

Evaluation of Pediatric Development (Normal)

Janel Casey, BSc
UBC Medicine, Class of 2006
May 23, 2005

1. General Presentation

- Definition

Developmental pediatrics is a subspecialty in pediatrics concerned with the study and treatment of the physical, social, emotional, and cognitive growth of children from birth through adolescence.

- Why is it important?

The concept of ongoing change and maturation is integral to the daily practice of pediatrics and encompasses all aspects of pediatric medicine. Observations about development should be made at every clinical encounter and developmental monitoring should be performed at every well-baby/well-child visit through a combination of history and physical exam. It is critical to identify disturbances in development early because there may be windows of time or sensitive periods when appropriate interventions may be instituted to effectively treat developmental problems.

- In general, how does development occur?

The first 5 years of life are a period of extraordinary physical growth and increasing complexity of function. From a gross motor perspective, development progresses in a cephalocaudal direction with the infant lifting his/her head up in the first few months of life, then sitting at about 6 months, then crawling, and finally walking at 1 year. In terms of fine motor development, an infant's grasp begins as a raking motion involving the ulnar aspect of the hand at 3-4 months and then the thumb is added to this motion at about 5 months. The thumb opposes the fingers for picking up objects just before 7 months of age, and the neat pincer grasp emerges at about 9 months. Language is picked up quickly with cooing at 2 months, babbling at 6 months, and a few words by 1 year. The child can speak in 2 word sentences by 2 years and 3 word sentences by 3 years. Socially, development begins by watching faces and learning to imitate others. This imitation leads to turn-taking games such as patty-cake and peek-a-boo, and then the child will begin to learn social and adaptive skills by trial and error. Cognitively, an infant will discover object permanence (that an object exists even when not seen) at about 9-12 months and will adapt this concept to the image of mom or the primary caregiver to form an attachment. Eventually, the child will become more independent and will venture farther and farther away from the parents to explore the environment.

During the early preschool years (3-5 yrs), magical thinking blossoms and fantasy facilitates the development of role playing, sexual identity and emotional growth. Children will create magical stories, can have imaginary friends, nightmares, and fears of monsters. In the early school years (5-7 yrs), magical thinking diminishes and concrete operations take over. The reality of cause-effect relationships become better understood. During middle childhood, school and peer relationships become more of a focus and peer relationships become even more important as the child approaches adolescence.

Early adolescence (10-13 yrs) sees another period of rapid growth as the child approaches puberty. Body-image and self-esteem fluctuate dramatically. By middle adolescence (14-16 yrs), children are more comfortable with their bodies, but intense emotions and mood swings are typical. The teenager is usually more self-centered and wants to experiment with dating and sex as they struggle for independence and autonomy. Concrete operations turn to more formal operations as they develop the ability to think more abstractly. By late adolescence (17-19 yrs), the child can think more realistically in terms of future plans, they are less self-centered, and dating becomes more intimate.

2. Questions to Ask

- History

A thorough history is crucial to a developmental assessment since every aspect of a child's development can't be demonstrated in one short visit. Usually this history will come from the parents, but collateral information may also be obtained from school teachers, child care workers, social workers, etc. If there is a problem with the child's development, attentive parents will usually already have concerns. Therefore, a good question to start with is, *"Do you have any concerns about your child's learning, behaviour, or development?"*

After a general pediatric history, the developmental pediatric history usually focuses on developmental milestones. By each age, there are certain abilities or skills that the child should have attained. You should be aware of some of these important milestones and the normal age range for them to occur ([see link to table](#)). Failure to meet these milestones by the appropriate age should prompt further evaluation. Regression in any of these milestones is especially disturbing and should be investigated immediately.

As illustrated in the table, these milestones are usually divided into separate areas of development and care should be taken to ask about development in every category. This is important since a child may be abnormal in only one

area, more than one, or in all areas. For example, a child with completely normal motor skills may be delayed in language skills or vice versa. Also remember that there are variations still within the spectrum of normal and a small deviation away from these values should not necessarily be considered pathologic. For example, a social smile at 7 weeks of age rather than at 6 weeks is probably not worrisome, and some normal children never crawl but rather advance straight to walking. In addition, it is also normal to be slightly ahead in one category of development and slightly behind in another. Furthermore, for children born prematurely, you should really use their corrected age (age of child from birth minus the number of weeks premature) to determine developmental level.

3. Procedures for Investigation

- Physical exam

A physical exam for developmental pediatrics should begin with a general pediatric exam, going through each part of the body systematically. Look for any dysmorphic features and plot weight, height, and head circumference on growth curves. Don't forget to check vision and hearing, as a deficit in either of these could lead to slowed acquisition of skills.

In a developmental assessment, the most important part of the physical exam is observation. This will help confirm the history and reveal actual levels of functioning. Observe how the child reacts to his parents and environment and how he plays. Look at physical abilities like walking, running, climbing, and holding and manipulating objects. Listen to language – the content and complexity. Basically...keep your eyes and ears open!

A specific screening instrument may also be helpful such as the Denver II Developmental Screening Test for children up to age 6 years. This tool provides population-based norms for development in 4 “streams”: gross motor, fine motor/adaptive, language, and personal/social. There are many other screening tools which may be utilized as well, and the decision about which one to use is often based on the patient's characteristics and the physician's preference. It is also important to realize that a developmental screening test must not be considered equivalent to IQ testing or as a definitive predictor of current or future abilities. Screening merely identifies children at risk for possible developmental problems and confirms subjective suspicions of delay.

- Laboratory investigations

Lab procedures should be performed on a selective basis and are often not necessary in a developmental assessment. Problems the physician may

consider screening for include iron deficiency anemia, lead poisoning, and sickle cell disease.

4. Differential diagnosis

[See approach to developmental delay](#)

References

Bickley, L.S., Szilagy, P.G. Bates' guide to physical examination and history taking. 8th edition. Lippincott Williams & Wilkins. Philadelphia, 2003.

Dworkin, Paul H., ed. Pediatrics: The national medical series for independent study. Fourth Edition. Lippincott Williams & Wilkins. Maryland, USA, 2000.

Hay, Jr., W.W., Hayward, A.R., Levin, M.J. Sondheimer, J.M., ed. Current Pediatric Diagnosis and Treatment. 15th edition. Denver, Colorado, 2000.

Leonard, B.J.N., Yeung, J.C., ed. The Toronto Notes. 21st edition. Toronto Notes Medical Publishing 2005 Inc. Toronto, 2005.

Woodhead, J.C., ed. Pediatric Clerkship Guide. Mosby, Inc. Missouri, USA, 2003.