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Denver Developmental Screening Test

The Denver Developmental Screening Test© (DDST) is a widely used assessment for examining the developmental progress of children from birth until the age of six, devised in 1969. There were concerns raised from that time about specific items in the test and, coupled with changing normal values, it was decided that a major revision of the test was necessary in 1992 - the DENVER II©.[1] It was originally designed at the University of Colorado Medical Center, Denver, USA.

Developmental delay

Developmental delay occurs in up to 15% of children under 5 years of age.[2] This includes delays in speech and language development, motor development, social-emotional development and cognitive development.

- It is has been estimated that only about half of the children with developmental problems are detected before they begin school.[3]
- Parents are usually the first to pick up signs of possible developmental delay, and any concerns parents have about their child's development should always be taken seriously. However, the absence of parental concern does not necessarily mean that all is well.
- Parental recall of their child's developmental milestones has been demonstrated in a number of studies to be inaccurate, but it is generally more accurate when milestones are significantly delayed.[4]

The main purpose of developmental assessment depends on the age of the child:

- Tests may detect neurological problems such as cerebral palsy in the neonate.
- Tests may reassure parents or detect problems in early infancy.
- Testing in late childhood can help detect academic and social problems early enough to minimise possible negative consequences (although parental concern may be just as good a predictor for some problems).[5]

The move to targeted examinations at ages 2 and 3.5 years, rather than routine, has raised concerns that some conditions, eg pervasive developmental disorder, may be missed.[6] No developmental screening tool can allow for the dynamic nature of child development. A child's performance on one particular day is influenced by many factors. Development is not a linear process - it is characterised by spurts, plateaux and, sometimes regressions. Gradually screening has been replaced by the concept of developmental surveillance.[7] This is a much broader concept. It involves parents, allows for context and should be a flexible, continuous process.

The DENVER II© Developmental Screening Test

Test design

The test consists of up to 125 items, divided into four parts:

- Social/personal: aspects of socialisation inside and outside the home, eg smiling
- Fine motor function: eye/hand co-ordination, and manipulation of small objects, eg grasping and drawing
- Language: production of sounds, ability to recognise, understand, and use of language, eg ability to combine words

- Gross motor functions: motor control, sitting, walking, jumping, and other movements

Ages covered by the tests range from birth to six years.

What differentiates the DENVER II© from other screening tests?

- It enables the tester to compare a child's development with that of over 2,000 children who were in the standardised population, like a growth curve.
- It consists of items in which a sub-sample (race, less educated parents, gender and place of residence), which varied a clinically significant amount from the composite sample, are identified and their norms provided in the DENVER II© Technical Manual.
- It provides a broad variety of standardised items to give a quick overview of the child's development.
- It also contains a behaviour rating scale.
- The test is primarily based upon an examiner's actual observation rather than parental report.

Application

- No special training is required.
- The test takes approximately 20 minutes to administer and interpret.
- There may be some variation in time taken, depending on both the age and co-operation of the child.
- Interviews can be performed by almost anyone who works with children and medical professionals.
- The items are recorded through direct observations of the child plus, for some points, the mother reports whether the child is capable of performing a given task.
- Younger infants can sit on their mother's lap.
- The test should be given slowly.

Interpretation of the test

- The data are presented as age norms, similar to a growth curve.
- Draw a vertical line at the child's chronological age on the charts; if the infant was premature, subtract the months premature from chronological age.
- The more items a child fails to perform (passed by 90% of his/her peers), the more likely the child manifests a significant developmental deviation that warrants further evaluation

Referral

Concerns should prompt referral to a general or developmental paediatrician:

- Most paediatricians would prefer to see children early rather than late.
- If development appears normal, then reassuring anxious parents is always rewarding. On the other hand, if there is developmental delay, intervention at the earliest possible time can make a significant difference to outcome.[8]

Sensitivity rates are reported between 56-83% for the DENVER II©, but specificity may be as low as 43%, rising to 80%.[9] There is a danger of unnecessary referral. However, research has shown that children over-referred (false positives) because of developmental screens perform substantially lower on measures of intelligence, language, and academic achievement - the three best predictors of school success - than children with true negative scores. These children may also carry more psychosocial risk factors, such as limited parental education and minority status. Thus, children with false-positive screening results are an at-risk group for whom diagnostic testing may not be an unnecessary expense, but can serve as a signpost to focus on necessary interventions, eg Head Start programmes - intensive, supported nursery places.[10]

Further reading & references

- Dinkevich E, Hupert J, Moyer VA; Evidence based well child care. BMJ. 2001 Oct 13;323(7317):846-9.

1. Frankenburg WK, Dodds J, Archer P, et al; The Denver II: a major revision and restandardization of the Denver Developmental Screening Test. Pediatrics. 1992 Jan;89(1):91-7. [abstract]
2. National Health and Medical Research Council. Child health screening and surveillance: a critical review of the evidence. Canberra: NHMRC, 2002.; 2002
3. Glascoe FP, Dworkin PH; Obstacles to effective developmental surveillance: errors in clinical reasoning. J Dev Behav Pediatr. 1993 Oct;14(5):344-9. [abstract]
4. Glascoe FP, Dworkin PH; The role of parents in the detection of developmental and behavioral problems. Pediatrics. 1995 Jun;95(6):829-36. [abstract]
5. Glascoe FP; Parents' evaluation of developmental status: how well do parents' concerns identify children with behavioral and emotional problems? Clin Pediatr (Phila). 2003 Mar;42(2):133-8. [abstract]
6. Tebruegge M, Nandini V, Ritchie J; Does routine child health surveillance contribute to the early detection of children with pervasive developmental disorders? An epidemiological study in Kent, U.K. BMC Pediatr. 2004 Mar 3;4:4. [abstract]
7. Oberklaid F, Efron D; Developmental delay--identification and management. Aust Fam Physician. 2005 Sep;34(9):739-42. [abstract]
8. Shonkoff JP, Meisels SJ, editors. Handbook of early childhood intervention. UK: Cambridge University Press, 2000
9. Developmental Screening Toolkit. Website
10. Glascoe FP; Are overreferrals on developmental screening tests really a problem? Arch Pediatr Adolesc Med. 2001 Jan;155(1):54-9. [abstract]

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