3.6.1. Physical Development : Physical development influences children's behavior both directly and indirectly. Directly, physical development determines what children can do. Indirectly, physical development influences attitudes towards self and others. These in turn are reflected in the kind of adjustment that children make. Following are the some of the noticeable physical development in children.

1. Body Size : Body size is measured in height and weight. While height and weight follow similar patterns of development - the total growth in height from birth to maturity is less then the total growth in weight. The total increase in height is approximately 3½ fold and the total increase in weight is approximately 20 fold.

a) Height : Children of the same age vary greatly in height, but the pattern of growth is similar. The height of a newborn infant at birth is 50 cm. After birth to two years, height increases rapidly. At 4 months, the baby measures 58 cm to 61 cm and an one year old baby is 20-25 cm more than his height at birth, i.e., in one year the baby measures 81-86 cm and at 3 years, the height of a child is about 100-120 cm. After that, there is a slow gain in height. Generally, the rate of height increment is more in boys than girls. Height is normally distributed and mostly genetic. The adequacy of nutrition plays an important role in growth of height within genetic limitations. Deficit in protein-calorie affects height adversely. Because of genetic factors skeletal growth occurs more uniformly throughout the growth span.

b) Weight : The average newborn weighs between 2.5-3kg, the pattern of increase is similar. At 6 months, baby has doubled its birth weight.

With one year, the birth weight increases three times more than the initial weight. The child is about 12 kgs and 14 kgs at two and three years respectively. Soon after that, the rate of increment in weight becomes slow. Boys weigh more than girls during infancy and childhood. Weight is normally distributed trait but is less affected by genetic factors compared to height. Weight is much more influenced by exercise, disease, socio-emotional adjustment and nutrition.

2. Body Proportion : The proportion of the neonate's body are quite different from the adult body. [It is shown in the following figure, growth results not only in an increase in size but of equal importance in changes in body proportion]. While not all parts of the body attain mature proportions at the same timeall on the whole have attain by the time the individual is 16 or 17 years old. The following figure (Fig-3 No) shows changes in body proportion and the ages at which these changes occurs. Fig 2.

Fig - 2

The body proportion of the infant and adult

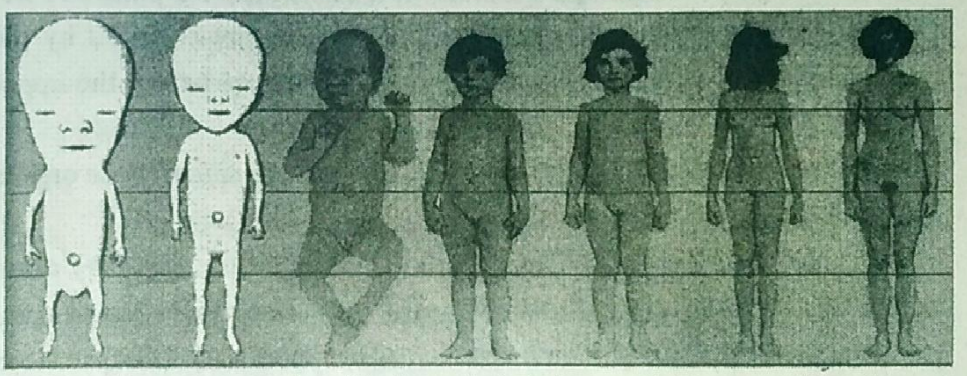


Fig - 3 ***Changes in proportion of the human body during growth. The most striking changes is that the head become smaller than the rest of the body. The increase leg proportion is almost exactly the reverse of the decreasing head proportion.***

3. Bones : Bone development consists of bone size, change in number of bones and change in their composition. It follows the same general trends as growth in size, that is, bone development is more rapid during

the first years of life, then relatively slows down to the time of puberty and then once again more rapid. To begin with, bones are soft, but gradually they become harder. Each bone has its characteristic shape. With the hardening of the bones, increase the body weight comes mainly from muscles and adipose tissue. There is marked increase in growth of muscle tissues in boys. The circumference of the forearm and thigh increases because of muscular development. Children from the upper socio-economic groups have greater amount of muscles and subcutaneous fat from 8-11 years age.

4. Muscles and fat : In the early years of childhood, adipose tissue develops more rapidly than muscles. From the ages of 12 to 15 years in girls and 15 to 16 years in boys, there is marked increase in muscle tissue.

5. Teeth : The growth of teeth is a continuous process from the third prenatal month, when the teeth begin to from in the jaw, until 21 to 25 years of age. During this time, the child develops two sets of teeth - the baby or temporary teeth and the permanent teeth. Generally, the first temporary teeth outcomes through the baby's gum between the sixth and eight month, but the time of eruption depends upon health, hereditary, nutrition before and after birth, race, sex and other factors. By the time the child is one year 4 teeth appears,. Numbers of temporary teeth are 20. During the late childhood period, temporary teeth are replaced by the permanent teeth, which are 32, the lower teeth appear before the upper ones.

6. Development of Sense organ : The development of sense organs are rapid during first two years of life.

7. Nervous System : The growth of nervous system is very rapid before birth and in the first 3 to 4 years after birth. Growth during prenatal period consists primarily of an increase in the number and size of nervous cells. Later, growth consists primarily if the developments of immature cells present at birth. After the age of 3 to 4, growth of nervous system proceeds at a relatively slow rate. Growth and development of the brain and nervous system affects all the aspect of child developments. Physical development occurs in orderly and predictable cycle for different age groups and different parts of the body.

3.6.2 Motor Development

Motor development means the development of central nervous system over bodily movement, through the co-ordinated activity of the nerve centre, the nerves and the muscles.

Motor development depends on neural and muscular maturation. Through motor development follows a predictable pattern, there are individual differences in the rate of motor development.

Sequence of Motor Development : There is a normal pattern of achieving muscle control with ages at which the average child is able to control different parts of the body. Some of the sequence of motor development are as follows :

1. Head Region : Ocular pursuit movement at 4 weeks.
Social smile' (in response to another's smile) at 3 months.
Eye Co-ordination at 4 months.
Holding the head up : In prone position at 1 months
In a sitting position at 4 months

2. Trunk Region :
Turning - From the side to back at 2 months
- From the back to side at 4 months
- Complete at 6 months.
Sitting - Pulls to sitting position at 4 months
- With support at 5 months
- Without support at 9 months

>Organ of Elimination> Bowel control at 2 years
> Bladder control 2-4 years.

3. Arms and Hands :
> Defensive movements at 2 weeks
> Thumb sucking at 1 months.
> Reach and grasp at 4 months.
> Picking up object with appose thumb at 8 months.

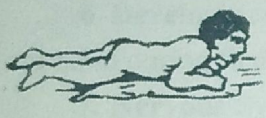
4. Legs and feet :

> Hitching (backward movement in sitting position at 6 months)
> Crawling (prone baby pulled by arms and leg kicks) at 7 months.
> Creeping - On hands and knees at 9 months.
- On all fours at 10 months.
> Standing - with suppport at 8 months.
- with support at 11 months
> Walking - with support at 11 months
- without support at 12 to 14 months

In other words, motor development is the child's ability to use muscles, bones, and nerves to perform different skills. A child's motor development is development of strength, coordination, speed, precision in the use of his arms, legs and other body muscles in an important feature in his total development. The child satisfies most of his aspiration with the help of motor development. It does influence his social and emotional adjustment. Their motor development changes are seen in every 3-4 weeks and these changes are as follows -

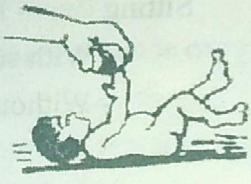
BIRTH TO THREE MONTHS (0-3 months)

Motor development begins when the baby is in mother's womb. During this period, the rate of development is slow. When the fetus is 2



1 month - chin up

2 months - chest up



3 months - reaches the object but cannot hold

7 month - can sit alone

8 months - crawls on abdown

9 months - can stand by holding furniture

Fig - 4

months old, the physical movement takes place and from 3 months onwards, these movement increases. From 6 to 8 months foetal movements are almost similar to that of a new born infant. At this stage, the pregnant mother can feel certain actions of fetus like shaking, kicking etc.

Soon after birth, the infant becomes helpless and lacks volitional control. After one week, he can move his hands and feet. The child starts holding his head from the age of one month and can turn his head while lying on bed. He is also able to hold his neck. At two months, the child can raise his head and chest while lying on the abdomen. At 3 months, the child tries to reach out to the object held near him. Due to inadequate focusing of vision he cannot hold the object. At birth, the neck of an infant is hardly visible. The neck is visible from 3 months onwards. The children at this age can respond to smile of other person. As age advances, the colour of eyes changes. The child can raise his hands and feet at this age.

FOUR TO SIX MONTHS (4-6 months)

Children at 4 months gain control over different tissues in neck, chest and waist region. Therefore, they are able to sit for sometime with the help of pillow, cushion etc. At 5 months they have complete control over the head and can grasp small object like rattle, toys etc. At this age, they cannot use their fingers, instead they use entire hand.

Six months old child can grasp mobile or hanging objects. They can even sit independently in a chair. They learn to focus on the colourful balloons or any objects hanging over their cot. They can hold bottle or cup for drinking water.

SEVEN TO NINE MONTH (7-9 months)

At seven months children can sit independently without any help. They are capable of shifting from lying position to sitting and back again to lying. At 8 months, the child starts crawling on his abdomen. The child learns to put his weight on hands and use leg to provide push needed to move forward. Nine months old child tries to stand with the help of some objects or by holding chairs, tables etc. At this age, he can walk easily

with the help of a 'walker'. At 9 months, the child is capable of holding any object with their fingers. They can even make use of specific fingers to hold small objects. They can eat food like gram, biscuit, puffed rice, peas, carrot etc., by holding with hands. They can now sip or drink water or milk from a glass or cup by holding it by hand.

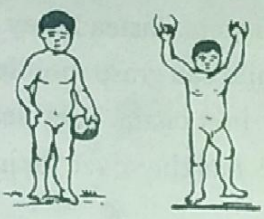
TEN TO TWELVE MONTHS (10-12 months)

At 10 months, the child is able to crawl better on his hand and knees. A 11 months old child learns to stand and can take one or two steps by holding the hands of parents, siblings or other people.

ONE TO TWO YEARS (1-2 years)

After one year, the child is able to sit and stand independently. At this period, the child can move here and there, but cannot walk on the stairs. At first, he tries to crawl up the steps. When the child is 14 to 15 months old, he tries to walk in co-ordination with hand and feet movement and become independent. He tries to go up the stairs in standing position. When the child is 2 years old, he can climb stairs in a standing position without any hesitation. Two years old child can even walk forward, backward and can stand on one leg for short duration. Some children can ride tricycles at the age of two years with the help of adults.

10 month - crawls on hand and knees



10 & 11 months - can stand alone and can walk if both hands are held

12 months -walk when only one hand is held

13 month - walks alone

18 months - can go up and down the stairs slowly

2 years - can climb stairs in a standing position

Fig - 5

TWO TO THREE YEARS (2-3 years)

Most of the children at this age shows improvement in motor development due to physical and muscular development. Two years old child can run and play well. Generally, small boys love to play football and cricket and girls like to run, jump and skip. The children can jump up with both the feet. They acquire the skills of grasping any object with their hands. A 3 years old child can balance on toes to reach any object kept at a height. At the age of 2-3 years, the child is able to put on his clothes, can zip up his pant. He can eat on a table learns to control bowel movements and can go to the bathroom alone. Therefore, children at his age should be encourage to develop good habits and to play independently.

IMPORTANT ASPECTS IN LEARNING MOTOR SKILLS

table.

Table - 1

Mile Stones of Motor Development

Skills	25 percent	50 percent	90 percent
Skill of Rolling Over	2 months	3 months	5 months
Skill of Grasping rattle	2½ months	3½ months	4½ months
Skill of Sitting without support	5 months	5½ months	8 months
Skill of Standing while holding on	5 months	6 months	10 months
Skill of Grasping with thumb and finger	7½ months	8½ months	10½ months
Skill of Standing without support	10 months	11½ months	14 months
Skill of Walking well	11 months	12 months	14½ months
Skill of Building tower of two cubes	12 months	14 months	20 months
Walking up or climbing of Steps	14 months	17 months	22 months
Jumping in place	20½ months	22 months	36 months
Copying circle	26 months	33 months	36 months

Note :This table shows the approximate age when 25 percent, 50 percent and 90 percent of children can perform each skills.

Source - Adapted from Frankenburg, 1967.