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Original article

IMPACT OF COORDINATION ABILITIES PROGRAM ON ACCURACY AND SPEED IN RHYTHMIC GYMNASTICS

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Abstract

Aim. Rhythmic gymnastics is one of the most beautiful Olympic Sports. It is a combination of the dynamics and flexibility of gymnastics, the technical knowledge of ballet, and the self-expression and rhythm of modern dance. It accompanied to music and colorful tools. In addition, a sport demands both the coordination of handling various apparatus (rope, hoop, ball, clubs, and ribbon) and motoric features. The aim of this study to explore the effects of coordination abilities program on accuracy and speed of the performance level among rhythmic gymnastics players.

Methods. The sample was comprised of 20 youth rhythmic gymnastics players under age, 10 years. The subjects divided into two groups. The experimental group (n= 10) participated in coordination abilities training program. Three times weekly. To eight weeks. The control group (n= 10) participated in the traditional program only.

Results. The results of this study showed that the experimental group higher scores than the control group in Coordination abilities and performance level.

Conclusion. These results were revealed that Coordination abilities training effectively. In addition, the best performance would be expected to be more Coordination abilities.

Keywords: Coordination Abilities, Performance level, rhythmic gymnastics

Introduction

Rhythmic gymnastics is a sport that combines elements of ballet, gymnastics, dance, and apparatus manipulation. The victor is the participant who earns the most points, determined by a panel of judges, for leaps, balances, pirouettes (pivots), apparatus handling, and execution. The choreography must cover the entire floor and contain a balance of jumps, leaps, pivots, balances and flexibility movements. Each movement involves a high degree of athletic skill. Physical abilities needed by a rhythmic gymnast include strength, power, flexibility, agility, dexterity, endurance and hand-eye coordination. (Mufti.1998)

Top rhythmic gymnasts must have many qualities: balance, flexibility, coordination, and strength are some of the most important. They also must possess psychological attributes such as the ability to compete under intense pressure, in which one mistake can cost them the title, and the discipline and work ethic to practice the same skills repeatedly.

Rhythmic gymnastics is a blend of gymnastics, dance and apparatus handling, a combination of impressive motor structures that are characterized by elegance and harmony of movement, with the constant striving to achieve perfectly coordinated, coherently connected and

precisely executed motions and movements (Nasreddin, Kamal, 1994).

Motor performance capabilities divided into sports physical capabilities, consensual capabilities; capabilities mixed these capabilities are broad-based access to good performance skills. (Ji, Huang, 1987)

It agreed in this direction to (Nasreddin, Kamal, 1994; Mohamed 1999 and Fikry 1999) that the diagnosis appears in identifying strengths and weaknesses of the thing to be evaluated and try to identify the causes either therapy is to develop appropriate solutions to overcome the weaknesses and take advantage of the strengths. Also confirms Mohamed (1999) on the calendar in physical education does not come from the previous concepts it includes an estimate of the performance of the players then the verdicts on this performance in light of the specific considerations for performance specifications.

The coordination abilities one of the main pillars of performance skill where are a common denominator and a boat with other elements to contribute to access the player to the highest-level athlete according to the potential physical. The novices who characterized by coordination abilities degree higher than their peers can register a higher

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degree of physical capacities of public. Moreover, that depend on them both of fitness and fitness skills, and does not relate to motor harmonic performance capabilities only, but also the skills vehicle, which characterized by a degree of difficulty and complexity in the tactical aspects and tactics.

This confirmed by Mohamed (1999) that novices who lose a certain amount of coordination abilities caused great difficulty in access to performance mechanism as well as the lack of balance between the movements and outcomes of the skill level of difficulty of performance.

The coordination abilities is the key to the success of education and to improve and develop the level of performance skills, availability of these capabilities to properly and accurately helps good thinking and ease of learning motor skills and development. In addition, the development level of coordination abilities plays an important role when the acquisition of motor skill. These skills express foundation composite level skill and working to develop this capacity, and coordination abilities gathered between the expectation and the performance requirements kinetic and psychological longer the boot performance motor while the motor performance is the actual implementation of the movement, as it represents consistency between the central nervous system and muscles during phases of performance skills.

The player acquires harmonic capacity through motor learning and requires the development of a synergy activate both cognitive abilities and sense of mobility for self-control in the performance of movements.

The coordination abilities contribute to the installation of total traffic movement's partial manner consistent if the level of synergy year required completing motor skills, and the development level of performance skills is not obligatory for beginners only, but is also the duty of the player's applicants to ensure continuous improvement and development of performance and mastery and install it.

And according to Amralla (1996), Mufti (1998), Ibrahim, Amr (1996) that the planning for the training of junior activities various sports aims to acquire motor skills essential in general as well as the development of the physical attributes to achieve the highest levels of the sport practice and preserve it. For as long as possible so that each player implementation plans entrusted to him by the duties of the center, which holds in the lines different play during the match to the fullest. In addition, must occupy harmonic capacity exercises a large part of the training program for beginners. Since at this stage

if there is no adequate interoperability capabilities of novices cause him great difficulty in access to performance mechanism as well as the lack of balance between the movements and outcomes of the skill level of difficulty of the performance.

The coordination abilities enables one to have the conscious and accurate perception of the strength, timing and spatial parameters of a range of movement, which leads to various motor skills being more efficient and fluid (Raczek, et al. 2002; Starosta, et al., 2003). The essence of coordination abilities is its capability in positioning the body's joints (the spatial component), activating the strength of the involved muscles (the strength component) and the speed of the involved movement (the temporal component) (Starosta, et al., 2003, 1983). Coordination abilities have been identified as one of the most important factors of motor coordination (Starosta, et al., 2003; Bajdziński, et al. 2002). Previous literature has emphasized its importance in sport, but also stressed its complex and variable character, which depends on a number of factors, including the difficulty in selecting which methods could use to assess such an ability (Starosta, et al., 1983; Zatoń, et al. 2009). Many studies have reference to the fact that coordination abilities should base on the performance level found in national sport competition and, as such, be considered in the selection process of sport disciplines. Previous studies have also reported on coordination abilities and its relationship with the level of play depending on which sport disciplines considered. Starosta, et al. (2006) conducted a study on figure skaters and found an interdependence between their kinesthetic sensibility and their skill level, and showed that a higher skill level in sport is associated with greater movement accuracy (in performing specific moves). In addition, Zajac et al. (1992) in a study of basketball players, found that an increasing level of competition accompanied by a higher level of upper limb strength, confirmed by similar observations made by Ji & Huang (1987). Starosta, et al. et al. (2003) Found a significant increase in the differentiation movement levels between the ready phases and start phase of kayakers,

Rhythmic gymnastics has undergone immense development in the last few decades, owing to the ever-increasing technical skills required through the revision of the code of points. These rules stress the importance of high-difficulty activities, and high difficulties require suitable physical fitness. According that, Rhythmic gymnastics is a sport that requires the complexity of skills, and develops a variety of motor abilities (coordination, dynamic



balance and static balance, sense of kinesthesia, movement time, and speed). In addition, perceptual abilities (whole-body reaction time, anticipation of coincidence, and depth perception) (Jastrjemskaia, Titov 1999; Gionett., et al. 1986).

Specific coordination is a vital part of technical preparation in RG, and those abilities play an important role in creating the preconditions necessary to allow the gymnast to learn many Rhythmic gymnastics techniques (Jastrjemskaia, Titov, 1999). Indeed, precise muscular efforts as well as space and time parameters of movements are especially important in Rhythmic gymnastics. Therefore, the aim of this study to explore the effects of coordination abilities program on accuracy and speed in rhythmic gymnastics.

Methods

Experimental Approach to the Problem

Two groups (experimental and control), performed a pre and post training designed intervention in which coordination abilities and

performance level were recorded. The experimental group trained one hour per day 3 times a week on coordination abilities training besides the rhythmic gymnastics training for eight weeks. The control group continued their normal training, while the experimental group completed a coordination abilities training program to see whether this type of training modality would have a positive or negative or no effect on coordination abilities and performance level.

Participants

The sample was comprised of 20 youth rhythmic gymnastics players under age, 10 years. The subjects divided into two groups. The experimental group (n= 10) participated in coordination abilities training program. Three times weekly. To eight weeks. The control group (n= 10) participated in the traditional program only. Table one shows the basic characteristics of the sample.

Table (1) the basic characteristics of the sample

Variables	unit	Mean	Standard deviation	Median	Skewness
Age	Year	9.69	0.382	8.77	-0.656
Height	Cm	140.17	2.78	140.00	-0.122
Weight	Kg	43.00	2.07	43.00	0.125

Table (1) shows that the coefficient of torsion of the growth variance of a sample of basic research is limited to between ± 3 , which refers to the homogeneity of the research sample.

Ethical considerations

The Ethics Committee of the Faculty of Physical Education, Alexandria University, Egypt, approved the study protocol. Written requests promptly sent to the Expert Committee of the Gymnastics Federation of Egypt, after informed about the study, its scientific value and multiple benefits, approvals were given for the testing. All testing performed in accordance with the ethical standards.

Procedures

The researchers select variables according to the references and previous studies, and the basic skills, which will be included in the proposed training program, are -

Firstly, coordination abilities: -

- The ability to accurately determine the status (DS)
- The ability to control of the motor rhythm (MR)
- The ability to control of the motor balance (MB)
- The ability of the motor organizes (MO)
- The ability to the reaction speed (RS)

Secondly: performance level:

- Rope (R)
- Clubs (C)
- Ball (B)
- Hoop (H)

Results

Table 2. Coordination abilities for two groups

Variables	Control			Experimental			T sign between groups
	Pre	Post	T sign	Pre	Post	T sign	
(DS)	11.25±1.61	9.35± 1.55	Not Sign	11.20±1.64	8.40±1.47	Sign	Sign
(MR)	8.75±0.91	7.67±0.69	Not Sign	8.60±0.99	5.70±0.86	Sign	Sign
(MB)	12.95±1.64	13.55± 1.42	Not Sign	12.90±1.65	16.30±1.30	Sign	Sign
(MO)	4.30±0.66	5.13±0.74	Sign	4.15±0.81	6.05±0.83	Sign	Sign
(RS)	193.50±4.26	188.54±5.82	Sign	193.75±3.86	168.75±6.53	Sign	Sign

Data in Table 2 shows that there is a significant difference in overall Coordination abilities between the pre- and post-training. Significant differences between the two groups in overall Coordination abilities, coordination Abilities are responsible for the difference observed.

Table 3. Performance level scores for two groups

Variables	Control			Experimental			T sign between groups
	Pre	Post	T sign	Pre	Post	T sign	
(R)	12.70 ±1.22	14.25 ±1.25	Sign	12.55± 1.32	17.10 ±1.33	Sign	Sign
(C)	13.00 ±1.34	14.45 ±1.32	Sign	12.85 ±1.35	17.25 ±1.41	Sign	Sign
(B)	11.30 ±1.22	12.65 ±1.31	Not Sign	11.20 ±1.97	14.30 ±0.92	Sign	Sign
(H)	9.80 ±1.32	10.80 ±1.47	Not Sign	9.70 ±1.34	13.25 ±1.12	Sign	Sign

Data in Table 3 shows that there is a significant difference in overall performance level, between the pre- and post-training. Significant differences between the two groups in overall performance level, coordination Abilities are responsible for the difference observed

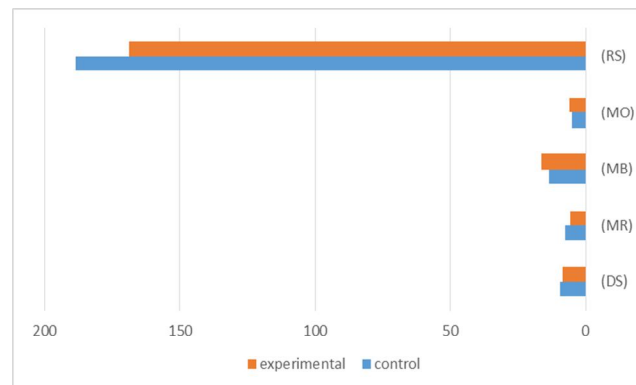


Fig 1, show the differences in coordination abilities for two groups

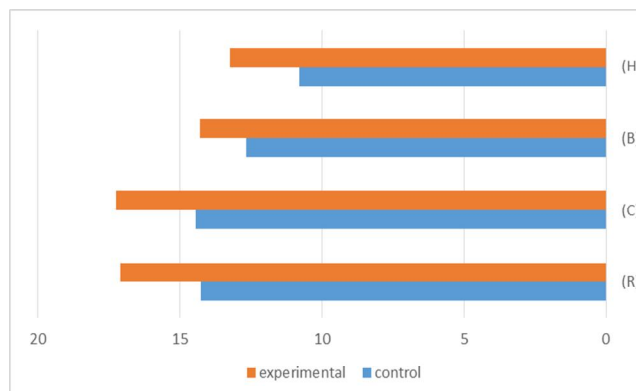


Fig 2, show the differences in performance level scores for two groups



Discussion

The results of this study showed that the experimental group higher scores than the control group in Coordination abilities and performance level. These results were revealed that Coordination abilities training effectively. In addition, the best offensive performance would be expected to be more Coordination abilities.

Its fundamental nature is the perception of movement while it is happening, allowing such a movement to be better controlled. Literature that studied and assessed the level of differentiation ability and its determinants and relationships often find that the level of this ability determines, largely, success in many sport disciplines. Starosta, et al. found such a dependency in figure skaters, by Starosta, et al. (1989) in kayakers, by Zajac et al. (1992) in basketball players and by Jastrevskaya, 1995 in martial art athletes. The highest level of kinesthetic sensitivity found in these athletes especially applies to the particular body limbs more involved in that sport's physical movement: the lower limbs for figure skaters, the upper limbs for boxers or the lower limbs for karate practitioners (Starosta, et al., 2003, 1989).

Ji, Huang (1987) also observed a high level of kinesthetic sensitivity in the hands and elbows of basketball players, which was similar to what Zajac et al. (1992) observed. Some researchers also claimed to find a relationship between kinesthetic differentiation and high-level training technique. Such dependencies were found by Cynarski et al. (2005) in karate practitioners, by Bańkosz, Skarul, 2010 in football players and by Starosta, et al. (1989) in kayakers. Also, many correlations have been found between kinesthetic differentiation ability and the level of sport played or advanced sports techniques used in game play; thanks to a high kinesthetic sensitivity one can more accurately control their movement (Raczek, et al. 2002; Bajdziński, et al. 2002). In addition, through kinesthetic impression, the "focus" (Starosta, et al., 2003, 1983, 1978; 2006) on one's bodily movement is far fuller and richer, where the functioning of one's teleoreceptors is supplemented by proprioceptor stimuli (Raczek, et al. 2002). Thanks to this "extra" information, learning new motor skills is more precise. However, as has been found in relevant research, the importance of visual and kinesthetic information is still disagreed upon (Farahat, et al. 2004; Fery, Morizot 2000). This study assumed that the sport of rhythmic gymnastics requires a high level of kinesthetic differentiation

ability (Bańkosz, 2008; Bańkosz, Skarul 2010). This ability manifested in rhythmic gymnastics due to the numerous skills needed to be effective in this game, above all, the ability to sense and adapt to game dynamics (Hotz & Muster 1993). Adjusting the angle of one's paddle when catching the tool most probably is also a derivative of kinesthetic differentiation ability.

According to (Alexander, 1989; Alexander, 1991; Gionett, et al. 1986; Jastrjemskaia, Titov, 1999) the rhythmic gymnastics is a sport that demands both the coordination of handling various apparatus (rope, hoop, ball, clubs, and ribbon) and motoric features. The evaluation of routine is based on grace, precision, originality, coordination to music and must contain some technical difficulties. That is why conditioning and coordinative elements, physical features, training principles and mastery of apparatus technique that affect the compositions performance are very important.

To attain perfection and reproducibility of their routines, the gymnasts must practice and repeat the basic elements of their routines several times. Therefore, preparing and executing the proper intensity of training program is compulsory and that kind of program should be executed in order to keep the level of the composition performance for each age group.

Conclusion

The findings of this study indicated that Coordination abilities are related to performance success. Coaches working with athletes need to consider these factors when preparing for competition.

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