



The concept of domains of development was introduced in standard XI. We are aware that development has been divided into separate aspects. Among these aspects, we have learnt about physical and motor development during infancy. Now let us check our prior knowledge regarding this aspect.

Milestones of Physical and Motor development during Infancy

1. Begins to sit with support.
2. Holds and shakes toys
3. Crawls skilfully and quickly
4. Stands, holding on to adult or furniture for support
5. Walks alone
6. Enjoys pushing or pulling toys while walking
7. Eats with a spoon
8. Begins to run
9. Running
10. Climbing

Prior knowledge regarding infancy clearly signifies that there is rapid growth during this stage. Let us now understand the details of Physical and Motor Development during the 'preschool' period.



Reflection / Darpan

Think back to your preschool years .You might have noticed that some children were taller than yourself, some shorter, some fatter, some thinner, some were stronger and some weaker.

What could some of the reasons be?

4.1 Physical Development in Early Childhood

Physical Development involves developing control over the body, particularly muscles and physical co-ordination. It relates to the growth and skill development of the body, including the brain, muscles and senses. For example, children learn about the world as they develop their physical senses of sight, touch, smell, sound and taste. Physical Development is an important indicator of health and wellness.

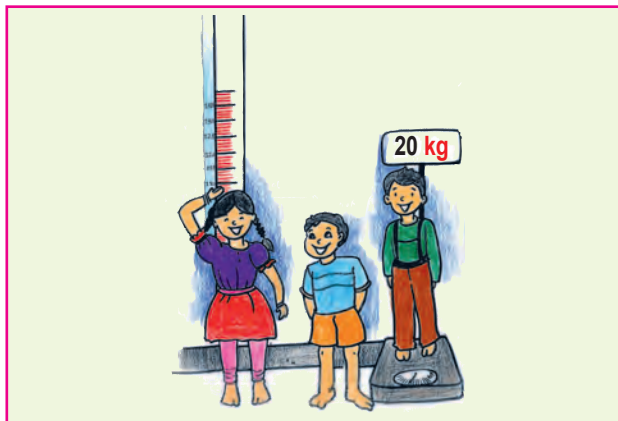
4.2 Aspects of Physical Development

Since both Heredity and Environment affect Physical Development, individual differences are seen in all of the aspects of Physical Development.

A. Height and Weight

During the preschool years children grow steadily, gaining on average about 6.35 cms in height and between 2.27 to 3.18 kg in weight every year. As the preschool child grows older, the percentage of increase in height and weight

decreases with each additional year. During this period, both boys and girls slim down as the trunks of their bodies lengthen. The chubby baby often looks leaner by the end of early childhood. They lose some of the baby fat and look smaller and slimmer. Legs and arms lengthen out and the muscles grow stronger.



Picture 4.1 Height and weight

Three year old pre-schoolers may grow to be about 96 cms tall and weigh about 14.51 kgs. For the next 3 years, healthy preschoolers grow an additional 5 to 7 cms and gain from 1.81 to 2.72 kgs per year. By age 6, children reach a height of about 117 cms and weigh about 21 kilograms. Of course, these figures are averages and differ from child to child, depending on factors such as socioeconomic status, nourishment, health, and heredity.

B. Body proportion



Picture 4.2 Body proportion

The 'Baby look' disappears during early childhood. Facial features remain small. The body tends to become cone-shaped. Shoulders start broadening. The arms and legs lengthen and the hands and feet grow bigger. Differences in body build become apparent for the first

time during early childhood. Some children have an Endomorphic (fat) shape, some have a Mesomorphic (muscular) shape and some have an Ectomorphic (thin) shape.

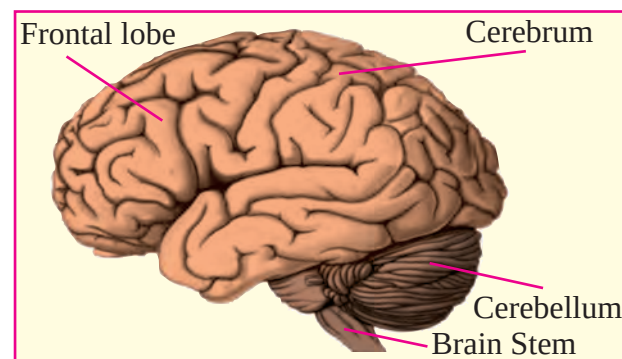
C. Muscular Development

Children's muscles become larger, stronger and heavier. Large and small muscles start to develop rapidly. Children learn to perform Gross (large) motor skills such as walking and jumping, climbing and balancing. They also learn to perform Fine (small) motor skills such as drawing, stringing beads or colouring.

D. Skeletal Development

The bones ossify at different rates in different parts of the body. Bones gradually harden throughout early childhood. The rate of ossification differs between boys and girls.

E. Brain Development



Picture 4.3 Brain Development

One of the most important Physical Development during early childhood is the continuing development of the brain and nervous system. Although the brain continues to grow during early childhood, it does not grow as rapidly as it does in infancy.

By the time children reach the age of three years, the brain is nearly three quarters of its adult size. By age 6, the brain has reached about 95 percent of its adult size. Some of the internal changes of the brain involve increase in dendritic connections as well as myelination, a process in which nerve cells are covered and insulated with a layer of fat cells. The process of myelination is responsible for increasing the speed and efficiency of information travelling

through the nervous system. Myelination is important in the development of a number of children's abilities. As seen during the infancy and toddler years, brain development continues throughout the early childhood period.

The brain grows faster than any other part of the body. By the end of early childhood, some parts of the brain show a significant growth. For instance the Corpus Callosum, a bundle of nerve fibres that connect the two hemispheres of the brain becomes thicker. Production of synapses and myelination of the Corpus Callosum reaches its peak during early childhood. The Corpus Callosum supports smooth coordination of movements on both sides of the body and integration of many aspects of thinking, perception, attention, memory, language and problem solving.

The cortex of the brain is made up of two halves called hemispheres which control different functions. The left hemisphere shows especially vigorous electrical activity from 3 to 6 years of age. The left hemisphere concentrates on verbal abilities such as speaking, reading, thinking and reasoning. The right hemisphere develops its own strength in nonverbal areas such as spatial abilities like judging distances, reading maps and recognition of patterns, drawing, music and emotional expression. This pattern may be reversed in left handed individuals.

Handedness or the tendency to use one hand in preference to the other is not firmly established by the end of early childhood. Fibres linking the Cerebellum to the Frontal and Parietal lobes of the Cerebral cortex grow and undergo myelination. This change contributes to dramatic gains in motor coordination during early childhood.

F. Development of teeth

By age two and a half years, most children have their full set of 20 primary teeth. Ten teeth in the upper (top) jaw and ten teeth in the lower (bottom) jaw. As the child grows, the jaws also grow and spaces may begin to appear between the primary teeth. This growth makes spaces for the larger permanent teeth.

After the age of 6 years, a child's temporary/primary teeth begin to be replaced by permanent teeth. At the end of early childhood, a child generally has one or two permanent teeth in front and some gaps where permanent teeth erupt later.

4.3 Factors influencing Physical Development.

A. Health

Preschoolers are generally quite healthy but may develop medical problems. Typical minor illnesses which usually last no more than two weeks include colds, coughs, and stomach aches. Respiratory ailments are the most common illnesses among children at this age because the lungs have not yet fully developed. Most childhood illnesses usually do not require a physician or nurse's attention. Additionally, minor illnesses may help children to learn coping skills particularly those related to dealing with physical discomfort and distress.

B. Nutrition

Preschoolers need healthy food to meet their growth and developmental need. Milk is the best source of calcium. Calcium is needed to develop strong, healthy bones and teeth. Fiber is another important source of nutrition. Fruits, vegetables, whole grains and beans, all provide fiber. Healthy eating habits and good nutritional choices are important to ensure normal development. Poor nutrition during the early childhood years can significantly impair healthy growth and development. Hence parents and caregivers must fulfil children's nutritional needs in an appropriate manner.

C. Immunization

The Immunization Programme is one of the key interventions for protection of children from life threatening conditions which are preventable. Immunization is a clinical preventive service that is recommended for every child. Children who are immunized against diseases during the early period of growth continue to grow faster than those who have not been immunized.

Do You Know?

Immunization Programme in India was introduced in 1978 under the Universal Immunization Programme. The Government of India provides vaccination to prevent seven vaccine preventable diseases such as Diphtheria, Pertussis, Tetanus, Polio, Measles, Childhood Tuberculosis, Hepatitis B, Haemophilic influenza Type B and Diarrhoea.

D. Rest

During the early childhood stage, a child needs around ten to twelve hours of sleep to develop better because the highest levels of growth hormones are released into the bloodstream during sleep. Sleep provides rest to a child's body whereas sleep deprivation results in a decrease in the release of the growth hormone. Children's physical growth can get affected by lack of sleep.

E. Environment

During the entire life span, environmental factors such as family, climate, food, geographical environment, socioeconomic status affects the growth and development of children.

F. Heredity

The Physical Development of an individual is greatly influenced by heredity. Genes which are the true carriers of heredity are passed from one generation to the next. These genes carry information about height, weight, skin colour, eye colour, hair and even some genetic disorders such as diabetes, heart diseases and asthma.

4.4 Motor Development in Early Childhood

Motor Development refers to the physical growth and strengthening of a child's bones, muscles and ability to move and touch his/her surroundings.

Early childhood is the ideal age to learn skills. Children enjoy repetition during the early years. They are adventuresome as well as their bodies are still very pliable. Which particular skills young children will learn depends partly upon their maturational readiness and the opportunities and guidance they receive in acquiring various skills. The common hand skills and leg skills which develop during early childhood are mentioned below.

A) Hand Skills

During early childhood, children become proficient in skills like brushing teeth, combing hair, bathing, throwing and catching a ball, paper cutting, clay moulding, writing, drawing and painting. At age three, a child is developing both, muscular control and concentration. A four year old child has the capacity of coordination and the ability to use his/her hands more efficiently.

Activity :

You can conduct the following activities with preschool children in an attempt to improve their hand skills. You may try some of these simple activities.

- Solving simple jigsaw puzzles
- Coloring with crayons or chalk
- Building sand castles
- Pouring water into pots of various sizes
- Dressing dolls.
- Tracing and copying geometric patterns, such as a star or diamond
- Painting with a brush and finger painting
- Clay modeling
- Building complex structures with many blocks

B) Leg skills

Once the children have learned to walk, they turn their attention to learning other movements using legs. By the end of early childhood, children learn to run, hop, skip, jump and climb more proficiently. Besides these, they also acquire certain skills like balancing, rolling, skating, dancing and riding a tricycle.

4.5 Factors influencing Motor Development

A. Body size

Body size plays an important role in learning various motor skills. Children with a Mesomorphic body shape have enough opportunities for developing particular skills. They learn more and better quality motor skills, than those of an Ectomorphic body shape. The Mesomorph has greater strength and energy so they learn the skills easily. The Ectomorph has less strength and endurance while the Endomorph tends to be clumsy and awkward and tire easily because of a flabby body and weak muscles.

B. Readiness

Maturation of nerves and muscles are necessary to acquire various skills. As children get physically ready to learn particular skills, they learn them very rapidly. For example, a child cannot draw a picture or write a letter of the alphabet until he/she has developed the motor control to hold a crayon or pencil.

Along with the physical readiness, children's mental readiness and the kind of

environment available to them are also beneficial for learning new skills. A supportive environment in the family and preschool enables a child to develop various motor skills very rapidly.

C. Motivation

Appreciation and motivation by the parents, caregivers and elders play a significant role in developing various skills rapidly.

D. Guidance

Proper guidance by caregivers motivate a child to learn new motor skills more proficiently.

E. Attention

Concentration is the foundation that supports learning all kind of motor skills. While acquiring and practicing skills, children need to concentrate on those activities.

F. Feedback

Positive feedback after learning new skills creates more energy and enthusiasm in a child.

G. Opportunities

Parents and caregivers must provide varied opportunities to children for learning various motor skills.

H. Practice

Maximum time for practice and trials is needed to master new motor skills. However, the quality of the practice is far more important than its quantity.

Activity :

You can try to engage a group of preschool children in your immediate neighbourhood in some activities that will encourage motor development. Here are some activities you can try.

Activities to encourage Motor Development

1. Opportunities to throw a ball, ride a tricycle and manipulate a pencil.
2. Allow young children the opportunity to practice dressing and undressing themselves.
3. Clearing dishes from the table after a meal.
4. Allow children practice in drawing, stringing beads, cutting with a pair of scissors.
5. Allow children to play, swing, run and jump.
6. Allow children to wear their own socks and shoes.

4.6 Motor skills :

Motor skills refer to the ability to move our bodies and manipulate objects. Motor skills show enormous growth during early childhood. The two basic forms of skills are Gross motor

and Fine motor. Both types of skills show great improvement during these years. Development of motor skills is linked with the brain and the entire nervous system. Contribution from genes, maturation and environment lead to the development of motor skills.

A) Gross Motor Skills :



Picture 4.4 Gross Motor Skills

Gross motor skills focus on large muscle groups of the body e.g legs and arms. They involve larger movements such as balancing, running and jumping.

By the age of three years, children have mastered a variety of skills such as jumping, running and skipping. By the age four to five years they have greater control over their muscles. For example, by the age of four, a child can throw a ball with enough accuracy that a friend can catch. Five year olds can learn to ride a tricycle and climb ladders. Girls and boys differ in several aspects of gross motor coordination e.g. boys can typically throw a ball better and jump higher than girls of the same age.

B) Fine motor skills :

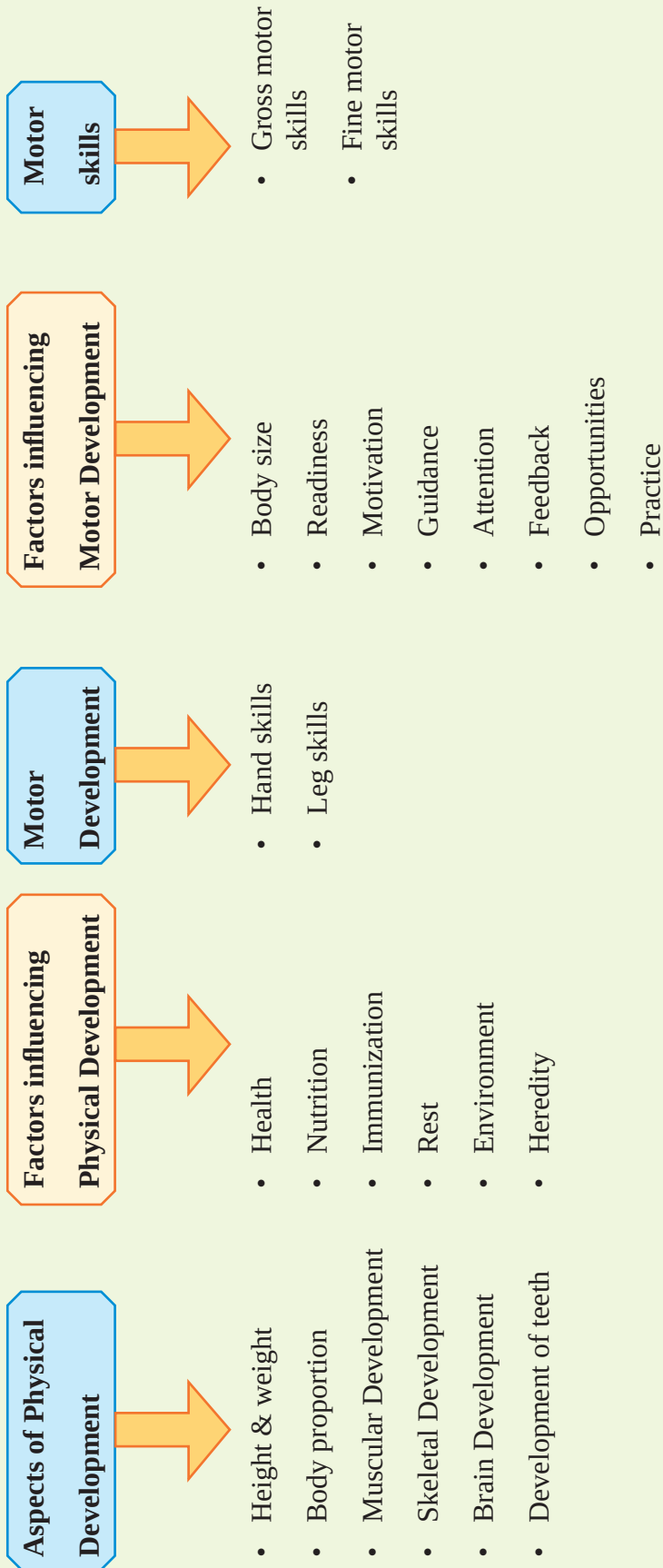
These involve small movements, mostly of the hands, fingers, toes and eyes and enable coordination of small actions.

Fine motor skills include varied activities such as fastening buttons, using a fork and spoon and cutting with a pair of scissors, tying a shoe lace, grasping a toy, writing with a pencil, making garlands, threading beads or plucking flowers .

According to **Albert Bandura's 'Social Learning Theory'**, the following activities are beneficial to develop new skills in children.

1. Observing the behaviour of others.
2. Forming a mental image of the behaviour.
3. Imitating the behaviour.
4. Practicing the behaviour.
5. Motivation to repeat the behaviour.

Revise the points



Glossary

Corpus Callosum : A bundle of nerve fibres that connect the two hemispheres of the brain.

Ectomorphic : Thin body shape

Endomorphic : Fat body shape

Mesomorphic : Muscular body shape

Motor skills : Ability to move our bodies and manipulate objects.

Exercises

Q. 1. Select and write the most appropriate word from the alternatives given.

- The chubby baby look disappears during
a) infancy b) early childhood
c) late childhood
- By years of age, the brain has reached about 95 percent of its adult size.
a) 6 b) 10
c) 8
- After the age of years, a child's temporary teeth begin to be replaced by permanent teeth.
a) 4 b) 5
c) 6

- The ideal age to learn skills is
a) early childhood b) late childhood
c) infancy

Q. 2. Explain the following terms.

- Motor skills
- Gross Motor Skills
- Fine Motor Skills
- Body proportion
- Handedness
- Nutrition
- Immunization
- Motor development
- Hand skills
- Leg skills

Q. 3. Match the pairs :

A	B
1) Endomorphic	a) Tying shoelaces
2) Mesomorphic	b) Fat body
3) Ectomorphic	c) Jumping
4) Gross Motor Skills	d) Muscular Body
5) Fine Motor Skills	e) Thin body
	f) Short

Q. 4. Unscramble the underlined word to get the answer from the clue given.

- True carriers of heredity are passed from one generation to the next generation (**esegn**)

- Fat body shape (**ordhpcioenm**)
- The cortex of the brain is made up of two halves (**meherepish**)

Q. 5. By considering the first correlation complete the second correlation.

1. **Verbal abilities** : Left hemisphere::Spatial ability: ?
2. **Paper cutting** : Hand skills:: Skating: ?

Q. 6. Read the following paragraph and write answers to the questions asked.

The brain grows faster than any other part of the body. By the end of the early childhood period some parts of the brain show a significant growth. For instance, Corpus Callosum, a bundle of nerve fibres that connect the two hemispheres of the brain, becomes thicker. Production of synapses and myelination of the Corpus Callosum reaches its peak during early childhood. The Corpus Callosum supports smooth coordination of movements on both sides of the body and integration of many aspects of thinking, perception, attention, memory, language and problem solving.

The cortex of the brain is made up of two halves called hemispheres, which control different functions. The left hemisphere shows especially vigorous electrical activity between the ages of 3 to 6 years.

The left hemisphere concentrates on verbal abilities such as speaking, reading, thinking and reasoning. The right hemisphere develops its own strength in nonverbal areas such as spatial abilities like judging distances, reading maps and recognition of patterns, drawing, music and emotional expression.

1. What is the role of the Corpus Callosum?
2. What is the difference between the left hemisphere and right hemisphere?

Project / Self Study

Conduct a survey of ten to fifteen preschool children regarding the immunization they have received so far.

