Development and Developmental Assessment

This article will give you a structure on which to base a developmental history, review usual milestones, and give an understanding of structured developmental assessment. The aim is that you will be able to identify key warning signals and know the practical relevance to your current practice.

The fundamental difference between paediatric and adult neurology is that children continue to grow and develop. This process continues into young adulthood beyond what is conventionally regarded as the “cut off” for paediatric services.

For many paediatricians, let alone adult physicians, developmental assessment is an area where they express a lack of competence and confidence. Remembering that your own child was walking on their first birthday and could just about put on his own shoes when he started at nursery does not qualify you as a confident assessor of child development!

Basic concepts in child development
Developmental progress is about gaining functional skills which will over time allow a child to become independent of its adult caregivers.

Developmental skills are achieved sequentially following a remarkably consistent pattern, there is however a wide normal range.

Development is considered within four fields in the young child:
1. Gross Motor
2. Vision and Fine Motor
3. Hearing, Speech and Language
4. Social, Emotional and Behavioural

Hearing and vision are grouped with the skills which are most contingent on them. Important consideration must be given to these areas as impairments can have important consequences for other areas of development and early intervention is crucial.

Difficulties within one developmental field can lead to delays in the acquisition of skills in another field. The child with a significant hearing impairment may be late to speak, this limits his play opportunities with other children and consequently his social development.

Development should always be a process of progression, any suggestion of developmental standstill or loss of previously attained skills is a cause of significant concern.

The abnormal persistence of immature aspects of behaviour can also be a cause for concern e.g. mouthing approach to toys beyond 12 months of age.

Cognitive development
In the school aged child, skills become more complex and progress tends to be judged by cognitive rather than physical development. That is not to say that cognition can not and should not be assessed in the younger child. Concepts which can be covered in a routine assessment include object permanence, recognition of self and symbolic thought (see Table 1).

Infancy – a child sees himself as the centre of the world, thoughts processes relate to immediate experiences.

Preschooler – inanimate objects are alive with feelings and events have a magical nature.

School age – the dominant mode of thought is practical and relates to specific circumstances and experiences.

Mid teens – abstract thought begins to develop with the ability to test hypotheses and manipulate more complex concepts.

Important influences on development
Development occurs as a result of an interplay between hereditary factors and the environment. In order for development to occur a child’s basic physical and psychological needs must be met.

Case 1
An 18-month-old baby boy attends clinic as he is not crawling. He has three siblings under the age of 5, the household is very busy. You discover he spends large parts of his day in the buggy or car seat. On examination he sits independently but gets upset in the prone position and makes no attempt to crawl.

Case 2
An 18-month-old girl is referred for assessment of delayed development by her social worker. She has no recognisable words and crawls but does not walk. In the clinic room she does not appear to know what to do with toys simply putting them in her mouth, is quiet and reluctant to interact with you. On examination she has a small head 2nd centile, weight on 75th centile you wonder if she is dysmorphic in facial appearance. The social worker tells you that her mother has a long history of drug and alcohol misuse.
A baby will develop motor skills if:
- he has a normal central nervous system
- he has motivation to practice new skills
- he has the opportunity to practice new skills.

In case 1 the child lacks the opportunity and motivation to practice new skills. In case 2 the central nervous system may not be normal as illicit drug and alcohol use in pregnancy are both associated with significant effects on the developing foetus. Parents who misuse substances may expose their children to significant neglect both physically and emotionally, compounding any underlying neurological problem.

### The developmental history

The developmental history needs to be taken within the context of a full assessment as described in the previous article in the series. Development is highly influenced by the environmental context in which a child exists, the history is your chance to gain an insight into this.

Begin at the beginning. Concerns may have arisen antenatally on the basis of family history or screening tests. In the birth history it is important to identify prematurity, which should be corrected for until two years of age when considering development. A child born at 30 weeks gestation may not be normal as illicit drug and alcohol use in pregnancy are both associated with significant effects on the developing foetus. Parents who misuse substances may expose their children to significant neglect both physically and emotionally, compounding any underlying neurological problem.

### Developmental milestones

A developmental milestone is an important developmental skill. For each skill there is a normal range of time for a child to develop it within. A median age is the age at which half of children acquire a skill.

A limit age is the age at which a skill should have been achieved; it reflects two standard deviations from the mean. Failure to achieve these warrants more detailed assessment, investigation or intervention.

This concept can be demonstrated with respect to walking unaided:
- 25% by 11 months
- 50% by 12 months
- 75% by 13 months
- 90% by 15 months
- 97.5% by 18 months

Of those not walking by 18 months some will be normal late walkers. However, 20% will have a significant problem including cerebral palsy, Duchenne muscular dystrophy or global developmental delay.

It is important to have a feel for which milestones are most consistent. Smiling socially by the age of eight weeks is a very consistent milestone and failure to achieve this is a real cause for concern. Crawling is a very inconsistent milestone, it occurs at a widely varying point and some children with normal development never learn to crawl.

It is important to have a few key milestones on which to base your assessment and to know where to go for more detail (see Table 2).

### Developmental assessment

You can gain a brief idea of a child's developmental level by asking a few targeted questions depending on their age and making a careful observation of their behaviour in the clinic room without recourse to more formal assessment.

These questions form the 'Parent Evaluation of Developmental Status' (PEDS). A study using this in children aged 21 to 84 months found it to be as good as most developmental screening tests.

#### Please tell me any concerns about the way your child is behaving, learning and developing.

Any concerns about how she understands what you say? talks? makes speech sounds? uses hands and fingers to do things? uses arms and legs? behaves? gets along with others? is learning to do things for herself? is learning preschool and school skills?

A range of formal developmental tests exist which are based on cross sectional observations of many children. They require specialist training to deliver, but can generate useful information. Those in common use include:
- Bayley II Scales of Infant Development
- Griffiths Abilities of Babies and Young Children

Testing of development is not without pitfalls, points to consider include:
- Testing reflects a single observation and a child who is unwell, tired, hungry or...
anxious may not perform at their usual level.

- Many tests rely heavily on motor skills and a child with difficulties in this area may underperform.
- Some test components do not stand the test of time, most children’s shoes fasten with Velcro now, tying shoe laces is a lost art! To gain a skill you must have experience of it.
- Some tests in widespread use were designed many years ago and may not reflect current societal norms. Children from some ethnic groups may therefore appear to be disadvantaged because of this.

Performing one of these tests of development gives a horizontal assessment of the child in comparison with other children of the same age at a point. In a child about whom there are concerns, a vertical assessment of their abilities over time will allow you to assess rate of progress and skill acquisition.

**Key messages**  
- Parents who are concerned that there is something wrong with their child are usually right.
- A history of loss of skills i.e. regression implies a progressive underlying cause for developmental delay.
- Delayed gross motor development, (sitting and walking) is the least significant pointer to a general delay, but can be the most obvious and most worrying for the parents.
- Almost all normal babies born around their expected due date smile by 8 weeks. Failure to do so should alert you to the possibility that there is a problem.
- Children not walking at 18 months have a 1 in 5 chance of having a significant problem.

**Conclusion**  
Child development can seem baffling to those not used to thinking about it. However, like most things in medicine it is straightforward if you familiarise yourself with what is normal and develop a system for trying to identify what is abnormal. Abnormal patterns or delays in development are essential to recognise in order to identify causes and institute appropriate support.

**REFERENCES**  