

Melillo R, Leisman G. (2009) **Autistic spectrum disorders as functional disconnection syndrome**. Rev Neurosci. 20(2):111-31.

F.R. Carrick Institute for Clinical Ergonomics, Rehabilitation, and Applied Neuroscience of Leeds Metropolitan University, Leeds, UK.

ABSTRACT

We outline the basis of how functional disconnection with reduced activity and coherence in the right hemisphere would explain all of the symptoms of autistic spectrum disorder as well as the observed increases in sympathetic activation. If the problem of autistic spectrum disorder is primarily one of desynchronization and ineffective interhemispheric communication, then the best way to address the symptoms is to improve coordination between areas of the brain. To do that the best approach would include multimodal therapeutics that would include a combination of somatosensory, cognitive, behavioral, and biochemical interventions all directed at improving overall health, reducing inflammation and increasing right hemisphere activity to the level that it becomes temporally coherent with the left hemisphere. We hypothesize that the unilateral increased hemispheric stimulation has the effect of increasing the temporal oscillations within the thalamocortical pathways bringing it closer to the oscillation rate of the adequately functioning hemisphere. We propose that increasing the baseline oscillation speed of one entire hemisphere will enhance the coordination and coherence between the two hemispheres allowing for enhanced motor and cognitive binding.

PMID: 19774789 [PubMed - indexed for MEDLINE]

Gerry Leisman, MD, PhD^{1,2}, Robert Melillo, DC, MSc^{1,3}, Sharon Thum, MSc^{1,3}, Mark A Ransom, MSc¹, Michael Orlando, DC¹, Christopher Tice, DC¹ and Frederick R Carrick, DC, PhD⁴ (2010) Running title: Underactive hemispheric function in ADD **The effect of hemisphere specific remediation strategies on the academic performance outcome of children with ADD/ADHD** Int J Adolesc Med Health 2010;22(2):00-00.

1The FR Carrick Institute for Clinical Ergonomics, Rehabilitation and Applied Neuroscience, Mineola, New York, United States, 2University of Haifa, Israel, 3Department of Psychology, DeMontfort University, United Kingdom and 4Carrick Institute for Graduate Studies, Cape Canaveral, Florida, United States of America

Abstract: The development and normal function of the cerebrum is largely dependent on sub-cortical structures such as the cerebellum and basal ganglia. Dysfunction in these areas can affect both the nonspecific arousal system and information transfer in the brain. Dysfunction of this sort often results in motor and sensory symptoms commonly seen in children with ADD/ADHD. These brain regions have been reported to be underactive, with that underactivity restricted to the right or left side of the sub-cortical and cortical regions. An imbalance of activity or arousal of one side of the cortex can result in a functional disconnection similar to

that seen in splitbrain patients. Since ADD/ADHD children exhibit deficient performance on tests thought to measure perceptual laterality, evidence of weak laterality or failure to develop laterality has been found across various modalities (auditory, visual, tactile) resulting in abnormal cerebral organization and associated dysfunctional specialization needed for lateralized processing of language and non-language function. This study examines groups of ADD/ADHD elementary school children from first through sixth grade. All participants were administered all of the subtests of the WIAT, the Brown Parent Questionnaire and given objective performance measures on tests of motor and sensory coordinative abilities (interactive metronome). Results measured after a twelve-week remediation program aimed at increasing the activity of the hypothesized underactive right hemisphere function, yielded significant improvement of greater than two years in grade level in all domains except in mathematical reasoning. Results are discussed in the context of the concept of functional disconnectivity in ADD/ADHD children. **Keywords:** Attention deficit hyperactivity disorder, ADD, hemispheric function, rehabilitation, synchronized metronome

Robin Pauc (2005) Comorbidity of dyslexia, dyspraxia, attention deficit disorder (ADD), attention deficit hyperactive disorder (ADHD), obsessive compulsive disorder (OCD) and Tourette's syndrome in children: A prospective epidemiological study *Clinical Chiropractic, Volume 8, Issue 4, Pages 189-198*

Summary

Background context

Currently dyslexia, dyspraxia, attention deficit disorder, attention deficit hyperactive disorder, obsessive compulsive disorder and Tourette's syndrome of childhood are considered as being separate disorders. There is now evidence to suggest that, on the basis of comorbidity, they should be downgraded to symptoms that will appear in syndromes of developmental delay.

Purpose

To establish that a child diagnosed by a health practitioner or educational professional as having a single disorder in fact presents symptoms of other disorders in a pattern of comorbidity.

Method

A prospective epidemiological study of 100 children attending a specialist clinic.

Results

A clear pattern of comorbidity was demonstrated. Whilst not always quantifiable, no patient was found to have one condition in isolation and comorbidity rates were found at incidences of up to 95%, representing an increase on the expected prevalence in a general population of 160–2300%.

Conclusion

The patterns of comorbidity occurred with such frequency that it would suggest that there could be an argument for the downgrading of these conditions from disorders per se to symptoms and that further investigation might suggest that the patterns of comorbidity may fit the criteria for a developmental delay syndrome.

Robin Pauc, Antoinette Young (2006) Foetal distress and birth interventions in children with developmental delay syndromes: A prospective controlled trial *Clinical Chiropractic, Volume 9, Issue 4, Pages 182-185*

Summary

Objective

To investigate the incidence of birth intervention/foetal distress in children with developmental delay syndromes (attention deficit disorder, attention deficit hyperactivity disorder, dyslexia, dyspraxia, obsessive compulsive disorder, Tourette's syndrome of childhood, autistic spectrum disorders).

Methodology

A population of 100 children aged 4–15 years and diagnosed with developmental delay syndrome(s) were investigated using a parental questionnaire to determine whether they had suffered any birth interventions or distress. These results were compared with an age- and gender-matched control group.

Results

On the basis of this relatively small study, significant risk of development delay syndrome(s) occurred with both foetal distress ($p < 0.001$) and Ventouse assisted delivery ($p < 0.01$).

Robin Pauc, Antoinette Young (2009) The history of von Economo neurons (VENs) and their possible role in neurodevelopmental/neuropsychiatric disorders: A literature review *Clinical Chiropractic, Volume 12, Issue 3, Pages 101-108*

Summary

Background

Von Economo neurons (VENs) develop late in the gestational period, not starting to be produced until the 35th week, when only 15% of the total adult population develops. Their development, migration and synaptogenesis is then halted until the 4th postnatal month when a second generation of cells begins to develop in a process that continues until the 4th year of life. They migrate to three areas of the human brain and to date have only been found in the great apes, certain whales, elephants, bottlenose dolphins and in very small numbers in the manatee. It has been suggested that their presence in these limited species is related to the degree of encephalization and a high brain to body ratio. They are species specific in terms of numbers present, structure, location and columnar arrangement. It has been suggested that the evolution of humans was driven by the emergence of large social networks and it is possible that VENs in humans, whales, great apes, dolphins and elephants may have a vital role in the development of this social behaviour.

Objective

To draw together research being conducted into the presence of von Economo neurons, their location, number of cells present, their migration, their connections, and the neurodevelopment of the paediatric brain and discuss their possible role in neurodevelopmental/neuropsychiatric disorders.

Design

This study was a review of the available literature.

Method

The Boolean operators (von Economo cells OR spindle cells) AND anterior cingulate; von Economo cells AND (infraorbital area OR frontal pole) were used to perform a computerised literature search of MEDLINE, Science Direct, Cochrane Library, Science Citation Index, SCOPUS, CINAHL and the worldwide web. Papers chosen were limited to those concerning human studies, the great apes, cetaceans and the African and Indian elephants.

Robin Pauc (2008) The occurrence, identification and treatment of convergence failure in children with dyslexia, dyspraxia, attention deficit disorder (ADD), attention deficit hyperactive disorder (AD/HD), obsessive compulsive disorder (OCD) and Tourette's syndrome *Clinical Chiropractic, Volume 11, Issue 3, September 2008, Pages 130-137*

Summary

This paper examines a neurological manifestation, convergence insufficiency, as yet not considered in association with the primary diagnosis of learning/behavioural disorders. When the data from a previous study were initially examined what appeared to be a significantly high number of the children (57%) demonstrated

convergence failure on testing. The data were then sorted and convergence failure related to the primary diagnosis, comorbidity patterns and other neurological findings. The conclusion based on this relatively small case series would suggest that a high percentage of children have convergence failure – in association with the primary condition – which can be effectively monitored using a computer generated program and efficiently treated by a combination of cerebellar-based exercises and a computer generated treatment program.

Cooper J, Feldman J. (2009) **Reduction of symptoms in binocular anomalies using computerized home therapy-HTS**. Optometry. 80(9):481-6.

State University of New York, New York, USA. cooperjsc1@gmail.com

BACKGROUND: Asthenopic symptoms often are associated with various accommodative/vergence disorders. Recent studies have found that symptoms associated with convergence insufficiency are reduced by in-office vision therapy with supplemental home therapy. No studies have used standardized symptom questionnaires to evaluate the effectiveness of either in-office or home-based vision therapy in binocular anomalies other than convergence insufficiency. This retrospective study was designed to evaluate the changes in symptoms using an automated, home computer vision therapy program (HTS) in accommodative/vergence disorders.

METHODS: A retrospective study of 43 presbyopic patients who completed the HTS was performed. Before and immediately after treatment all patients in this study completed a 15-question symptom questionnaire (Convergence Insufficiency Symptom Survey). Treatment consisted of various accommodative and vergence activities. **RESULTS:** Initial symptoms scores on the scaled questionnaire were 32.8 (SD = 8.1); after therapy they were 20.6 (SD = 11.5). These changes were both clinically and statistically significant. Forty percent were "normalized" and 55% improved. Convergence amplitude improved from 22Delta to 53Delta after treatment, and divergence amplitudes improved from 15Delta to 25Delta. These findings were clinically significant. Lastly, more than 75% of the patients finished the program by 40 sessions (equivalent to 8 weeks).

CONCLUSION: Automated vision therapy delivered by the HTS system improved convergence and divergence amplitudes with a concomitant reduction in symptoms. The HTS system should be used on those patients with symptoms associated with an accommodative/vergence anomaly when in-office vision therapy supplemented with home therapy is not practical.

Goss DA, Downing DB, Lowther AH, Horner DG, Blemker M, Donaldson L, Malson T, Gray KH. (2007) **The Effect of HTS Vision Therapy Conducted in a School Setting on Reading Skills in Third and Fourth Grade Students.** *Optom Vis Dev.* 38(1):27-32.

ABSTRACT

Background: Home Therapy System (HTS) is a computer program designed to improve accommodation, vergence, and eye movements. The purpose of the research described in this paper was to investigate whether normalization of accommodation, vergence, and eye movements in third and fourth grade students using HTS vision therapy in a school setting improved reading performance.

Methods: Subjects were divided into two groups: those receiving real therapy (n=39) and those receiving placebo therapy (n=32). The school year ended before any of the 39 treatment subjects had reached HTS criteria for therapy completion. Therefore, we performed a second study which was composed of a control Group which did not receive therapy and a second Group which received active HTS therapy. Fourteen of the 34 treatment subjects had sufficient training to meet or exceed all seven of the HTS training goals. School achievement scores were measured with the STAR test.

Results: In the first study, the mean increases in reading grade equivalent were 0.7 (SD=1.0) for the treatment group, and 0.9 (SD=1.1) for the placebo group; and the mean increases in math grade equivalent were 1.5 (SD=1.5) for the treatment group, and 1.3 (SD=1.5) for the placebo group, neither difference being statistically significant. In the second study, the mean increases in reading grade equivalent were 1.4 (SD=0.7) in the treatment group, and 1.0 (SD=0.8) in the control group. These results showed a statistically significant difference ($p < 0.01$). The mean increase in grade equivalent for 14 treatment subjects who reached all of the HTS recommended post-therapy training goals was 1.8 (SD=0.7), which was significantly greater than the increase in the treatment subjects who did not reach those goals ($p < 0.005$).

Conclusions: The results of the first study demonstrate that when HTS training is not completed according to the recommended criteria, reading scores will not improve more than with placebo therapy. The greater increase in grade equivalent reading scores in the treatment group than in the control group in the second study suggests a positive effect of training when the HTS program is carried out to completion. Our results suggest the importance of completing the recommended training protocols in order to achieve significant improvements in reading with the HTS system.

KEY WORDS

fusional vergence, math skills, ocular accommodation, ocular convergence, orthoptics, reading skills, vision therapy.