

	Research support for the applied kinesiology management of childhood health problems
<p>Cuthbert S, Rosner A. Applied kinesiology methods for a 10-year-old child with headaches, neck pain, asthma, and reading disabilities.</p>	<p><i>J Chiro Med.</i> 2010; 9(3):138-145.</p> <p>Objective: The purpose of this case report is to describe the chiropractic care of a 10-year-old boy who presented with developmental delay syndromes, asthma, and chronic neck and head pain and to present an overview of his muscular imbalances during manual muscle testing evaluation that guided the interventions offered to this child. Clinical Features: The child was a poor reader, suffered eye strain while reading, had poor memory for classroom material, and was unable to move easily from one line of text to another during reading. He was using 4 medications for the asthma but was still symptomatic during exercise. Intervention and Outcome: Chiropractic care, using applied kinesiology, guided evaluation, and treatment. Following spinal and cranial treatment, the patient showed improvement in his reading ability, head and neck pain, and respiratory distress. His ability to read improved (in 3 weeks, after 5 treatments), performing at his own grade level. He has remained symptom free for 2 years. Conclusion: The care provided to this patient seemed to help resolve his chronic musculoskeletal dysfunction and pain and improve his academic performance.</p>

<p>Applied Kinesiology Management of Candidiasis and Chronic Ear Infections: A Case History, Cuthbert S, Rosner A.</p>	<p><i>J. Pediatric, Maternal & Family Health</i> - August 3, 2010.</p> <p>Objective: To describe the use of Applied Kinesiology (AK) in the management of a pre-adolescent female with candidiasis, recurrent ear infections, and severe postural imbalances that occurred when these infections were present. Clinical Features: This six-year-old patient had painful earaches on a monthly basis since the age of 4-months. She had undergone antibiotic treatment 25 times in her life, suffered two urinary tract infections, and displayed oral thrush.</p> <p>Exposure to water and cold air consistently produced an ear infection according to her parents. Intervention & Outcome: AK methods were utilized to diagnose and treat this patient with rapid resolution of her candidiasis, ear pain in cold air and water, and ear infections. She has been symptom-free for 2 years since her first 4 AK treatments over a three-month period. Conclusion: In this case a multi-modal chiropractic system for the evaluation of muscle-joint subluxations were useful for the discovery of a number of complex causative factors underlying this patient's digestive and immune system compromise, as well as her recurring infections and earaches.</p>
<p>Cuthbert SC, Barras M. Developmental delay syndromes: psychometric testing before and after chiropractic treatment of 157 children.</p>	<p><i>J Manipulative Physiol Ther.</i> 2009 Oct;32(8):660-9.</p> <p>OBJECTIVE: This study presents a case series of 157 children with developmental delay syndromes, including the conditions such as dyspraxia, dyslexia, attention-deficit hyperactivity disorder, and learning disabilities who received chiropractic care. CLINICAL FEATURES: A consecutive sample of 157 children aged 6 to 13 years (86 boys and 71 girls) with difficulties in reading, learning, social interaction, and school performance who met these inclusion criteria were included. INTERVENTION AND OUTCOMES: Each patient received a multimodal chiropractic treatment protocol, applied kinesiology chiropractic technique. The outcome measures were a series of 8 standardized psychometric tests given to the children by a certified speech therapist pre- and posttreatment, which evaluate 20 separate areas of cognitive function, including patient- or parent-reported improvements in school performance, social interaction, and sporting activities. Individual and group data showed that at the end of treatment, the 157 children showed improvements in the 8 psychometric tests and 20 areas of cognitive function compared with their values before treatment. Their ability to concentrate, maintain focus and attention, and control impulsivity and their performance at home and school improved. CONCLUSIONS: This report suggests that a multimodal chiropractic method that assesses and treats motor dysfunction reduced symptoms and enhanced the cognitive performance in this group of children.</p>
<p>Developmental Delay Syndromes and Chiropractic: A Case Report. Blum C, Cuthbert S.</p>	<p><i>J Ped Matern Fam Health.</i> Aug 2009: 3.</p> <p>Objective: Issues regarding chiropractic treatment for various types of conditions such as developmental delay syndromes, while controversial to some, have some support in the literature. At this time developmental delay syndromes such as ADHD have inconclusive etiologies. While many consider developmental delay disorders solely genetic in origin, others have supported the concept that a subset of patients may have a trauma or other physical related imbalances that could be contributory to the patient's dysfunction.</p> <p>Clinical Features: Presented is a case of fraternal twins where one twin's developmental and emotional growth was notably delayed compared to her other twin. Chiropractic cranial care was rendered, which appeared to assist a positive outcome for the treated child.</p> <p>Interventions and Outcomes: Perhaps a better way of interpreting chiropractic's ability to help patients with learning disabilities, dyslexia, dyspraxia, and ADHD, is viewing a specific subset of patients as having their conditions secondary to trauma. With developmental delay syndromes there are various related possible chiropractic interventions, such as cranial related therapies and upper cervical, cervical and even treatment for pelvic related dysfunction.</p> <p>Conclusion: Since there is some question as to the causation of the various developmental</p>

delay syndromes, this ultimately leads to some lack of clarity on treatment options, particularly for children sensitive to medication or who do not choose medication as an option. Patients are seeking alternative care, and particularly care that offers low risk and some benefit should be brought to their attention. While the studies are inconclusive, there is an emerging evidence base that does show chiropractic care can be involved in the treatment and care of patients with developmental delay syndromes. Greater study is needed into understanding which patients might best benefit from chiropractic care, where co-treatment is indicated, and consistent outcome assessment tools to measure changes so mechanisms of care can be evaluated.

A randomised controlled trial of the Neuro Emotional Technique (NET) for childhood Attention Deficit Hyperactivity Disorder (ADHD): a protocol. Karpouzis F, Pollard H, Bonello R.

Trials. 2009 Jan 27;10(1):6.

ABSTRACT:

BACKGROUND: An abundance of literature is dedicated to research for the treatment of Attention Deficit Hyperactivity Disorder (ADHD). Most, is in the area of pharmacological therapies with less emphasis in psychotherapy and psychosocial interventions and even less in the area of complementary and alternative medicine (CAM). The use of CAM has increased over the years, especially for developmental and behavioral disorders, such as ADHD. 60-65% of parents with children with ADHD have used CAM. Medical evidence supports a multidisciplinary approach (i.e. pharmacological and psychosocial) for the best clinical outcomes. The Neuro Emotional Technique (NET), a branch of Chiropractic, was designed to address the biopsychosocial aspects of acute and chronic conditions including non-musculoskeletal conditions. Anecdotally, it has been suggested that ADHD may be managed effectively by NET. Design/methods A placebo controlled, double blind randomised clinical trial was designed to assess the effectiveness of NET on a cohort of children with medically diagnosed ADHD. Children aged 5-12 years who met the inclusion criteria were randomised to one of three groups. The control group continued on their existing medical regimen and the intervention and placebo groups had the addition of the NET and sham NET protocols added to their regimen respectively. These two groups attended a clinical facility twice a week for the first month and then once a month for six months. The Conners' Rating Scales (CRS) were used at the start of the study to establish baseline data and then in one month and in seven months time, at the conclusion of the study. The primary outcome measures chosen were the Conners' ADHD Index and Conners' Global Index. The secondary outcome measures chosen were the DSM-IV: Inattentive, the DSM-IV:Hyperactive-Impulsive, and the DSM-IV:Total subscales from the Conners' Rating Scales, monitoring changes in inattention, hyperactivity and impulsivity. Calculations for the sample size were set with a significance level of 0.05 and the power of 80%, yielding a sample size of 93. **DISCUSSION:** The present study should provide information as to whether the addition of NET to an existing medical regimen can improve outcomes for children with ADHD.

Comment: Within the framework of AK there are many examination and therapeutic procedures that are intimately involved with the mental-emotional side of the triad of health. As AK has grown and branched into so many areas within the healing arts, it has become apparent that many mental and emotional problems are due to physiologic dysfunction. When the body is returned to normal function, the mental or emotional problem is often eliminated or the patient is better able to cope with it. The literature on the AK and its associated MMT systems of diagnosis and treatment in relationship to children with various kinds of cognitive and behavioral disorders is growing. This paper is an important contribution to our understanding of how manual treatments may be helpful in these children.

Relationship between foot strength and motor function in preschool-age children. Rose KJ, Burns J, North KN.

Neuromuscul Disord. 2009 Feb;19(2):104-7. Epub 2008 Dec 3.

Abstract: Foot weakness occurs in many paediatric neuromuscular disorders, which overtime can cause considerable functional motor difficulties. Measuring foot strength with hand-held dynamometry is reliable in preschool-age children, but its validity in this age group is unknown. If foot strength measures are collected as endpoints in clinical trials, they should represent functionally meaningful outcomes. We evaluated the foot strength-motor function relationship in 60 healthy children aged 2-4 years. Foot strength measures included inversion, eversion, dorsiflexion and plantarflexion using hand-held dynamometry. Motor function parameters included time to run 10-m, standing long jump distance and vertical jump height. **Measures of foot strength showed significant correlations with all measures of motor function (r=0.40-0.57, p<0.001).** Hand-held dynamometry may be used as a valid and functionally meaningful measure of foot strength in very young children.

A Multi-Modal Chiropractic Treatment Approach for Asthma:

Chiropr J Aust 2008;38:17-27.

<p>a 10-Patient Retrospective Case Series, Cuthbert SC.</p>	<p>Objective: To describe the clinical management of 10 cases of childhood asthma using a conservative, multi-modal treatment approach based on applied kinesiology (AK) chiropractic methods. Clinical Features: Ten patients are presented (7 male, 3 female) between the ages of 3 and 22. Each patient had been medically diagnosed and treated for asthma, and all patients were taking one or more asthma medications. Intervention and Outcome: After physical, orthopaedic and AK manual muscle testing examination, the patients were admitted to a multi-modal treatment protocol including chiropractic manipulative therapy, cranial manipulative therapy, muscle therapies aimed at strengthening the muscles of respiration, and nutritional evaluation using the methods developed in applied kinesiology chiropractic. Outcome measures for the study included subjective/objective visual analogue respiratory impairment scales (VAS), improvement in exercise-induced asthma symptoms, reduction in respiratory distress with daily activity, reduction in the frequency of coughing during the day and night, and ease of breathing. These assessments were gathered from both the children and their parents or guardians. Additionally, each patient was able to go off their asthma medications over a range of 3-6 visits (covering a range of 14 days to 5 months times) without a return of their asthma symptoms. All the patients remained off their medications during a follow-up period ranging from 3 months to 4 years. Conclusion: A percentage of patients presenting to chiropractors have asthma. This case series report suggests that a potential benefit may exist in asthma-associated symptoms for selected cases treated with this multi-modal chiropractic protocol.</p>
<p>Applied Kinesiology: An Effective Complementary Treatment for Children with Down Syndrome, Cuthbert SC.</p>	<p><i>Townsend Letter.</i> 2007 July;288:94-107.</p> <p>Abstract: This essay describes 15 children's case histories who have Down syndrome, and provides their clinical findings and their evaluation and treatment using applied kinesiology methods. Children with Down syndrome will be developmentally slower than their siblings and peers and have intellectual functioning in the moderately disabled range, but the range is enormous and the distance from their peers is the crucial factor where chiropractic and cranial therapeutics can make a profound difference.</p>
<p>Sunflower therapy for children with specific learning difficulties (dyslexia): a randomised, controlled trial. Bull L.</p>	<p><i>Complement Ther Clin Pract.</i> 2007 Feb;13(1):15-24. Epub 2006 Dec 15.</p> <p>The aim of the study was to determine the clinical and perceived effectiveness of the Sunflower therapy in the treatment of childhood dyslexia. The Sunflower therapy includes applied kinesiology, physical manipulation, massage, homeopathy, herbal remedies and neuro-linguistic programming. A multi-centred, randomised controlled trial was undertaken with 70 dyslexic children aged 6-13 years. The research study aimed to test the research hypothesis that dyslexic children 'feel better' and 'perform better' as a result of treatment by the Sunflower therapy. Children in the treatment group and the control group were assessed using a battery of standardised cognitive, Literacy and self-esteem tests before and after the intervention. Parents of children in the treatment group gave feedback on their experience of the Sunflower therapy. Test scores were compared using the Mann Whitney, and Wilcoxon statistical tests. While both groups of children improved in some of their test scores over time, there were no statistically significant improvements in cognitive or Literacy test performance associated with the treatment. However, there were statistically significant improvements in academic self-esteem, and reading self-esteem, for the treatment group. The majority of parents (57.13%) felt that the Sunflower therapy was effective in the treatment of learning difficulties. Further research is required to verify these findings, and should include a control group receiving a dummy treatment to exclude placebo effects.</p>
<p>The Effects of Chiropractic Care on Individuals Suffering from Learning Disabilities and Dyslexia: A Review of the Literature, Pauli Y.</p>	<p><i>J Vertebral Subluxation Res</i> 2007, Jan 15:1-12.</p> <p>Objective: To present current mainstream and alternative theories about learning disabilities, with a special emphasis on dyslexia, as well as to systematically review the chiropractic and related literature about the effects of chiropractic care in people suffering from learning disabilities and dyslexia, and to compare chiropractic causal theories to accepted medical</p>

	<p>models. Methods: Computerized and hand searching of the various databases Mantis, ICL, CRAC as well as the Proceedings of the International College of Applied Kinesiology were conducted with the following index terms: “dyslexia”, “learning”, “learning disabilities”, “learning disorders”, “applied kinesiology”, and “neurologic disorganization”. The retrieved literature was selected or rejected according to predetermined inclusion and exclusion criteria and was subsequently classified according to level of evidence and critically reviewed on predefined methodologic criteria. We also compared the various causal chiropractic theories to accepted mainstream science causal theories of learning disability and dyslexia. Results: Eight studies met our criteria. Four of them belonged to the lowest class of evidence, for a total of 25 anecdotal reports. The remaining four were before/after studies. None of the studies met all of our predefined methodologic criteria. Points of interests and methodologic weaknesses are discussed. Conclusion: All studies reviewed suggested a positive effect of chiropractic care in individuals suffering from learning disabilities and dyslexia. However, the various methodological weaknesses of those studies preclude any definitive conclusions and all the results are therefore to be considered preliminary. Within those limitations, there seem to exist a potential role for chiropractic care in improving various cognitive modalities known to be essential in learning. The model of vertebral subluxation and its effects on cognitive function may serve as a link between the field of chiropractic care and the neuroscience of those disorders. Comment: This paper offers an excellent review of AK concepts regarding the treatment of children with learning disabilities and dyslexia. This is an extensive review and a description of the evidence-base in the literature regarding outcomes for these children who have been treated with AK.</p>
<p>Assessment of muscle strength of hip joints in children with idiopathic scoliosis, Pingot M, Czernicki J, Kubacki J.</p>	<p><i>Ortop Traumatol Rehabil.</i> 2007 Nov-Dec;9(6):636-43.</p> <p>BACKGROUND: The choice of an appropriate approach to the treatment of idiopathic scoliosis is considerably complicated owing to the lack of a clear-cut aetiology of this condition. Idiopathic scoliosis impairs the body's biomechanical balance and adversely affects body statics. MATERIAL AND METHODS: The muscle torques of the flexor and extensor muscles of the hip joints were assessed in 123 children (96 girls and 27 boys) aged from 8 to 16 with the I degrees scoliosis. Statistically significant differences (p>0.05) were revealed. RESULTS: The primary lumbar scoliosis was to the left in 109 patients (Group 1) and to the right in 14 patients (Group 2). All children participated in a 6-month exercise programme to strengthen the weakened muscle groups. Torque measurements were performed twice: immediately after the child joined the rehabilitation programme and on completion of the programme. The strength of the weakened muscles was seen to increase to a statistically non-significant level (p>0.05). CONCLUSIONS: 1. Exercises strengthening weakened muscles of the hip joint improve the posture of scoliotic children and can be helpful in treating idiopathic scoliosis. 2. Differences in the strength of the flexors and extensors of the hip joint impair body statics and may constitute one of the causes of idiopathic scoliosis in children.</p>
<p>A method for comparing manual muscle strength measurements with joint moments during walking, Fosang A, Baker R.</p>	<p><i>Gait Posture.</i> 2006 Dec;24(4):406-11. Epub 2006 Jan 18.</p> <p>Abstract: This paper describes a protocol for dynamometer assisted manual muscle testing of the major muscle groups of the lower extremity and its application to 11 able-bodied children who also had conventional gait analysis to obtain joint kinetics. Data from the manual muscle testing was processed in such a way that the results for maximum muscle strength (grade 5) and resistance against gravity alone (grade 3) were presented in Nm/kg allowing direct comparison with conventional joint kinetics. The strength measurements of the hip muscles and the knee extensors were between two and three times the moments exerted during normal walking. Those of the knee flexors and dorsiflexors were about five times the joint moments. Measured plantarflexor strength was only just greater than the moment exerted during walking. These results, particularly those for the plantarflexors,</p>

	<p>question how valid it is to use measures of isometric muscle strength as indicators of muscle function during activity. The study also compares grade 3 muscle strength with both grade 5 strength and the maximum joint moments. For all muscle groups tested grade 3 muscle strength was less than the maximum moment exerted during normal walking. For the plantarflexors it was less than 1% of that moment. The study demonstrates that reliable isometric muscle testing is possible in able-bodied children but requires considerable care and is time consuming. More work is required to understand how measurements made in this way relate to how muscles function during activity.</p> <p>Comment: Many studies have compared the findings of MMT with dynamometer tests favorably, however dynamometers are not as sensitive to changes in strength nor to strength measurements below 3 during the MMT. The human examiner is the most sensitive of all instruments in relationship to interpreting the MMT.</p>
<p>Improvement in paraspinal muscle tone, autonomic function and quality of life in four children with cerebral palsy undergoing subluxation based chiropractic care: Four retrospective case studies and review of the literature, McCoy M, Malakhova E, Safronov Y, Kent C, Scire P.</p>	<p><i>J Vertebral Subluxation Research</i>, June 21, 2006:1-15.</p> <p>Objective: To review the literature and present results experienced by four children with cerebral palsy who underwent chiropractic care to reduce vertebral subluxation. Clinical Features: Four children previously diagnosed with cerebral palsy secondary to birth trauma. All four demonstrated objective evidence of vertebral subluxation. Intervention and Outcomes: Chiropractic care directed at reduction of subluxation was undertaken. Paraspinal surface electromyography and thermography readings were taken prior to the initiation of care and approximately one month (12 visits) later. The mothers and care providers in each case monitored changes in activities of daily living and quality of life. All four children showed improvement in paraspinal muscle tone (improved symmetry and decreased amplitude) as well as a decrease in the number of levels of abnormal thermography readings. All four children showed improvement in activities of daily living including mobility, feeding, and postural control. Conclusion: Improvement in muscle tone and autonomic function coupled with improvement in activities of daily living occurred in these four patients undergoing chiropractic care for reduction of vertebral subluxation. It is suggested that larger studies of this nature be carried out.</p>
<p><i>Neurobehavioral disorders of childhood: an evolutionary perspective</i>, Melillo R, Leisman G.</p>	<p>Kluwer Academic: New York, 2004.</p> <p>This ground-breaking textbook shows that motor dysfunction, and specifically muscular inhibition, is a very common comorbidity associated for children with neurobehavioral disorders and brain dysfunction. Because of this neurological reality, a reliable clinical tool for the diagnosis of this muscular inhibition is desirable. The best tests for children are those that are safe, reliable, and valid. Poor motor performance is most practically assessed in the clinic using the MMT. Every doctor using AK should be familiar with this excellent textbook.</p>

<p>Proposed mechanisms and treatment strategies for motion sickness disorder: A case series, Cuthbert S.</p>	<p><i>Journal Chiro Med</i>, Spring 2006;5(1):22-31.</p> <p>Objective: To present an overview of symptomatic motion sickness disorder, with allopathic and chiropractic approaches for treatment. A convenience sample of three representative cases is presented involving patients with motion sickness, ranging in age from 9 to 66. All three patients had suffered from this condition throughout their lives.</p> <p>Clinical Features: A discussion of the hypothesis of sensory conflict as a causative factor in cases of motion sickness will be given. Specific diagnostic tests and clinical rationales in relation to the diagnosis and chiropractic treatment of patients with motion sickness will be presented. Intervention and Outcome: Following spinal and cranial manipulative treatment the three patients were able to travel long distances without nausea, sickness, or dizziness. The evaluation of these patients' responses to treatment was determined by the doctor's observation, the patients' subjective description of symptoms while riding in a motor vehicle, the Visual Analog Scale for Neck and Associated Pain, and applied kinesiology chiropractic physical assessment tools. Conclusion: Further studies into chiropractic manipulative treatments for sensory conflict and proprioceptive dysfunctions associated with the problem of motion sickness are indicated. The hypothesis of sensory conflict as the cause of motion sickness should be explored more fully by other chiropractic physicians and researchers.</p>
<p>AK classic case management: enuresis, Goodheart GJ.</p>	<p><i>Int J AK and Kinesio Med</i>, 2003;16: 22-23.</p> <p>Many doctors and many parents are deeply concerned with the problems that enuresis produces in the children under their care. Attempts have been made to ascribe this troublesome condition to psychic or emotional causes. Efforts have been made to use conditioned reflexes and elaborate moisture sensing devices to alleviate the problem of bed-wetting. Spontaneous cessation of the symptoms sometimes occurs as the child grows older. Fluid restriction and interruption of the child's sleep by the parent to allow the child to void any accumulation of fluids is good management of the situation. This is a physical, functional, structural problem associated with disturbances of the segments, not at the kidney and bladder areas of the spine, but at C3, which is associated with the innervation of the phrenic and intercostals nerves. The respiratory center is located in the lower brain stem and consists of two division, an inspiratory and an expiratory center. This respiratory center is powerfully affected by changes in the CO₂ content of the blood, in that, as the CO₂ level rises, the respiratory center is stimulated. It vents off or washes out the accumulating CO₂ by increasing the depth or frequency of respiration or both. This increase in the depth or the frequency of the respiration must be accomplished by an increased excursion of the diaphragm, and this action must be accomplished by the phrenic nerve, which is basically derived from the segments at cervicals 3, 4, and 5, principally at cervical 3. The depth of sleep varies with children and adults on two distinct curves. In most adults, sleep deepens rapidly to the end of the first hour, then sharply shallows out, and then gradually shallows its curve until the person awakens. In the child the sleep curve is different. There are two periods of deepest sleep in children. The initial period occurs in the first one or two hours. There is a second deep sleep curve at the eighth and ninth hour, following which the curve sharply shallows, as does the adults' curve, as the child nears awakening. It is these different patterns of sleep that are sometimes responsible for the oft told admonition "not to worry", that the child will outgrow the condition. This is occasionally true but is only sheer chance and unpredictable to say the least. As the child sleeps, either at the first deep period or at the second deep period, and as the sleep deepens, there is an occasional sighing respiration as the CO₂ is vented off by action of the respiratory center. If the nerve control to the diaphragm is normal, there is no interruption of sleep nor is there any involuntary voiding or urine.</p>
<p>Pediatric case history: cost effective treatment of block naso-lacrimal canal utilizing applied kinesiology tenets,</p>	<p><i>Int J AK and Kinesio Med</i>, 2003;16:34.</p> <p>Abstract: To present a case discussing the successful treatment of a blocked tear duct in a 14-month-old boy. Through the use of surrogate testing – a technique unique to applied kinesiology – cranial and spinal lesions were specifically identified for correction. This</p>

Maykel W.	approach provides a safe, cost effective approach and should therefore be considered as a standard first line of treatment for this condition. Further studies should be designed to elucidate this.
The use of osteopathic manipulative treatment as adjuvant therapy in children with recurrent acute otitis media, Mills MV, Henley CE, Barnes LL, Carreiro JE, Degenhardt BF.	<p><i>Arch Pediatr Adolesc Med.</i> 2003 Sep;157(9):861-6.</p> <p>OBJECTIVE: To study effects of osteopathic manipulative treatment as an adjuvant therapy to routine pediatric care in children with recurrent acute otitis media (AOM). STUDY DESIGN: Patients 6 months to 6 years old with 3 episodes of AOM in the previous 6 months, or 4 in the previous year, who were not already surgical candidates were placed randomly into 2 groups: one receiving routine pediatric care, the other receiving routine care plus osteopathic manipulative treatment. Both groups received an equal number of study encounters to monitor behavior and obtain tympanograms. Clinical status was monitored with review of pediatric records. The pediatrician was blinded to patient group and study outcomes, and the osteopathic physician was blinded to patient clinical course. MAIN OUTCOME MEASURES: We monitored frequency of episodes of AOM, antibiotic use, surgical interventions, various behaviors, and tympanometric and audiometric performance. RESULTS: A total of 57 patients, 25 intervention patients and 32 control patients, met criteria and completed the study. Adjusting for the baseline frequency before study entry, intervention patients had fewer episodes of AOM (mean group difference per month, -0.14 [95% confidence interval, -0.27 to 0.00]; P =.04), fewer surgical procedures (intervention patients, 1; control patients, 8; P =.03), and more mean surgery-free months (intervention patients, 6.00; control patients, 5.25; P =.01). Baseline and final tympanograms obtained by the audiologist showed an increased frequency of more normal tympanogram types in the intervention group, with an adjusted mean group difference of 0.55 (95% confidence interval, 0.08 to 1.02; P =.02). No adverse reactions were reported. CONCLUSIONS: The results of this study suggest a potential benefit of osteopathic manipulative treatment as adjuvant therapy in children with recurrent AOM; it may prevent or decrease surgical intervention or antibiotic overuse.</p>
Reliability of 4 outcome measures in pediatric spinal muscular atrophy, Iannaccone ST, Hynan LS, American Spinal Muscular Atrophy Randomized Trials (AmSMART) Group.	<p><i>Arch Neurol.</i> 2003 Aug;60(8):1130-6.</p> <p>BACKGROUND: Spinal muscular atrophy is a common neurologic disorder of infants and children with a high mortality rate. Clinical trials have not been attempted in this population until recently. OBJECTIVE: To demonstrate that 4 outcome measures are reliable for use in clinical trials in patients with spinal muscular atrophy. DESIGN, SETTING, PATIENTS: Thirty-eight children with spinal muscular atrophy who fulfilled inclusion and exclusion criteria were enrolled at 5 pediatric centers for a reliability study. Paired samples statistics were performed comparing results of the qualifying variance visit with a fourth visit. MAIN OUTCOME MEASURES: Quantitative muscle testing and the Gross Motor Function Measure. RESULTS: Thirty-four patients and 7 evaluators completed the study. Thirteen patients were aged 2 through 4 years and 21 were 5 through 17 years. The Gross Motor Function Measure was completed by 34 subjects. Six variables for pulmonary function tests were measured in 20 subjects. Quantitative muscle testing was performed on 21 subjects in 8 muscle groups. Thirty-three subjects completed the PedsQL Neuromuscular Module for Parents. The intraclass correlation coefficient and Bradley-Blackwood procedures indicated a very high level of agreement between measures. CONCLUSION: The Gross Motor Function Measure, pulmonary function tests, quantitative muscle testing, and quality of life are reliable outcome measures for clinical trials in pediatric spinal muscular atrophy.</p>
Quantitative study of muscle spindles in suboccipital muscles of human fetuses, Kulkarni V, Chandy MJ, Babu KS.	<p><i>Neurol India.</i> 2001 Dec;49(4):355-9.</p> <p>Abstract: The proprioceptive inputs from the cervical musculature play an important role in head-eye co-ordination and postural processes. Deep cervical muscles in humans are shown to have high spindle content. The density, distribution and morphology of muscle spindles</p>

	<p>were studied in superior oblique capitis, inferior oblique capitis and rectus capitis posterior major and minor three small suboccipital muscles. The muscles were obtained, post-mortem from stillborn human foetus. The spindle density was calculated as the ratio of mean spindle content to the mean wet weight of that muscle in grams. The distribution and arrangement of spindles within the muscle and their arrangement was studied. The spindle density of superior oblique muscle was found to be 190, that of inferior oblique was 242 and the rectus capitis posterior contained 98 spindles per gram of muscle. No tendon organs were seen. The serial transverse sections of inferior oblique muscle revealed muscle spindles of varying sizes, length varying between 100-650 microns and, diameter 50-250 microns. A complex parallel arrangement of group of large spindles were seen in the belly of the inferior oblique muscle, while the polar regions contain few small isolated spindles. The relevance of such high spindle receptor content in these tiny muscles is discussed.</p> <p>Comment: Postural instability in children may contribute to various learning and behavior problems, including attention deficit disorder and complex developmental disorders. Many children who fall within these categories will demonstrate significant posture and balance dysfunctions when carefully tested. More often than not, the postural deficit is related to a biomechanical dysfunction, which can be addressed with the proper manipulative therapy. More than 40% of the sensors relaying proprioceptive information are found in the cervical region. The suboccipital area is critically important to proprioception, and it is the area most frequently faulted in proprioceptive examination and treatment. Grostic, Sweat, and other upper cervical chiropractic researchers have shown that joint dysfunctions of even less than 1 mm can disturb cerebellar function, muscle function, body posture, leg length inequalities, and nociception.</p>
<p>Applied Kinesiology Helping Children with Learning Disabilities, Mathews MO, Thomas E, Court L.</p>	<p><i>Int J AK and Kinesio Med</i>, 1999;4.</p> <p>Abstract: This was a study of a group of 10 children all experiencing learning difficulties and how they responded to Applied Kinesiology (AK) treatment. Treatment involved a patient/therapist contact time of 3 to 4 hours spread over 9 to 12 sessions over a period of 6-12 months. The children were tested before and after treatment by an Educational Psychologist using standardised tests of intelligence to monitor changes in their learning skills. Parents and teachers were asked to complete questionnaires before and after treatment regarding other aspects of the children's educational performance. A health profile was also kept based on parental observation. Results were compared with a control group of 10 children matched for age, IQ and social background who had not received any AK treatment over a similar period.</p>
<p><i>The Collected Papers of Viola M. Frymann: Legacy of Osteopathy to Children</i>, Frymann VM.</p>	<p>American Academy of Osteopathy, Indianapolis, IN;1998.</p> <p>The importance of cranial dysfunction to the developmental potentials of children is discussed in depth in Dr. Frymann's books and papers.</p>
<p>The Role of the Chiropractic Adjustment in the Care and Treatment of 332 Children with Otitis Media, Fallon, J.</p>	<p><i>Journal of Clinical Chiropractic Pediatrics</i>, 1997 Oct; 2(2) :167-83</p> <p>Objective: To conduct a pilot study of chiropractic adjustive care on children with otitis media using tympanography as an objectifying measure, and to propose possible mechanisms whereby subluxation is implicated in the pathophysiology of otitis media. Design: Case series Setting: Subjects presented in a private clinical practice in New Rochelle, New York. The subjects were referred by various sources including pediatricians, other MDs, chiropractors and parents. Participants: 332 children who presented consecutively with previously diagnosed otitis media, ages 27 days to 5 years. Main Outcome Measures: A survey of the parent/guardian was used to determine historical data with respect to previous otitis media bouts, age of onset of initial otitis media, feeding history, history of antimicrobial therapy, referral patterns, and birth history. Otoscopic and tympanographic data was collected as well as data concerning the number of adjustments administered to produce resolution of the otitis media. Data with respect to recurrence rates over six months</p>

	<p>was also collected. Results: The average number of adjustments administered by types of otitis media were as follows: acute otitis media (n=127) 4.0±1.03, chronic/serous otitis media (n=104) 5.1±1.53, for the mixed type of bilateral otitis media (n=10) 5.3±1.35 and where no otitis was initially detected on otoscopic and tympanographic exam (but with history of multiple bouts) (n=74) 5.88±1.87. The number of days it took to normalize the otoscopic examination was for acute 6.67±1.9 chronic/serous 8.57±1.96, and 10.18±3.39, and mixed 10.9±2.02. The overall recurrence rate over a six month period from initial presentation in the office was for acute 11.02%, chronic/serous 16.34%, for mixed 30% and for none present 17.56%. Conclusion: To our knowledge this is the first time that tympanography has been used as an objectifying tool with respect to the efficacy of the chiropractic adjustment in the treatment of children with otitis media. As tympanography has been used extensively in the medical assessment of children with otitis media, it also serves as a bridge from which the chiropractic field and the medical field can begin to communicate with respect to otitis media. The results indicate that there is a strong correlation between the chiropractic adjustment and the resolution of otitis media for the children in this study. Normal cranial molding, which is essential for the proper juxtaposition of the cranial bones, often does not occur in the case of a birth malposition, as well as in the case of the child born with the aid of a C- section. This pilot study can now serve as a starting point from which the chiropractic profession can begin to examine its role in the treatment of children with otitis media. Large-scale clinical trials need to be undertaken in the field using tympanography as an objectifying measure. In addition, the role of the occipital adjustment needs to be examined. This study begins the process of examining the role of the vertebral cranial subluxation complex in the pathogenesis of otitis media, and the efficacy of the chiropractic adjustment in its resolution.</p>
<p>Chiropractic Treatment of the Musculoskeletal System During Pregnancy, Bilgrai-Cohen K.</p>	<p><i>Journal Of The American Chiropractic Association</i> May 1997: 33-34, 90.</p> <p>Abstract: The childbearing year is a period of dynamic change and adaptation. Alterations occur in every system, including the musculoskeletal system. This article will discuss the major structural changes inherent in pregnancy, the goals of therapy and protocol for the major presenting complaints, including sacroiliac, lumbar and thoracic involvement. Pregnancy is a time of profound change and adaptation. As early as 10-12 weeks after fertilization, increased estrogen and relaxin begin to affect the musculoskeletal system by causing the softening of ligaments and increased joint laxity. Compensation for the enlarging uterus, anteriorly, produces the need for the pregnant woman to lean back, thus increasing the lumbar lordosis shifting the center of gravity over the lower extremity. I point out the three joints in the ring (two SI joints and one pubic symphysis) and explain that hormonally, one or both of the SI joints has become softened and is less supportive than normal. The tender muscles and joint pain is the body's response to this instability in the joints. A portion of my treatment of sacroiliac dysfunction occurs with the patient in the prone position. I accomplish this by using SOT-type blocks and pillows. Sacroiliac Involvement In the non-gravid state, the sacroiliac (SI) joint is very stable relative to the lumbosacral joint. However, during pregnancy, the ligamentous support to the SI joint is significantly relaxed. This is the most common presenting musculoskeletal complaint comprising 75-85 percent of women seen during pregnancy. A portion of my treatment of sacroiliac dysfunction occurs with the patient in the prone position. I accomplish this by using SOT-type blocks and pillows. Lumbopelvic treatment considerations focus on the pelvic block placement with the patient in the prone position, sacral pumping into dural flexion on inhalation, adjust for bilateral AS ilium, and neurolymphatic drainage particularly over the sacrum. Thoracic techniques are also stressed in many ways during pregnancy due to enlargement and increased weight in the breasts, widening of the sub-costal angle and pressure on the lower four to five ribs, viscerosomatic reflex from stressed organs such as the stomach, liver and pancreas and response to increasing lordosis of the lumbar region.</p>
<p>Ear infection: a retrospective study examining improvement from chiropractic care and</p>	<p><i>J Manipulative Physiol Ther.</i> 1996 Mar-Apr;19(3):169-77.</p> <p>OBJECTIVE: The aims of this study were to determine (a) if the patients improved while</p>

<p>analyzing for influencing factors, Froehle RM.</p>	<p>under chiropractic care; (b) how many treatments were needed to reach improvement; and (c) which factors were associated with early improvement. DESIGN: Cohort, nonrandomized retrospective study. SETTING: Private chiropractic practice in a Minneapolis suburb. PARTICIPANTS: Forty-six children aged 5 yr and under. INTERVENTION: All treatments were done by a single chiropractor, who adjusted the subluxations found and paid particular attention to the cervical vertebrae and occiput. Sacral Occipital Technique-style pelvic blocking and the doctor's own modified Applied Kinesiology was used. Typical treatment regimen was three treatments per week for 1 wk, then two treatments per week for 1 wk, then one treatment per week. However, treatment regimen was terminated when there was improvement. OUTCOME MEASURE: Improvement was based on parental decision (they stated that the child had no fever, no signs of ear pain, and was totally asymptomatic), and/or the child seemed to be asymptomatic to the treating DC and/or the parent stated that the child's MD judged the child to be improved. A data abstraction form was used to determine number of treatments used and presence of factors possibly associated with early improvement. RESULTS: 93% of all episodes improved, 75% in 10 days or fewer and 43% with only one or two treatments. Young age, no history on antibiotic use, initial episode (vs. recurrent) and designation of an episode as discomfort rather than ear infection were factors associated with improvement with the fewest treatments. CONCLUSION: Although there were several limitations to this study (mostly because of its retrospection but also, significantly, because very little data was found regarding the natural course of ear infections), this study's data indicate that limitation of medical intervention and the addition of chiropractic care may decrease the symptoms of ear infection in young children.</p>
<p>Educational Kinesiology with learning disabled children: an efficacy study, Cammisa KM.</p>	<p><i>Percept Mot Skills.</i> 1994 Feb;78(1):105-6.</p> <p>Abstract: Educational Kinesiology is a treatment using specific movements to access different parts of the brain in maximizing learning potential. It has been recommended for use with learning disabled children; however, studies validating its effects are limited. The school records of 25 students each with a diagnosis of specific learning disability were examined for pre- and posttest scores on academic and perceptual motor skill measures following an Educational Kinesiology program. Analysis indicated significant improvement in perceptual motor skills following the Educational Kinesiology program. The change in academic skills was not significant. Educational Kinesiology is recommended as a treatment to improve perceptual motor function of learning disabled children. Other variables affecting this study as well as clinical and research implications are discussed.</p> <p>Comment: In AK, a diagnostic and treatment system called "cross-crawl patterning" was developed from the work of Doman and Delacato. This treatment is thought to assist in the re-patterning of certain central nervous system functions that are impaired in some patients. This paper examines the effect of this treatment method on children with academic and motor control problems.</p>
<p>A pilot study on the value of applied kinesiology in helping children with learning difficulties, Mathews MO, Thomas E.</p>	<p><i>Br Osteopathic J,</i> 1993;XII.</p>
<p>Childhood psychological trauma and chronic refractory low-back pain, Schofferman J, Anderson D, Hines R, Smith G, Keane G.</p>	<p><i>Clin J Pain.</i> 1993 Dec;9(4):260-5.</p> <p>OBJECTIVE: To examine the correlation between childhood psychological trauma(s) and refractory back pain in patients with and patients without prior spine surgery. DESIGN: Retrospective chart review survey of 101 consecutive patients who had undergone multidisciplinary evaluation for refractory back pain. SETTING: Private practice, tertiary care spine center. MAIN OUTCOME MEASURES: Each psychological risk factor (physical abuse, sexual abuse, emotional neglect or abuse, abandonment, and chemically dependent caregiver) was rated as present or absent. Spinal pathology was graded as</p>

	<p>significant or not significant. RESULTS: There were 56 patients with failed back surgery syndrome, 28 men and 28 women, with a mean age of 43 and mean pain duration of 45 months. There were 45 patients with no prior surgery, 26 men and 19 women, with a mean age of 43 and mean pain duration of 33 months. In the failed back surgery syndrome group, 27 (48%) had three or more risks and 39 (70%) had two or more. When the 12 patients with significant pathology are not considered, 24 of the remaining 44 (55%) patients had three or more risks. In the group with no prior surgery, 26 (58%) had three or more risks and 38 (84%) had two or more. When the five patients with significant pathology are not considered, 24 (60%) had three or more risks. CONCLUSIONS: Multiple childhood psychological traumas may predispose a person to chronic low back pain. In patients in this setting with refractory low back pain with or without prior lumbar spine surgery, three or more childhood psychological risk factors are prevalent, especially in patients with minimal structural pathology.</p>
<p>Cervical spine subluxation associated with congenital muscular torticollis and craniofacial asymmetry, Slate RK, Posnick JC, Armstrong DC, Buncic JR.</p>	<p><i>Plast Reconstr Surg.</i> 1993 Jun;91(7):1187-95; discussion 1196-7.</p> <p>Abstract: The relationship between craniofacial asymmetry, congenital muscular torticollis, and cervical spine subluxation was examined in a study of 30 children who presented to our Craniofacial Program from 1987 through 1990. Twenty-six of the 30 patients had craniofacial asymmetry and muscular torticollis without true suture synostosis documented by head and neck CT scans. These 26 patients had positional skull molding with consistent flattening of the contralateral occipitoparietal region and the ipsilateral fronto-orbital region relative to the side of the torticollis. Thirteen of the 26 patients also were found to have a C1-C2 subluxation. C1 was rotated forward of C2 on the side contralateral to the muscular torticollis in 12 of 13 patients. None of the patients with subluxation had neurologic deficits or required spinal stabilization. Ophthalmologic evaluations demonstrated amblyopia (4 patients) and horizontal strabismus (1 patient), both thought to be coincidental, with no evidence of nystagmus in any case. Seven of the 26 patients required surgical therapy for their neck muscle tightness, while the remainder responded to physiotherapy. Only 2 of the 26 patients underwent cranio-orbital reshaping for correction of their upper face asymmetry. Recognition of cervical subluxation in patients with congenital muscular torticollis may help to explain residual head-neck posturing problems even after successful neck muscle therapy.</p>
<p>Effect of osteopathic medical management on neurologic development in children, Frymann VM, Carney RE, Springall P.</p>	<p><i>J Am Osteopath Assoc.</i> 1992 Jun;92(6):729-44.</p> <p>Abstract: For 3 years, children between 18 months and 12 years of age with and without recognized neurologic deficits were studied at the Osteopathic Center for Children. Their response to 6 to 12 osteopathic manipulative treatments directed to all areas of impaired inherent physiologic motion was estimated from changes in three sensory and three motor areas of performance. Houle's Profile of Development was used to compare neurologic with chronologic age and rate of development, and scores were age-adjusted. Results in children after treatment were compared with those following a waiting period without treatment. Neurologic performance significantly improved after treatment in children with diagnosed neurologic problems and to a lesser degree in children with medical or structural diagnoses. The advances in neurologic development continued over a several months' interval. The results support the use of osteopathic manipulative treatment as part of pediatric healthcare based on osteopathic medical philosophy and principles.</p>
<p>Infantile Colic – Does Every Baby Have It?, Arcadi, V.C.</p>	<p><i>Dynamic Chiropractic</i>, February 1991;9(3).</p> <p>http://www.chiroweb.com/archives/09/03/35.html</p> <p>The treatment, which is 90 percent effective in treating newborns and infants right from the moment they are born, is full spine chiropractic adjustments, especially in the occiput/C1 area and thoracics from T8 superior to T1. A newborn with cephalgia and cranial molding requires a cranial adjustment utilizing such gentle techniques as Upledger, Sacro-occipital</p>

	<p>Technique (SOT), or Applied Kinesiology. A cranial adjustment in my experience can be the most important adjustment that can be made to a newborn or infant. Reversing the damage done from the birth can be of optimal benefit to the baby as an infant, and throughout the child's life. Temporomandibular joint dysfunction early on can lead to breast feeding difficulties, headache, and improper feeding which in turn can lead to colic and digestive problems.</p>
<p>Effect of educational kinesiology on static balance of learning disabled students, Morris GS, Siftt JM, Khalsa GK.</p>	<p><i>Percept Mot Skills</i> 1988 Aug, 67(1):51-4.</p> <p>Abstract: Educational Kinesiology is a movement-based program designed to enhance academic performance and may also influence performance of motor skills. The purpose of this study was to determine whether the Educational Kinesiology techniques of repatterning and/or integration movements affected static balance of 60 learning disabled students, ranging in age from 7 to 11 yr. Subjects were matched on age and sex and assigned to one of three groups: control, movement, or repatterned. Children in the repatterned group received a 10-min. individual session of combined arm and leg movements coordinated with eye-placements prior to the start of the 6-wk. program. Both treatment groups then participated in a movement program for 5 min. twice a day, 5 days a week for 6 wk. The control group received no exposure to these special techniques. Static balance was pretested and posttested in each group using the Modified Stork Stand test. A one-way analysis of variance indicated a significant difference between groups. A Scheffé post hoc test showed that the repatterned group improved more than the movement group, who in turn improved more than the control group.</p> <p>Comment: In AK, a diagnostic and treatment system called “cross-crawl patterning” was developed from the work of Doman and Delacato. This treatment is thought to assist in the re-patterning of certain central nervous system functions that are impaired in some patients. This paper examines the effect of this treatment method on children with academic and motor control problems.</p>