Effects of Individual and Group Games on Static Balance and Social Development of 8 to 12-year Old Children with Developmental Coordination Disorder

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Abstract

The present study seeks to investigate the effects of the selected individual and group games on the static balance and social development of 8 to 12-year old children suffering from developmental coordination disorder. To this end, 39 students (19 boys and 20 girls) were purposefully selected from among 253 students of Ahwaz elementary school, suffering from developmental coordination disorder. The selection of the samples was based on the students’ IQ and MABC test. They were randomly divided into control group, individual games group, and group games group.

First, a pre-test was conducted on the participants of the three groups. It incorporated tests of height, weight, stork balance, and Vineland questionnaire to measure height, weight, static balance, and social development. The results of the tests were recorded on special sheets. Then, the experimental groups played the selected individual and group games for 8 weeks (3 sessions of 45-60 min per week) while the control group received no treatment.

In the last phase of the study, the same tests were again conducted on the three groups. In order to analyze the data, ANCOVA was performed at a significant level \(\alpha = 0.05\), using SPSS. The results showed that social development of the groups benefiting from individual and group games improved more than that of control group \((P \leq 0.05)\) However, static balance significantly improved simply due to the effects of individual games \((P \leq 0.05)\) Therefore, it can be claimed that in comparison to the perceptual-motor trainings, playing in individual and group games encourages students more to take part in group activities. Given static balance was found to be stronger in individual games than group games and also regarding the high cost of group games, individual games seems to be the best option.

Key words: individual games, group games, static balance, social development

Introduction

Perceptual-motor skills are regarded as the basis of advanced sport skills (Bouterfield, Lenhard and Kladarsi, 2002). The results of numerous researches confirm that there is a significant relationship between perceptual motor development and social development (Estonson, 1975; Yarmohammadi, 1997). On the other hand, children start their process of socialization with primary motor activities, which paves the way for their motor development and evolution in childhood and participation in sportive activities in the future (Emanuel, Zervas and Vagnas, 1992). Balance is one of the basic motor skills. Balance is maintained by regulating the interaction between the center of mass (CoM) and base of support (BoS) (Shaykh, Bagherzadeh and Yosefi, 2000). Reaching stability necessitates keeping the center of mass over base of support even if the forces of center of mass exceed the area of base of support. Balance has a crucial role in the entire movements and activities of humans (Norbakhshg and Rezvani Asl, 2002).

According to the data, 6 to 22% of the children in the age range of 5 to 11 years old suffer from developmental coordination disorder (DCD) (Physiological Association of America, 2000). Considered
as an injury, immaturity, or motor disorder, DCD is one of the most obvious deficiencies of elementary school students, which is first manifested as a problem in learning or lack of skills of motor coordination. DCD is 3 to 7 times more prevalent among boys than girls. The disorder may pose problems for children in their speech style, eye movements, perception, thoughts, personality, behavior, and stability, or it may cause specific learning difficulties (Archibald, 2008). Moreover, some researchers highlight attention deficit disorder in these children (Gillberg and Kadesjo, 1998; Kadesjo and Gillberg, 1999). Physical inactivity of DCD children in comparison to their peers is another problem (Woo et al., 2011; Karni et al., 2010). Due to coordination difficulties and a delay in the development of motor skills, children with DCD are mostly seen to be teased by their peers; they consequently will have difficulties socializing and reaching social development. Socialization is crucial to motor development since motor experiences are of high significance to the evolution of motor skills. Also, living in a society necessitates children being able to perform everyday tasks. The children who were socialized through motor experiences tend to learn motor skills (Hei Wood and Catlin, 1997).

Social growth can be defined as the mutual compatibility of a child with the social environment and in relation to his/her peers. It can also be regarded as a process which enables the child to perceive others’ behavior and regulate his/her own behavior and social interaction. (Rahnama and Ellein, 2006). Game is one of the techniques of socialization deeply influencing children’s social development (Garita & Ovaldeson, 1998; Pourshakouri, Movahedi and Abedi, 2011). Through games, children often for the first time appreciate the value of their peers without whom playing is impossible; they also learn how to accept each other, reach agreement on the rules of the game, and play in group games. Concepts such as cooperation, victory, defeat, competition, and sense of superiority are developed in group games. On the other hand, children observe and analyze behavior modeled by adults while playing and get familiar with the role they are going to take in the future. As a result, they try to develop their physical-verbal and mental capacity for interacting positively with other people.

As children develop socially, interaction with peers in games enables them to shape a good understanding of themselves and their peers (Tarman, 2011). Researches show that game and physical education can be used as a therapy for treatment of children with motor, personality, and behavioral disorders (Esmaeilzadeh, Salehi and Mansouri, 2011; Salman et al., 2009; Lee et al., 2011).

Regarding the existing theories of development and evolution as well as the results of the studies done on the role of motor and physical activities in humans’ integrated development, it seems that a proper motor and sport program compatible with people’s structural and psychological characteristics not only guarantees them a healthy body and mind, but also helps them to live a better life in social environment, especially in childhood and teenage era (Balouchi, 2000). Numerous researches show that performing long-term sports skills activities can be effective in overcoming DCD children’s motor difficulties to some extent. However, the main focus of the present study is to investigate DCD children’s physical fitness and pediatric issues and to compare their characteristics with healthy children’s (Haga, 2008; Karni et al., 2010 b; Karni et al., 2012).

Few researches were so far conducted on the effects of selected individual games on healthy children’s social and motor skills development (Pourshakouri et al., 2011; Pourbakhsh and Rezvani Asl, 2005). This study is confined to the scope of individual games and healthy children.

Given the increase in development coordination disorder and the fact that, to best of the authors’ knowledge, no studies have attempted to investigate the effects of individual and group games on the static balance and social development of the children with development coordination disorder, the present study sought to investigate the probable effects of elementary school individual and group games on 8 to 12-year old DCD children’s static balance and social development. It also tried to find the most effective game.

The findings of this study hopefully provide educators, sport trainers, and even parents with the necessary techniques for improving perceptual-motor skills. They can also be beneficial for preventing the increase in DCD rate and reducing its possible complications.

Materials and Methods

This is a quasi-experimental research with pre-test and post-test including control group and two experimental groups – individual and group games. As the first step, elaborating the symptoms of DCD children to school teachers, the researchers wanted the children showing the symptoms to be introduced to them. 253 children were selected as the population of the study in the first phase of screening (based on physical education teachers and the other teachers’ remarks). Then, all the students were assessed using MABC test so as to make sure they were afflicted with DCD and to
quantify the data. 39 students (19 boys and 20 girls) were quite purposefully selected based on their Raven’s IQ scores and randomly divided into control, group, and individual games groups. To collect pre-test data, participants took MABC test for the second time as well as stork balance test. Their parents also filled out Vineland questionnaire to evaluate social growth. The two experimental groups played group and individual games for 8 weeks (3 sessions of 45 to 60 minutes per week). After 2 days all the same tests were conducted again to collect post-test data. First, for the examination of the hypothesis of the normality of data distribution Climograph Smirnoff test was used. Then, Levine test was conducted to assess the equality of variances. Finally, in order to investigate the differences between the groups, covariance test was conducted using SPSS version 19 at a significant level p<0.05.

Selected Plays
Individual games incorporate carrying a book head, angel balance, ball and bucket, ball and cylinder. Group games include take wood, ball-spoon, flowers, ball and circle, and standing stork test.

Results

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<th>Table 1: shows mean and standard deviation of participants’ age, height, and weight in both pre-test and post-test</th>
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<td>Height (cm)</td>
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Table1. Participants’ Anthropometric Characteristics
To examine the hypothesis of the normality of data distribution, Climograph Smirnoff test was used, result of which is indicative of normal distribution of data.

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<th>Table 2: The Significant Level Obtained from Climograph Smirnoff Test</th>
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The study yielded the result that there is a significant difference between individual games group and control group in terms of the post-test values of social development (P=0.000). There is also a significant difference between group games and control groups (P=0.000). However, there is no significant difference between group and individual games in terms of the afore-mentioned values (P=1). Regarding the difference between the means and also the lower value of control group in comparison to the group and individual games groups (-2.116 and -1.928), it can be claimed that since Vineland questionnaire scores indicates an improvement in social development, playing group and individual games can lead to an improvement in the social development of DCD children aged 8 to 12. Scrutinizing the study, one can find that playing 8 weeks of individual and group games respectively leads to 5/9% and 5/3% improvement in the scores of DCD children’s social development.
The results also confirmed that there is a significant difference between individual games and control groups in terms of the post-test values of static balance ($P=0.000$). There is also a significant difference between individual and group games in regard to the afore-mentioned values ($P=0.000$). However, no significant difference was seen between group games and control groups ($P=1$). Given the difference between the means and high values of the mean of the control group in comparison to individual games group, it can be claimed that since MABC test results show motor disorders, only playing individual games – neither group games nor control group – leads to an improvement in CD students aged 8 to 12. A closer look reveals 8 weeks of playing individual and group games respectively leads to 31/66% and 2/4% improvement in DCD children’s static balance.
The present study yielded the result that in the terms of static balance of DCD children aged 8 to 12, a significant difference can be detected simply when 8 weeks of individual games are played in comparison to the performance of control group. Yet, playing 8 weeks of group games failed to significantly improve the children’s static balance. The results of the study expands upon the works done by Shaikh, Bagherzadeh & Yousefi (2003), Salman et al (2009), Dehghan et al (2010), and Hang & Pang (2010). However, this is not in line with the studies conducted by Emarati et al (2011), hamidpour, Hussainai & Pajouhandeh (2011) and Koubilai (2011). Balance is regarded as an important factor in almost all motor activities. It is often known as postural control which is defined as the act of maintaining or achieving a state of balance in a gravitational field through returning to center of mass which exceeded the area of base of support. Factors influencing the size of base of support such as length or width of feet are also effective on postural responses.

Balance also has an inverse proportion with the height of center of mass over base of support. In order to keep balance in any conditions, human body should receive some information about its situation and the environment. Brain receives this information through the nervous system which acts as proprioceptive receptors and also through muscular system in muscles and joints. These systems are known as postural control system. Most researches confirmed that the more people’s age increases and muscular spindle improves, the more the proprioceptive receptors and static and dynamic balance improves.

The results of the study showed that 8 weeks of group and individual games in comparison to control group performance led to a significant improvement in the social development of DCD children aged 8 to 12. However, there is not any significant difference between the effects of individual or group games. This part of the finding is in line with the results of the works done by Bagheri & Shahsavari (2008), and Pourshokouhi Sharemi, Movahedi & abedi (2011). The findings are in conflict with the findings of the researches done by Hamidpour, Hussainai and Pajouhandeh (2009) and Emarati et al (2011).

As it was mentioned earlier, the participants of the study done by Hamidpour, Hussainai and Pajouhandeh incorporated pre-school children while those of the works done by Emarati et al were healthy children. Therefore, the difference in the condition of the participants in regard to their age and illness can be the reason behind the contradiction of the findings of this study with those of the two researches mentioned above. Rahnama (2005) defined social development as children’s ability to adjust their behavior with their peers and social environment; a process which enables children to perceive and predict other people’s behavior, control their own behavior, and also regulate their social interactions. Also, the social information processing theory developed by Smith highlights the importance of the role of motor experiences in social skills development.

In their early period of life, children establish relationship with the environment for the first time, begin their social interactions, and build a sense of who they are. In this period, their personality and behavior structure is founded and, as permanent members of their community, they always deal with different stimuli received by their senses. Children are influenced by the stimuli; therefore, environmental experiences are of high significance.

Social life necessitates children’s ability to cope with the situations and tasks that emerge as a result of relating with the others. Children who acquired the necessary social skills are supposed to be more successful in relating with peers and learning in educational environment than those deprived of these skills (Rahnama, 2005). Motor programs and purposeful games along with the other sport activities pave the way for DCD children practicing and rehearsing some mental and cognitive concepts. Motor is a means of communication and education through which children can be educated on concepts such as weight, orientation, shape, quantity, quality, time, place, and even perception of space since they find mere theoretical education too boring (Jensen, 2004).

All in all, in comparison to perceptual-motor training, playing group or individual games more inspire children to participate in social affairs. Moreover, since static balance improves more significantly in individual games than group ones, and also due to the high cost of the latter, individual games are recommended.

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