., Maliceva, O.M., Perfilev,, D.G., & Popova, E.G. (1985). Klassifikatsionie programmi kak coctavnaia tsast sistemi texnitseckoi podgotovki gimnastov (Compulsory routines as a part of gymnasts’ technical preparation) (in Russian). In Alekperov, C.M. (ed.) *Technical preparation in modern artistic gymnastics* (pp. 10-20). Leningrad: Physical Education and Sport.
- Arkaev, L.G. (1994). *Integralnaia podgotovka gimnastov –na primere cbornoj komandi ctrani (Global preparation of gymnasts-on the example of the Russian national team)* (in Russian). Unpublished Doctoral Thesis, National State Academy of Physical Education, P.F. Lesgaft, S. Petersburg, Russia.
- Arkaef, L.G. (1997). 1-my Championaty Rossii po gimnastike-cto let (dostizenia, problem I perspektivi), (One hundred years since the first National Championship of Russia (achievements, problems and prospects of Russian gymnastics). *Teoria I praktika fizitseskoj kylyri (Theory and Practice of Physical Education)* (in Russian) 11, 2-7.
- Arkaef, L.G. & Rozin, E.G. (1994). *Sportivnoe masterctvo I spetsialnaia texnitseskaia podgotovlenoet gimnastov. Methodi diagnostiki I otsenki (Athletic perfection and special technical preparedness of gymnasts. Diagnostic and evaluation methods)* (in Russian). Methodical and Teaching notes for Universities and National teams, Moscow: Physical education, Culture and Science.p.43.
- Arkaef, L.G & Sutsilin, N.G. (1997). Metodologitseskie osnovi covremenoj podgotovki gimnastov vicokovo klasa (Methodological bases of contemporary preparation of elite gymnasts). *Teoria I praktika fizitseskoj kylyri (Theory and Practice of Physical Education)*, (in Russian), 11, 7-26.
- Arkaev, L.J. & Sutsilin, N.G. (2004). *Kak gotovits championov (How to prepare champions)*. Fijkultura I sport (Physical Education and sport), (in Russian), p.315.
- Borissenko, S.I. (2000). Povichenie icpolnitseskovo masterstva gimnastok na ocnove covercencvovania xoreografitseskoj podgotovki (*Improvement of gymnasts’ executional skill based on the improvement of their choreographic preparation*)(in Russian). Monography, St. Petersburg, Russia: State Academy of Physical Education P.F. Lesgaft.
- Code of Points of Women’s Artistic Gymnastics, (W.A.G), 2013-16, International Federation of Gymnastics (F.I.G).
- Code of Points of Women’s Artistic Gymnastics, (W.A.G), 2009-12, International Federation of Gymnastics (F.I.G).
- Code of Points of Women’s Artistic Gymnastics, (W.A.G), 2005-2008, International Federation of Gymnastics (F.I.G).
- Code of Points of Women’s Artistic Gymnastics, (W.A.G), 2001-2004, International Federation of Gymnastics (F.I.G).
- Code of Points of Women’s Artistic Gymnastics, (W.A.G), 1996-2000,

International Federation of Gymnastics (F.I.G).

Donti O. (2000). *Covercenvstvovanie spetsialnoi texnitseskoi podgotovlenosti gymnastok 9-12 let (Development of special technical preparation of artistic gymnasts, aged 9-12 years old)* (in Russian). Unpublished Doctoral Thesis, National State Academy of Physical Education, P.F. Lesgaft, S. Petersburg, Russia.

F.I.G Report: Newsletter 34, December 2013

Gula D.A. (1990). *Dance choreography for competitive gymnastics*. Leisure Press, Champaign, Illinois.

Karpenko, L.A. (1976). O vopitanii virazitel'nosti y zanimaoucixcia xydozesvenoi gimnastikoi (About the development of expressivity in athletes of rhythmic gymnastics). *Aktualnie problem cportivnoi trenirovki (Contemporary problems of athletic training)*, (in Russian). Leningrad, pp. 50-52.

Karpenko, L.A. (2003). *Xydozestvenaia Gimnastika (Rhythmic Gymnastics)*, Russian Gymnastics Federation, St. Petersburg: Department of Physical Education, P.F. Lesgaft.p.380.

Lawson J. (1984). *Ballet class. Principles and Practice*. London: A. & C. Black Publishers.

Lazarenko, T.P. (1978). Kvalimetriia v xydojestvenoi gimnastike (Qualimetry in Rhythmic Gymnastics), *Gimnastika (Gymnastics)*, (in Russian), 1, 33-39.

Lissitskaia, T.S. (1984). *Provedenie janiatii po xoreografii c gimnastkami (Choreography class with gymnastics athletes)*. (in Russian). Teaching notes for students. State Academy of Physical Education and Athleticism, Russian State University of Physical Culture, Sport, Youth and Tourism (GTSOLIFK).

Lissitskaia, T.S. & Zaglada, B.E. (1997). Volnie ypraznenia zencin (Women's floor exercises). In Gaverdovski, G.K. (ed.) *Gymnastics All-Around* (pp. 3-16). Moscow: Physical Education and Athleticism.

Lobjanidje, M.M. (1980). *Esthetika cportivnovo zrelica (Aesthetics of athletic performance)* (in Russian). Tbilisi.

McDermott E. (2009). *Gymnastics choreography in a snap*. <http://www.articlesbase.com>.

Morel, F. (1987). *Choreographia v sporte (Choreography in sport)*, Fizkyltyra I sport (Physical education and sport) (in Russian). Moscow, p 33.

Rozin, E.G. (1997). Nekotorie teoritiko-metodologitseskie aspect pedagogitsskovo kontroliia fizitseskovo sostoiania I podgotovlenosti sportsmenov (Some theoretical and methodological aspects of pedagogical control of athletes' physical preparation). *Teoria I praktika fizitseskoi kylytri (Theory and Practice of Physical Education)*, (in Russian), 11, 41-44.

Rumba, O. (2014). Improving the quality of the rhythmic female gymnasts's feet performance by the means of traditional choreography. *Science of Gymnastics*, 5(3), 19-29.

Plehanova, M.E. (2006). *Aesthetitseskie aspect cportivno-texnitseskogo masterstva v cloznokordinatsionix vidax cporta (Aesthetic aspects of technical mastery in sports with difficult coordination)* (in Russian). Russian scientific-research institute of physical education and sport, p.168.

Savelieva, L.A. (1996). *Podgotovka trenerov-choreographov po cportivnoi gimnastike na osnove kompleksnovo analiza volnih-ypraznenii (Coaches-choreographers' preparation based on the floor exercises analysis)* (in Russian). Monography, St. Petersburg: Department of Physical Education Science P.F. Lesgaft.

Smolefski, V.M & Gaverdovski, U.K. (1999). *Sportivnaia gimnastika (Artistic Gymnastics)*. Kiev: Olimpiskaia Literatyra.p.456.

Terekhina, R. (1997). *Kompleksnii analiz cportivnoi gimnastiki (Composite analysis of gymnastics)*. (in Russian). St. Petersburg: Department of Physical Education, P.F. Lesgaft. p.45

Terekhina, R., Titov, G., & Turisheva, L. I. (1991). *Metodi ekcpertnoi otsenki icpolnitseskovo masterctvo gimnastov, (Evaluation methods of gymnasts'*

executional skill). Teaching Notes, St. Petersburg: Department of Physical Education, P.F. Lesgaft p.31.

Tofler, I. R., Stryer, B. K., Micheli, L.J., & Herman L. R. (1996). Physical and Emotional Problems of Elite female gymnasts. *New England Journal of Medicine*, 335, 281-283.

Turisheva, L.I. (1986). *Komponenti icpolnitseskovo masterctva gimnastok I metodi ix otsenki (The components of gymnasts' executional skill and the method of their evaluation)*. (in Russian). Unpublished doctoral thesis, St. Petersburg: Department of Physical Education, P.F. LESGAFT.

Zatsiorsky V.M. (1995). *Science and practice of strength training*. Human Kinetics, P.O Box 5076, Champaign, IL 61825-5076.p.242.

Corresponding author:

Olyvia Donti, PhD
Faculty of Physical Education and Sports
Sciences,
41 Ethnikis Antistasis Str,
Daphne, 17237, Athens, Greece.
E-mail: odonti@phed.uoa.gr