



ELSEVIER

RESOURCE DOCUMENT

Autism: A chiropractic perspective

Jane Jennings*, Martina Barker

Newbury Chiropractic Centre, 6 Cheap Street, Newbury, Berkshire RG14 5DD, UK

Received 12 July 2004; received in revised form 21 June 2005; accepted 16 August 2005

KEYWORDS

Autism;
Behavioural
abnormalities;
Aetiology;
Chiropractic;
Pediatrics;
Spinal manipulative
therapy

Summary Chiropractors, as with other primary healthcare clinicians, are often faced with a child whom they suspect may have symptoms of autism, often previously undiagnosed. As such, it is important that there is familiarity with the symptoms, primary of which are difficulties in communicating or relating to other people. Although there is no known cause for autism, various potential aetiologies are under investigation. A number of abnormalities are found in multiple systems and functions in the autistic individual who presents a number of management challenges.

Some researchers have discovered a laterality of the atlas in children with autism and there are various suggestions as to why removing upper cervical dysfunction may have a positive effect on the symptoms of autism. This paper offers a systematic review of the condition with emphasis on the elements pertinent to the manual therapist.

© 2005 The College of Chiropractors. Published by Elsevier Ltd. All rights reserved.

Introduction

Autism is a life-long developmental disability, which, in the United Kingdom, affects approximately 90 people in every 10,000. Put into clinical perspective, this means that the average general practitioner (GP) will have 18 people with autism on their list.¹

Individuals with autism are affected in different ways, but all seem to suffer from a triad of impairments: difficulty in interacting with others, impairments in social communication and difficulty thinking imaginatively. An absence of play is often one of the first obvious signs of autism.

The cause of autism is unknown; there are no universally accepted explanations. Current research favours a genetic component,^{2,3} although other factors are also implicated, including environmental triggers and imbalances in neurochemistry.⁴

There is no medication that can 'cure' autism. When medication is used, it is to treat a particular symptom of the syndrome.⁵ Specialist education often dramatically improves the quality of life for sufferers and their families.¹

Many chiropractors and other manipulative therapists report good symptomatic improvements following treatment.⁶ However, there is little literature available to support these claims.

Autism affects the way a person communicates and relates to people around them, particularly with respect to understanding other people's emotional expression. Learning difficulties may further compound the difficulties that they face.¹

* Corresponding author. Tel.: +44 1635 48088.

E-mail address: newburychiropracticcentre@hotmail.com (J. Jennings).

Table 1 Symptoms of the autistic spectrum.¹

Behavioural
Obsession, ritualistic or bizarre behaviour
Challenging behaviour and self injury (e.g. banging head against wall)
Handles or spins objects
Interactive
Inappropriate eye contact
Inappropriate laughing or giggling
One-sided interaction
Echolalic (parrots words)
Play
Inability to transfer skills from one setting to another
Lack of creative, pretend play
Does not play with other children
Joins in only if adults insists/persists
Psychological
High levels of anxiety
Lack of motivation
Social
Ability to perform tasks not involving social understanding quickly/well
Indicates need by holding an adult's hand
Talks incessantly about one topic

The clinical picture of autism varies between individuals and it is for this reason that the concept of a spectrum of disorders was developed.⁷ The spectrum of autistic conditions is wide ranging. It varies from profound disability in some through to subtle problems of understanding in others of apparently average or above average intelligence. The

autistic spectrum includes a number of other conditions that may or may not be separate syndromes, notably Asperger's syndrome. A diagnosis of Asperger's syndrome tends to include individuals at the higher functioning end of the autistic spectrum.

Wing,⁸ whose work is still relevant today, described individuals with autism as having a triad of impairments:

- Absence or impairment of two-way social interaction.
- Absence or impairment of comprehension and the use of language and non-verbal communication.
- Absence or impairment of true flexible imaginative activity, substituted by a narrow range of repetitive, stereotyped pursuits.

This disability leads to related problems that may include those listed in [Table 1](#).

On average, parents first become concerned when their child is around 18 months of age and usually seek help at about two years.⁹ However, it can often take years before a firm diagnosis is made. The Checklist for Autism in Toddlers (CHAT) ([Table 2](#)) aims to screen for autism in young children.¹⁰ This survey was designed for use by GPs or health visitors at the 18-month check and can be completed in about 5 min. Baron-Cohen et al.'s¹¹ study in 1996 screened 16,000 children at their 18-month check and found that consistent failure of the CHAT indicates an 83% risk of autism; however, the false positive rate is not known.

Table 2 Checklist for autism in toddlers.¹⁰

Questions for the parent	Physician's observations
1. Does your child ever pretend, for example, to make a cup of tea by using a toy cup and teapot or pretend other things?	1. During the appointment, has the child made eye contact with you?
2. Does your child ever use his or her index finger to point, to indicate interest in something?	2. Get the child's attention, then point across the room at an interesting object and say, "Oh look! There's a (name object)." Watch the child's face. Does the child look across to see what you are pointing at?
3. Does your child take an interest in other children?	3. Get the child's attention, and then give the child a miniature toy cup and teapot and say, "Can you make a cup of tea?" Does the child pretend to pour tea, drink it, etc.? (May use other objects for pretend play.)
4. Does your child enjoy playing peek-a-boo or hide-and-seek?	4. Say to the child, "Where's the light?" or "Show me the light." Does the child point with his or her index finger at the light?
5. Does your child ever bring objects over to you to show you something?	

[If the answer to two or more in either of the above is "no," autism is suspected].

Aetiology

To date, the literature fails to identify any anatomical, physiological or neurochemical cause for autism. That is not to suggest that no abnormalities have been found. Instead, it is the quantity and diversity of abnormalities, found in multiple systems and functions, associated with a wide range of potential aetiological agents and processes that is confounding. As yet, no single measure of abnormality is consistently found in all or even most cases of autism, and none has been shown to be unique or pathogenomic of autism.^{4,12}

Research is currently focused on a number of different areas.

Neuroanatomical approach

Some studies report^{2,4} that macrocephaly occurs in 10–20% of autistic individuals. Three possible mechanisms for brain enlargement have been proposed⁴: increased neurogenesis, decreased neuronal death and increased production of non-neuronal brain tissue. The finding that head circumference at birth is near normal but increases in the early post-natal period is consistent with decreased programmed cell death since neurogenesis occurs mainly in the post-natal period.

Ritvo et al.¹³ noted that there was a loss of Purkinje cells in the cerebella of four subjects with autism. The cerebellum is known to be primarily concerned with the maintenance of bodily balance and motor co-ordination, although it is also implicated in a number of cognitive and affective processes. Buitelaar and Willemsen-Swinkels⁴ reported that abnormalities of the limbic system and the cerebellum might be linked to the core social and communicative deficits in autism. However, it is important to note that not all autistic brains are found to contain these abnormalities so it is by no means conclusive evidence of the involvement of these factors in the aetiology of autism.

Neurochemical approach

Current interest in the neurochemistry of autism is focused on serotonin. Elevation of the blood levels of serotonin in individuals with autism is a well-replicated finding.¹⁴

Any implication of serotonin in the pathogenesis of autism would be of great interest. Serotonin performs a critical role during embryogenesis and maturation of the brain and has a modulatory effect on a variety of important processes such as sensory

perception, learning and memory, motor function and sleep, which are often affected in autism.

Genetic approach

The genetic approach focuses on the identification of inheritable factors for aspects of autism. Lord et al.² demonstrated a sibling recurrence risk of approximately 4.5% relative to a population incidence and estimated prevalence of 0.1–0.5%. The most compelling evidence for high heritability is the greater than 50% concordance rate for identical twins relative to an approximate 3% concordance for non-identical twins.²

Family genetic studies have documented the presence of a range of conditions and characteristics in the non-autistic relatives of individuals with autism. It may be that one or both parents of autistic children have the phenotype but are so mildly affected that they continue to function in their environment as 'normal'. However, their child may express the genotype more fully, leading to a diagnosis of an autistic spectrum disorder. The parent(s) may be at one end of the autistic spectrum, the child towards the other end, with obvious and recognisable disabilities.¹⁵

Measles, mumps and rubella (MMR) vaccination and autism

Concerns about the MMR vaccine and autism first surfaced in the UK in 1998, when gastroenterologist Dr. Andrew Wakefield reported on 12 children with developmental disorders (9 with autism) who had gastrointestinal disturbances similar to irritable bowel syndrome.¹⁶ Wakefield's team looked for the measles virus in the intestines of such children and began to formulate theories about a possible link between MMR vaccine and a subtype of autism that includes bowel symptoms.

At the same time, some parents noticed behavioural changes and bowel disturbances following their children's MMR vaccine.¹⁷ Combined with these parental reports, Wakefield's publication triggered several epidemiological studies^{18,19} and many hundreds of letters and articles in the medical press. Subsequent publicity caused large reductions in uptake of the MMR vaccine in many areas, increasing the incidence of measles and the risks associated with the disease (pneumonia, deafness and encephalitis) to rise.

In March 2004, the Lancet²⁰ published a statement regarding serious allegations of research misconduct concerning Dr Wakefield's original 1998 study. However, Dr. Wakefield's response²¹ claims misrepresentation.

There have been numerous large scale studies since Wakefield's allegations.^{22–24} These studies have found no link between the MMR vaccine and the development of autistic spectrum disorders.

Current allopathic management approaches

As yet, there is no medication that can 'cure' autism, nor are there any medications approved for use in the direct treatment of autism. Medication is usually used to treat a particular symptom or group of related symptoms that are not specific to autism, such as hyperactivity, aggression and self-injurious behaviours.⁵

Manipulative care

Many chiropractors and other manipulative therapists purport to treat autism and related disorders and report good improvements. However, there are only a handful of published papers regarding the efficacy or mechanism by which manipulative care can help.

Most of the available literature is in the form of anecdotal case reports rather than larger, more meaningful studies. Barnes⁶ is typical with his claims that, under certain circumstances, children with autism may receive clinical benefit or palliative relief of concurrent problems via chiropractic intervention. Manipulation may, therefore, help with some of the associated symptoms, rather than cure or treat the underlying disease process. Despite these limited claims for success for some children, it may be the associated symptoms that are the most distressing, and preventing them from leading a more normal life.¹⁵

Aguilar et al.²⁵ carried out a series of chiropractic adjustments on 26 autistic children over a 9-month period. Twelve were found to have a left atlas

laterality and 14 had a right atlas laterality. Outcomes from the study were varied but included normalization of deep tendon reflexes and dermatomal subjective sensation, increased cervical range of motion and reduction of other health problems. Many of the children were taken off Ritalin, bladder and bowel control improved, some children started to speak and eye contact and attention span also improved in some children. Hyperactivity and aggressive behaviour were reduced in other children and five children were able to attend mainstream classes at school for the first time. Behavioural data, recorded by the teachers and parents, showed significant improvements in most cases.

The authors of the study believed that the children were suffering from neurological interference contributing to their diagnosis of autism. This neurological interference was thought to have hindered the development of the child, interfering with their ability to reach their full potential. Aguilar et al.²⁵ believed that correcting a chiropractic subluxation improves local neurological function, allowing for more neurological integration, enabling an overall improvement in function.

Grostick²⁶ supported this view, stating that "abnormal movement of a cervical vertebra is capable of transmitting pathologic forces to the spinal cord and brainstem". Grostick²⁶ proposed that a misalignment of the first cervical vertebra (atlas) could produce neurological insult directly via mechanical irritation of the spinal cord, and indirectly via vascular compromise of the cervical cord.

Whilst the Aguilar et al. study²⁵ may be one of the most comprehensive yet performed, it still has significant methodological weaknesses. There was no control group and the authors themselves concede that the subjective results could be due in part or in full to natural maturation. However, the observations of these children are encouraging and Aguilar et al.²⁵ suggested that follow up studies of the link between upper cervical adjusting, the nervous system and behaviours are warranted.

Table 3 Treatment guidelines for children with autism.⁶

- Establish consistent treatment routines. Since many of these children are disturbed by change, it is best to maintain a general consistency in the way each child is greeted, treated and sent home from visit to visit.
- Avoid any loud disturbances during treatment. Hypersensitivity to a sound is a common problem and may even interfere with therapy. A relaxed quiet environment will promote effective care.
- Distraction is key. Having an assistant distract the child with finger puppets or story books for instance, may allow the clinician to work more effectively.
- Be alert for non-verbal cues of discomfort from the child; these may be areas in need of attention.
- Question parents about changes in behaviour patterns. Significant changes for a child with autism may include the cessation of curious behaviours such as headstands, spinning objects and tugging at clothing. Positive change may also be indicated by an increase in the repertoire of foods the child will eat or an improved use of vocabulary.

Barnes⁶ has worked with many autistic children and has developed a list of guidelines for manipulative therapists to help maximise the benefits of the treatment (Table 3).

Case studies, anecdotal reports and uncontrolled trials do not provide proof of the efficacy of chiropractic care for autistic individuals. However, for some patients and parents, the results are significant and may make a positive difference to their quality of life.

Conclusion

Autism is a life-long developmental disability characterised by impairments in social interaction, communication and imagination.

There is still no agreement regarding the causes of autism, in spite of the many years of research. The areas currently under investigation include anatomy and neurology, as well as the neurochemical and genetic aspects of the condition. There are no medications licensed to treat autism; drugs are used to treat symptoms such as aggression and hyperactivity and special educational techniques are used to help autistic individuals to realise their potential.

Many chiropractors and other manipulative therapists report symptomatic improvements in behaviour following treatment, particularly upper cervical adjusting. However, whilst case studies and anecdotal reports are encouraging, further research in the form of larger, controlled trials are needed to establish the role of manipulative care in the treatment of autism.

References

1. National Autistic Society fact sheet 1—Important facts about autism and Asperger syndrome for GPs.
2. Lord C, Cook EH, Leventhal BL, Amaral DG. Autism spectrum disorders, review. *Neuron* 2000;28:355–63.
3. Baker P, Piven J, Schwatz S. Brief report; Duplication of chromosome 15q 11-13 in 2 individuals with autistic disorder. *J Autism Dev Disord* 1994;24:529–35.
4. Buitelaar J, Willemsen-Swinkels S. Autism: current theories regarding its pathogenesis and implications for rational pharmacotherapy. *Paediatr Drugs* 2000;2(1):67–81.
5. Dragulev I. The use of medication for people with autism. *Autism Netw* 2000;6:1.
6. Barnes T. Chiropractic management of the special needs child. *Top Clin Chiropractic* 1997;4(4):9–18.
7. Wing L. The continuum of autistic characteristics. In: Schopler E, Mesibov GB, editors. *Diagnosis and Assessment of Autism*. New York: Plenum Press; 1998.
8. Wing L, Gould J. Severe impairments of social interaction and associated abnormalities in children: epidemiology and classification. *J Autism Dev Disord* 1979;9:11–29.
9. Howlin P, Moore A. Diagnosis in autism. *Autism* 1997;1:135–62.
10. Baron-Cohen S, Allen J, Gillberg C. Can autism be detected at 18 months? The needle, the haystack, and the CHAT. *Br J Psychiatry* 1992;161:839–43.
11. Baron-Cohen S, Cox A, Baird G. Psychological markers in the detection of autism in infancy in a large population. *Br J Psychiatry* 1996;168:158–63.
12. Buitelaar J, Willemsen-Swinkels S. The autistic spectrum: subgroups, boundaries and treatment. *Psychiatr Clin North Am* 2002;25(4):811–36.
13. Ritvo ER, Freeman BJ, Scheibel AB, Duong T, Robinson H, Guthrie D, et al. Lower purkinje cell counts in the cerebella of four autistic subjects: initial findings of the UCLA-NSAC Autopsy Research Report. *Am J Psychiatry* 1986;143:862–6.
14. Minderaa RB, Anderson GM, Volmar FR. Whole blood serotonin and tryptophan in autism: temporal stability and the effects of medication. *J Autism Dev Disord* 1989;19:129–36.
15. Jennings J. Current aetiology and treatment of autism: a literature review. Aecc Library 2002.
16. Wakefield AJ, Murch SH, Anthony A, Linnell J, Casson D, Malik M, et al. Ileal-lymphoid-nodular hyperplasia, non-specific colitis and pervasive-developmental disorder in children. *Lancet* 1998;351:637–41.
17. Vastag B. Congressional autism hearings continue, no evidence MMR vaccine causes disorder. *J Am Med Assoc* 2001;285(20):2567–9.
18. Patja A, Davidkin I, Kurki T, Kallio MJ, Valle M, Peltola H. Serious adverse events after measles, mumps and rubella vaccination during a fourteen year prospective follow up. *Paediatr Infect Dis J* 2000;19(12):1127–34.
19. DeStefano F, Chen RT. Autism and measles, mumps and rubella vaccine: no epidemiological evidence for a causal association. *J Pediatr* 2000;136:125–6.
20. A statement by the editors of The Lancet. *Lancet* 2004;363:820–4.
21. Wakefield A. A statement by Dr. Andrew Wakefield. *Lancet* 2004;363:823–4.
22. Madsen KM, Vestergaard M. MMR vaccination and autism: what is the evidence for a causal association? *Drug Saf* 2004;27(12):831–40.
23. Chen W, Landau S, Sham P, Fombonne. No evidence for links between autism, MMR and measles virus. *Psychol Med* 2004;34(3):543–53.
24. Honda H, Shimizu Y, Rutter M. No effect of MMR withdrawal on the incidence of autism: a total population study. *J Child Psychiatry* 2005;46(6):572–9.
25. Aguilar AL, Grostic JD, Pflieger B. Chiropractic care and behaviour in autistic children. *J Clin Chiropractic Pediatr* 2000;5(1):293–304.
26. Grostic J. Dentate ligament—cord distortion hypothesis. *Chiropractic Res J* 1998;1(1):50.