

Developmental Learning Disorders: Current Concepts and Management Strategies

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Learning Disorders occur frequently, and are characterized by inadequate development of specific academic skills not related to mental retardation, brain damage or socio-cultural deprivation.

It appears related to an operational difficulty of the central nervous system in gathering, storing and retrieval of information. A "cybernetic" model lends itself well to understanding these processes. Clinical features, locus of impairment, assessment and treatment are described for each type of learning disorder.

The material characterizes such problems in ways that increase clinicians' understanding of the variety of difficulties encountered, making them better able to advise and refer appropriately. (Egypt.J. Psychiat.,1994, 17:155-161).

Introduction

It is estimated that between 5-15 percent of most students present a disorder of learning accomplishing at an age and grade appropriate level.

These disorders are characterized by inadequate development of specific academic, language, speech and motor skills and are not due to demonstrable physical or neurologic disorders, an emotional disturbance, mental retardation or deficient educational opportunities (Silver, 1971).

Rather, their learning difficulty reflects an as yet poorly understood "operational" difficulty of their central nervous system.

These learning disabilities are most commonly manifested as a:

- a- Developmental arithmetic disorder.
- b- Developmental expressive writing disorder.

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c- Developmental reading disorder.

Such disorders in the past have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia (Duane, 1989).

Throughout this century primary care physicians as well as educators, psychologists and other professionals have increasingly focused their attention upon this population of students. This article will endeavour to enhance physicians' awareness, conceptualization and appropriate referral for psychoeducational remediation. Unfortunately such remedial services are virtually non-existent in the UAE. However, awareness of these concepts may enable a physician to work out a helpful plan using a non-specialized teacher.

Historical Background:

Prior to the 1940's in the Western world, children who had academic difficulties were considered to be mentally retarded, emotionally disturbed or socially and culturally disadvantaged. During the 1940's a fourth possibility for these

difficulties was introduced: children might have problems with academic performance for subtle neurologic reasons. This idea presumed that the brain and nervous system was outwardly and grossly intact but that there might be problems in the neural pathways or processing which handicap gathering, storing or retrieving knowledge (Clements, 1966).

Another way of putting this was that the brain functioned differently, possibly due to being "wired" differently rather than being damaged. Recent research supports this latter view, that is one of brain dysfunction rather than brain damage (Tallal, 1985).

Early on, reading disorders were called dyslexia, writing disorders were called dysgraphia and arithmetic disorders were called dyscalculia. Later efforts led to these being incorporated under the general heading of learning disability (L.D.) which is the term preferred among educators.

Studies have consistently shown an increased prevalence of this disorder amongst males. This may be due to the tendency on the part of boys to act out their disability and frustration more than girls who tolerate greater degrees of discomfort, or reflect a generally slower maturation of the male brain often cited to account for sex differences in linguistic and spatial ability.

Associated Disorders

Children with a variety of diagnosed neurologic disorders such as Tourette's Syndrome or Seizure Disorders, show a considerably higher incidence of learning disabilities than would be expected. It had long been known that truly neurologically impaired, i.e. "brain damaged children", presented serious learning disorders. What became more apparent in recent times is that one frequently finds Attention Deficit Hyperactivity Disorder

(ADHD), also referred to as the hyperkinetic child or the hyperactive child, associated with learning disabilities.

Most children and adolescents with learning disabilities also have secondary emotional, social and family problems probably related to the difficulty they have in school but there may be other reasons for this having to do with their limitations in neurologic integration interfering with adaption.

A Cybernetic model for understanding specific developmental learning disorders lends itself well (Tallal, 1985), but is only a convenient model and in no way explains the disorder.

Learning is based on presumed steps used in the brain. The first task is to receive the information and record it in the brain (input). Once recorded this information must be handled in such a way that it can be understood (integration). The third process is storage and retrieval (memory). Finally the information must be communicated from the brain and put into use (output).

Learning disabilities are defined based on this input - integration - memory - output model.

a- Input Disabilities:

This central brain process is that of perception. A person might have a visual perception disability or an auditory perception disability. Visual perception disabilities might be distinguishing subtle differences in shapes of letters or numbers, i.e. misperceiving a d and a b or a 6 and a 9. Such a child might have difficulty with figure-ground tasks, that is not being able to focus on the relevant stimulus in the field of vision.

Auditory perception disabilities might be in the area of distinguishing subtle differences in sounds, thus leading to misunderstanding what is being said. Here too some individuals will have dif-

difficulty with auditory figure-ground, confusing what sounds to listen to when there is more than one source. Such children cannot process sound input well or quickly. They appear to have to think about what is heard before understanding what is said. Besides there being this "auditory lag" they appear to be lost or confused when too much is said.

b- Integration Disabilities:

At least three steps are needed to understand what is recorded in the brain. The stimuli must be sequenced correctly then understood in the context used, i.e. abstraction, and then organized with all other stimuli into a concept. One can have an integration disability in each of these areas and the disability can be for visual or auditory inputs. If one were able to assess a case accurately, one could find visual-sequencing disabilities or auditory - sequencing disabilities and so on with great precision. This is not always possible.

Sequencing disabilities can result in an individual confusing inputs, such as mispronouncing words on the child's level or a child trying to explain something but starting in the middle and then going to the beginning and finally to the end. They can memorize the months of the year for example, but be unable to say what comes after any month without starting with January and working their way up.

The inability to derive the correct meaning of a word based on how it is used is the essence of an abstraction disability. Such individuals may have difficulty generalizing from specific words or concepts, miss the meaning of jokes and even appear unduly suspicious because they interpret what others say in a more concrete way than what is intended.

Organizational disabilities can result in difficulty pulling multiple parts of information into a full or complete con-

cept. Such children can learn individual facts but may not be able to integrate them into a full concept. The disorganization of their thinking may also show itself in notebooks or desks which are totally disorganized or organizing time or making plans with difficulty.

c- Memory Disabilities:

Children with learning disabilities usually have very adequate long term memory. They can retain information once it is stored. Their difficulty however is in short term memory, the inability to concentrate on information and store it. They might seem to learn the information well while attending to it, such as a spelling list, yet not be able to retain this information once they stop attending to it. In order to learn, these students need many more repetitions to process information into long term memory than the average. They can learn, but they must work on the process over and over again.

d- Output Disabilities:

One may have difficulty getting information out of the brain through oral communication, i.e. a language disability, or through the use of the muscles, i.e. a motor disability.

Most individuals have little difficulty with spontaneous language, that is when another person initiates the conversation. In such a case they have the opportunity to organize their thoughts and find words before speaking. Some individuals might have difficulty with demand language, that is when they are asked to produce language by others and they need to organize their thoughts quickly and find the right words to speak. In such situations they might struggle for words, ramble and appear to be disorganized.

Some individuals with learning disabilities have trouble coordinating the use of large muscle groups and yet others coordinating small muscle groups. Gross

motor disabilities will result in the individual being clumsy or having difficulty with such activities as running, climbing or swimming. The most frequently found fine motor disability relates to writing. This skill requires the coordination of teams of small muscles. These individuals have difficulty getting their dominant hand to write in a fast and legible way. In addition to having poor handwriting they may have difficulty with such written language tasks as spelling, grammar, spacing or punctuation.

The Learning Disability Profile:

Each child with a learning disability will have his or her own profile of learning disabilities. Each will have one or more of the above described disabilities. No two children are the same in this regard and each must be assessed and understood individually.

1- Developmental Reading Disorder:

In this disorder there is a marked impairment in the development of word recognition skills and reading comprehension. This disorder is often referred to as "Dyslexia". This disturbance in reading significantly interferes with academic achievement as well as with activities of daily living requiring reading skills.

Aetiology:

The aetiology of this disability is not known and we must fall back on the concepts of problems with input, integration, memory and output.

Children who have difficulty learning to read often have difficulty learning to spell and write. Thus by late primary school they present with several academic skill disorders.

Assessment:

The assessment is made by exclusion rather than inclusion. We test intelligence and find it to be within the normal

range provided we do not give an intelligence requiring much reading. Vision and hearing are normal. Tests of neurologic integration such as the Bender-Gestalt and the Proteus Maze test are reasonably well done. If these indeed are normal and yet we clinically observe the child to be struggling with language in the manner previously described, we can comfortably say that that youngster has a specific reading disorder.

Treatment:

Developmental reading disorders are not curable but they do respond to proper special education approaches. There are a number of approaches used but most of them take advantage of the child's intact strengths and develop a multisensory model using letter - sound - touch associations. An example of such an approach is the Orton-Gillingham method, perhaps the best known, where the child will hear the word, see the word and trace word with his finger thereby reinforcing it through several channels (Ayres, 1972).

2- Developmental Expressive Writing Disorder:

The impairment is in the ability to express oneself in writing that is not explainable by other causes. The diagnosis is to be made only if this impairment significantly interferes with academic achievement or with activities of daily living that require expressive writing skills. It is not meant to be attached to children who have a crude handwriting but otherwise manage. This disorder may be shown by an inability to compose written text or many spelling errors, grammatical or punctuation errors within sentences or poor paragraph organization. Written language includes handwriting, spelling and the way words are put together to form phrases, clauses or sentences (syntax).

The individual may have complex and complete thoughts in his or her head and

may be able to express these thoughts orally with great ease. Yet the same individual may be unable to express these thoughts through written language.

Aetiology:

Here too we fall back on the concepts of input, integration, memory and output disabilities.

Although it is felt that reading and writing disabilities are separate we do see them together in a given child quite frequently. This could be a double deficit however there may be another way of looking at it; slow progress in learning to read might deprive the child of knowledge about writing that is gained through reading (Johnson, 1988).

Diagnosis:

The diagnosis is made by first establishing a discrepancy between writing skill and intelligence and then systematically eliminating all other possible explanations of a physical, neurologic and emotional type.

Treatment:

The treatment of this disorder involves systematic, sequential writing instruction coupled with the provision of opportunities to write. To allow the student to keep up with academic demands while working on this disability, compensatory classroom and home approaches may be used. These approaches include use of typewriters and computers, having more time on tests, and receiving copies of units of material that students might have to copy from the board.

3- Developmental Arithmetic Disorder:

The essential feature of this disorder is marked impairment in the development of arithmetic skills that is not explainable by lack of intelligence, visual or hearing defects, neurologic disorder or inadequate poor schooling and teaching

skills. The level of arithmetic deficit significantly interfere with academic achievement or activities of daily living that require arithmetic skills.

Aetiology:

One relies on the same cybernetic model of input, integration, memory, output debilities. However, with arithmetic disorders it has been found that extrinsic factors frequently play an important role such as a child never attaining basic number skills which he or she has the ability to attain, that is inadequate or incomplete instructional factors (Fleischner et al., 1989). In addition, visual spatial processing deficits are frequently seen followed by a subtle neurologic or possible psychologic difficulty in inability to develop a pattern of strategic problem - solving, that is to have the confidence and aggressiveness to develop a systematic plan for problem solution. In addition, memory plays an important role in that, once a problem solution is underway the student must remember where they are in the process as they proceed from step to step (Hunt & Cohen, 1984).

Diagnosis:

A diagnosis is made by first establishing a discrepancy between arithmetic skill and intelligence and then systematically eliminating all other possible explanations for the discrepancy.

Treatment:

This special education approach to working with this disorder focuses on the development of arithmetic skills. The teacher goes back and re-establishes basic concepts and reinforces these with the use of illustrations and concrete materials. Exercises designed to improve the consolidation of "number facts" is emphasized. New computer systems using interactive video programs may prove to be helpful.

Additional Considerations Regarding Learning Disorders:

Recent research using newer imaging techniques allowing gross and microscopic study of the brain never before available have turned up some possible indications to substantiate the "wiring" problem in certain areas of the brain relating to language. Whether these are the cause or the result of these disorders is unclear (Duane, 1989).

Other studies have focused on difficulties in pregnancy, smoking on the part of the mother during pregnancy, the impact of various medications taken during pregnancy, and in time these newer methodologies and researches may afford a clearer knowledge of the causes of these learning disabilities. However even should this occur they will still only provide greater detail on why and where in the cybernetic model some impairment has taken place (Butter & Goldstien 1973).

Learning Disabilities and Emotional Disturbance:

It has been noted for a long time that children with learning disabilities are far more likely to be seen for emotional disturbance and family dysfunction and be referred to mental health centres for psychiatric assessment. It is easy to understand how emotional disturbance would play a role in interfering with the learning process. On the other hand it is also understandable that a specific learning disability of significant proportion would impact on the child's self-esteem, attitude toward life, school and family and give rise to emotional disturbance. In such cases, psychological therapy will prove necessary in order for the special educational approaches to prove effective (Silver, 1989).

Outcome:

For most, the disorder will persist

through life. The learning disabled child becomes the learning disabled adolescent, who becomes the learning disabled adult. Thus the treatment planning will change with each developmental stage. Some individuals with developmental learning disorders will mature out of the disorder at sometime during the childhood, but this is not the usual course.

The earlier the recognition and the earlier appropriate special educational intervention, the more likely that the individual can overcome or learn to "compensate" for the learning disability. Today in certain countries there are services available in secondary, post-secondary, vocational and even college levels.

Where recognition and treatment is absent or late the outcome can be very poor, giving rise not only to poorly educated youth, but those more prone to a variety of serious emotional disturbances. The best prevention for such disturbances is early recognition of the learning disability, followed by appropriate special educational treatment.

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Les Désordres Développementals D'apprendre: Conceptions Currentes Et Stratégies De Ménagement

Les désordres d'apprendre arrivent fréquemment et sont caractérisés par le développement inadéquate des talents spécifiques et académiques qui n'ont pas de rapport à la retardation mental, au défaut au cerveau ou à la déprivation socio-culturelle. Ils apparaissent dans l'ensemble reliés à une difficulté opérationnelle du système nerveux, accumulation et rappelation des informations. Un modèle "cybernetic" a bien amené lui-même à comprendre ces méthodes. Les images cliniques, les lieux de l'impairment, l'assessment et le traitement sont décrits pour chaque type de désordre d'apprendre. Le matériel caractérise ces problèmes dans des manières qui augmentent le comprend des cliniciens à des variétés de difficultés in-conquérables, tout en les rendant plus capables à conseiller et à référer plus justement.

المفاهيم الحديثة واسيراتيجيات العلاج لاضطرابات التعلم النمائية

تحدث اضطرابات التعلم بشكل متكرر. وتتميز بتطور غير كاف للمهارات الأكاديمية الخاصة غير المرتبطة بالتخلف العقلي أو عطب الدماغ أو الحرمان الاجتماعي - الثقافي. ويبدو أن هذه الاضطرابات مرتبطة بمصاعب في عمل الجهاز العصبي المركزي في تجميع وحفظ واستعادة المعلومات. ويظهر أن "السبرانية" أو علم الضبط هو خير ما ينطبق لفهم هذه العمليات. وتصف هذه الورقة المظاهر السريرية وبؤرة (مركز) الخلل وتقييم وعلاج هذه الحالات لكل نمط من أنماط اضطرابات التعلم.