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ФИЗИКАЛЬНОЕ ОБСЛЕДОВАНИЕ РЕБЕНКА

Учебное пособие

2-е издание, исправленное и дополненное

Министерство образования и науки РФ

Рекомендовано ФГАУ «Федеральный институт развития образования» в качестве учебного пособия для использования в образовательном процессе образовательных организаций, реализующих программы высшего образования по специальности 31.05.02 «Педиатрия»

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Chapter 2
GENERAL EXAMINATION

Before examining a child, one should contact him or her depending on the state. With older children, one should get to know, find out the name, and ask about academic achievements, hobbies, interests, tastes, habits. If necessary, one should obtain the child's (older children) or parents' consent; it is unacceptable to use the words and terms able to exacerbate anxiety of the patient or parents, orient them to any unfavorable prognosis or disease course or inadequacy of the treatment. With young children, one should be confident but careful, should not obtain their consent for examination, as they usually say "no", if necessary, a toy can distract them.

On examination of a child, these rules must be followed:

- throughout the examination, the child should be calm;
- all manipulations causing discomfort (pharyngoscopy, ear, tender area, instrumental methods) should be performed at the end of examination;
- a child should be nude: under the age of 3 he or she should be nude, children of school age (especially girls in puberty) should be undressed gradually on examination considering the air temperature which should be within 20 to 22 °C;
- at room temperatures below 22 °C, a child should be examined with partial undressing;
- examination of a child should be performed in bright light (preferably in daylight), with the patient facing the light source.

The doctor examining the child should be located to the right.

Examination of a child begins with characteristics of consciousness and general state, which is assessed by the data of anamnesis, inspection, general complex examination of a patient. It is performed on a child lying, sitting, standing, on leaning forward.

The state related to the objective parameter should be distinguished from the patient's well-being which is subjective.

Child's mood is noted along with the general state (steady, calm, raised, excitable, unsteady), his/her reaction and contact with the environment, interest to the toys. **Level of consciousness** can be alert, lethargic, sonorous, and in sufficient brain cortex dysfunction unconsciousness develops — *coma* or comatose state (table 2.1).

Table 2.1. Consciousness score

Somnolent state	Soporous state	Coma		
		I degree (mild)	II degree (moderate)	III degree (severe)
Response to ambient environment is present, but it is slowed down and degraded, the child reacts to irritation by crying, sluggishly answers questions	Consciousness is clouded, no response to the environment are present, but still the response to pain irritations is present	Consciousness and voluntary movements are absent, corneal reflexes are preserved.	Lack of consciousness, areflexia, only sluggish pupil reflexes are preserved, respiratory rhythm disorders are often observed	Lack of all reflexes, deep disorders of respiratory and heart rhythm, cyanosis, hypothermia

Three levels of severity of the general state are distinguished: good, moderate, and severe.

When **assessing the general state** of children, two criteria are used: severity *of toxemia* and *dysfunction of some systems.*

⚠ In acute disorders, intoxication is a dominant value evaluating the severity. In long-standing diseases, the first place is taken by the level of functional disorders of the systems and signs of insufficiency: cardiovascular, respiratory, renal, liver and other systems (table 2.2).

Table 2.2. Assessment of the severity of the state

Sign	Severity		
	satisfactory	moderate	severe
Complaint and symptom	No significant complaints and symptoms indicating to dysfunction of organs and systems	Significant complaints, moderate toxicosis and subcompensation of the functions of vital organs	Complaints are explicit, loss of consciousness, restriction of mobility, severe intoxication and decompensation of the main physiological systems of the body.
Extremely severe state is characterized by aggravation of these phenomena and manifestation of signs threatening to the child's life			

To evaluate the state of newborns, the Apgar score is used (at the 1st and 5th minutes of life), which is a sum of five numeric values. The maximum score for each value is two. The newborn's state: satisfactory — with the score 8–10, moderate — 6–7, mild asphyxia, 4–5 — moderate asphyxia, 0–3 — severe asphyxia (table 2.3).

Table 2.3. Apgar scale

Sign	Score in points		
	0	1	2
Appearance, skin color (Appearance)	General cyanosis or pallor	The torso is pink, cyanotic extremities	Pink
Heartbeat (Pulse)	Absent	Less than 100 per minute	More than 100 per minute
Reflex irritability, grimace (Grimace)	Absent	Grimace of pain, facial muscle movements	Crying, movements
Muscle tone (Activity)	Absent	Some bending (flection) of extremities	Good tone
Breathing (Respiration)	Absent	Faint cry, irregular breathing movements	Loud scream, regular breathing

For the respiratory distress syndrome of newborns and in premature infants, the Silverman score is used to evaluate the state. With the total score 10 in a newborn, the extremely severe syndrome of respiratory disorders is observed, 6–9 — severe, 5 — moderate, below 5 — the developing respiratory distress syndrome (table 2.4).

Table 2.4. Silverman score

Sign	Score in points		
	0	1	2
Chest movements	Chest and belly are equally involved in the act of breathing	Arrhythmic breathing	Paradoxical breathing
Retraction of intercostal spaces	No	Moderate	Pronounced
Retraction of the strenum	No	Moderate	Constant, pronounced
Position of the mandible	Mouth is closed, mandible does not fall back	Mouth is closed, mandible falls back	Mouth is open, mandible falls back
Breathing	Calm and even	Difficulty of inhale on auscultation	Groaning, audible at distance

Fetal maturity is referred to the readiness of fetal organs and systems to extra uterine life in rational nutrition and environment, which is determined by the morphological and functional features. **Morphofunctional immaturity** can be determined by the anatomical underdevelopment of organ structures because of unfavorable influence of the environmental factors on a female organism and fetus during pregnancy.

Ballard, Hoffner, Petruss, etc. perform postnatal evaluation of the level of fetal morphofunctional maturity or immaturity based on a number of charts. The most effective *evaluating scale by Dubovich* in spite of its unwieldiness is based on 10 neurological and external somatic signs. Each feature of the scale is assessed by the score ranging from 0 to 5, and the total sum of scores ranges from 0 to 70. The number of weeks of pregnancy corresponds to the total score obtained.

After that, one proceeds to evaluation of **the child's bed position**: active, passive, and forced.

Active position is referred to the child's position when he/she can actively move and take any position in bed.

Passive position means that without assistance a child cannot change his/her position or takes a forced position (unusual posture with head and neck arched backwards in meningitis, sitting position with the hands stabilized in bronchial asthma, etc.).

Body type. According to M.V. Chernorutskov's classification (1927), depending on the features of body composition and expression of the main functions and metabolic processes, 3 types of constitution are distinguished (table 2.5). In childhood, only predisposition to certain type of constitution is defined because the type of composition can be determined only after 14–15 years of age.

In case a child can stand and walk, his/her **posture and gait can be assessed**. Posture reflects general tone of the organism, level of muscle development, and physical training of muscular strength.

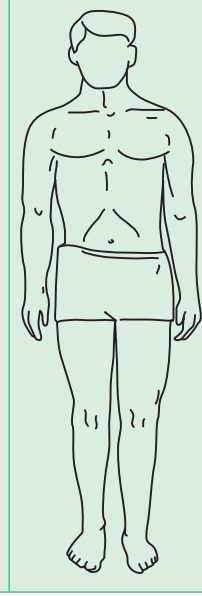
- In normal development of muscles and ligaments, good health state and mood of a patient, the *posture is normal.*
- In poor muscle and ligament tone, different *posture disorders* are observed:

Observing the patient walking (starting from the heel, with extended legs) and climbing the stairs, a conclusion can be made about his/her gait. If no changes are revealed, a conclusion of a *steady* or *normal* gait is made. With disorders of the muscle tone, central and peripheral nervous system, diseases of musculoskeletal system, different changes of the gait are observed.

Table 2.5. Distinctive features of body-build types

Type of body-build	Sign	Illustration
Normostenic	Intermediate position between representatives of the extreme body-build types. Proportionate body-build. Moderate development of the bone and muscle systems. Normal blood pressure values. Moderate fat disposition. Normal intensity of metabolic processes, etc.	
Hypersthenic	Predominance of the transverse body size over the longitudinal one. Predominantly average height. Long torso and relatively short extremities with wide hands and short fingers. Rounded head shape and broad face, short and thick neck. Broad and straight shoulders. Short and wide chest with blunt epigastric angle Large abdomen (with considerable distance between the costal arch and the iliac crest), wide pelvic girdle. Good development of subcutaneous fat and muscles. Inclination to the development of obesity, arterial hypertension, diabetes mellitus, cholelithiasis, hemorrhage, ischemic heart disease; predominance of assimilation processes over dissimilation	

End of the table 2.5

Type of body-build	Sign	Illustration
Asthenic or hyposthenic	Predominance of the longitudinal body size over the transverse one. Usually tall. Short torso and relatively long and thin extremities with narrow hands and long fingers. Elongated (dolichocephalic) skull, long and narrow face, thin and long neck. Narrow and sloping shoulders, long, narrow and flat chest with a sharp epigastric angle. Small size of the abdomen, narrow pelvis. Poor development of the subcutaneous fat and muscles. Hypofunction of the gonads and adrenal glands; inclination to more frequent development of the Addison's disease, arterial hypotension, peptic ulcer and duodenal ulcer, etc.	

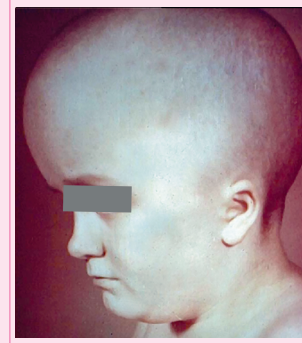
On general examination, attention is paid to the changes of the skull and face (table 2.6).

Table 2.6. Characteristics of changes on examination of the head

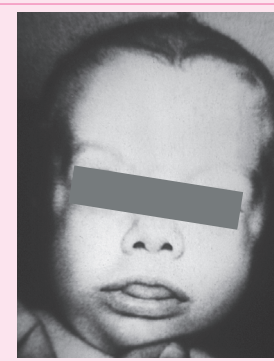
Changes on examination of the skull	Changes on examination of the face			
	expression	general	eyelids, conjunctiva, cornea	eyeballs, pupils
Dimensions: hydrocephaly, microcephaly. Shape: square, basal skull. Position: fixed, bent or tilted. Presence of non-arbitrary movements	"The face of the patient does not express painful manifestations" on good health. With a change in the general state — suffering mimics	Face features, coloring of skin and the lips color, rash (for example, herpes on the lips). The appearance of puffiness. State of mimics, etc.	Oedema. Changes in their color. Drooping of the upper eyelid (ptosis). Appearance of hemorrhages. Opacification, corneal scars	Extension (mydriasis) or constriction (miosis). Glitter of the eyes. Bulging (exophthalmos) or retraction (enophthalmos). Strabismus, involuntary rhythmic oscillations of the eyeballs (nystagmus)

Table 2.7 represents the most prevalent **stigmas of dysembryogenesis** or **stigmas of dysmorphogenesis**.

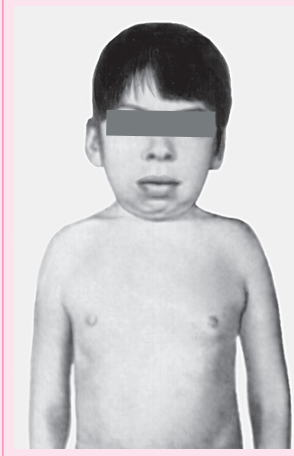
Table 2.7. Characteristics of stigmas of dysembriogenesis

Name	Characteristics	Illustration
Skull	Shape: microcephalic, hydrocephalic, brachycephalic, dolichocephalic, and asymmetric. Low forehead, pronounced supraorbital arches. Overhanging occipital bone	
Face	Straight line of sloping forehead and nose. Mongoloid or antimongoloid eye shape. Hypertelorism (increased distance between the inner edges of the orbits). Twisted nose. Broad nasal root. “Bird’s face” (discephaly with hypoplastic mandible and cartilage of the nose). Prognathia (protrusion of the upper jaw forward due to its excessive development). Micrognathia (reverse state). Progeny (excessive development of the lower jaw). Microgenia (reverse state). Split chin	 

Continued of the table 2.7

Name	Characteristics	Illustration
Eyes	Epicant (semilunar skin fold, covering the inner corner of the palpebral fissure). Low eyelid position. Asymmetry of palpebral fissures. Absence of lacrimal caruncle. Distichia (double eyelash growth). Coloboma (lack of part of the iris). Heterochromia of the iris, irregularly shaped pupils. Enophthalmos, microphthalmos. Congenital cataract	
Ears	Large, bulged, small deformed, of various sizes. Varied level of ears, low ears position. Anomaly of helix and antihelix development. Attached earlobes, additional tragus	
Mouth	Microstomy, macrostomy. High narrow (gothic) palate. Short frenum of the tongue. Folded tongue, splitted tongue. Macroglossia	

Continued of the table 2.7

Name	Characteristics	Illustration
Neck	Short, long. Torticollis. Pterygoid folds. Excessive folding of the neck skin	
Trunk	Long, short. Narrow chest, «pigeon chest», «cobbler's chest». Hypertelorism of the nipples, extra nipples. Underdevelopment of the xiphoid process. Divergence of the rectus abdominal muscle. Low navel location, umbilical hernia	

End of the table 2.7

Name	Characteristics	Illustration
Hands, feet	Wide palm, short palm. Transverse groove of the palm. Polydactyly (extra fingers). Brachydactyly (shortened fingers). Arachnodactyly (unusually long thin fingers). Syndactyly (complete or partial fusion of adjacent fingers). Clinodactyly (lateral or medial curvature of the fingers). Camptodactyly (flexion contracture of the fingers). Short crooked little finger. Finger placement over one another	 
Gonads	Cryptorchidism. Phimosis. Underdevelopment of the penis. Cleft scrotum. Underdevelopment of the vaginal labia. Clitoral increase	
Skin	Depigmented and hyperpigmented areas. Large birthmarks with hair growth, excessive local hair growth. Hemangiomas, fistulas	
Teeth	Lack of teeth. Extra teeth. Incorrect tooth position	

⚠ Stigmas of dysembryogenesis or dysmorphogenesis or minor anomalies of development are important for differential diagnosis of hereditary diseases if their number is over 6.

CONCLUSION

- General examination including evaluation of the well-being, posture, changes of face and stigmas of dysembryogenesis, allows suggesting the genesis of the disease, and severity of the patient's state.
- Subsequently, after detailed history taking and examination of separate organs and systems, evaluation of the state, the scope and order of treatment, the need for laboratory instrumental and functional methods of investigation are determined.

Example of a report: satisfactory state, clear consciousness, good well-being, adequate reaction to surrounding people, normal posture, no changes of the face and stigmas of dysembryogenesis.