

SOME THOUGHTS ABOUT VISUAL EDUCATION IN THE KINDERGARTEN OF CEREBAL PALSIED CHILDREN

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Manipulative activities and graphomotor development of cerebral paretic children is a central issue in the methodology of Conductive education (CE). The development of motor disabled children's drawing is hindered by some reasons. Earlier research examined the special characteristic of drawing development in the case of hemiplegia. It points out current realities and suggests future possibilities for investigations in this field. This paper describes the symptomspecific features of drawing in kindergarten-age disabled children, and the effects which influence the development of drawing. The motor disabled children's drawing may give us information about the general developmental process of the child. Nevertheless one has to be careful in the interpretation of drawing, as other factors such as environment, emotions, past experiences and the feelings they evoke will affect the representative quality of the drawing. Therefore more than one drawing may be needed to obtain a better understanding of the child. The article is planned to continue with special developmental programs and ideas to teachers and nursery teachers who work with cerebral palsied children.

Keywords: drawing, disabled, scribbling, cognitive development, cerebral palsied, developmental effects

The Development of Motor Disabled Children's Drawing

The developmental course of the ability to draw among motor disabled children may vary greatly from one child to another based on the extent and the nature of the damage suffered by the nervous system. For some children the developmental course may be normal or very close to normal while for others it will be greatly hindered or virtually nonexistent.

Because of the complexity of the central nervous system, brain injury may not only result in motor dysfunction and aberration of movements but quite often it may involve visual and perceptual disorders as well as intellectual impairment, learning disabilities, language disorders, behavioural and emotional disturbances and convulsions. All these symptoms, whether alone or coupled will inevitably affect the development of the child, and the development of its drawing ability.

Drawing is a developmental process that takes place through several stages (by H.Eng, 1971):

scribbling	1.5 to 2 years
pre-schematic	2 to 4.5 – 5 years
schematic	5 to 10 years
visual realism	10 to 12 years

Each stage conditions the transition and the development into the next stage. Because of motor dysfunction alone or coupled with the impairment of any other function mentioned above, the evolution of drawing in motor disabled children may be halted at a particular stage of its development and the child will not be able to progress forward as long as the cause of the problem is not overcome.

The Place of Motor Development in the Scribbling Stage

Scribbling as the first stage of the development of drawing is originated by unplanned motor activity and the need to act. The infant discovers by accident that his hand can leave a trace on the paper. On the surface, this discovery takes place through manipulation of any object through which the child can leave a mark: tearing, playing with sand, leaving marks on a surface with dirty hands, etc. The mark left by the child is a strong feedback for him, and a source of curiosity and enjoyment. As a result the child seeks to repeat the activity. When given a pencil it does not take him very long to use it to make a mark on any surface within reach: a table, books, etc.

Another prime condition for scribbling is the ability of the child to grasp a writing instrument in his hand and to hold it. The adequate pressure of the instrument on the paper and free flexion extension movements of the arm from side to side will enable the child to experience tracing lines and leaving a mark on the paper. Thus he will enter the phase of scribbling.

As the motor function of the arm and the hand becomes more differentiated and autonomous from the median axis of the body, scribbling develops into more "elaborated" lines, and from drawing straight lines the child starts to draw big loops, and then smaller ones. His straight lines also become smaller and broken into a grid. Through this process, he discovers new drawing techniques which are preliminary to the drawing of forms.

This development takes place with the maturation of the nervous system and its implications for the child's movements. The movements of the arms, wrists and thumbs become more differentiated with better control. In the early stages of scribbling the infant is not able to control either the starting point of his tracing on paper or his stopping in a voluntary fashion. When the movement becomes dependent on distal motor function (wrist/hand/thumb) it loses its impulsive character. The child is able to control the span and the speed of his movement as well as to control the starting point of his tracing and to stop it voluntarily.

Implication of Motor Impairment on the Development of Scribbling

As discussed in the previous section scribbling is essentially a motor activity that is largely dependent on the maturity of the nervous system and its development. The scribbling stage begins around a year and a half and lasts up to around two years of age. As a direct consequence of motor dysfunction, the development of scribbling of motor disabled infants is delayed and may start after the age of two and often much later.

Through personal experience with young children between the ages of two and three I have noticed that when given a pencil for the first time they will grasp it, put it in their mouth, bang it on the table, and do other activities. It is only much later that they will initiate using it as a drawing tool. This can be explained by the fact that motor disabled infants are usually left in confinement in their pram with very little opportunity to move around and manipulate objects. When entering an educational system, these children may be given the opportunities to receive adequate sensory motor stimulations and experiences with direct implication on their general development and promoting their maturity to enter the age of drawing readiness.

The young child may have reached adequate maturity to start scribbling. But motor impairment will prevent him from engaging himself spontaneously in this activity and in developing his scribbling into higher skills because of the following motor disorders.

Motor disability and drawing development / Symptomspecific drawing development

Central injury of the nervous system may lead to important disorders of the muscle tone with direct implication on the control of voluntary movements and visual control.

Spasticity is characterized by an increase of the muscle tone resulting in spasticity, the muscles become stiffened and voluntary movements are made very difficult because of muscular spasm. Due to exaggerated contractions of the muscles contractures develop and can affect any joint in the body resulting in poor amplitude of movements in mild cases or in lack of movement in more difficult cases.

Spastic Quadriplegia/Tetraplegia Spastica

The upper and lower limbs are affected. There are frequent contractures at the hip and knees and feet joints often affecting the seating position. Possible contracture at the shoulder and/or elbow joints limits the movement of the arm and the forearm with direct implication on the performance of the range of movements that play a part in the evolution of the scribbling stage. Shoulder joints may also be affected.

The hands are closed tightly with the thumb inside making grasping and releasing difficult. The movements of the wrist are very limited. As a result the child may not be able to grasp the pencil and hold it properly. Inadequate holding of the pencil and limited movements of the upper limbs will influence its pressure on the paper. It will either increase to such an extent that the child will be stuck with it and unable to move it on the paper or the pressure will be weak and consequently the marks left on the paper will be barely perceptible.

Movement between finger and thumb is not differentiated and affect the development of fine manipulation with direct implications on drawing activity.

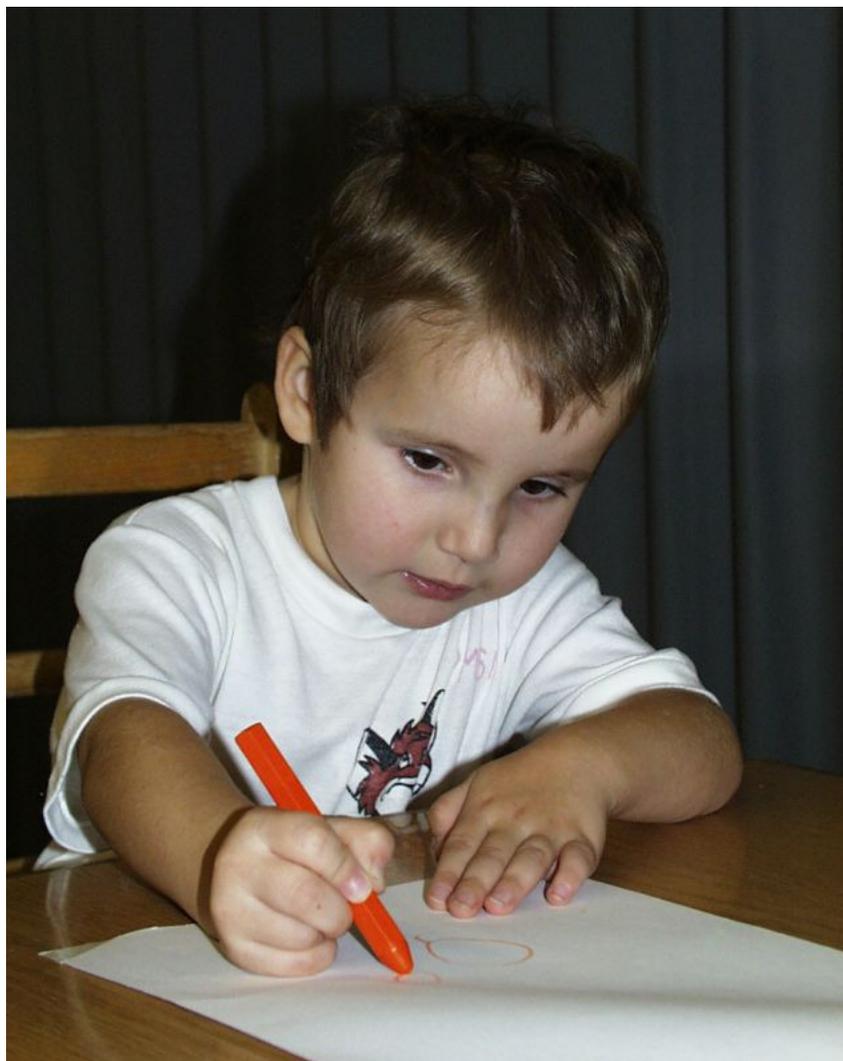
Spasticity is very often mixed with hypotonicity of the back and the head with direct consequence on the seating position. The child will not be able to keep his back straight and his head up within the axis of the spine. This incorrect posture will affect the proper development of movement and visual control.

Spastic Diplegia

In this condition only the lower limbs are affected. Slight clumsiness in fine manipulation may be present but this will not have any real implications in the general development of drawing.

Visual and perceptual disorders are common in spastic diplegia. Their implications in the development of drawing will be perceptible only at a later stage. Therefore these disorders will be discussed with the role of cognition with regard to the development of the schematic stage. In this stage they play an important role.

3. picture. Diplegic child²



² Picture made by I.Örkényi (Foto Video dept) collected by Julia Horváth Pető Institute.

4. picture. Diplegic child's drawing³



Hemiplegia

Hemiplegia is characterized by the impairment of only one side of the body. Sensory deficiency on the affected side, visual field disorders, and epilepsy are common manifestations.

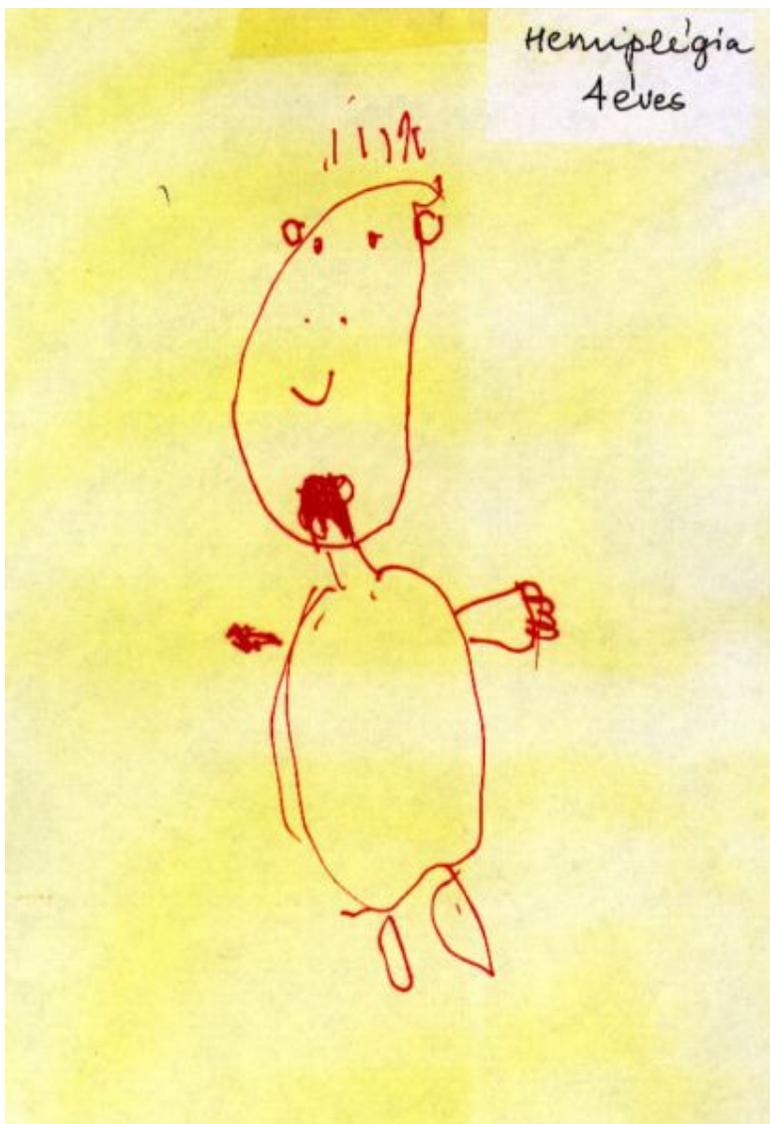
There will be no implications of the motor dysfunction in the early stages of development of drawing. However in the later stages visual field and sensory deficiency may lead to perceptual disorders that will become apparent in the drawings of a child and his representations of the body image. In cases of Epilepsy, cognitive impairment may develop as a consequence of anti-convulsive drugs administered to the child and as such, The development of drawing will be affected.

In the early stages of scribbling muscle tone disorders as discussed above will alter the nature of the feedback that the child will receive from the marks on the paper and the experience itself. This will have a direct influence on the readiness of the child to repeat his scribbling. The child may

³ Picture made by I.Örkényi (Foto Video dept) collected by Julia Horváth Pető Institute.

fail to develop an interest in drawing because of a lack of adequate feedback from the drawing itself or because of immense frustration in this particular activity.

5. picture. Hemiplegic children's drawing



Athetosis

Athetosis is characterized by exaggerated and uncoordinated movements with alternating muscle tone that may become incredibly increased by the intention of the child to behave actively as well as by emotional states. These exaggerated movements affect the head and trunk, and the upper and lower limbs. As a result safe and stable sitting is hindered. The development of adequate motor-visual control is disturbed, grasping and holding the pencil high may alternate with sudden releasing and letting go because of alternating muscle tone.

In the same fashion the pressure of the pencil on the paper will alternate from being too strong and then too weak. Together with exaggerated

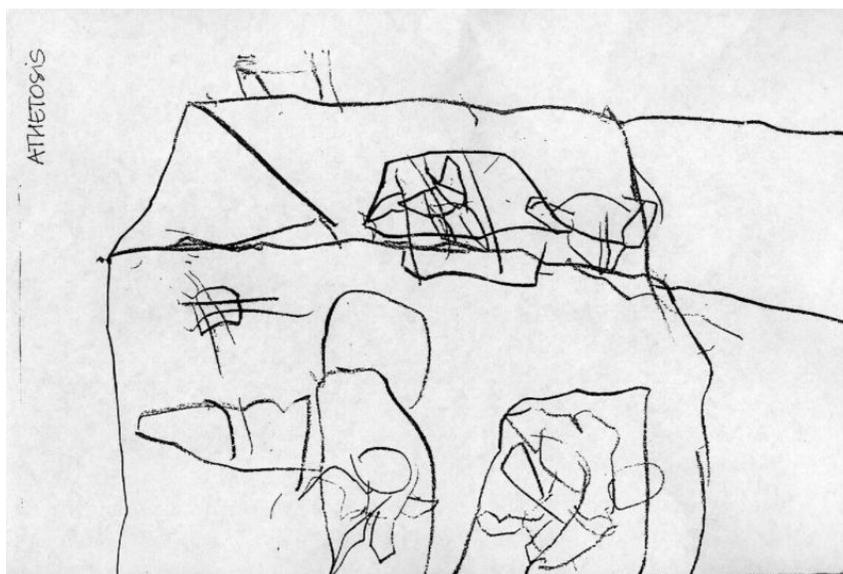
movement the paper may be torn by the child's scribbling and drawing. Dribbling is also important with the implications discussed above.

The combination of these factors turns the scribbling and drawing of the child into a very frustrating activity. In mild cases the graphic skill of the child may develop very slowly with significant delay from scribbling to representational drawing as the child learns to master his handicap. In severe cases drawing is not at all possible. The child will not be able to develop past the scribbling stage since he cannot control the span and speed of his movement and develop proper visual control.

6. picture. Athetotic child



7. picture. Athetotic child's drawing



Ataxia

Ataxia is a result of damage of the cerebellum. The cerebellum is responsible for movement regulation. Damage to the cerebellum affects the coordination of movements in space and time. Movements are inaccurate and broken. Intentional tremors and shaking appear when performing movements and can affect the head and the trunk or the limbs, particularly the upper ones.

When initiating movements the starting impulse is too strong. In stopping movements in its course to reach a given aim it is too late in time and goes over the target to be reached. Together with marked disorders of movement coordination and intention, *Nystagmus is very often present*. It is characterized by involuntary movements of the eyeball, which can be either rotatory, vertical or horizontal. These manifestations make the development of proper visual-motor control inadequate, with poor or total lack of eye-hand coordination. *Hypotonia* is characterized by a pronounced decrease of the muscle tone. In such cases the muscles are weak and fail to respond to volitional movements. In this case the child may be able to grasp the writing utensil but he will have great difficulty in holding it in his hand and keeping the grasp so that the utensil does not fall. The range of movement needed may be present but their span and intercity are very much decreased. The pressure of the utensil on the paper may be too weak to leave a mark.

Hypotonicity of the back and head will affect the posture and seating of the child as well as affecting the development of motor and visual control.

Ataxia is very often accompanied by severe cognitive impairment. This explains why the drawing of children with moderate to severe Ataxia cannot develop past the scribbling stage. Good visual-motor control and cognitive maturation are at the basis of the evolution of scribbling into intentional graphic representation.

7. picture. Drawing an ataxic children



Role of Sitting in Drawing

Proper sitting is a basic condition for the child to scribble and draw. Only safe and stable sitting will enable the child to concentrate totally on his activity, to develop control movement distally from the axis of the body and

motor visual control. Muscle tone disorders and contractures will affect proper sitting with direct implications on the development of drawing.

The Pre-schematic Stage. As the visual-motor control becomes more sophisticated the first intentional representation appears. At the beginning this representation is accidental. The child discovers that his drawing can represent a form which reminds him of a known object or situation. Then he gives it a name after he has found some sort of analogy between the form produced and the known object. This marks the beginning of the development of a whole system of figuration where the evolution of the accidental drawing develops into "formal" graphic scheme in a way very much similar to that of language development.

Later the child tries to reproduce the forms that he has first drawn accidentally and to which he could attribute similarity with forms of known objects. This signifies the evolution of the child from the accidental representation to the development of intentional graphic scheme, the schematic stage. This major evolution is dependent upon the development of psychomotor skills involving visual motor control, perception, memory and cognitive maturity and the ability of the child to build and manipulate concepts. During this stage the development of motor control is not as dominant as in the scribbling stage. It still plays a role in the development of graphic forms that, with time will become more diverse, sophisticated and accurate in their representative function.

Perception Disorders in Motor Disabled Children

Children with gross motor impairments will "never" be able to achieve the required conditions regarding motor and visual control to progress to the pre-schematic and schematic stages. Coupled with these impairments, further evolution of the drawing ability of children with mild motor impairment may still be slowed to a great extent or impaired because of disorders of perception or cognitive impairments. These two elements are of prime importance in further development of drawing once the child has passed through the scribbling stage.

Perceptual disturbances of all kinds are common symptoms in motor disabled children. They are not confined to one type of clinical picture but they may be present in any type of motor dysfunctional patterns and in various combinations.

Perception develops from a variety of sensory motor experiences resulting from the interaction of the child with his environment. Perception is a developmental process of central origin and requires the proper functioning of all senses and their successful interaction. Sight, hearing and touch are essential in this process as they form primary channels that convey to the central nervous system the various stimuli that the child receives from the environment. This variety of sensory stimuli is then processed into meaningful information that will be the basis for development of schemes and concepts that he will be able to manipulate so as to understand his environment and adapt to it.

Development and Role of Body Scheme

The development of the body scheme plays an important role in the perceptual process and vice versa. Since perception is not based on an absolute and static value but on a constantly changing environment where each reality is relative to another, a point of reference is needed so as to give

meaning and to organize the things around us and to perceive our environment in a coherent totality. One's own body is the point of reference through which the relativity of the spatial relations becomes meaningful.

Perception of self is the basis from which sensations from the environment become meaningful. During the second half of the first year of life the infant gradually becomes aware of the separation that exists between self and the environment. There is a gradual attainment of a sense of individualization as the child becomes aware of parts of his body and starts to control them through movements.

Proprioception refers to the perception of the different parts of the body in space. Through proprioception we are aware of our own movement and of the posture of our body. Proprioception play an essential role in the development of body scheme (Geschwind & Galaburda, 1985).

Active movements play a very important role in the development of the body scheme since they lead to better perception of the body. They are a great unifying factor between the different parts of the body and help to perceive it as a whole. Through movement and the development of his body awareness the child comes to understand the relativity of the spatial relationship of the world around him. He can then develop spatial perception and translate it into concepts such as right and left, up and down, front and back, etc.

Visual Perception Disorders

Perception of form disorders. In perceiving a form, one does not perceive the complex form but various parts of it that are later integrated into the complete impression. This is due to the fact that the eyes fixation is not stable but shift from one point to another so as to bring the image into focus on the retina. Thus the object is processed into a whole unit by the nervous system.

The combination of parts into a whole is a common problem in children with brain injury. When perceiving a form the motor disabled child will not be able to combine its different parts into a whole. This perceptual disturbance can be easily diagnosed by perceptual tests involving copying shapes. Instead of copying the shape as a whole unit the child will draw the parts of the shape individually without connecting between them. For example: when copying the shape of a square the child will draw a series of four independent lines not connected spatially into a whole. For the same reason the child has difficulties in colouring within the confines of a shape.

Figure Background Relationship Disorders

In figure background relationship the figure consists of those parts that are emphasized through colours, forms or scope. The background is the less shaped, generally more indistinct part of the visual field. In perception of the figure background relationship the figure is derived as a group of impressions from a single sense and these are perceived into a gestalt and an independent unit. The background, being unattended plays a less important role in the formation of the total concept.

Disturbance of figure background relationship has been demonstrated often in children with central nervous system injury. It is marked by a confusion in the isolation of ground from figure or by perceiving both ground and figure as equal.

The place of vision in perceptual disorders. Vision plays a primary role in perception since it is the most efficient sensory organ in its role as provider of information from the outside world. In motor disabled children with central nervous system injury vision can be impaired with direct effect on the development of perception. There are common visual disorders in motor disabled children like poor vision, or nystagmus (as mentioned above) or squinting or other visual field defects.

These disorders will invariably have an impact on the ability to perceive figure background relationships, forms as a whole, development of visual discrimination and eye hand coordination.

The Place of Attention in Perceptual Disorders

Distractibility. Studies have shown that basic to the phenomenon of figure background disturbances in brain injured children are the factors of hyperdistractibility and limited attention span.

The child is highly distracted by any stimuli in his close surrounding – noise, moving objects, colours, etc. He finds himself unable to refrain from reacting to singular or groups of stimuli regardless of whether they are related to the content being dealt with.

Dissociation is another factor playing a role in the inability of the child to distinguish between figure and background relationship. In this situation the child has difficulty in relating parts to the total configuration. The tendency is towards segmentation of the whole while in the worst case the whole as a unit may never be perceived.

It is assumed that dissociation is a direct result of distractibility. It comes about because of the distraction to extraneous stimuli to the point where a meaningful whole cannot take place. Another explanation is that because of dissociation figure and ground reversal take place.

Sensory and Perceptual - Motor Disturbances

Common impairments in motor disabled children include:

- disturbances in proprioception
- disturbances of sensations
- sensory deficiencies in various degrees and combinations
- disorders in sensory integration of the four senses
- audio, vision, tactile and smell
- disorders in general sensory functioning

The origin of these disorders is not clear. It is assumed that they result partly from cortical sensory damage. They may also be a result of deprivation in vital experiences that are necessary at certain optimal times of learning. According to (Burt 1921, cit. Abercrombie 1964), just as there are critical periods in the development of certain behaviours in animal and human infants, so there is also a critical period regarding the development of sensory functions. The timing of sensory training particularly during the first three years of life seems of crucial importance. The researchers have proved that lack of sensory-motor experience does affect the development of proprioception as well as the general development of the child.

Confined Space

Confinement is an important factor in the development of sensory and perceptual motor deficiency. Motor disabled children are usually immobile in infancy and experience limited opportunities to build a concept of body and space relationship through proprioceptive and exteroceptive feedbacks.

Piaget's developmental theory states that through the gradual increase of sensorimotor experiences acquired during the first eighteen months of life the child develops and understands spatial links.

Also, a child who cannot look and touch simultaneously or turn his head to locate the source of sound has little chance of developing proper integration of the different senses of perception.

Lack of sensory integration and sensorimotor experiences during the early years will have definitive implications for the development of concept formation in the child. It may be delayed or impaired and as a result the child will be delayed in finding analogies between his tracing and known objects. There will be direct implications on the course of drawing development. The transition between the scribbling stage and the pre-schematic stage will be delayed. Also the evolution of the pre-schematic stage into the schematic period will be significantly slowed.

Implication of Perceptual Disorders in the Development of Drawing

Children suffering from perceptual disorders will have great difficulty in performing tasks involving visual perception even if their motor control and level of intelligence are adequate. Perception has important implications for the acquisition of skills such as writing and reading as well as the development of drawing.

Implication of Visual Impaired Motor Control

Visual disorders such as nystagmus, visual field defects, and strabism (squinting) may hinder the development of visual motor control as described in the scribbling stage and delay the emergence of the pre-schematic stage. The evolution of scribbling to accidental graphic representation (pre-schematic stage) arises from a new ability of the child to discover an analogy between his drawing and the perceptive characters of a known object that he has memorized through practicing and repetition. The child enters the schematic stage when his first accidental drawing has developed into a constant graphic form bearing likewise permanent significance: graphic schemes which he can then use intentionally to represent what he wants.

The development of graphic schemes is based on developing a constancy between the tracing and the analogy of the object evoked. This takes place through practice and repetition of similar tracing evoking similar objects. In this process visual motor control, visual perception, memory and cognitive maturation play an important role.

Adequate visual motor control will play a role in the formation of a motor scheme: through increased ability to control visually the tracing of his hand, the child is then able to repeat the same forms and to develop new ones. With time, the tracing develops into graphic representations with formal meaning, graphic schemes. In order to be manipulated freely by the child, these graphic schemes have to be integrated into motor schemes by the higher center of the nervous system so as to be translated graphically by the

hand in a constant and automatic manner. On the other hand the cognitive maturation of the child will express itself through the ability to form and use concepts. This will lead the child to discover an analogy between his drawing and the object or situation evoked and to give it a name.

In this process visual perception and visual memory are of prime importance. Through visual perception, the child is able to catch the relevant character of the object which he will store in his memory. Through visual memory, he will be able to find a link between an accidental tracing and the perceptive character of an object he has memorized. Later on, in the schematic period, visual memory will play an even more important role as the child will draw directly from an image of a memorized object or situation. The integration between the automatic motor execution of the drawing and the attribution of a meaning which stays constant results in graphic motor schemes which form the basis of drawing.

As a consequence of vision motor control, perceptual disorders and poor memory the child may have great difficulties developing first unintentional tracing into intentional tracing. Perceptual disorder and bad visual memory will inevitably affect his ability to find an analogy between unintentional tracing and a known object.

As a result the child will fail to develop appropriate graphic-motor schemes and his evolution from the pre-schematic stage to the schematic stage may be delayed.

The role of cognition in the development of drawing will be treated in a separate chapter. However children with mental retardation will also be delayed in their transition from one stage to the next stage because of poor conceptualization ability.

Implication of Impaired Spatial Relationship Development

In the pre-schematic stage the child draws objects with no consideration for spatial relationship and rules of perception. The ability to draw objects following only a spatial relationship order starts to develop gradually in the schematic stage onwards and is directly connected with the development of perception and the formation of spatial concepts.

Since motor disabled children are limited in their motion, they may be very slow at developing spatial relationship concepts because of a lack of appropriate kinaesthetic experiences in space. As a result they will have difficulty in organizing the content of their drawing in space and in representing objects following an adequate spatial relationship order.

Development of spatial relationship concepts will be discussed on page with regard to development of body scheme.

Implication of Poor Visual Memory in Drawing

The development of intentional graphic representation is closely dependent on visual memory since to draw an object the child needs to have some visual picture in his head of the object to be drawn. Visual memory is directly connected to the comprehension of the visual features of an object and to the formation of concept. It is also widely influenced by the child's interest and emotions towards the object.

Visual memory deficiency is a frequent disorder in motor disabled children and it will affect the ability of the child to express himself graphically. Visual memory becomes perceptible in the schematic stage since it is directly connected with the development of appropriate graphic-

motor schemes and intentional representations. Consequently the graphic representative ability of the motor disabled child will keep the unintentional characteristic of the pre-schematic stage, although better motor-control and adequate eye hand coordination may be present.

There is a big difference in the type of visual memory existing in the pre-schematic and schematic stage. In the pre-schematic stage, the purely accidental form evokes the memorized features of an object whereas in the schematic period the visualization of the object is the starting point. Poor visual memory is characterized by the fact that when the child is asked to draw a known object he is not able to visualize the features of the object as guidelines of what to draw. As a result the graphic representation of the object will be very poor and in the worst case meaningless.

If the child is intelligent enough he will help himself in drawing by using other features of the concept. But its representation will remain very basic and clumsy since he wants to plan his drawing ahead of time.

Implication of Sensory Deficiency

The development of graphic motor scheme is largely dependent on the maturation of visual-motor control. In this process the integration of sensory feelings such as:

- ❖ feeling the pencil by the hand and the finger
- ❖ feeling of the pressure of the pencil on the paper
- ❖ proprioceptive feelings resulting from the movements and posture of the body when drawing will be part of a whole feedback system.

The integration of these sensory feedbacks with the visual feedback resulting from the tracing of the child will enable the child to repeat his tracing, to correct it and to develop it into a graphic motor scheme that he will be able to manipulate freely in an intentional representative fashion.

As such, sensory and sensory integration deficiency will affect the development of intentional graphic representation in different ways. When drawing a form one does not only rely on its visual characteristics but also largely on the sensory impressions that we know about the object that we want to represent. The integration of these impressions with the visual features of the object are part of our understanding of the object and its conceptualization.

Therefore, sensory disorders in general and sensory integration disturbances will affect the development of perception and concept formation of the child with direct implication on the development of his graphic motor schemes and as a result on his general drawing ability.

Apraxia = Apraxia results in difficulty or inability to organize and plan purposeful movements.

Constructive Apraxia = The child is not able to copy shapes although there is no visual or perceptual deficiency. He is able to see the shape but he is unable to translate it into graphic forms. This is a result of his inability to plan movements and to connect them with what he sees.

Apraxia results from cortical integration disorders. It will have significant impact on the development of drawing resulting in the inability of the child to draw deliberately what he wants. This occurs not because of lack of understanding or inability to conceptualize but because of the incapacity to build adequate motor schemes that he will be able to connect freely with the objects he wants to represent. In such a case he will have in mind the forms

and their graphic representations but his hand will not be able to translate them onto the paper.

This disorder will become perceptible in the schematic stage that is characterized by the growing representative ability of the child as a direct consequence of the development of his graphic motor schemes (Eng, 1971).

Implication of Body Scheme Development in Drawing of Motor Disabled Children

The child's maturing concept of the body image is reflected in the increasing complexity of his human figure drawing. The form in figure drawing is related to the ego ideal and to the body image. However, the ways these are expressed are usually not direct and simple. The body image may be expressed through distortion of lines, over emphasis of size, emphasizing the importance attributed to parts of the body or on the shrinking or complete omission of other parts that are not integrated in the child's body scheme or that are not perceived by the child as significant.

In his work on the child's human figure drawing as a representation of self image. Yude (1998) notes that there are instances when the child unmistakably draws a self image as when he is beset by fears and anxiety he draws a weeping child. When a child is well adjusted to his environment and is not tormented by anxiety, he forgets the self through total involvement with the world and people around him. When he draws a person the result will most likely be a somewhat standardized schema of a human figure that will not necessarily be a drawing of the self.

Accordingly, one may assume that a well drawn standard human figure with regard to age group characteristics is the figure of a well integrated body scheme resulting from a good adaptation process of the child in his surrounding.

Concerning motor disabled children perceptual disturbances and disorders in interpreting sensory information will affect the development of the body image and its expression in drawing. As a result human figure drawings will reveal poor body concept when in the worst cases parts of the body may not be connected or may be scattered in space. Similar to orthofunctional children, motor disabled children will use techniques of emphasizing or omitting parts of the body.

In drawings of children with hemiplegia we observe that they draw their affected hand much smaller than the unimpaired one. This fact is directly connected with the diminished or lack of sensory feelings in the affected arm and the inability to use it actively. The child has not integrated this part of the body into his body scheme. For obvious reasons he does not regard this part as having any significance. In this fashion, poor body scheme integration may be seen in drawings of children with Spinal Bifida resulting from a lack of feeling and voluntary movement of the paralyzed limbs (Horváth, 2001).

In the motor disabled children's drawings of a human figure it is not always clear whether the drawing is an expression of the child's body scheme or a reflection of his self image. Motor disabled children have difficulty in adjusting themselves to the demands of a normal environment. Consequently they develop feelings of frustration, failures, uselessness, etc. These feelings may be perceptible in their drawing of a human figure as the reflection of their negative self image (Horváth, 2001).

In interpreting expressions of body scheme or self image of children with motor dysfunctions one must be very careful, as the inadequate drawing of a

human figure does not always reflect negative or poor body scheme or self image. As discussed in previous chapters, inadequate motor skills, disturbances in visual motor control and in perception, poor visual memory and apraxia will affect the representative quality of the drawings and may give us wrong information about the body scheme or self image development of the child.

Therefore, to obtain a better understanding of the child's representation of body scheme, one may ask him to do the following tasks:

- to name the parts of the body on the picture of the human figure that he has drawn
- to put together the part of the puzzle representing a human figure
- to perform activities such as "put my right hand on my left shoulder", etc.

Use of perceptual tests such as copying shapes and joining dots together will also be useful in better understanding the child's body image through his drawing of a human figure.

The Place of Cognition in the Development of Drawing

Studies of children from all over the world have shown that the development of drawing follows stages that are almost identical in their order of appearance and in their content for all children regardless of race and culture (Gaddes,1985). The development of drawing has proved to be a universal process. This finding led to the assumption that drawing is an evident expression of an inherent maturation process of man.

Further research and longitudinal observations of children's drawing have added evidence that the drawing development of the child is parallel to the development of concept formation. In the same way that the child's concepts are initially poor, and at later stages become richer in content, his graphic schemes are at first very basic representations that encompass generalized concepts. These scheme later develop into more differentiated and detailed representations of singled-out objects. Drawing requires a fairly good understanding of the object that one is attempting to draw as well as a strong visual memory. The latter is known to be influenced by the former and together they contribute to the formation of the concept and the ability to represent it graphically.

Accordingly, the representative quality of a drawing, with appropriate consideration of the motor ability of the child with regard to his age group, is a reflection of the conceptual development of the child. Similarly many parallels were found between the child's drawing and his speech and his thinking development. This confirms that the development of drawing does correlate with the cognitive evaluation of the child.

The IQ on the drawing test is determined by the completeness of the child's representation of the traits of the man figure and the details in the dress.

A high correlation is to be found between the Goodenough test and the Stanford-Binet intelligence test. This confirms the assumption that the development of drawing is closely bound with the mental development of the child (Gyarmathy, 2002). Finally, drawing reflects the development of the child's power of attention. At first the child is not able to hold, for long enough, mental pictures and direct movement altogether. Later his power of attention becomes more intentional as well as observational, analytic and possesses the ability to synthesize, think and pass judgement.

The Development of Cognition in Motor Disabled Children and its Implication in Drawing's Development

Delayed or impaired cognitive development is common in motor disabled children.

Very few studies on the mental development of brain injured children with motor dysfunction have been conducted. (Abercrombie, 1964) However lack of sensorimotor experiences during the early stages of childhood, impaired sensory integration and space confinement have been largely credited as factors in delayed and impaired development of cognitive functions.

The place of early perceptual-motor development and its importance in later conceptual development has been largely developed by Piaget in his description of the developmental sequences of cognitive process with stress on the various sensory motor experiences that the child receives from active interaction with his surrounding during the sensory motor stage. This stage serves as the basis of concept formation.

Drawing of Motor Disabled Children as a Means of Cognitive Evaluation

In the case of normal development drawing is a reliable index of the mental development of the child. In the case of motor dysfunction, drawing on its own cannot be used as an evaluation of the child's cognitive development. This is explained by the fact that motor disability resulting from central injury is very often accompanied by a set of disturbances of various kinds (as discussed in previous chapters). Therefore, when we are confronted with drawings of motor disabled children it will be very difficult to assess whether the incapacity to draw results from motor dysfunction, perceptual disorders, cognitive impairment, emotional disturbances or from a cocktail of those disorders.

Operative observation as a way of evaluation of the children's progress

The interpretation of drawing of such children will be valuable only if it is accompanied by a close observation of the child involved in drawing:

- ✓ description of his sitting position including facilitation need, quality of sitting, secure/not secure
- ✓ description of the body's posture when drawing starts from the top downward
- ✓ description of how the child grasps and holds the pencil/right of left handed/pressure of pencil on paper
- ✓ general description of movements involved in drawing
- ✓ impulsive
- ✓ slow with little amplitude
- ✓ eye hand coordination
- ✓ report on
- ✓ dribbling
- ✓ choice of colour
- ✓ order of forms being drawn
- ✓ does he talk when drawing, if
- ✓ so what is content of speech

Spontaneous drawing. When the child has completed his drawing ask him to give a name to his drawing and if need be to name the different forms represented with an explanation. A test of perception involving copying shapes will be helpful in checking perceptual disturbances. General knowledge concerning the child's development in the following functions: walking, fine motor manipulation ability, self care and speech is also important for a total picture.

The Place of Emotions in Children's Drawing

"...the child's drawing is a hint of his soul spread out on paper..." Claparede
For the child drawing is a form of play that involves emotions and their symbolic expression. When the child draws an object it is not just a visual impression that he is seeking to represent. The drawing becomes the experience of an action, the souvenir of an experience, a means of reliving an emotion.

The expression of emotions in drawing is significant in the pre-schematic and schematic stages. In this phase of his evolution the child relies essentially on remembering and what he remembers depends a great deal on his feelings and emotions towards the object/situation/event being remembered.

Certain studies on the development of drawing make emotions a central point of interest and relate to the drawing of a child as the expression, in a picture, of an inner experience. For researchers supporting this point of view, arrangement and compression, asymmetry, emphasis on central figures, the use or lack of unusual details, the use of proportions as well as the use of colours in a strange or unrealistic manner are all ways in which the child expresses his emotions and feelings.

It is important to remember that the validity of children's drawing as an expression of their emotions still raises controversy and the attempts to compile a comprehensive list of graphic features that serve as indications of the emotional states of the child have not yet borne fruit. These features have not proved to be valid clues that can be applied to all drawing. Therefore one must be very careful in interpreting children's drawing.

The implementation of the programme in disabled child's group

Like the drawing of any child, with regard to age group, the drawing of children with motor dysfunction will reflect their experiences, feelings and emotions. The difference will be that in the case of orthofunctional children their drawings alone may tell us about their feelings. In the case of disabled children there is little chance that solely their drawings will suffice. Due to the limitations in the graphic representative capacities of these children, their feelings and emotions will be conveyed mostly through their talking about the pictures they have drawn. During the different stages of teaching manipulation, drawing and writing the problems of perception, recognition, turning the head, eye movement and lateral problems emerge together. All this has to be taken into account when planning the programme. Tasks aimed at the development of manipulation and their application (drawing, writing, sewing) should be built up in a co-ordinated manner step by step. During exercising manipulative tasks, they learn the orthofunctional movements,

and in this way, these forms of movement become co-ordinated and conscious and integrated into other activities.

With the development of energetic, relaxing and slowing down, rapid and slow movements, the children prepare their motor abilities for harmonising them with drawing, elementary tracing of a line and sewing.

The orthofunctional exercises are practised not for themselves but always in different functions and in qualitatively new from realisation. (For example, adjusting smaller objects together, tearing different materials into pieces, or cutting them.) Various means are applied to prepare the development of correct co-ordination. (For instance sticks of different thickness, beads of different sizes, cubes ranging from big ones to Lego bricks, spoons with thick handle to normal cutlery.)

Viewpoints for planning and implementing conductive lessons with example: large aids, spacious surfaces and interesting techniques so that they get to like the activity, realisation of integration in between the drawing lesson and other programmes of the day (knowledge and its implementation), the subject matter and the adjoining technique should be identical for each child, but the methods of realisation should be planned by teacher for the individual child.

Topics: autumn leaf; group of children (mixed) in according of severity. Technique: painting. Methods of realisation: with finger (those children, who are not able to grasp the pencil) with paper fixed; thick brush (those children, whose fine motor movement are hampered); thin brush (those children who are able to grasp, and able to fine motor movement) with or without drawing the lines in; other way of differentiation: advance, without fixing the paper, with water colour, with mixed colours or with colours the child mixes.

Even during organised and guided lessons, free and informal atmosphere has to be ensured.

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