

Developmental Coordination Disorder Movement

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Summary

The third revised edition of the Diagnostic and statistical manual of mental disorders (DSM-III-R, 1987) of the American Psychiatric Association, includes Developmental Coordination Disorder movements for the first time as a specific developmental disorder (Karabatzaki Z.- Sarris D., 2012). The Developmental Disorder Coordination affects important parts of the human brain associated with the input / output mode information (Research in Developmental Disabilities, 2014, 35o issue) and various aspects of social and psycho-emotional life of man (Rush & Francis, 2000; Smits-Engelsman et al, 2003). The identification of the existence of the disorder takes place through appropriate weighted motor scales (Karapetsas A., 2015, Niemeijer, A.S., Smits-Engelsman, B.C.M & Schoemaker, M.M. 2007). Applying custom-tailored intervention program aimed at improving school performance of children and the normal development of social and emotional relationships.

Key words: Developmental Coordination Disorder, brain, movement disorder, dyspraxia, coordination

Import

The Developmental Coordination Disorder, also known as Dyspraxia, it is a movement disorder characterized by difficulty in developing motor coordination in the chronological age of the child (Karapetsas A., 2015, American Psychological Association, 2013, Zwicker, Missiuna Harris & Boyd, 2012). Children face a range of difficulties in posture, motion and coordination without the presence of neurological, mental or musculoskeletal causes (Karapetsas A., 2015, American Psychological Association, 2013, Zwicker, Missiuna Harris & Boyd, 2012).

Several resources are used in the literature to describe the one situation in which dominant element seems to be the lack of psychomotor coordination (Barkley et al, 2002; Bender & Smith, 1990; Morton, 2004; Sugden & Chambers, 2005). Some such conditions are: Clumsy child syndrome, motor clumsiness, developmental dyspraxia, developmental apraxia, non verbal apraxia, perceptual damage, minimal brain dysfunction, minimal brain damage, agnosia, developmental delay, psychomotor retardation. Each score indicates its origin (medical, neurological, educational psychology, etc.), but also the confusion as to the etiology of the phenomenon (Cratty, 1994; Dussart, 1994; Kirby, 2005; Visser, 2003).

Features- subcategories of Developmental Coordination Disorder

Children with the syndrome of Developmental Coordination Disorder exhibit poor motor coordination, clumsiness, difficulties with fine motor skills, such as difficulties of coordination of the fingers, difficulties with gross motor skills such as walking, running, balance and climbing, as well as display audio-motor dysfunctions (Piek & Dyck,2004).

Despite the widespread damage in almost all areas of motor performance, children with Developmental Coordination Disorder show significant changes in the extent and pattern of perceptual deficits (Tsai, Wilson, &

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Wu, 2008). Some studies have suggested the separation of the aforementioned disorder categorized by visual glitches (Hoare, 1994; Macnab, Miller & Polatajko, 2001). These are: deficits in visual-motor integration (Bonifacci, 2004; Van Wael Velde, De Weerd, De Cock & Smits-Englesman, 2004; Wilson & McKenzie, 1998), reduced visual sensitivity (Sigmundsson, Hassen & Talcott, 2003) or visuospatial processing (Wilson & McKenzie, 1998). The visual perception of the identity of objects and locating space, and is closely related to the mode of action. Any deficit in this processing network driven design problems, spontaneous motion correction and feedback control (Wilson & McKenzie, 1998).

They should also take into account the four criteria established by the D.M.S IV (1994) for the evaluation of Developmental Coordination Disorder which are:

1. The performance of daily activities that require motor coordination is lower than expected (taking into account chronological age and mental capacity of the child). Manifested a significant delay in motor milestones conquest damaged, clumsiness, poor performance in sports.
2. The daily life of a child affected by the above.
3. The etiology of the disorder is not medicine (cerebral palsy, hemiplegia, or muscular dystrophy) or Pervasive Developmental Disorder.
4. If coexisting mental retardation, the disabilities are in addition to those associated with mental retardation

Frequency

According to the literature, the incidence of Developmental Coordination Disorder is between 5-7%, and the boy-girl ratio is about 2: 1, which is fully in line with the distribution of the disorder in the general population (Cermak & Larkin, 2002).

Developmental Coordination Disorder and health

The existence of this disorder in the child indirectly affects the mental and physical health. In health clinic level are sometimes responsible for the occurrence of heart disease, childhood obesity and mental health is responsible for the low self-esteem, high stress levels and lower social acceptance of children who develop this disorder (Tsai, Wilson & Wu, 2008).

Rationale

Various views on the etiology of Developmental Coordination Disorder formulated. The Gubbay that the

disturbance has genetic influences (1975) and the lists that Koutsouki hereditary factor plays an important role in skillfully piece (2001). Another theory that has been attributed to the ground Disorder Resonance is that of "minimal brain dysfunction" (Clements, 1966), whereby the poor motor coordination due to neurological impairment. But mobility difficulties due to "sensory dysfunctions" in the sense that the child with difficulties in movement can be correctly attributed sensory or perceptual information regarding the movement and turn it into skilful move (Ayres, 1985). In a recent study of Zwicker, Missiuna & Harris, (2010), reported that children with A.D.S. trigger-visual spatial processing to perform fine skill activities, unlike the 'typical developing children "which only activate the spatial processing. This suggests a different brain function among children with A. Board and "standard population". In conclusion many theories and hypotheses have been put forward for the investigation of the etiology of Developmental Coordination Disorder, but the data collected is not likely if the support and it is not possible to give a final answer on its origin (Flouris, Faught, Hay & Cairney, 2005).

Coexistence with other disorders

One of the special features of the developmental disorder of motor coordination is the heterogeneity not only in relation to perceptual dysfunction profile but also in relation to the presence of additional impairments such as ADHD, dyslexia, behavioral problems and psychiatric disorders (Missiuna, 2003; Sugden & Wright, 1998). Although these latest surveys indicate the coexistence of Developmental Coordination Disorder with ADHD, Dyslexia and Specific Learning Difficulties in up to about 50% (Cruddace & Riddell, 2006; Visscher, Howwen, Scherder, Moolenaar & Hartman, 2007; Kaplan, Wilson, Dewey & Crawford, 1998).

Appraisal

Early diagnosis of children with Developmental Coordination Disorder can lead to proper design intervention programs so that they can avoid secondary problems, which may occur from the aforementioned disorder (Wright & Sugden, 1998; Polatajko, Fox & Missiuna, 1995). Evaluation of disturbance used appropriately weighted kinetic test. The most widely used test for evaluation of Developmental Coordination Disorder is the Movement Assessment Battery for Children (Henderson & Sugden, 1992). In 2007 it appeared the motor test Movement Assessment Battery for Children - 2 (MABC-2, Henderson, Sugden & Barnett, 2007), which

is the renewed form of kinetic tests Movement Assessment Battery for Children (MABC, Henderson & Sugden, 1992) which underwent changes and improvements. The content of MABC-2 (Henderson, Sugden & Barnett, 2007) are associated with the older test as studies of the reliability of the previous version can confirm the credibility of the renewed version. The Movement Assessment Battery for Children is designed in such a way that it can be used by a wide professionals serving (PE teachers, physiotherapists, occupational therapists, psychologists, etc.), furthermore, the fact that is easy to transport makes it as a handy tool.

Confrontation

Addressing the Developmental Coordination Disorder is a suitably designed intervention programs that are tailored and personalized was consistent with the needs and specificities of each student. These programs aim to improve the performance of students and the normalization of social and family relationships concluded during their student life.

Mentioned two basic methods of intervention: 1) the method based on dynamic system oriented skills and aims to improve performance in this capacity, and 2) the method based on the processing of information and neurocognitive testing methods and the principles of kinetic learning. The aim of the latter method is to treat information processing deficits.

However, last made the appearance of a new method that combines the practical and the two aforementioned methods. This ecological method based on cognitive motion model and aims to address the motor deficits in the wider ecological environment (school, family, community) with the participation of children throughout their life activities (Sudgen, 2007).

Conclusions

The Developmental Coordination Disorder is a disorder that is common in children of school age. It can coexist with other developmental disorders and learning difficulties, and sometimes it is responsible for the occurrence of secondary problems (health, psychosocial, school performance). It is a developmental disorder that with the passage of time can not be cured, however, following the application of the child appropriate intervention programs can improve school performance; to collect social acceptance to participate in motor activities and improve social relations.

References

- American Psychological Association Diagnostic and statistical manual of mental disorders. (2013).
- Ayres, A.J. *Developmental Dyspraxia and adult onset apraxia*. Torrance CA: Sensory Integration. (1985).
- Barkley, R.A., Shelton, T.L., Crosswait, C., Moorehouse, M., Fletcher, K., Barrett, S., Jenkins, L., & Metevia, L. Preschool children with disruptive behavior: Three-year outcome as a function of adaptive disability. *Development and Psychopathology*, (2002). 14, 45-67.
- Bonifacci, P. Children with low motor ability have lower visual- motor integration ability but unaffected perceptual skills. *Human Movement Science*, (2004) 23(2), 157-168.
- Cantin, N., Polatajko, H. J., Thach, W.T., & Jaglal, S. Developmental coordination disorder: Exploration of a cerebellar hypothesis. *Human Movement Science*, (2007) 26(3), 491-509.
- Cermak, S.A., & Larkin D. *Developmental coordination disorder*. Canada: Thomson Learning (2002).
- Clements, S.D. *Minimal brain dysfunction in children: Terminology and identification (NINDS Monograph No 3, U.S. Public Health Service Publication No14-15) Washington D.C.: U.S. Government Printing Office, (1996).*
- Cratty, B. J. *Clumsy child Syndromes. Descriptions, Evaluation and Remediation*. U.S.A : Harwood Academic Publishers (1994).
- Cruddace, S.A. & Riddell, P.M. Attention Deficits Processes in Children with Movement Difficulties, Reading Difficulties or Both. *J of Abnorm Child Psychol*, (2006) 34, 675-683.
- Flouris, A., Faight, B.E., Hay, J. & Cairney, J Exploring the evidence of developmental disorders. *Dev. Med Child Neurology*, (2005). 47,436.
- Gubbay, S.S. *The clumsy children. A study of developmental apraxic and agnostic ataxia.5 in the series: Major problems in neurology* London: Sanders Co. Ltd. (1975).
- Henderson, S.E. & Sugden, D. A. *Movement Assessment Battery for Children*. London: The Psychological Corporation, Harcourt Brace Jovanovich. (1992).
- Hoare, D. Subtypes of developmental coordination disorder. *Adapted Physical Activity Quarterly*, (1994). 11 (2), 158-169.
- Karabatzaki Z.- Sarris D., intervention program for children with developmental coordination disorder of movement. *Pedagogical reason*, issue 1. (2012),
- Karapetsas A. *Neuropsychology of developing human*, Editor edition (2015).
- Kaplan, B.J., Wilson, B.N. Dewey, D. & Crawford, S.G. D.C.D. may not be a discrete disorder. *Human Movement Science*, (1998). 17, 471-490.
- Koutsouki, D. *Special Physical Education. Theory and Practice*. Athena (2001).
- Missiouana, S., Gaines, R., Soucie, H. & McLean, J. Parental Questions about developmental coordination disorder: A synopsis of current evidence. *Paeditr Child Health*, (2006) 11(8), 507-512.
- Niemeijer, A.S., Smits-Engelsman, B.C.M & Schoemaker, M.M. Neuromotor task training for children with developmental coordination disorder: A controlled trial. *Developmental Medicine and Child Neurology*, (2007) 49(6),406-411.
- Piek, J. P., & Dyck, M.J. Sensory-motor deficits in children with developmental coordination disorder, attention deficit hyperactivity disorder and autistic disorder. *Human Movement Science*, (2004) 23(3-4), 475-488.
- Research in Developmental Disabilities, 35ο τεύχος, (2014)
- Rush, A.J., & Francis, A. (Eds) *Expert consensus guideline series: Treatment of psychiatric and behavioral problems in mental retardation*. *American Journal of Mental Retardation*, (2000) 105, 159-228.
- Sigmundsson, H., Hansen, P. C. & Talcott, J. B Do 'clumsy' children have visual deficits. *Behavioural Brain Research*, (2003) 139(1-2), 123-129.
- Smits-Engelsman, B.C.M., Wilson, P.H Westenberg , Y., & Duysens, J. Fine motor deficiens in children with developmental coordination disorder and learning disabilities: An underlying open-loop control deficit. *Human Movement Science*, (2003) 22, 459-513.
- Sugden, D. Current approaches to intervention in children with developmental coordination disorder. *Developmental Medicine & Child Neurology*, (2007). 49, 467-471.
- Tsai, Wilson & Wu, Role of visual – perceptual skills (non motor) in children with developmental coordination disorders. *Human Movement Science*, (2008) 27(4), 649-664.
- Visscher, C., Howwen, S., Scherder, E.J.A., Molenaar, B. & Hartman, E. Motor profile of children with developmental speech and language disorders. *Pediatrics*, (2007) 120(1), 158-163.
- Wilson, P. H., & McKenzie, B. E. Information processing deficits associated with developmental coordination disorder: A meta-analysis of research findings. *Journal of child Psychology and Psychiatry*, (1998) 39(6), 829-840.
- Wright, C.H.& Sugden, D.A. A School Based Intervention Programme for Children with Developmental Coordination Problem. *European Journal of Physical Education*, (1998) 3, 35-50.
- Zwicker, Missiouana Harris & Boyd, *Developmental coordination disorder: A review and update*. *European Journal of Pediatric Neurology* (2012) 16(6), 573-581.