

Pediatric Neurologic Examination

Updated: November 14, 2009

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HISTORY

- review of **pregnancy, labor, delivery**.
- history of **Apgar score, birthweight, length, head circumference**.
- **jaundice, feeding difficulties, sleep & cry patterns**.

for further details → see p. Exam11 >>

OBJECTIVE EXAMINATION

see also p. Exam11 >> for general examination tips!

- the more examination seems like a game, the greater will be degree of cooperation.

CNS at birth is underdeveloped – **functions at subcortical level** – **cortical function** cannot be tested in its entirety until early childhood!

- in *newborn ÷ early infancy period*, normal brainstem and spinal functioning do not ensure intact cortical system; vice versa - abnormalities of brainstem and spinal cord may exist without concomitant cortical difficulties!

Determine **HAND PREFERENCE** (right or left *dominance* should not be present until age 2 - before this it suggests problem with neglected hand)!

MOTOR EXAMINATION

- most infants have excess of body fat - muscle **fasciculations & atrophy** are best demonstrated in *tongue*.
- **tremors at rest after 4 days** signal CNS disease!

1. Put each major joint through its range of motion – determine **MUSCLE TONE**.

N.B. *kūdikiams iki 3 mėn. raumenų tonusas fiziologiškai yra padidėjęs, bet prematūrai esti hipotoniški* (scarf sign, popliteal angle > 80°):

- **premature** infant of 28 wk tends to **extend all extremities** at rest, but by 32 wk there is evidence of lower extremities flexion;
- normal **full-term** infant's posture is **flexion of all extremities**.

Hypotonic infant:

- assumes **frog-leg posture** in supine position.
- when suspended in prone position, limbs and head all hang limply "like rag doll" ("floppy infant").

normally, arms and legs move out, and head is held in line with body

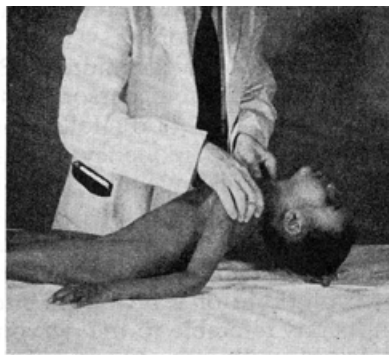
Head lag (when infant is pulled to sitting position from supine) is sign of weakness, not of low tone! Must not be present in 6 month-old-infant!

Observe newborns for asymmetry of spontaneous movements!

2. **MUSCLE STRENGTH**

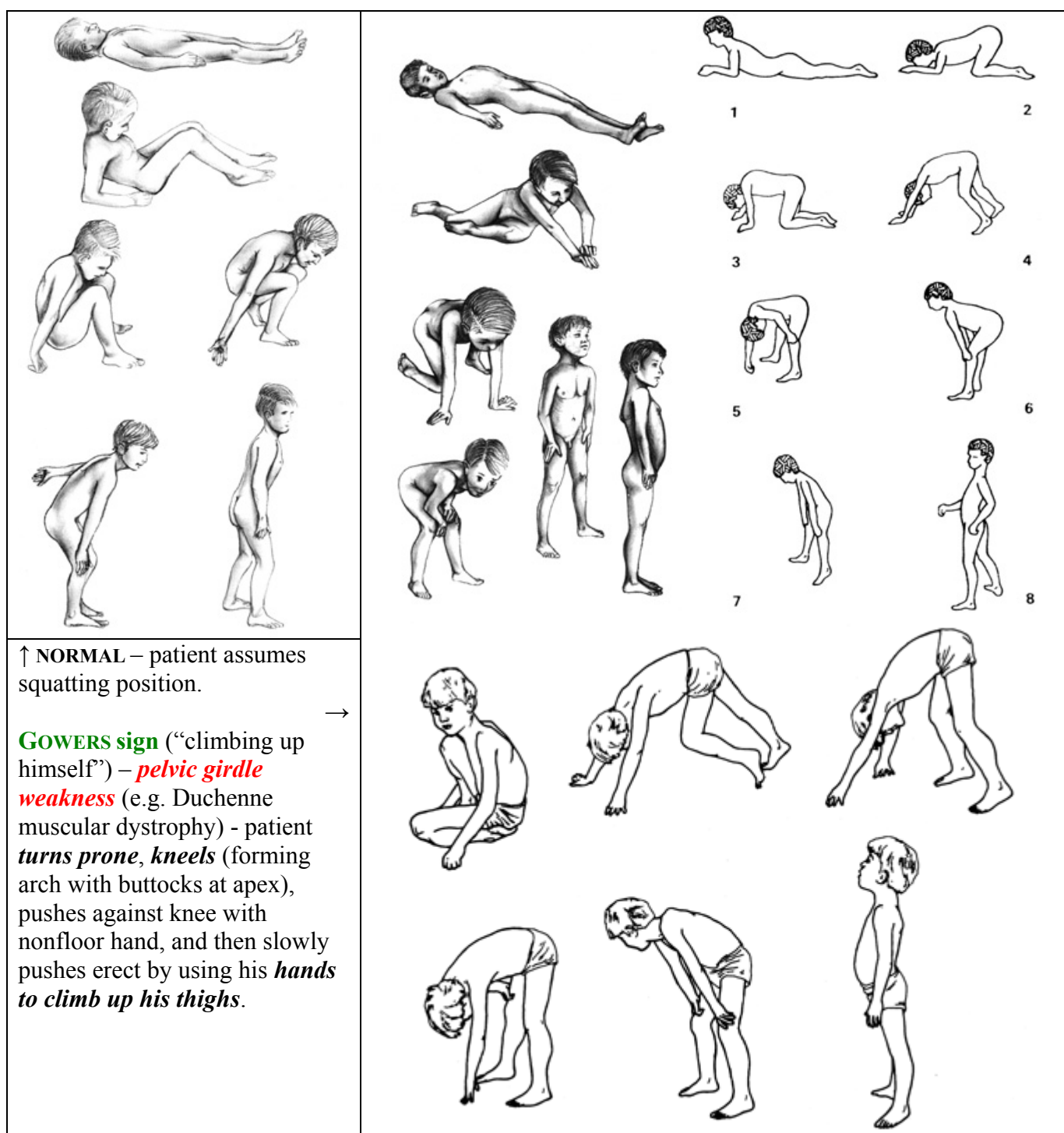
- 1) **SHOULDER GIRDLE STRENGTH** - **support baby by axillae** - patient with weakness will be unable to support body weight and will **"slip through" examiner's hands**.

Erb's palsy - right arm is medially rotated and wrist is flexed:



Head-drop sign: the head fails to continue in the plane of the body when the shoulders are elevated.

- 2) **DISTAL POWER** - **palmar grasp**.
- 3) are **sucking** and **swallowing** impaired?
- 4) observe **gait** (walking & running); **unequal wear of soles and heels** on child's shoes may indicate hemiparesis.
- 5) **PELVIC GIRDLE STRENGTH** - observe **rising from floor from supine position**:



↑ **NORMAL** – patient assumes squatting position.

→ **GOWERS sign** (“climbing up himself”) – **pelvic girdle weakness** (e.g. Duchenne muscular dystrophy) - patient **turns prone, kneels** (forming arch with buttocks at apex), pushes against knee with nonfloor hand, and then slowly pushes erect by using his **hands to climb up his thighs**.

SENSORY EXAMINATION

Infants:

- thresholds higher, reactions relatively slow;
- screening – gently touch arms and legs with **PIN** – observe movement of stimulated extremity and concomitant facial expression change;
 - UMN paralysis** - facial change without extremity movement
 - spinal cord lesion** - extremity movement without facial change
- child quickly loses patience and soon begins to disregard stimuli.

CRANIAL NERVES

- tested as in adults; see p. D1 >>, p. D1eye >>, p. D1ear >>

REFLEXES

are variable in infancy (*underdeveloped corticospinal pathways!*) - reflex↑ or ↓ has very little diagnostic significance unless asymmetric.

- in infants use **semiflexed index (or middle) finger** instead of reflex hammer.
- **BABINSKI sign** (ir kiti pažeistų piramidinių laidų refleksai) - norma vaikams iki 2 metų amžiaus, o iki 6 mėn. jie pasireiškia spontaniškai!
- **unsustained ankle clonus** (8-10 rapid, rhythmic plantar flexions in response to *eliciting ankle reflex* or *abrupt foot dorsiflexion*) is common in newborns; **sustained ankle clonus** indicates severe CNS disease.
- **triceps reflex, abdominal reflexes** are absent until after 6 months (**anal reflex** is present in newborns!).
- **crossed adductor response** (tapping patellar tendon in one leg causes contraction in opposite extremity) is not abnormal until 6-7 months of age.
- **oralinio automatizmo & griebimo refleksai** yra norma ankstyvoje kūdikystėje (infantile automatizms – žr. žemiau)!

HEAD

NEWBORN

- size & shape.
- **head circumference** - occipitofrontal circumference (OFC). *see below >>*
- **MOLDING, CAPUT SUCCEDANEUM, SUBGALEAL HEMATOMA, CEPHALOHEMATOMA**

→ see p. Ped9 >>

INFANTS

- **dilated scalp veins** – long standing **ICP↑, thrombosis** of superior sagittal sinus.
- **CRANIOTABES (syphilitic or rachitic)** – localized **areas of osteoporotic thinning** in outer table of cranial flat bone; by pressing firmly on such area you may feel momentarily give (as **ping-pong ball** would respond to similar pressure).
- direct finger percussion over parietal bones will produce “**cracked-pot**” sound prior to closure of sutures.

Assess **FONTANELLES** (soft concavities) - baby is quietly sitting or being held upright:

POSTERIOR FONTANELLE (1-2 cm at birth – admits finger tip) closes at birth or by 2 months; persistence suggests hydrocephalus or congenital hypothyroidism.

ANTERIOR FONTANELLE (4-6 cm in largest diameter at birth) closes at 9 ÷ 26 months (average – 18); best evaluated when infant is held upright and is asleep or feeding - normally slightly depressed and pulsatile.

- anterior fontanelle **pulsations** reflect peripheral pulse.
- anterior fontanelle **tenseness & fullness** reflects ICP:
 - a) bulging - **ICP↑**, but also in normal crying, coughing, vomiting.
 - b) depression - **ICP↓, dehydration**.

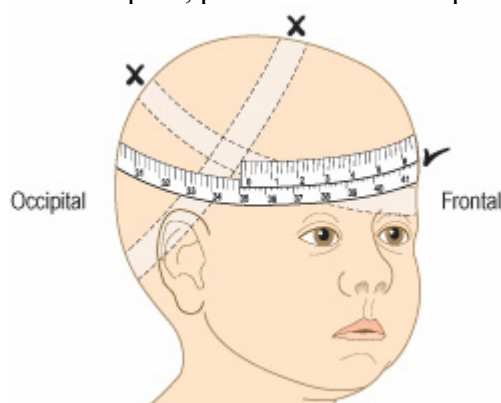
N.B. **palpate anterior fontanelle before proceeding with any other part of physical examination on acutely ill baby!**

Assess **SUTURES** (slightly depressed ridges) – palpable ridging resolves by \approx 6 months.

OCCIPITOFRONTAL CIRCUMFERENCE (OFC) (greatest head circumference) – obtain at every examination during first 2 years (\pm biennially thereafter) - should be recorded on suitable chart.

e.g. from Centers for Disease Control and Prevention - www.cdc.gov/growthcharts/

- place non-extendible tape over occipital, parietal and frontal prominences:



- measure three times and note largest measurement.
- normal head circumference of term infant:

at birth - 34-35 cm
at 6 months - 44 cm
at 12 months - 47 cm

if \downarrow - suspect **premature closure of sutures, microcephaly**;

if \uparrow - suspect **hydrocephalus, subdural hematoma, brain tumor**.

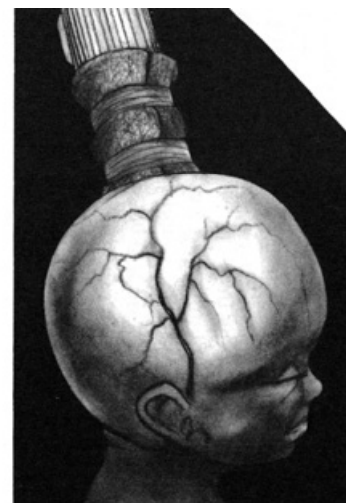
- children who are **above 90-98th percentile** or **below 5th percentile** (as well as those who **cross percentiles** rather than growing along curve) require evaluation for cerebral pathology.
- value for head circumference should be **related to age, sex, body length**.
e.g. head circumference of +3SD, is not abnormal unless body length is $<$ +1SD.
- for objective confirmation of **hypertelorism / hypotelorism** – measure **interpupillary distance** (vs. intercanthal distance)!

Assess cranial vault and face for **ASYMMETRY**.

- in utero positioning may result in **transient facial asymmetries** (e.g. micrognathia due to head flexion on sternum).
- head of **premature infant** at birth is relatively long in occipitofrontal diameter and narrow bitemporally; this continues for first year.
- plagiocephaly** (cranial vault asymmetry) occurs when infant sleeps constantly on one side; disappears as baby becomes more active and spends less time in one position.

SKULL TRANSILLUMINATION (not routinely used since advent of CT) – in completely darkened room, with standard 3-battery flashlight (with soft rubber collar).

- in normal infant **2 cm halo** of light is present around flashlight when placed over frontoparietal area, and **1 cm halo** – over occipital area;
- uniform transillumination** of entire head – **thinned / absent cortex**, advanced **hydrocephaly** (+ “setting sun” sign):
- decreased area of transillumination** - acute **subdural hematoma**.



AUSCULTATION (with stethoscope diaphragm) over **anterior fontanelle** and **temporal areas**:

systolic / continuous bruit is normal in $<$ 5 years;

bruit after 5 years – significant anemia, ICP \uparrow , AV malformation.

SPINE

- turn baby over and feel along length of vertebral column starting at neck
- note that sacrum and coccyx are present (**sacral agenesis** is associated with maternal diabetes).
- hairy / pigmented patch** over lower spine may indicate **spina bifida occulta**.
- if you find **sacroccoccygeal pit** \rightarrow visualize bottom of it by separating surrounding skin in good light (if pit is lined with dry skin, it excludes pathological communication with spinal cord).

INFANTILE AUTOMATISMS (PRIMITIVE REFLEXES)

- **normal developmental reflex phenomena** present at birth and disappearing in early infancy.

N.B. **absence in neonate, asymmetry, or persistence beyond expected disappearance time** (delayed neuromaturation) – nonspecific indicator of severe CNS dysfunction!

Not fully developed in premature infants!

In preferred order:

- Blinking (dazzle) reflex** – eyelids close in response to bright light.
 - disappears after 1st year.
 - absence may indicate **blindness**.
- Acoustic blink (cochleopalpebral, audiopalpebral) reflex** for details \rightarrow see p. D1 ear $>>$
 - difficult to elicit during first 2-3 days.
 - may disappear temporarily after it is elicited (habituation).
 - disappearance time variable**.
 - absence may indicate **decreased hearing** but it is crude test and does not indicate deafness!
- Darwinian (grasping) reflex**
 - PALMAR GRASP**: with baby's head positioned in midline and arms semiflexed, place your index fingers from ulnar side into baby's hands and press against palmar surfaces \rightarrow flexion of all baby's fingers to grasp your fingers and hang suspended; you can enhance reflex by offering bottle (sucking facilitates grasping).
 - starts at 28 wk gestation and is well established by 32 wk.
 - disappears at 3-4 months; persistence beyond 4 months suggests cerebral dysfunction.
N.B. **newborns normally hold hands clenched**, but persistence of fistled hand beyond 2 months suggests **spastic diplegia**.
 - light stroking of hand ulnar surface and 5th finger \rightarrow finger extension (**digital response reflex**).
 - PLANTAR GRASP** - stroke sole \rightarrow toes will flex and curl round your examining finger.

N.B. make sure response is not inhibited by inadvertently stimulating dorsal aspects of feet and hands!

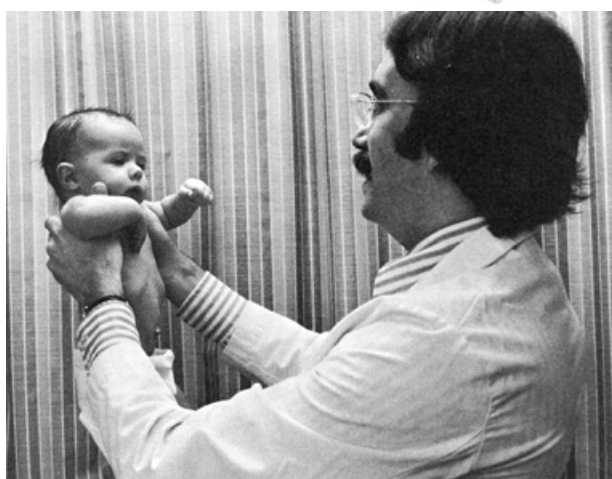
4. **Pull to sit** - hold baby's hands and gently pull to sit - watch sternocleidomastoid muscles which should bilaterally anticipate pull to sit; head flexes for moment before head lag occurs:



5. **Galant (trunk incurvation) reflex** - gulint krūtine ant tiriančiojo delno pusia vertikalioje padėtyje, braukiant pirštu lygiagrečiai stuburui (≈ 1 cm nuo midline) per visą liemens ilgį → mažylio kūnas išsilenkia į dirginamąją pusę.
- disappears at 2 months.
 - used to detect **transverse spinal cord lesions**.



6. **Rotation test** – hold baby under axillae, at arm length facing you, and rotate him in one direction and then the other → baby's head turns in direction in which you turn baby; if you restrain head with your thumbs, his eyes will open and turn in direction in which he is turned.
- disappearance time variable.
 - early detection of **strabismus**; absence indicates **vestibular dysfunction**.



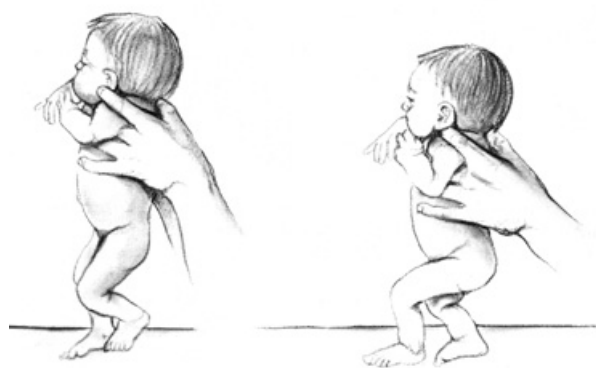
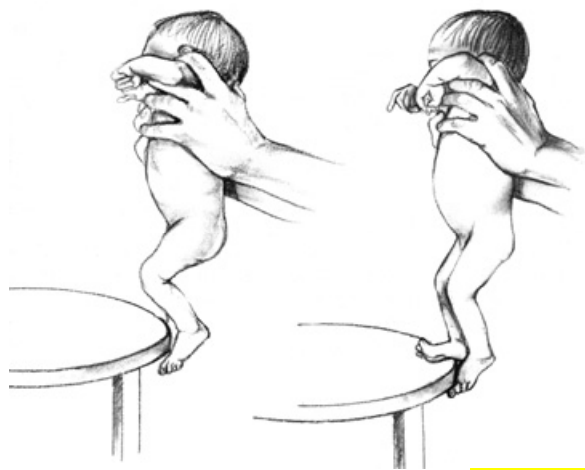
7. **Vertical suspension positioning** - už pažastų paėmus naujagimį (rodomaisiais pirštais ir nykščiais prilaikant galvą) ir pakeliant jį vertikaliai, mažylis sulenkia kojas per kelio ir klubo sąnarius, o nuleidžiant ant atramos, jis atsiremia visa pėda ir "stovi" ant pusiau sulenktų kojų ištiesęs liemenį.
- disappears after 4 months.
 - fixed leg extension and adduction ("scissoring") indicates **spastic paraplegia**:



8. **Placing response** - laikant naujagimį iš nugaros už pažastų (rodomaisiais pirštais ir nykščiais prilaikant galvą):

a) allow dorsal surface of one foot to touch undersurface of table top (do not plantarflex foot!) → baby flexes hip & knee and places stimulated foot on table top.

b) pastačius ant stalo ir šiek tiek palenkus jo kūną į priekį, kojos atlieka žengimo judesius.



- best after the first 4 days; **disappearance time variable** (replaced by voluntary action).
- absence indicates **paresis** or **breech delivery**.

Here is also convenient to test **Moro reflex**. see below >>

9. **Rooting reflex** – with baby's head positioned in midline and his hands held against his anterior chest, stroke with your index finger perioral skin:
- at mouth corners** → mouth will open and turn to stimulated side;
 - at midline of upper lip** → head will retroflex;
 - at midline of lower lip** → jaw will drop.

- disappears at 3-4 months; may be present longer during sleep.
- absence may indicate cerebral dysfunction.



10. **Straubliuko** - stuktelėjus pirštu per lūpas.

11. **Sucking** – įdėjus į burną pirštą ar čiulptuką, pradeda čiulpimo judesius.

12. **Tonic neck reflex** – baby in supine position; turn head to one side (holding jaw over his shoulder) → arm & leg on this side extend, while opposite arm & leg flex.

- present at birth (from 37th week gestation); most intensive at 1 month; disappears at 6 months.

N.B. reflex normally must not occur each time it is elicited!!!

- if **persists beyond 6 months** or **occurs each time is elicited** (at any age) or is **asymmetric** or is **obligatory** (posture maintained beyond 30 sec.) – **major cerebral damage**.



- 13. **Babkino (delnu-burnos)** - paspaudus delną, naujagimis išsižioja.
- 14. **Galvos posūkio** - paguldžius ant pilvo, jis pasuka galvą į vieną arba kitą pusę, išlaisvindamas kvėpavimo takus.
- 15. **Bauerio (šliaužimo)** - gulint ant pilvo ir pridėjus prie kojų atramą, naujagimis ima šliaužti.

Mass reflexes:

- disappear by 3rd month.
- absence indicates **cerebral ÷ muscular lesion**.
absent Moro reflex + “setting sun” sign + opisthotonus = **KERNICTERUS**
- persistence beyond 6 months – clearly abnormal (*neurologic disease*).

16. **Perez reflex** - padėtis kaip Galanto, spaudžiant nykščiu perbraukti per stuburą nuo uodegikaulio iki kaklo → head & spine extension, truputį sulenkia galūnes, pravirksta ir pasišlapina (tinka naujagimiams paimti šlapimo mėginiui!).

17. **Startle reflex (s. Moro reflex)** - baby’s arms briskly abduct and extend with hands open and fingers extended + legs flex slightly and abduct (but less so than arms); arms then return forward over body in clasp maneuver (sukryžiuoja, lyg apglėbdamas krūtinės ląstą);
- it is phylogenetic remnant of movements used by subhuman **primate infants to cling to their mothers**.
 - reflex begins by 28-32 wk gestation and is well established by 37 wk; may occasionally occur in term newborns during handling.
 - reflex is elicited by any stimulus that suddenly moves head in relation to spine:
 - a) lift supine baby by supporting his head at angle ≈ 30° → suddenly release your grip by allowing head to fall ≈ 1 cm backward (into your hand):



- b) hold baby in supine position (supporting head, back and legs); suddenly lower entire body ≈ 2 feet and stop abruptly;
- c) support baby in vertical position; suddenly tip upper body downward (as if child were to fall) - child spontaneously extends upper extremities (as protective mechanism) - **parachute reflex**.
- d) produce sudden loud noise (e.g. strike examining table with palms of your hands on either side of baby’s head).

“SOFT” NEUROLOGIC SIGNS

- considered **normal in younger children**, but when still present in school-aged child suggest **neuromaturational delay**.

N.B. specific soft signs *lack association with particular disability* and can occur in normal child - it is unwise to label child who manifests several soft neurologic signs!

1. **Dystonic posturing of arms & hands** when walking on heels.
2. **Mirror movements** of opposite hand while performing rapid alternating movements with thumb & fingers.
3. **Substantial movements of tongue or mouth** while writing.

MENINGEAL SIGNS

- **nuchal rigidity** is most reliable sign of meningeal irritation; infants may lie in **OPISTHOTONUS** position:

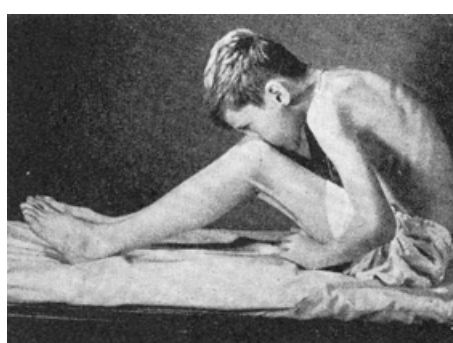


Testing nuchal rigidity in uncooperative, struggling infant: place shoulders at edge of table, supporting occiput manually. Flex anteriorly - only true involuntary rigidity persists.

- ask child to sit with legs extended; normally he is able to sit upright and touch chin to chest (padėk žaisliuką ant sternum – vaikas pats į jį pasižiūrės); in meningeal irritation child assumes **TRIPOD POSITION**:



Tripod sign: characteristic position associated with stiffness of the spine.



Kiss-the-knee test: ability to complete maneuver only by flexing the knee. Note tense appearance of the hamstrings.

- kūdikių **didžiojo momenėlio išsipūtimas ir pulsacija!**
- **LESAŽO** - pakeltas už pažastų vaikas pritraukia ir laiko kojas prie pilvo.

NEONATES - 25-75% will not have **nuchal rigidity***; **tense bulging fontanel** is more reliable sign (but may be absent in dehydration).

*Kernig's and Brudzinski's signs appear at or shortly after 1st year of life

SPASMOPHILIA SIGNS

- Chvostek sign** – plaktuku / pirštu sudavus tarp skruosto lanko ir lūpos kampo, just aterior to auditory meatus (*n. facialis*), toje pusėje trukteli burnos, nosies, voko raumenys.
Normal in newborns and some infants!
- Trousseau sign** - 3 min užspaudus *a. brachialis* plaštaka įgauna "akušerio rankos" formą (*carpopedal spasm* - flexion of wrists and metacarpophalangeal joints and extension of phalangeal joints; feet are dorsiflexed at ankles and toes plantar flexed).
- Liusto** - stuksenant *n. peroneus* sritį, pėda įgauna "arklio pėdos" formą.

PSYCHOMOTOR DEVELOPMENT

Išvados daromos tik apžiūrėjus pakartotinai! (wide variations in normal development are rule!)

Screening of **infant** - ability to:

- Reach toy
- Transfer cube from one hand to other
- Use thumb and forefinger pincer grasp in picking up small object

Screening in **early childhood** - ability to:

- Build tower with blocks
- Play ball with examiner
- Perform hop, skip, jump

Screening for **early schoolchildren**:

- Orientation to time and place
- Language and numbering skills
- Tie shoelaces
- Button shirt fronts
- Writing skills
- Using scissors
- Right-to-left discrimination: for self (attained at 6-7 yrs), for examiner (attained at 8-9 yrs).

Kūdikis vertinamas gulintis ant pilvo, po to ant nugaros:

- stebimas spontaninis aktyvumas.
- kaip reaguoja į žmogaus ar daiktų, patekusių į regėjimo lauką, judėjimą bei į jo artimiausią pasiekimo zoną pakliuvusius stambius daiktus.

≥ 7 mėn vaikams paduodami kubeliai, sviedinukai arba pieštukas ir popieriaus lapas - ar sugeba pakartoti gydytojo veiksmus.

> 2.5 metų vaikų galima paprašyti nupiešti žmogų, kitą figūrą.

Screening Scheme for Developmental Delay (Upper Range of Normal Skills):

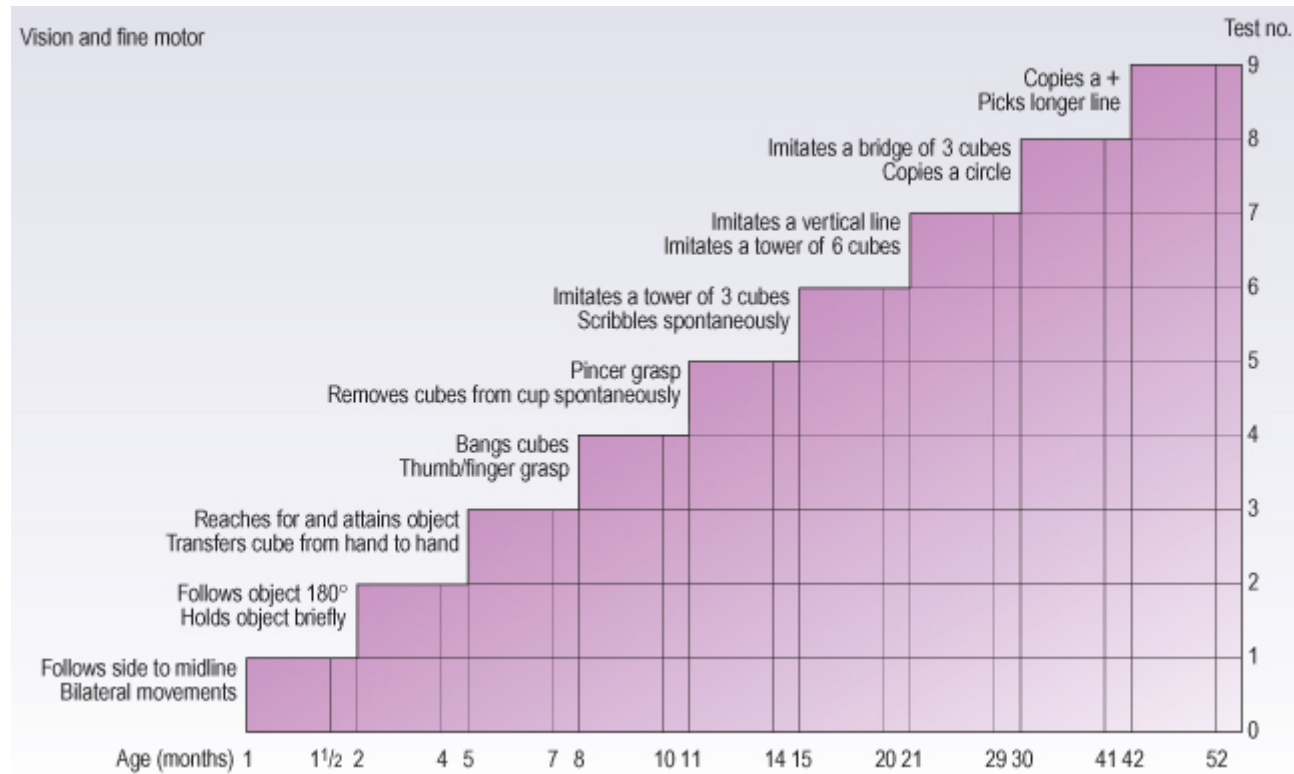
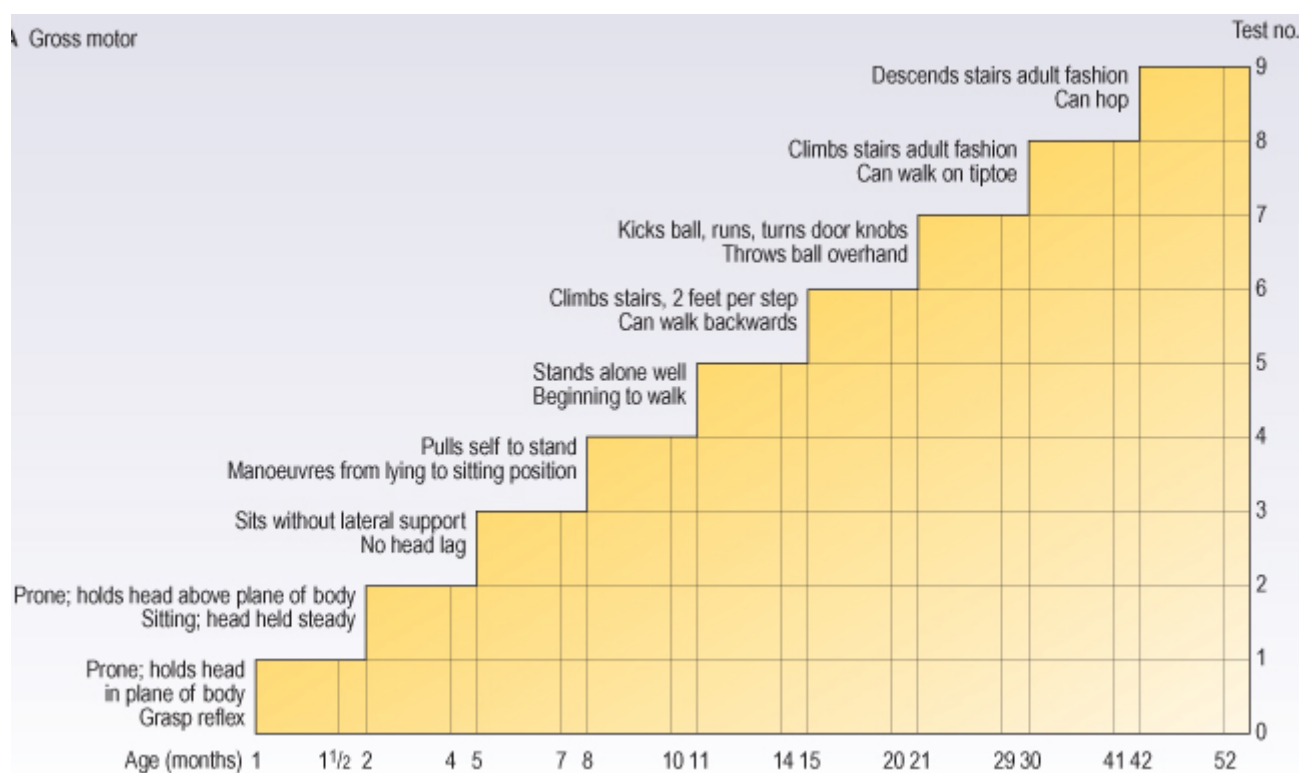
Age (Months)	Gross Motor	Fine Motor	Social Skills	Language
2	Lifts head/chest when prone	Tracks past midline	Recognizes parent, social smile	Alerts to sound, coos
3	Supports weight on forearms	Opens hands spontaneously	Smiles appropriately	Coos, laughs
4-5	Rolls front to back, back to front (5 months)	Grasps rattle	Enjoys looking around	Orients to voice, “ah-goo”, razzes
6	Sits momentarily unassisted	Transfers objects , raking grasp	Shows likes and dislikes, stranger anxiety	Babbles
9-10	Pulls to stand, crawls	3-finger pincer grasp	Plays patty-cake, peek-a-boo, waves bye-bye	Imitates sounds, mama/dada (nonspecific)
12	Walks with one hand held, cruises, walks alone	2-finger pincer grasp, releases object on command	Comes when called, imitates actions	1-2 meaningful words, mama/dada (specific)
15	Walks backward	Uses cup	Temper tantrums	4-6 words
18	Walks upstairs / downstairs with assistance, runs, kicks ball	Feeds from spoon, Builds tower of 2-4 blocks	Copies parent in tasks (e.g. sweeping)	≥ 6 words, names common objects
24		Builds tower of 6 blocks	Plays in solitary, parallel play. Follows 2-step command	2 word phrases
36	Rides tricycle , climbs stairs with alternating feet	Copies a circle, uses utensils, brushes teeth with help, washes/dries hands		3 word sentences
48	Hops	Copies cross	Cooperative play	close to adult speech competence; counts to 10

- review family's *baby book* (milestones for child may have been dutifully recorded).
- neurodevelopment of girls** is more accelerated for many motor tasks.

MOTOR

Birth	Sleeps much of time; sucks, clears airway
2-4 weeks	Moves head from side to side when lying on stomach; reflex grasp
1-2 months	Lifting head up 45-90° from prone position
2 months	Lifting chest up from prone position
3 months	Holds head steady on sitting; opens and shuts hands; pushes down when feet are placed on flat surface; swings at and reaches for dangling toys
4 months	Sitting with support; rises body on arms when prone; brief purposeful grasp
5-6 months	Rolls over (usually from stomach to back); reaches for objects
7 months	Sitting without support; bears some weight on legs when held upright; transfers objects from hand to hand; holds own bottle
8-10 months	Standing without support

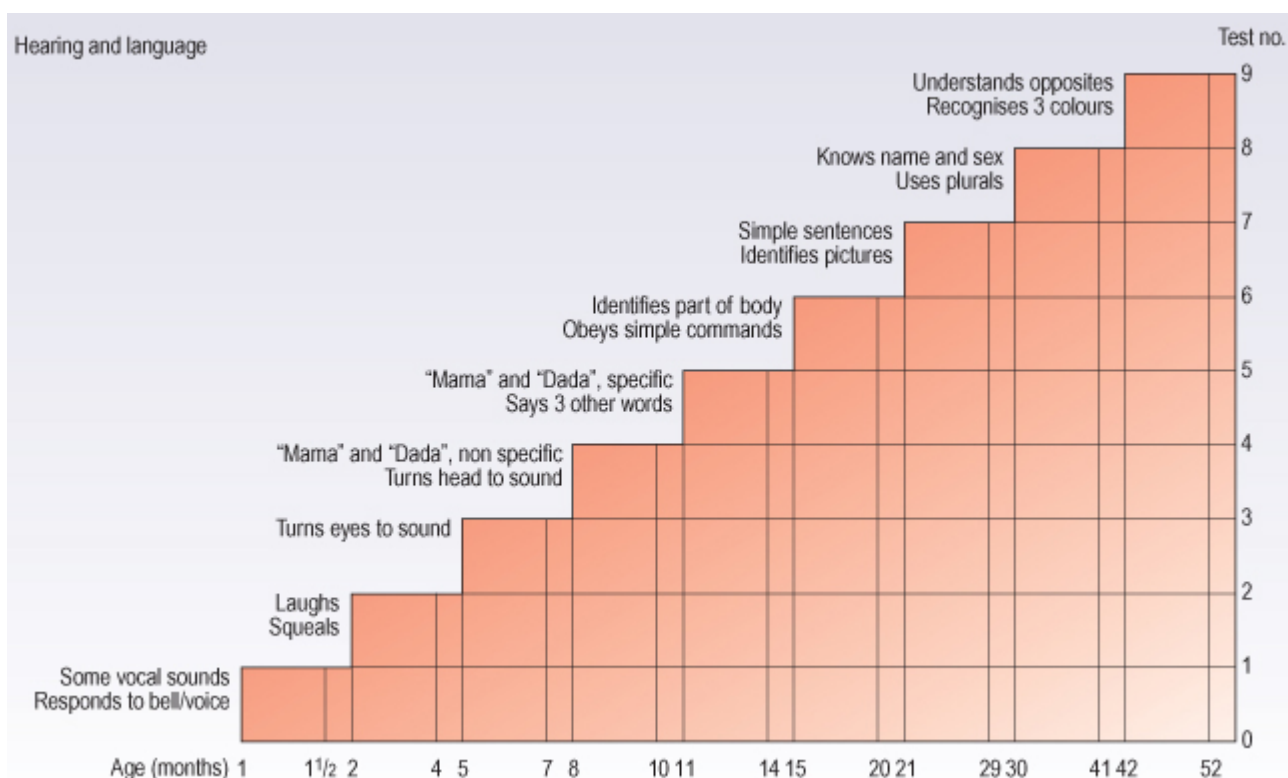
9-10 months	Creeping on hands and knees; gets into sitting position from stomach; pulls self up to standing position
11 months	Walking when led by hand
12 months	Walks by holding furniture (“cruising”); may walk 1-2 steps without support; stands for few moments at time; drinks from cup; has pincer grasp
15 months	Adept at independent locomotion
18 months	Descends / climbs stairs holding on (may slide on belly); turns several book pages at time; partially feeds himself; throws ball overhand
2 years	Can reproduce circle ; climbs up and down stairs alone; runs well; turns single book pages; puts on simple clothing; kicks ball; holds cup securely
3 years	Can reproduce cross , climbs up stairs alone, can stand on one foot, builds tower of 9-10 cubes; rides tricycle; dresses well except for buttons and laces
4 years	Alternates feet going up and down stairs; throws ball overhand; hops on one foot ; copies cross; washes hands and face
5 years	Can reproduce square ; catches bounced ball; dresses and undresses without help; walks on tiptoes
6 years	Can skip, tie shoelaces
7 years	Can reproduce diamond
8 years	Can hop twice on one foot and then smoothly alternate to hop twice on opposite foot
10 years	Can stand in feet tandem (heel-to-toe) with eyes closed for 15 seconds; can crumple paper into ball without using table surface (5 seconds for dominant hand; 7 seconds – nondominant)



VOCAL

Birth	Responds with crying to discomforts and intrusions
6-8 weeks	Cooing, precursor to later babbling and speech
2 months	Development of 7 phonemes*
6 months	Development of 12 phonemes
9 months	Says “mama” or “dada” (possibly appropriately in reference to parents)
12 months	Development of 18 phonemes
18 months	10-50 words
2 years	≈ 50% of child’s speech should be intelligible; makes 2-3-word sentences; verbalizes toilet needs; questions “what’s this”; uses pronouns (me, you, I)
3 years	More than 1000 words; ≈ 75% of child’s speech should be intelligible; counts to 10 and uses plurals; uses “me” and “you” correctly; questions constantly
4 years	Style of adult language is established; almost 100% of child’s speech should be intelligible; can tell someone his name, discuss simple aspects of daily life; uses some plurals and past tenses
5 years	Can tell simple story

*adult American speech has 35 phonemes (distinct sounds)



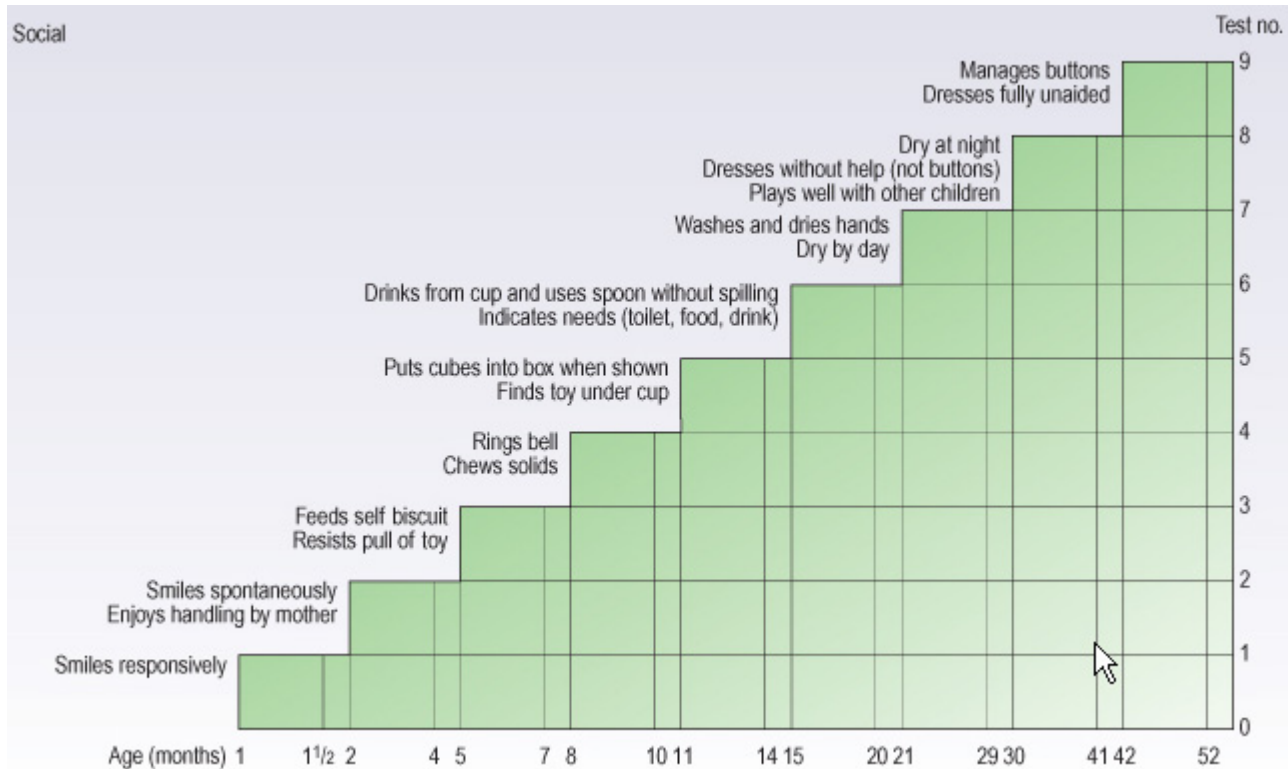
- at 3-5 years, average child learns two new words daily.
- *articulation errors* (e.g. substituting “w” for “r” in rabbit, or “d” for “th”) are common and normal in toddler age group.

SENSORY

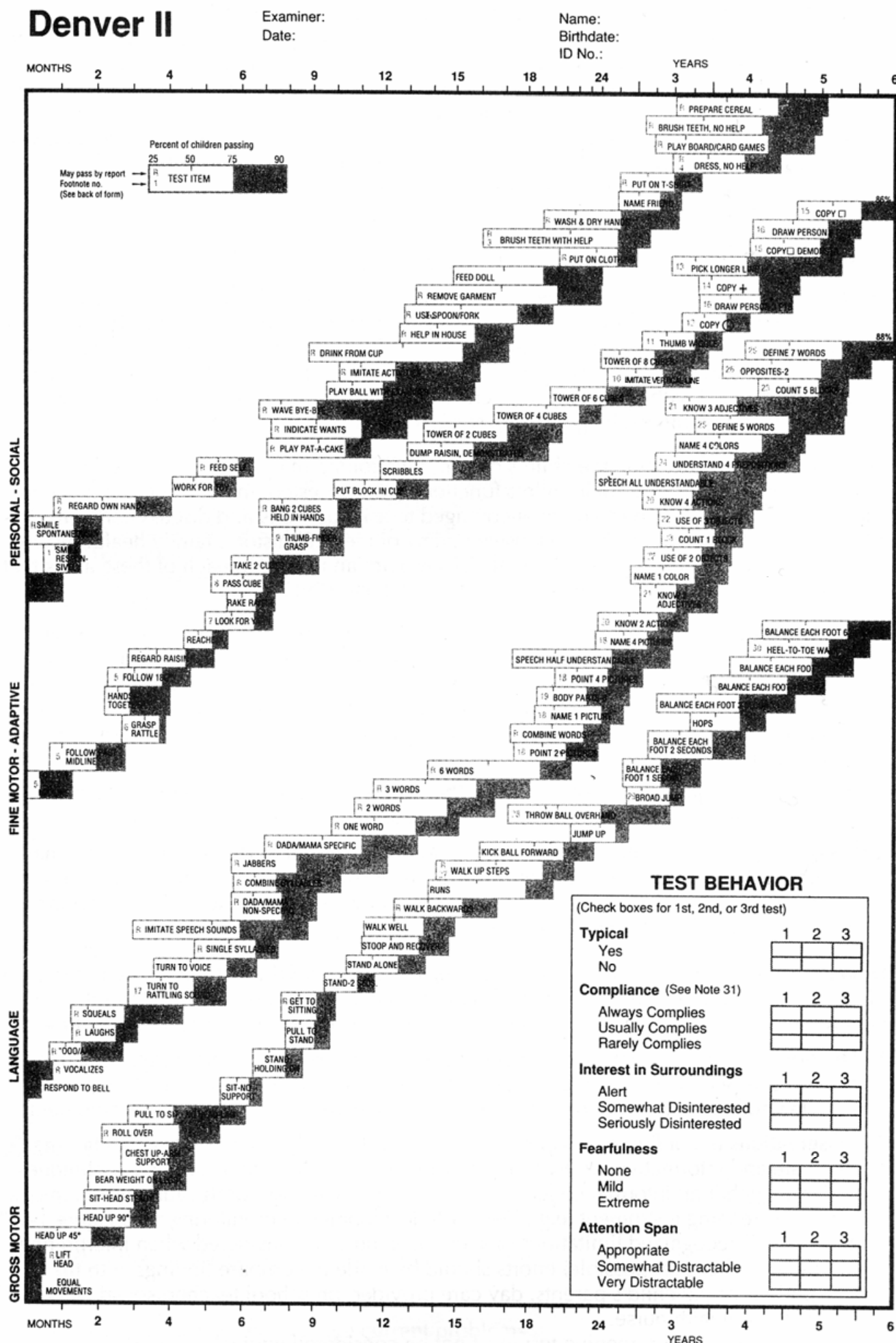
Birth	Can discriminate sound and visually follow light; capacity for visual fixation within several hours after birth
10 days	Can differentiate smell of mother versus nonmother
4 weeks	Follows object as it is moved 90° to either side from midline about 15 cm above face; responds to noise with startling, crying, or quieting; may turn toward familiar sounds and voices
6-8 weeks	Regards objects in line of vision; follows object as it is moved from side-to-side in 180° arch (i.e. past midline); turns head and eyes to sound
3 months	Watches faces intently
4 months	Can fully accommodate visually; visual fixation is increased if pattern is complex and especially if it resembles human face
5-6 months	Recognizes people at distance; listens intently to human voices
7 months	Looks for dropped object
12 months	Looks for object hidden in his presence
3 years	Recognizes at least 3 colors
5 years	Knows 4 colors

SOCIAL

6 weeks	Begins to smile when spoken to
3 months	Smiles at sound of caretaker's voice
5-6 months	Smiles spontaneously
7-8 months	Plays peek-a-boo
9 months	Objects if toy is taken away; plays pat-a-cake; responds to own name; understands “no” and waves “bye-bye”
2 years	Engages in solitary or parallel play (not capable of sharing)
3 years	Shares playthings, plays interactive games; sibling rivalry begins; ½ of children can take care of toilet needs
4-5 years	Fixed and stable concept of gender; has imaginary friend
Time of school entry	Easily separates from mother



Denver II developmental monitoring tool (identifies children at risk for possible developmental problems and confirms subjective suspicions of delay):



DIRECTIONS FOR ADMINISTRATION

1. Try to get child to smile by smiling, talking or waving. Do not touch him/her.
2. Child must stare at hand several seconds.
3. Parent may help guide toothbrush and put toothpaste on brush.
4. Child does not have to be able to tie shoes or button/zip in the back.
5. Move yarn slowly in an arc from one side to the other, about 8" above child's face.
6. Pass if child grasps rattle when it is touched to the backs or tips of fingers.
7. Pass if child tries to see where yarn went. Yarn should be dropped quickly from sight from tester's hand without arm movement.
8. Child must transfer cube from hand to hand without help of body, mouth, or table.
9. Pass if child picks up raisin with any part of thumb and finger.
10. Line can vary only 30 degrees or less from tester's line.
11. Make a fist with thumb pointing upward and wiggle only the thumb. Pass if child imitates and does not move any fingers other than the thumb.



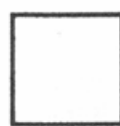
12. Pass any enclosed form. Fail enclosed round motions.



13. Which line is longer? (Not bigger.) Turn paper upside down and repeat. (pass 3 of 3 or 5 of 6)



14. Pass any lines crossing near midpoint.



15. Have child copy first. If failed, demonstrate.

When giving items 12, 14, and 15, do not name the forms. Do not demonstrate 12 and 14.

16. When scoring, each pair (2 arms, 2 legs, etc.) counts as one part.
17. Place one cube in cup and shake gently near child's ear, but out of sight. Repeat for other ear.
18. Point to picture and have child name it. (No credit is given for sounds only.) If less than 4 pictures are named correctly, have child point to picture as each is named by tester.



19. Using doll, tell child: Show me the nose, eyes, ears, mouth, hands, feet, tummy, hair. Pass 6 of 8.
20. Using pictures, ask child: Which one flies?... says meow?... talks?... barks?... gallops? Pass 2 of 5, 4 of 5.
21. Ask child: What do you do when you are cold?... tired?... hungry? Pass 2 of 3, 3 of 3.
22. Ask child: What do you do with a cup? What is a chair used for? What is a pencil used for? Action words must be included in answers.
23. Pass if child correctly places and says how many blocks are on paper. (1, 5).
24. Tell child: Put block on table; under table; in front of me, behind me. Pass 4 of 4. (Do not help child by pointing, moving head or eyes.)
25. Ask child: What is a ball?... lake?... desk?... house?... banana?... curtain?... fence?... ceiling? Pass if defined in terms of use, shape, what it is made of, or general category (such as banana is fruit, not just yellow). Pass 5 of 8, 7 of 8.
26. Ask child: If a horse is big, a mouse is ___? If fire is hot, ice is ___? If the sun shines during the day, the moon shines during the ___? Pass 2 of 3.
27. Child must walk up steps. Child may use wall or rail only, not person. May not crawl.
28. Child must throw ball overhand 3 feet to within arm's reach of tester.
29. Child must perform standing broad jump over width of test sheet (8 1/2 inches).
30. Tell child to walk forward, heel within 1 inch of toe. Tester may demonstrate. Child must walk 4 consecutive steps.
31. In the second year, half of normal children are non-compliant.

OBSERVATIONS:

BIBLIOGRAPHY for ch. "Diagnostics" → follow this [LINK](#) >>