

Periods of childhood: their characteristics and significance. Risk factors

Periods of childhood

- **Ages and Stages** is a term used to broadly outline key periods in the human development timeline.
- During each stage of growth and development occur in the primary developmental domains including physical, intellectual, language and social-emotional.
- All of these periods are unique and important factors in the child's growth.
- Our goal is to help parents understand what is taking place in their child's brain and body during each period with the hope that they will be able to provide the necessary support, encouragement, structure and interventions to enable a child to progress through each stage as easily and successfully as possible based on each child's unique set of traits and interest.

Periods of childhood

The classification of periods of childhood is useful for pediatricians for their differential attitude to the care for and treatment of children of different age.

Periods of childhood

The following periods of childhood are put forward according to the modern classification:

- intrauterine period:
 - embryonic stage (stage of embryonic development) – till 12 weeks of pregnancy
 - fetal stage (stage of placenta development) – from 12 weeks of pregnancy to birth

Periods of childhood

- newborn period – 0-28 days
- infant period – 29 days -1 year
- pre-preschool period – 1-3 years
- preschool period – 3-6 years
- early school period – 7-11 years
- middle school age – 12-15 years
- late school period – 15-18 years

Embryonic stage

- The embryo secretes chemicals that suppress the mother's immune system so that the embryo will not be rejected
- The embryo produce the chorionic gonadotrophin which stops the embryo being carried away by a menstrual period
- The first trimester of human development is a period of morphogenesis – the major organs and basic tissues are laid down
- During the first phase of embryonic differentiation there are a number of spontaneous abortions, often of embryos with major chromosomal defects
- The umbilical cord, a soft tube containing blood vessels, connects the embryo to the placenta, which provides respiration and nourishment for the unborn baby
- Growth rate is about 1 mm per day
- By 12 weeks, crown-rump length is 5.4 cm and weight is 14 grams

Fetal stage

- Most of the baby's external features that are observed at birth are now apparent
- The heart beats at 140-150 per minute
- The body begins to straighten and elongate
- The head is large in comparison to the body
- The unborn organism is no longer an embryo, but a fetus; not an it, but a he or she; not an indistinct cluster of cells, but an increasingly recognizable, unique human being in the making
- The fetus not only looks more human; it is possible by 12 weeks to discern its gender
- It now contains nearly the same number of neurons as an adult, and the nerves from the brain begin to be coated in myelin
- This is a crucial stage in their maturation as it facilitates the passage of messages to and from the brain

Final month

- During the final 3 months *in utero the fetus is reported to be capable of* learning from the events in its environment
- The uterine environment is a stimulating, interactive home for a now ceaselessly active – kicking, hiccuping, face-pulling, crying, hitting out – inhabitant
- The fetus with the use of its rudimentary access to the fundamentals of experience and communication – touch, taste, smell, hearing, and vision – is preparing for life outside the womb

Newborn period

- Starts since the moment of birth and separation of the child from the mother
- The duration of the newborn period is about 4 weeks
- *Early neonatal period* (first 7 days of life) – the most responsible for children's adaptation to extra-uterine life
- *Late neonatal period* (since the 8th to 28th days of life) – healthy child during this period is already at the home and followed up by pediatrician

The importance of newborn period

- The important characteristics of this period are intensive development of visual reflexes, the beginning of movement, development formation of conditional reflexes, formation of visual and sensational contact with mother
- It is a very important period of human life because changes in the environment during this period are very serious
- After birth the newborn infant is getting adaptation to the condition of the extrauterine existence

Physical characteristics of newborn

- In medical contexts, **newborn or neonate** refers to an infant in the first 28 days after birth; the term applies to premature infants, postmature infants, and full term infants
- Full term newborn characteristics
 - Is a normal duration of pregnancy between 37-42 weeks of gestation
 - The average birth weight is around 3.5 kg, the normal range is 2.5-4.5 kg
 - Newborns often lose around 230 g (6-8%) in the first 4-5 days after birth but regain it by about 10 to 12 days of age
 - In the first month, the typical newborn gains about 20 g a day, or about 110-230 g a week.
 - The average length of full-term babies at birth is 51 cm, the normal range is 46-56 cm
 - In the first month, babies typically grow 4 cm to 5 cm

Newborn classification

WEIGHT AND PERCENTILE CLASSIFICATIONS

Classification	Birth Weight	Percentile
Small for gestational age (SGA)	<2500 g	10th percentile
Appropriate for gestational age (AGA)	2500-4500 g	10th to 90th percentile
Large for gestational age (LGA)	>4500 g	>90th percentile

GESTATIONAL AGE CLASSIFICATION

Classification	Gestation
Premature	<37 weeks
Full-term	37 to 42 weeks
Post-term	>42 weeks

Apgar score

- In 1953, an anesthesiologist named Virginia Apgar designed a tool for evaluating newborn infants
- The Apgar scores grade the infant's response to extrauterine life in five categories
 - Heart rate
 - Respiratory effort
 - Muscle tone
 - Reflex irritability
 - Color
- There are a maximum of 2 points possible in each category, for a total of 10 possible points
- The Apgar determination is completed at 1 and 5 minutes of life



Infant reflexes

Role of reflexes in developing future movement

- **Postural reflexes** are related to the development of **later voluntary movement**
 - Reflexes **integrated, modified, and incorporated** into more complex patterns to form voluntary movements
 - Automatic movement is **“practice”** for future voluntary movements
 - Some **believe reflexes may not be related** to future motor development

Role of Reflexes in Developing Future Movement

Infant reflex	Future voluntary movement
Crawling	Crawling
Labyrinthine	Upright posture
Palmar grasp	Grasping
Stepping	Walking

Newborn reflexes

- Survival Reflexes:
 - Sucking
 - Swallowing
 - Rooting – this is the reflex that occurs when the cheek or the corner of the mouth is stroked slightly
- Safety Reflexes:
 - Tonic neck reflex – this is when baby lies in a “fencing” position
 - Moro reflex – this is when baby will thrust out both arms when he is startled
 - Grasp reflex – if you place your finger in the baby’s palm hand, he or she will grasp very tightly

Reflexes as diagnostic tools

- Reflexes can determine **level of neurological maturation**
 - Reflexes are age-specific in normal, healthy infants
 - Severe deviations from normal time frame may indicate neurological immaturity or dysfunction
- Reflexes should be **tested** carefully and only by **trained professionals**
 - Need state of quiet
 - If baby restless, crying, sleepy, or distracted, may not respond to applied stimulus

Reflexes as diagnostic tools

Reflex	Concern
Moro reflex	May signify cerebral birth injury if lacking or asymmetric
Asymmetric tonic reflex	May indicate cerebral palsy or other neurological problem if persists past normal time

The typical pathology of newborn period

The following pathology is typical for the newborn period:

- *sequelae of intrauterine development disorders* (malformation, prematurity)
- *sequelae of birth injury*
- *immunologic maternal-fetal incompatibility* (Rh factor, ABO system – hemolytic jaundice)
- *prenatal infection diseases* (toxoplasmosis, CMV infection, syphilis, and others)
- *acquired diseases* (sepsis, gastroenteritis, meningitis, etc.)
- *newborn infant death rate* is higher in comparison with other childhood periods

Newborn period needs

- proper medical observation
- special care
 - hygienic regimen
 - nutrition that must be adequate to their morphofunctional peculiarities

The infant period

- Its duration is about 1 year
- The connection between an infant and its mother does not break off completely due to breastfeeding
- During the infant period the growth and morphofunctional development are very intensive

The infants characteristics

- Everything is new and interesting to one-year-olds. They enthusiastically use their five senses to actively explore the world around them. They find pleasure in causing things to happen and in completing basic tasks.
- During this year, language skills typically progress from grunting and pointing to speaking single words and experimenting with simple word combinations
 - Pronunciation is quite difficult, familiar adults almost always need to "translate" for others
 - One-year-olds steadily build their vocabularies by absorbing the language around them
 - They are able to understand common phrases and simple directions used in routine situations
- Most infants typically move from crawling to running by about 20 months
- They use their new mobility to push and pull toys, dance and climb
- One-year-olds also improve in hand and finger coordination, but skills at this age are still immature

The typical pathology and the needs of infant period

The following pathology is typical for the infant period:

- Infants are predisposed to *acute and chronic disorders of nutrition and digestion, rickets, anemia*
- Infections can develop due to *transient immunodeficiency*
- Prophylactic vaccination of infections must be followed in the infant period
- There is functional immaturity of the digestive system, which demands the proper organization of nutrition

The period of deciduous dentition

- The duration is from 1 to 7 years
- It is possible to divide this period into 2 parts:
 - pre-preschool period – the first 3 years
 - preschool period – from 4 to 7 years
- These periods have some morphological and functional difference, but without any quality difference

The importance of deciduous dentition period

- Gradual perfection of basical functions of child's organism is marked in this period
- The functions of the thymus, hypophysis and epiphysis dominate in the endocrine system within this period
- In general children during the first two years of life quadruple their weight and increase their height by two-thirds, this rate slows down between 2-3 years
- Quick development of movement activity, perfection of coordination, increase of strength are typical for children in this period
- Their central and peripheral nervous systems become more differentiated, the analyzer synthesis function of the cortex becomes more perfect. The increasing activity of the cerebral hemispheres has a violent tempo and a grand scale.

The typical pathology of deciduous dentition period

- Due to often contacts with other children, environment and domestic animals, children at this period suffer from
 - *infectious diseases* (measles, scarlet fever, whooping cough)
 - *parasites* (ascariasis, lamblasis, hymenolipidosis, trichocephaliasis,)

The school period

- After 7 years follows the school period
- It may be divided into:
 - the young school age (7-11 years)
 - the middle school age (12-15 years)
 - older school age (15-18 years)

The importance of school period

- Many systems and organs within this period develop both morphologically and functionally
- The accomplishment of functions needs more time than intensive growth
- At that time a change in the balance of functions of endocrine organs occurs:
 - the dominating role of the thymus decreases
 - functions of the thyroid and sex glands increase
- It leads to changes in the body's forms, with the formation of the psychosocial and sexual orientation of boys and girls
- The age from 7 to 11 years is the quietest one for the central nervous system development. Neural processes are quite powerful and balanced
- Self-criticism is quite well expressed

The typical pathology of school period

- Peculiarities in the growth and development during this period result in specific pathology
- Disorders of normal affectivity can develop quite often due to inadequate progress of studies
- Quite common are diseases caused by disorders of school hygiene regimen (myopia, habit scoliosis)
- Acute infections occur as a pathology of children at the school age
- Endocrinopathy and asthenia can be frequently diagnosed
- It is necessary to note the increasing frequency of rheumatic fever and functional disorders of the cardiovascular and nervous systems
- Some diseases have clinical manifestations like in adults

The period of sexual maturity (adolescence)

- in girls since 12 to 16 years
- in boys since 13-14 to 18-19 years

The importance of adolescence period

- The period of adolescence , like the newborn or infant periods, is a stage of development, when children are very sensitive to a harmful environment
- It is the period within which the organism starts to have new physiological changes and a lot of organs and systems rearrange their activity
- As a result of this rearrangement, the child's organism turns into the adult's one

Characteristic of adolescence

- Experience rapid, irregular physical growth
- Experience restlessness and fatigue due to hormonal changes
- Need daily physical activity because of increased energy
- Develop sexual awareness that increases as secondary sex characteristics begin to appear
- Have preference for junk foods but need good nutrition
- Are physically vulnerable because they may adopt poor health habits or engage in risky experimentation with drugs and sex
- Respond positively to opportunities to participate in real life situations
- Are often preoccupied with self
- Have a strong need for approval and may be easily discouraged
- Are generally idealistic, desiring to make the world a better place and to become socially useful
- Believe that personal problems, feelings, and experiences are unique to themselves

The typical problems of adolescence period

- The pathology of puberty includes 2 groups of diseases
 - *first group of diseases is typical only for this period* – pathologic conditions of the sexual and endocrine systems, causing significant disorders of puberty
 - precocious puberty, delayed puberty, disorder of sexual differentiation (intersexualism, homosexuality, genuine and false hermaphroditism, transsexualism and other sexual psychopathology, chlorosis of young girls, juvenile mastopathy)
 - *The second group of diseases of the puberty period* includes various diseases which can take place at any age; however, these have clinical peculiarities during the puberty period (tuberculosis, rheumatic fever)

Sensitive period vs critical period

	Sensitive period	Critical period
Starts and ends	Gradually	Abruptly
During the period	Is a period of maximal sensitivity	The organism has heightened sensitivity to external stimuli that are compulsory for development of a particular skill
After the period	The skill can still be learned, but less efficiently	The cortical areas allocated for the particular skill will adapt and perform a different function
Examples	Language development	Full development of visual capabilities (from 8 month to 3 years)

Risk factors

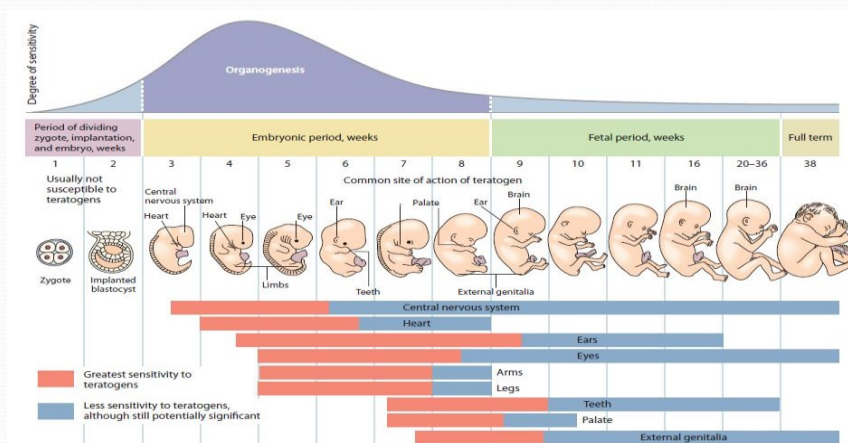
- There are numerous factors which can influence the development of the embryo and foetus:
 - condition of the parents' health
 - pathology of pregnancy
 - effects of environmental factors
- The factors, considered potentially toxic or harmful to cell growth and differentiation, are termed **teratogens**
- Many teratogens cause harmful results in developing congenital anomalies, diseases and intrauterine death

Risk factors

It is possible to estimate anomalies caused by:

- damage of the gamete – “**gametopathy**”,
- by damage of fertilized ovum (blastocyst) – “**blastopathy**”,
- by damage of the embryo (4 weeks to 3 months) – “**embryopathy**”
- by damage of the foetus – “**foetopathy**”

Embryonal Critical Periods



Risk and protective factors

- There are a wide range of factors that make a child especially vulnerable; these factors can be distinguished in *individual*, *family* and *community risk factors*
- Other environmental factors might have an enabling or mitigating/protecting impact on the child
- It is important to note that a single risk factor at any level does not necessarily lead to impairments developmental
- The combination of risk factors can make a child vulnerable
- Risk factors are cumulative and interactive, and tend to reinforce each other

Risk and protective factors

Risk factors		Protective factors
<ul style="list-style-type: none"> • Difficult temperament • Low self esteem • Negative thinking style 	child	<ul style="list-style-type: none"> • Easy temperament • Good social and emotional skills • Optimistic coping style
<ul style="list-style-type: none"> • Family disharmony, instability or breakup • Harsh or inconsistent discipline style • Parent/s with mental illness or substance abuse 	family	<ul style="list-style-type: none"> • Family harmony and stability • Supportive parenting • Strong family values
<ul style="list-style-type: none"> • Peer rejection • School failure • Poor connection to school 	school	<ul style="list-style-type: none"> • Positive school climate that enhances belonging and connectedness
<ul style="list-style-type: none"> • Difficult school transition • Death of family member • Emotional trauma 	life events	<ul style="list-style-type: none"> • Involvement with caring adult • Support available at critical times
<ul style="list-style-type: none"> • Discrimination • Isolation • Socioeconomic disadvantage • Lack of access to support services 	social	<ul style="list-style-type: none"> • Participation in community networks • Access to support services • Economic security • Strong cultural identity and pride

Special groups of vulnerable children

- There are some groups that deserve particular attention, because their needs require special services. Especially vulnerable are children affected by:
 - HIV/AIDS
 - Disabilities
 - Abuse or neglect
 - Child labor
 - Civil war

Risk and protective factors

- Identifying the children that are particularly at risk will help in ensuring that the ECD intervention will have the greatest impact because it is targeted at those that are potentially most in need

