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THE IMPACT OF EDUCATIONAL PLAY ON FINE MOTOR SKILLS OF CHILDREN

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Abstract
This study was conducted in an attempt to compare eye-hand coordination, hand-hand coordination and speed of hand skills (right and left) in two groups of children; one receiving educational play, and the other a non treatment control group. Sixty children, aged 4 to 6 years, were randomly assigned to control and experimental groups. All subjects were pre and post tested within an interval of two months. The educational play program was presented to the experimental group in this interval. The assessments used for pre and post testing were the Purdue Pegboard, Cutting and Bead-Sorting.

Each was administered three times to provide a reliable average. Analyses showed a statistically significant difference between the two groups with regard to right/left hand skills speed (P£0/001). It was also found that the two groups were significantly different in their eye-hand and hand-hand coordination performance (P£0/001) and (P£0/001) respectively. Further analysis revealed that there was no significant correlation between height, weight and arrival date on the one hand and speed of hand skills, eye-hand and hand-hand coordination on the other. Eye-hand coordination was not found to be related to age or gender in the experimental group. A significant relationship was found between speed in right-hand skills (P£0/04) and age, while speed in left-hand skills was related to gender (P£0/02). Clinical implications of these findings for occupational therapy are discussed.

Keywords: Educational Play, Eye-Hand Coordination, Hand-Hand Coordination, and Speed of Hand Skills.

Introduction

Play is an important topics in occupational therapy. Play is considered to be a desirable activity, which results in physical and mental satisfaction. The child is considered to be a theorist moving from one stage of intellectual development to another. If the child's needs and incentives are not considered, his transition from one stage to another cannot be understood, because changes in the child's motives and desires are related to development. It is important that in play the child's needs are met. If the special features of these needs are not understood, the unity of playing as a form of activity cannot be understood.

The relationship between play-development and training-development can be examined; but in addition play provides a vast opportunity for the transformation of needs and awareness. Action in daydreams, the creation of intents, the formation of plans for life and motives are all appear in play is most highly developed during the preschool years. The child develops mostly through play activities. From this point, play can be considered to be a guiding activity, which determines the development of the child. Most fine motor skills appear approximately from the age of 4 with the tripod pinch, and development is completed by the age of 6. These skills can be assessed in pre-school children as a means for finding any delay in the development of hand motor skills. This study examines the effect of play on the development of fine movement of the hand. The findings of this study have the potential to assist occupational therapists designing intervention plans.

From 1930 to 1960 specialists tried to explain the different aspects of play in terms of a basic framework. These efforts formed a foundation for the use of play as a means of diagnosis. Assessment through play has become common in the last two decades. Parten (1932) was the first to describe the development of play behaviors. His observation made it possible to consider specific time criteria for emergence of individual play from birth to two years. Berlyne (1969) proposed a theory on the basis of inner motive suggesting that play is related to exploration. Therefore it is described as an equalizer for the excitement of a living organism. Bruner (1972) states that play is an opportunity to create new motor skills, in particular hand skills, which are necessary for tool use. In this way childhood play provides a calm activity in which the behavior components of complicated skills which are required for adulthood come together in a new way without any anxiety or pressure.

Schaaf (1990) implemented the sensory integration approach in occupational therapy for pre-school children and showed the effect of treatment through the assessment of play behaviors. Bundy (1993) states that occupational therapists use play as a means for

creating therapeutic success. He recommends that occupational therapists should provide an exact definition of play. Since play is an important means for intervention, it should be distinguished from non-play activities. If occupational therapists believe in the importance of play they will take it very seriously. The treatment of the basic components of skills, such as fine and gross motor skills, which exist in a child's play, can be an intervention approach (Bundy & Clifford, 1989). The main aim of this study was to determine the extent of the effect of educational play on the fine motor skills of 4-6 year-old children. The study sets out to:

- Compare the extent of the effect of educational play on fine movements in girls and boys.

- Determine the extent of the effect of educational play on eye-hand coordination in the control and experimental groups.

- Determine the extent of the effect of educational play on hand-hand coordination in the control and experimental groups.

- Determine the extent of the effect of educational play on the speed of hand skills in the control and experimental groups.

Method

Participants: This is a study of an intervention method. The sample consisted of an experimental group of 30 children (boys and girls) and a control group of 30 children (boys and girls). Participants were aged 48-79 months and sampled randomly from a Welfare center (Ameneh welfare center) in Tehran. The children in the study were all healthy, physically and mentally, with no orthopedic or neurological problems.
Tools: The data for this study was collected from direct and indirect observation. Eye-hand coordination, hand-hand coordination and speed of hand skills in Cutting tests, Threading beads and Purdue Pegboard were observed directly, and recorded on a checklist. Demographic information was also recorded. Data was analysed using measures of variation and central tendency, T-student test to compare the effect of educational play on various age-groups, T-student test to compare the results of tests of Cutting, Threading beads and Purdue Pegboard, on experimental and control groups, and T-student test to study the correlation between variables.
Process: During the assessment the participants did not have sleeping problems neither were they on medication. They also had clear laterality. The educational plays were taught individually in 45-minute sessions, three times a week for two months. The tests were administered twice, before and after intervention. In order to avoid the fatigue, participants rested for 3-4 minutes between the first and second evaluation.
Results: Participants' speed of right and left hand skills, hand-hand coordination, eye-hand coordination with the comparison of control group are summarized below.

Fig.1 indicates the increased eye-hand coordination (P£0/000) compared with control group, Fig.2, in pre/post level.

Figure 1 - Comparison of primary and secondary assessment in eye-hand co-ordination in control group

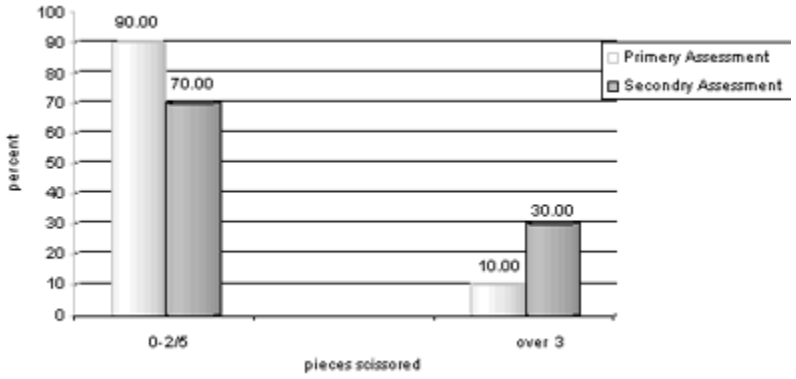

Figure 2 - Comparison of primary and secondary assessment in eye-hand co-ordination in experimental group

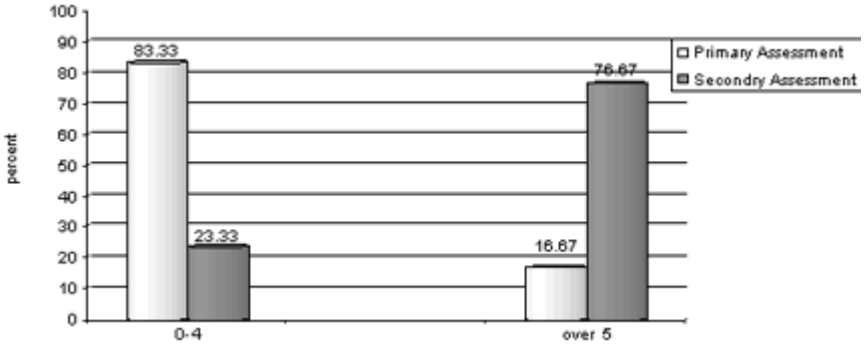

Fig.3 indicates the hand-hand coordination (P£0/000) compared with control group, Fig.4, in pre/post level.

Fig. 3 - Comparison of primary and secondary assessment in hand-hand co-ordination in control group

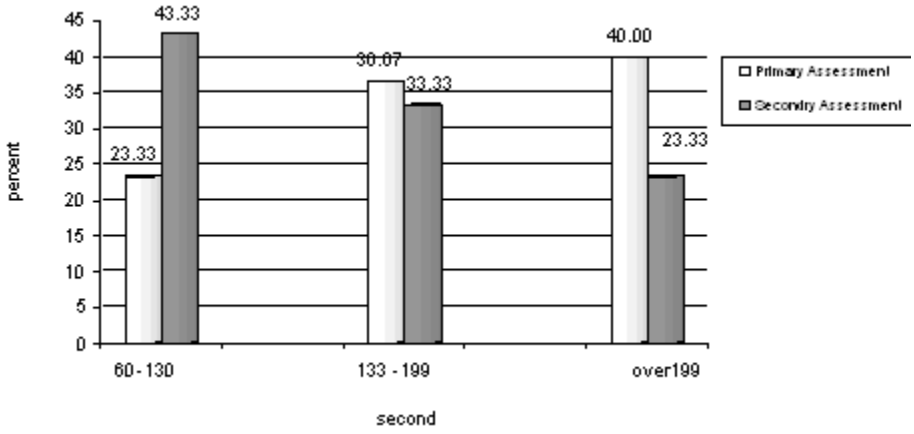

Fig. 4 - Comparison of primary and secondary assessment in hand-hand co-ordination in experimental group

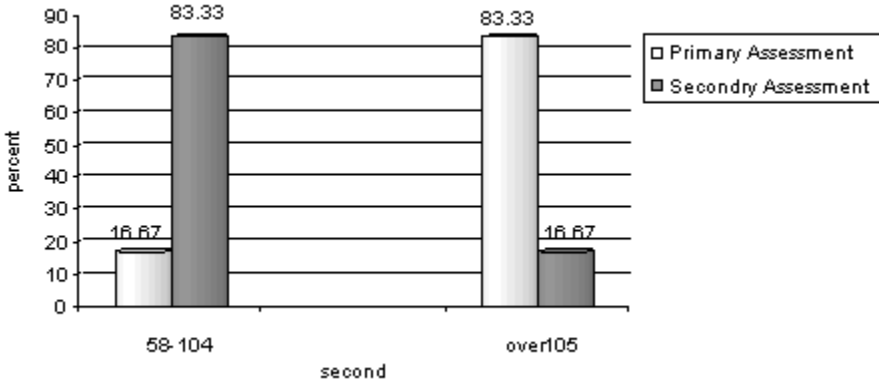

Fig.5 indicates primary and secondary assessment of the right hand skills. The result shows significant differences in experimental group increased speed of right hand skills (P£0/000) compared with control group, Fig.6.

Fig. 5 - Comparison of primary and secondary assessment in speed of right-hand skill in control group

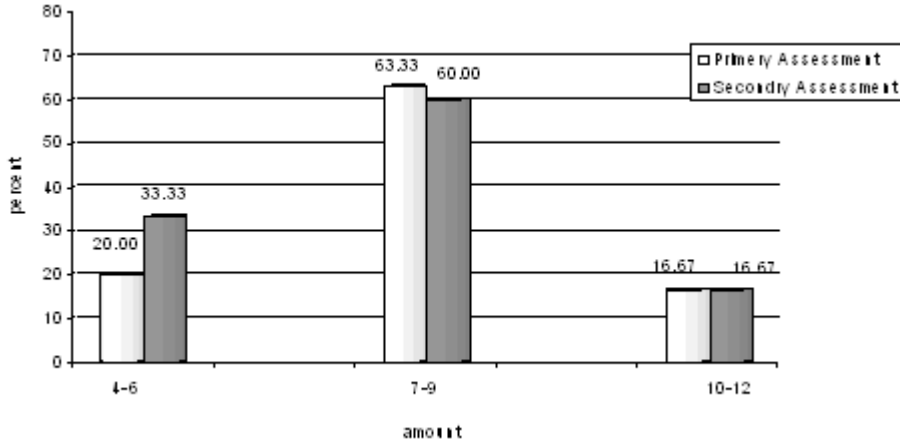

Fig. 6 - Comparison of primary and secondary assessment in speed of right-hand skill in experimental group

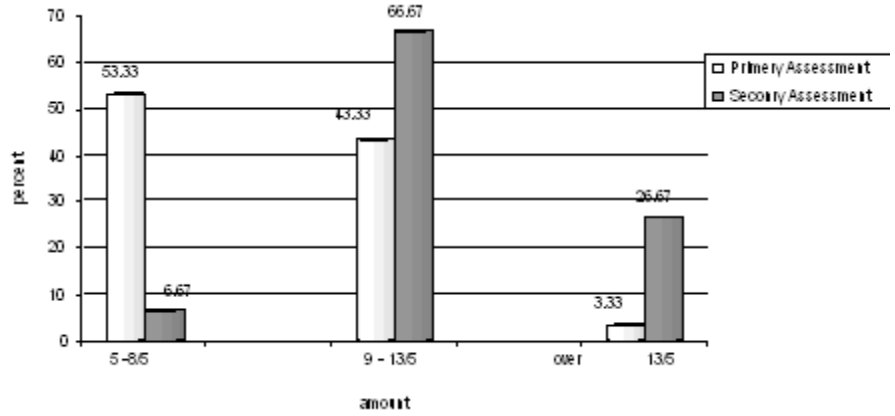

Fig. 7 - Comparison of primary and secondary assessment in speed of left-hand skills in control group

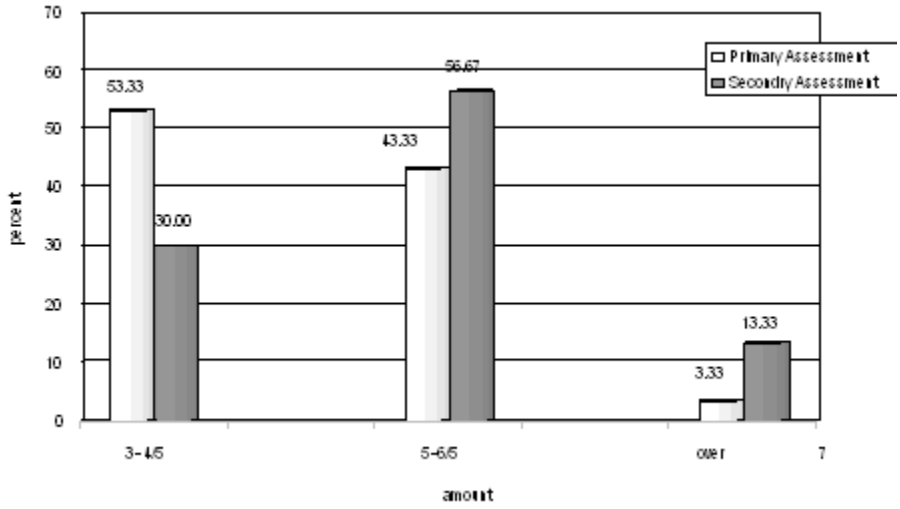

Fig. 8 - Comparison of primary and secondary assessment in speed of left-hand skills in experimental group

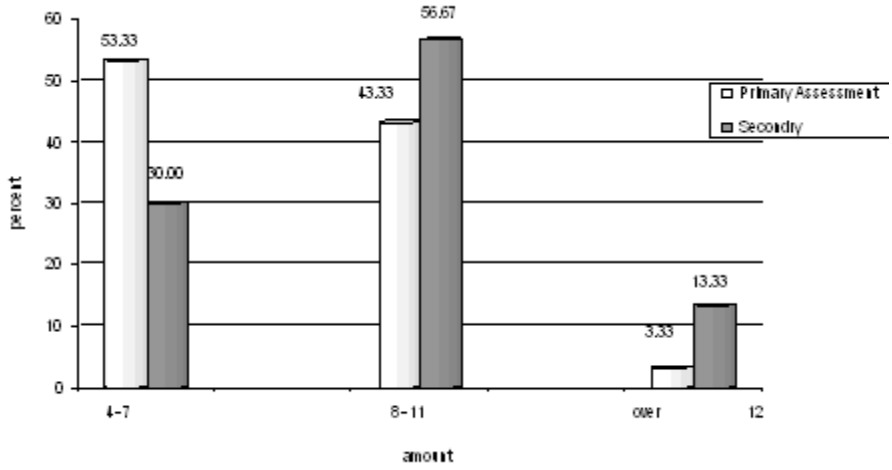

Fig.7 indicates primary and secondary assessment of the left hand skills. The result shows significant differences in experimental group increased speed of left hand skills (P£0/000) compared with control group, Fig.8.

These results were also extracted from the analysis of data:

- No significant relationship between weight, height, duration of attention in the center and increase of fine motor skills was noted in the experimental group.
- Increase of fine motor skills in two groups was similar.

- There was a significant difference between the average speed of right-hand skill in the two age groups in the experimental group (P£0/04).
- The increase in the fine motor skills of the two sexes groups was similar.
- There were significant differences between the average speed of left-hand skills in the two sexes in the experimental group (P£0/02).

Discussion

The results show that plays facilitates the development of hand-hand, hand-eye coordination and speed of hand skills. Play promotes specific features, i.e. concentration, positive motivation and enjoyment, and has a particular effect on the limbic system, which in turn has a role in the performance of motor objectives. Therefore in this section a brief account of the activity of the limbic system and its role on planning and learning of motor activities will be discussed to highlight the importance of play in the improvement of fine motor skills. The activity of the limbic system and its role in the development of processes such as sensory-motor organization has been studied in the past decade. The relationship between emotional-affective, sensory-motor and other functional systems is considered more important than before. The limbic system is connected with the reticular system and is very complicated with many connecting fibers, as a result any stimulation in this system will result in a durable and established effect.

Parts of the limbic system such as the hipocampus, amigdala and mamillary bodies, have particular roles for example the amigdala with its many connections with other parts of the limbic system is involved in the onset of the level of motivation and emotion and assists the process of learning. The hipocampus and mamillary bodies have important roles in both short term and long term memory. The hipocampus has a basic role in storing information and in learning. It functions by generating stimulation, which changes short term memory to long term memory. The hipocampus generates a kind of signal which is sent to the long-term memory and gives the command for storage. Based on the experience the hippocampus determines what should be learned and memorized.

Motivation, awareness and concentration are three important factors for learning which appear during play. This process is mediated by the limbic system, especially the amigdala. Considering that the emotions have an effect on the limbic system, the role of emotive learning through play, which has a powerful reinforcing effect, can not be ignored in intervention.

It can be interpreted as follows:

- Motor responses are the result of the effect of the limbic system on the motor control system and not the motor control system alone.
- Hypothalamus and the limbic system are specifically involved in the emotive nature of the sensory feelings and whether the feelings are pleasant or not

It should be emphasized that eye-hand and hand-hand coordination and fine motor skills are the means for manual expression. Each of these skills is involved in non-verbal communication. The coordination and integration of eye-hand and hand-hand activities in

performing an effective movement involves the motor-perceptual relationship. The development of eye-hand coordination can enable the child to develop gross motor skills. Eye-foot and hand-hand coordination are necessary for the development of gross and fine motor skills such as mobility, movement patterns, rhythmical movement and manipulation.

The coordination of the fine motor skills is directly related to the growth of small muscles of hand, which are used for performing tasks such as writing, threading, assembling bolts and nuts and scissoring. The success on all these manual tasks will result in positive self-concept, and school achievement.

Our body is equipped with receptor organs, which are sensitive to senses of touch, pressure, temperature and position of various parts of the body in space. Perception of kinesis affects body image and the position of body in space. Providing opportunities for children to have some experience, practice and play in the tactile perceptions will help children to develop better perception of kinesis. These experiences will assist them to extend the execution of multi-sensory practices. Comparison of the degree of temperature, color, texture, design and touch will improve their kinetic perception. It is also important to encourage children to increase their awareness of their body position during movement. It seems that the more children become efficient in receiving and processing input stimulation, the more they are able to perceive their environment and as a result they become more able to describe and express themselves manually or verbally.

Considering the first stages of development, Vygotsky (1978) indicated that the basis of the formation of higher cortical functions is related to primary processes. If tactile perception and thoughts are not stable enough, complex concepts can not grow. If there is no stable foundation for immediate memory, long term memory will not form. However; in the next stages of mental development the relationship between primary and complex processes changes. Higher cortical functions which are based on the primary processes begin to affect the primary processes and even the simplest forms of cortical functions begin to reorganize. Therefore the development of memory in children should be studied by considering not only the changes happening in the memory but also the relationship between memory and other functions.

Play is a complex phenomenon, which is studied through different disciplines such as biology, humanities and sociology. For occupational therapists, play is multi-dimensional and socio-psycho-biological phenomenon. In recent years research has been done on the basis of the long history of the relationship between occupational therapy and playing as a comprehensive part of a healthy life. In conclusion it is important to mention 1) playing is not only a distinguishing feature of childhood but it is a guideline for development, 2) transformation from the domination of imaginary situations to the rule-driven situations in the development of play is very important, 3) playing will create changes in the development of child.

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