	Research Related To Treatment Effects Using AK Methods: Clinical Series and Case Reports
A Multi-Modal Chiropractic Treatment Approach for Asthma: a 10-Patient Retrospective Case Series, Cuthbert SC.	*Chiropr J Aust* 2008;38:17-27. **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.
Dishman JD, Greco DS, Burke JR. Motor-evoked potentials recorded from lumbar erector spinae muscles: a study of corticospinal excitability changes associated with spinal manipulation.	*J Manipulative Physiol Ther*. 2008 May;31(4):258-70. **OBJECTIVE:** The purpose of this study was to determine if high-velocity, low-amplitude spinal manipulation (SM) altered the effects of corticospinal excitability on motoneuron activity innervating the paraspinal muscles. In a previous study using transcranial magnetic stimulation (TMS), augmentation of motor-evoked potentials (MEPs) from the gastrocnemius muscle after lumbar SM was reported. To date, there is no known report of the effect of SM on paraspinal muscle excitability. **METHODS:** The experimental design was a prospective physiologic evaluation of the effects of SM on corticospinal excitability in asymptomatic subjects. The TMS-induced MEPs were recorded from relaxed lumbar erector spinae muscles of 72 asymptomatic subjects. The MEP amplitudes were evaluated pre-SM and post-SM or conditions involving prethrust positioning and joint loading or control. **RESULTS:** There was a transient increase in MEP amplitudes from the paraspinal muscles as a consequence of lumbar SM ($F([6,414]) = 8.49$; $P < .05$) without concomitant changes after prethrust positioning and joint loading or in control subjects ($P > .05$). These data findings were substantiated by a significant condition x time interaction term ($F([12,414]) = 2.28$; $P < .05$). **CONCLUSIONS:** These data suggest that there is a postsynaptic facilitation of alpha motoneurons and/or corticomotoneurons innervating paraspinal muscles as a consequence of SM. It appears that SM may offer unique sensory input to the excitability of the motor system as compared to prethrust positioning and joint loading and control conditions.

	Comment: This very important study shows a facilitation of motor evoked potentials in the paraspinal muscles after SMT. The MMT as used in AK also detects this facilitation of peripheral muscles after SMT. Similarly, in other studies in this compendium there are observations of a reduction in hypertonicity from EMG records of back and neck pain patients after SMT. Other investigators have reported a decrease in palpable lumbar muscle spasm and pain after SMT. These data offer further support for the fundamental hypothesis, long held in AK, that SMT procedures lead to an **increase** in central motor excitability rather than overall inhibition. Specifically, there is a post-synaptic facilitation of alpha-motoneurons and/or corticomotoneurons that may be unique to the HVLA thrust.
Applied Kinesiology: An Effective Complementary Treatment for Children with Down Syndrome, Cuthbert SC.	*Townsend Letter.* 2007 July;288:94-107. 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.
Sunflower therapy for children with specific learning difficulties (dyslexia): a randomised, controlled trial. Bull L.	*Complement Ther Clin Pract.* 2007 Feb;13(1):15-24. Epub 2006 Dec 15. 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.
The Effects of Chiropractic Care on Individuals Suffering from Learning Disabilities and Dyslexia: A Review of the Literature, Pauli Y.	*J Vertebral Subluxation Res* 2007, Jan 15:1-12. **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 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.
Cranial Therapeutic Care: Is There any Evidence? Blum CL, Cuthbert S.	Chiropractic & Osteopathy 2006, 14:10. **Background:** In the commentary by Hartman, (Cranial osteopathy: its fate seems clear, Chiropractic & Osteopathy 2006, 14:10.) he has attempted to elicit a response by making far overreaching statements, which are ironic since Hartman thinly veils himself in a gossamer cloak of science, research, and evidenced-based healthcare. Hartman has picked an isolated diagnostic procedure or treatment, cerebrospinal fluid (CSF) pulsation palpation, questioned its reliability and validity, and then used this fractional aspect of a method of care to condemn all of cranial therapy. What can be said by Hartman and fairly so, is that from his review of selected studies regarding CSF palpation as discussed in cranial therapeutic care, further study to investigate its validity and reliability is warranted and this component of cranial diagnosis should not be used at this time as a sole criteria for cranial diagnosis or treatment. **Discussion** Much of Hartman's position is refuted by, at the very least, reviewing the difference between the gross mechanical aspects of cranial care, which has documentation, and the subtle mechanical aspects, which remain controversial. A comprehensive evidenced based rationale of cranial therapeutics is presented along with three tables listing pertinent studies relating to cranial bone dynamics and the efficacy of cranial manipulative therapy. **Conclusion** While the onus to do the research is upon those who are proponents of a method of care, there is also an onus upon those who call for its virtual abolition to be familiar with all the published research on the topic and how evidenced based clinical practice is formulated.
Proposed mechanisms and treatment strategies for motion sickness disorder: A case series, Cuthbert S.	*Journal Chiro Med,* Spring 2006;5(1):22-31. **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. **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.
The Ileocecal Valve Point and Muscle Testing: A Possible Mechanism of Action, Pollard HP, Bablis P, Bonello R.	*Chiropr Aust* 2006;36(4):122-126 and 159-160. **Abstract:** This paper presents a literature review of recent evidence showing that stimulation of the skin changes muscle strength and function. In AK, therapy localization is a simple, non-invasive technique to find out where a problem in the body exists. TL doesn't show the physician what the problem is but shows that something under the hand that is contacting the patient's body is disturbing the nervous system. A number of papers in this Compendium have presented the neuro-physiological basis for this finding. The cutaneomuscular reflexes have been extensively investigated in the scientific literature, and they are part of the mechanism for what is found clinically with TL testing. In AK, positive TL always calls for further investigation to the area concerned.
Can the Ileocecal Valve Point Predict Low Back Pain Using Manual Muscle Testing? Pollard HP, Bablis P, Bonello R.	*Chiropr Aust* 2006;36:58-62 **Background:** According to some technique groups in chiropractic the ileocecal valve may malfunction and be associated with a large array of health problems that can lead to common chronic health issues prevalent in our society. Many tests commonly used in chiropractic are presumed to identify painful and/or dysfunctional anatomical structures, yet many have undemonstrated reliability. Despite this lack of evidence, they form the basis of many clinical decisions. One cornerstone procedure that is frequently used by chiropractors involves the use of manual muscle testing for diagnostic purposes not considered orthopaedic in nature. A point of the body referred to as the ileocecal valve point is said to indicate the presence of low back pain. This procedure is widely used in Applied Kinesiology (AK) and Neuro-Emotional Technique (NET) chiropractic practice. **Objective:** To determine if correlation of tenderness of the "ileocecal valve point" can predict low back pain in sufferers with and without low back pain. It was the further aim to determine the sensitivity and specificity of the procedure. **Methods:** One hundred (100) subjects with and without low back pain were recruited. Subjects first completed information about their pain status, then the practitioner performed the muscle testing procedure in a separate room. The practitioner provided either a *yes* or *no* response to a research assistant as to whether he had determined if the subject had back pain based on the muscle test procedure. Results: Of 67 subjects who reported low back pain, 58 (86.6%) reported a positive test of both low back pain and ICV point test. Of 33 subjects, 32 (97%) with no back pain positively reported no response to ICV point test. Nine (9) subjects (13.4%) reported false negative ICV tests and low back pain, and 1 subject (3%) reported a false positive response for ICV test and no low back pain. **Conclusion:** The majority of subjects with low back pain reported positive ileocecal valve testing, and all but one of the subjects without low back pain reported negative ileocecal valve testing. The application of ileocecal valve testing as a diagnostic measure of low back pain was found to have excellent measures of sensitivity, specificity and diagnostic competency. This study confirms that the use of this test within the limitations of this study is reliably associated with the presence of low back pain. Further testing is required to investigate all aspects of the diagnostic milieu commonly used by proponents of this form of diagnostic testing. **Comment:** In AK, the ileocecal valve dysfunction is not related automatically to low back pain though this is a frequent consequence of the problem. Another interesting research question that might have been posed to the subjects of this study would have been whether they had experiencing any digestive difficulties and its relationship to positive MMT outcomes. The finding of excellent sensitivity and specificity in this research report is noteworthy.
Chiropractic Testing for Equilibrium and Balance Disorders, Cuthbert S.	*DC Tracts* May 2006. **Abstract:** For about 76 million Americans, proprioceptive disorders cause more than a

	passing problem. More than 5 million of them visit their doctors each year because occasional or chronic feelings of wooziness, spinning, lack of balance, and fainting are seriously interfering with their ability to work or to enjoy their leisure. In fact, dizziness and other equilibrium disorders is one of the most common symptoms reported to physicians. The effective diagnosis and treatment of these disorders depends upon precise determination of the tissues involved producing the proprioceptive disorder, and their correction using manipulative methods. A comprehensive evaluation of the patient with equilibrium disorders using the standard techniques from AK is presented which provides additional data that informs the clinical decision-making process and directs therapy.
Effect of Counterstrain on Stretch Reflexes, Hoffmann Reflexes, and Clinical Outcomes in Subjects With Plantar Fasciitis, Wynne MW, Burns JM, Eland DC, Conatser RR, Howell JN.	*JAOA* Sept 2006;106(9):547-556. **Context:** Previous research indicates that osteopathic manipulative treatment based on counterstrain produces a decrease in the stretch reflex of the calf muscles in subjects with Achilles tendinitis. **Objectives:** To study the effects of counterstrain on stretch reflex activity and clinical outcomes in subjects with plantar fasciitis. **Methods:** In a single-blind, randomized controlled trial of crossover design, the effects of counterstrain were compared with those of placebo in adult subjects (N=20) with plantar fasciitis. The subjects were led to believe that both the counterstrain and placebo were therapeutic modalities whose effects were being compared. Ten subjects (50%) were assigned to receive 3 weeks of counterstrain treatment during phase 1 of the trial, while the other 10 subjects were given placebo capsules. After a 2- to 4-week washout period, phase 2 of the trial began with the interventions reversed. Clinical outcomes were assessed with daily questionnaires. Stretch reflex and H-reflex (Hoffmann reflex) in the calf muscles were assessed twice during each laboratory visit, before and after treatment in the counterstrain phase. **Results:** No significant changes in the electrically recorded reflexes of the calf muscles were observed in response to treatment. However, changes in the mechanical characteristics of the twitches resulting from the electrical responses were observed. Peak force and time to reach peak force both increased ($P \leq .05$) in the posttreatment measurements, with the increase being significantly more pronounced in the counterstrain phase ($P < .05$). A comparison of pretreatment and posttreatment symptom severity demonstrated significant relief of symptoms that was most pronounced immediately following treatment and lasted for 48 hours. **Conclusions: Clinical improvement occurs in subjects with plantar fasciitis in response to counterstrain treatment. The clinical response is accompanied by mechanical, but not electrical, changes in the reflex responses of the calf muscles.** The causative relation between the mechanical changes and the clinical responses remains to be explored.
Symptomatic Arnold-Chiari malformation and cranial nerve dysfunction: a case study of applied kinesiology cranial evaluation and treatment, Cuthbert, S., Blum, C.	*J Manipulative Physiol Ther*. 2005 May;28(4):e1-6. (www.journals.elsevierhealth.com/periodicals/ymmt) **Objective:** To present an overview of possible effects of Arnold-Chiari malformation (ACM) and to offer chiropractic approaches and theories for treatment of a patient with severe visual dysfunction complicated by ACM. **Clinical Features**: A young woman had complex optic nerve neuritis exacerbated by an ACM (Type I) of the brain. **Intervention and Outcome**: Applied kinesiology chiropractic treatment of the spine and cranium was used for treatment of loss of vision and nystagmus. After treatment, the patient's ability to see, read, and perform smooth eye tracking showed significant and lasting improvement. **Conclusion**: Further studies into applied kinesiology and cranial treatments for visual dysfunctions associated with ACM may be helpful to evaluate whether this single case study can be representative of a group of patients who might benefit from this care.
Chiropractic care for a patient with spasmodic dysphonia	***Journal Chiro Med,*** Winter 2005;4(1):19-24.

associated with cervical spine trauma, Waddell RK.	**Objective:** To discuss the diagnosis and response to treatment of spasmodic dysphonia in a 25-year-old female vocalist following an auto accident. **Clinical features:** The voice disorder and neck pain appeared after the traumatic incident. Examination of the cervical spine revealed moderate pain, muscle spasm and restricted joint motion at C-1 and C-5 on the left side. Cervical range of motion was reduced on left rotation. **Bilateral manual muscle testing of the trapezius and sternocleidomastoid muscles, which share innervation with the laryngeal muscles by way of the spinal accessory nerve, were weak on the left side.** Pre and post accident voice range profiles (phonetograms) that measure singing voice quality were examined. The pre- and post-accident phonetograms revealed significant reduction in voice intensity and fundamental frequency as measured in decibels and hertz. **Intervention and outcome:** Low-force chiropractic spinal manipulative therapy to C-1 and C-5 was employed. Following a course of care, the patient's singing voice returned to normal, as well as a resolution of her musculoskeletal complaints. **Conclusion:** It appears that in certain cases, the singing voice can be adversely affected if neck or head trauma is severe enough. This case proposes that trauma with irritation to the cervical spine nerve roots as they communicate with the spinal accessory, and in turn the laryngeal nerves, may be contributory to some functional voice disorders or muscle tension dysphonia. **Comment:** This case report examines the result of testing bilaterally, the trapezius and sternocleidomastoid muscles, as a diagnostic indicator for possible laryngeal nerve and muscle involvement in a case of muscle tension dysphonia due to their shared nerve supply. When cervical spine subluxations were corrected, the SCM and trapezius muscles were strengthened and this correlated with resolution in the voice dysfunction.
Kinesiology. Simeón F, Monge JC. [Article in Spanish]	*Rev Enferm.* 2005 Dec;28(12):19-22. **Abstract:** Kinesiology is a holistic and complete methodology. Having great applications in sub-clinical situations and to get rid of stress, kinesiology has proven to be of great help in pathological cases, given its possibility to activate innate health mechanisms and through its capacity to reduce stress. Kinesiology is very effective, since it is applied by means of the interested person's own muscles and at the same moment when information professionals work with is received. Besides being excellent therapy, its corrective techniques, by themselves, can improve the energetic and psychic state of a patient, thereby optimizing the resources people have in any situation.
Evaluation of Chapman's neurolymphatic reflexes via applied kinesiology: a case report of low back pain and congenital intestinal abnormality, Caso, M.L.	*J Manipulative Physiol Ther.* 2004 Jan;27(1):66. (www.journals.elsevierhealth.com/periodicals/ymmt) **Objective**: To describe the applied kinesiologic evaluation of Chapman's neurolymphatic (NL) reflexes in the management of a person with an unusual congenital bowel abnormality and its role in the manifestation of low back pain. The theoretical foundations of these reflexes will be elaborated on and practical applications discussed. **Clinical Features**: A 29-year-old man had chronic low back pain. Radiographs of the patient's lumbar spine and pelvis were normal. Magnetic resonance imaging (MRI) demonstrated a mild protrusion of the fifth lumbar disk. Oral anti-inflammatory agents, cortisone injections, and chiropractic manipulative therapy provided little relief. Though generally in robust health, the patient was aware of a congenital intestinal abnormality diagnosed when he was a child; it was thought to be of no consequence with regard to his current back condition. **Intervention and outcome**: The patient's history, combined with applied kinesiology examination, indicated a need to direct treatment to the large bowel. The essential diagnostic indicators were the analysis of the Chapman's neurolymphatic reflexes themselves, coupled with an evaluation of the traditional acupuncture meridians. The primary prescribed therapy was the stimulation of these reflexes by the patient at home. This intervention resulted in the resolution of the patient's musculoskeletal symptomatology, as well as improved bowel

	function. **Conclusion**: The rather remarkable outcome from the application of this relatively simple, yet valuable, diagnostic and therapeutic procedure represents a thought-provoking impetus for future study and clinical application.
Fix foot problems without orthotics, McDowall D.	*Int J AK and Kinesio Med,* 2004;18. **Abstract:** A new approach to supporting the functional movement of the foot without the use of orthotics is discussed. A short review of myo-tendinous attachments of the foot is presented with associated treatments. Epidemiologic studies provide strong support for the clinical advantages of orthoses, yet explanations of foot orthotic mechanisms remain elusive. Researchers await a more complete theoretical understanding of the mechanisms of foot orthotics. Some studies are considering the 3-dimensional effects of subtalar joint motion on the entire kinetic chain. Chiropractors and other manipulators have developed techniques to treat a variety of foot conditions. Some even propose using this area of skill as a bridge to working with physical therapists. Probably the most frequently a chiropractor looks at the feet is indirectly when checking for a leg length discrepancy. At this time the most common observation is usually of foot rotation. Walther describes a variety of approaches to resolving foot problems (5). I will not discuss existing techniques in this paper. The graphics of Netter illustrate the attachments of the lower leg muscles at both their origin on the femur, tibia, and fibula and their insertion on the foot. My observations are an application of Goodheart's work regarding origin-insertion technique recorded in his 1964 manual. I have applied these observations in regard to micro avulsion of the periosteal attachments of the tendons being the initial injury of most foot problems. These foot problems are easily fixed leaving the use of orthotics to chronic pathologies of the foot.
New diagnostic and therapeutic approach to thyroid-associated orbitopathy based on applied kinesiology and homeopathic therapy, Moncayo, R., Moncayo, H., Ulmer, H., Kainz, H.	*J Altern Complement Med,* 2004 Aug;10(4):643-50. **Objectives:** To investigate pathogenetic mechanisms related to the lacrimal and lymphatic glands in patients with thyroid-associated orbitopathy (TAO), and the potential of applied kinesiology diagnosis and homeopathic therapeutic measures. **Design:** Prospective. **Settings/location:** Thyroid outpatient unit and a specialized center for complementary medicine (WOMED, Innsbruck; R.M. and H.M.). **Subjects:** Thirty-two (32) patients with TAO, 23 with a long-standing disease, and 9 showing discrete initial changes. All patients were euthyroid at the time of the investigation. **Interventions:** Clinical investigation was done, using applied kinesiology methods. Departing from normal reacting muscles, both target organs as well as therapeutic measures were tested. Affected organs will produce a therapy localization (TL) that turns a normal muscle tone weak. Using the same approach, specific counteracting therapies (i.e., tonsillitis nosode and lymph mobilizing agents) were tested. **Outcome measures:** Change of lid swelling, of ocular movement discomfort, ocular lock, tonsil reactivity and Traditional Chinese Medicine criteria including tenderness of San Yin Jiao (SP6) and tongue diagnosis were recorded in a graded fashion. **Results:** Positive TL reactions were found in the submandibular tonsillar structures, the tonsilla pharyngea, the San Yin Jiao point, the lacrimal gland, and with the functional ocular lock test. Both Lymphdiaral® (Pascoe, Giessen, Germany) and the homeopathic preparation chronic tonsillitis nosode at a C3 potency (Spagyra,® Grödig, Austria) counteracted these changes. Both agents were used therapeutically over 3–6 months, after which all relevant parameters showed improvement. **Conclusions:** Our study demonstrates the involvement of lymphatic structures and flow in the pathogenesis of TAO. The tenderness of the San Yin Jiao point correlates to the abovementioned changes and should be included in the clinical evaluation of these patients.
Migraines – the Applied Kinesiology and Chiropractic perspective, Hambrick TM.	*Journal of Bodywork and Movement Therapies,* 2003;7(1):37-41. **Abstract:** A case presentation involving migraine headache is presented. The case is notable in that it contains most of the classical multifactorial elements typically found in instances of migraine headaches. Purely from a structurally based chiropractic perspective,

	correction of the cervical and thoracic subluxations resulting from the postural distortion is imperative. Further, a comprehensive evaluation of the patient with the standard techniques of Applied Kinesiology is presented which provides additional data that informs the clinical decision-making process and directs therapy. A food allergy was found using AK MMT methods, and this factor was part of the etiology of this patient's migraines.
AK classic case management: enuresis, Goodheart GJ.	*Int J AK and Kinesio Med,* 2003;16: 22-23. 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.
Applied Kinesiology and Down syndrome: a study of 15 cases, Cuthbert S.	*Int J AK and Kinesio Med,* 2003;16:16-21. This essay describes these children's histories, their clinical findings, and their evaluation and treatment using applied kinesiology methods. Down syndrome is the most common readily identifiable cause of intellectual disability, accounting for almost one-third of all cases. It occurs equally in all races with an overall incidence of approximately one in 800 births. 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 our chiropractic therapeutics can make a profound difference. The ability we possess to repair the neurological disorganization in these children can be affected rapidly with the proper treatment to the cranial-sacral mechanism. Parents are frequently amazed at the speed with which this happens. Once the cranial mechanism is repaired and it begins to move freely, the child becomes a new creature with his/her potentialities greatly improved for normal function. The cranial mechanism must be included in the practice of chiropractic care for the physically and mentally challenged because it is in fact the headquarters for all the

	functions that operate within the child. This is the part of the body with the greatest disturbances in these cases and should not be ignored.
Pediatric case history: cost effective treatment of block naso-lacrimal canal utilizing applied kinesiology tenets, Maykel W.	*Int J AK and Kinesio Med,* 2003;16:34. **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 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.
Insult, Interference and Infertility: An Overview of Chiropractic Research, Behrendt, M.	*Journal of Vertebral Subluxation Research*, May 2003:1 www.jvsr.com **Objective:** Infertility is distinct from sterility, implying potential, and therefore raises questions as to what insult or interference influences this sluggish outcome. Interference in physiological function, as viewed by the application of chiropractic principles, suggests a neurological etiology and is approached through the mechanism of detection of vertebral subluxation and subsequent appropriate and specific adjustments to promote potential and function. Parental health and wellness prior to conception influences reproductive success and sustainability, begging efficient, effective consideration and interpretation of overall state and any distortion. A discussion of diverse articles is presented, describing the response to chiropractic care among subluxated infertile women. **Clinical Features:** Fourteen retrospective articles are referenced, their diversity includes: all 15 subjects are female, ages 22-65; prior pregnancy history revealed 11 none, 2 successful unassisted, 1 assisted, 1 history of miscarriage. 9 had previous treatment for infertility, 4 were undergoing infertility treatment when starting chiropractic care. Presenting concerns included: severe low back pain, neck pain, colitis, diabetes, and female dysfunction such as absent or irregular menstrual cycle, blocked fallopian tubes, endometriosis, infertility, perimenopause and the fertility window within a religious based lifestyle, and a poor responder undergoing multiple cycles of IVF. **Chiropractic Care and Outcome:** Outcomes of chiropractic care include but are not limited to benefits regarding neuromuscular concerns, as both historical and modern research describe associations with possible increased physiological functions, in this instance reproductive function. Chiropractic care and outcome are discussed, based on protocols of a variety of arts, including **Applied Kinesiology (A.K.),** Diversified, Directional Non-Force Technique (D.N.F.T.), Gonstead, Network Spinal Analysis (N.S.A.), Torque Release Technique (T.R.T.), Sacro Occipital Technique (S.O.T.) and Stucky-Thompson Terminal Point Technique. Care is described over a time frame of 1 to 20 months. **Conclusion:** The application of chiropractic care and subsequent successful outcomes on reproductive integrity, regardless of factors including age, history and medical intervention, are described through a diversity of chiropractic arts. Future studies that may evaluate more formally and on a larger scare, the effectiveness, safety and cost benefits of chiropractic care on both well-being and physiological function are suggested, as well as pursuit of appropriate funding.
A 39-year-old female cyclist suffering from total exhaustion caused by over-training and false nutrition, Weiss G.	*Int J AK and Kinesio Med,* 2003;15:39. **Abstract:** To present a case involving a 39-year-old competitive female cyclist having menstrual troubles. Nutritional counseling (based on traditional Chinese medicine concepts) was offered and followed. Her menstruation improved and her energy level and cycling performance improved. Treatment to the sacrococcygeal area improved her symptom picture. After cranial correction and nutritional support she improved further and she

	remained stable.
Dishman JD, Burke J. Spinal reflex excitability changes after cervical and lumbar spinal manipulation: a comparative study.	*Spine J.* 2003 May-Jun;3(3):204-12. **BACKGROUND CONTEXT:** Spinal manipulation (SM) is a commonly employed nonoperative treatment modality in the management of patients with neck, low back or pelvic pain. One basic physiologic response to SM is a transient decrease in motoneuron activity as assessed using the Hoffmann reflex (H-reflex) technique. Previous research from our laboratory indicates that both SM with a high-velocity, low-amplitude thrust and mobilization without thrust produced a profound but transient attenuation of motoneuronal activity of the lumbosacral spine in asymptomatic subjects. To date, effects of cervical SM procedures on the excitability cervical motoneuron pools are unknown. **PURPOSE:** The objective of this research was to a gain a more complete understanding of the physiologic effects of SM procedures on motoneuron activity, by comparing the effects of regional SM on cervical and lumbar motoneuron pool excitability. **STUDY DESIGN/SETTING:** Maximal H-reflex amplitudes were recorded before and after SM in both the cervical and lumbar regions of asymptomatic subjects in two successive experimental sessions. **PATIENT SAMPLE:** Asymptomatic, young healthy volunteers were used in this study. **OUTCOME MEASURES:** Changes in flexor carpi radialis and gastrocnemius H-reflex amplitudes before and after SM procedures. **METHODS**: H-reflexes recorded form the tibial and median nerves were evaluated before and after lumbar and cervical SM, respectively. **RESULTS: Both Lumbar and cervical SM produced a transient but significant attenuation of motoneuron excitability.** The attenuation of the tibial nerve H-reflex amplitude was proportionately greater than that of the median nerve, which occurred after cervical SM. **CONCLUSIONS:** SM procedures lead to transient suppression of motoneuron excitability, as assessed by the H-reflex technique. Lumbar spine SM appears to lead to greater attenuation of motoneuron activity compared with that of the cervical region. Thus, these two distinct regions of the spine may possess different responsiveness levels to spinal manipulative therapy. **Comment:** There are numerous reports in this compendium showing the measurable and immediate physiological effects of spinal manipulative therapy on motor system function. Regardless of the mechanisms that make this occur, the physiological effects of SMT on motoneuronal activity have been inferred from evoked responses from peripheral muscles. This is the method of measurement used in AK for the past 43 years as well.
Dishman JD, Ball KA, Burke J. First Prize: Central motor excitability changes after spinal manipulation: a transcranial magnetic stimulation study.	*J Manipulative Physiol Ther.* 2002 Jan;25(1):1-9. **BACKGROUND:** The physiologic mechanism by which spinal manipulation may reduce pain and muscular spasm is not fully understood. One such mechanistic theory proposed is that spinal manipulation may intervene in the cycle of pain and spasm by affecting the resting excitability of the motoneuron pool in the spinal cord. Previous data from our laboratory indicate that spinal manipulation leads to attenuation of the excitability of the motor neuron pool when assessed by means of peripheral nerve Ia-afferent stimulation (Hoffmann reflex). **OBJECTIVE:** The purpose of this study was to determine the effects of lumbar spinal manipulation on the excitability of the motor neuron pool as assessed by means of transcranial magnetic stimulation. **METHODS:** Motor-evoked potentials were recorded subsequent to transcranial magnetic stimulation. The motor-evoked potential peak-to-peak amplitudes in the right gastrocnemius muscle of healthy volunteers (n = 24) were measured before and after homolateral L5-S1 spinal manipulation (experimental group) or side-posture positioning with no manipulative thrust applied (control group). Immediately after the group-specific procedure, and again at 5 and 10 minutes after the procedure, 10 motor-evoked potential responses were measured at a rate of 0.05 Hz. An optical tracking system (OptoTRAK, Northern Digital Inc, Waterloo, Canada [<0.10 mm root-mean-square]) was used to monitor the 3-dimensional (3-D) position and orientation of the transcranial magnetic stimulation coil, in real time, for each trial. **RESULTS:** The

	amplitudes of the motor-evoked potentials were significantly facilitated from 20 to 60 seconds relative to the prebaseline value after L5-S1 spinal manipulation, without a concomitant change after the positioning (control) procedure. **CONCLUSIONS:** When motor neuron pool excitability is measured directly by central corticospinal activation with transcranial magnetic stimulation techniques, **a transient but significant facilitation occurs as a consequence of spinal manipulation. Thus, a basic neurophysiologic response to spinal manipulation is central motor facilitation.** **Comment:** This very important study shows a facilitation of motor evoked potentials in the gastrocnemius muscle after SMT. The MMT as used in AK also detects this facilitation of peripheral muscles after SMT. Similarly, in other studies in this compendium there are observations of a reduction in hypertonicity from EMG records of back and neck pain patients after SMT. Other investigators have reported a decrease in palpable lumbar muscle spasm and pain after SMT. These data offer further support for the hypothesis, long held in AK, that SMT procedures lead to an increase in central motor excitability rather than overall inhibition.
Applied kinesiology for treatment of women with mastalgia, Gregory, W.M., Mills, S.P., Hamed, H.H., Fentiman, I.S.	*Breast*, 2001 Feb;10(1):15-9. (www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14965552&query_hl=1) To determine whether an applied kinesiology technique was of benefit to women with breast pain, an open pilot study was conducted in which 88 newly presenting women with self-rated moderate or severe mastalgia were treated by applied kinesiology. This involved a hands-on technique consisting of rubbing a series of 'lymphatic reflex points' while touching painful areas of the breasts. The women were predominantly pre-menopausal, and patients with both cyclical and non-cyclical pain were included in the study. Patients' self-rated pain scores, both before and immediately after applied kinesiology were compared, together with a further score 2 months later. Immediately after treatment there was considerable reduction in breast pain in 60% of patients with complete resolution in 18%. At the visit after 2 months, there was a reduction in severity, duration and frequency of pain of 50% or more in about 60% of cases (P<0.0001). This preliminary study suggests that applied kinesiology may be an effective treatment for mastalgia, without side-effects and merits testing against standard drug therapies.
Spinal reflex attenuation associated with spinal manipulation, Dishman JD, Bulbulian R.	*Spine*, 2000 Oct 1;25(19):2519-24;discussion 2525. STUDY DESIGN: This study evaluated the effect of lumbosacral spinal manipulation with thrust and spinal mobilization without thrust on the excitability of the alpha motoneuronal pool in human subjects without low back pain. OBJECTIVES: To investigate the effect of high velocity, low amplitude thrust, or mobilization without thrust on the excitability of the alpha motoneuron pool, and to elucidate potential mechanisms in which manual procedures may affect back muscle activity. SUMMARY OF BACKGROUND DATA: The physiologic mechanisms of spinal manipulation are largely unknown. It has been proposed that spinal manipulation may reduce back muscle electromyographic activity in patients with low back pain. Although positive outcomes of spinal manipulation intervention for low back pain have been reported in clinical trials, the mechanisms involved in the amelioration of symptoms are unknown. METHODS: In this study, 17 nonpatient human subjects were used to investigate the effect of spinal manipulation and mobilization on the amplitude of the tibial nerve Hoffmann reflex recorded from the gastrocnemius muscle. Reflexes were recorded before and after manual spinal procedures. RESULTS: Both spinal manipulation with thrust and mobilization without thrust significantly attenuated alpha motoneuronal activity, as measured by the amplitude of the gastrocnemius Hoffmann reflex. This suppression of motoneuronal activity was significant ($P < 0.05$) but transient, with a return to baseline values exhibited 30 seconds after intervention. CONCLUSIONS:

	Both spinal manipulation with thrust and mobilization without thrust procedures produce a profound but transient attenuation of alpha motoneuronal excitability. **These findings substantiate the theory that manual spinal therapy procedures may lead to short-term inhibitory effects on the human motor system.** **Comment:** This study demonstrates that there is an immediate effect upon the motor system after spinal manipulative therapy. This factor has been consistently demonstrated in AK, and measuring the effect upon the motor system is made after every manipulative treatment. Clinical conditions involving hypotonicity, spasticity or hypertonicity are attributed to pathophysiologic abnormalities in the motor neuron system, and this study measures this state.
Cervical root compression monitoring by flexor carpi radialis H-reflex in healthy subjects, Sabbahi M, Abdulwahab S.	*Spine*, 1999 Jan 15;24(2):137-41. STUDY DESIGN: One-group, pretest-posttest experimental research with repeated measures. OBJECTIVE: To determine the effect of head postural modification on the flexor carpi radialis H-reflex in healthy subjects. SUMMARY OF BACKGROUND DATA: H-reflex testing has been reported to be useful in evaluating and treating patients with lumbosacral and cervical radiculopathy. The idea behind this technique is that postural modification can cause further H-reflex inhibition, indicating more compression of the impinged nerve root, or recovery, indicating decompression of the root. Such assumptions cannot be supported unless the influence of normal head postural modification on the H-reflex in healthy subjects is studied. METHODS: Twenty-two healthy subjects participated in this study (14 men, 8 women; mean age, 39 +/- 9 years). The median nerve of the subjects at the cubital fossa was electrically stimulated (0.5 msec; 0.2 pulses per second [pps] at H-max), whereas the flexor carpi radialis muscle H-reflex was recorded by electromyography. The H-reflexes were recorded after the subject randomly maintained the end range of head-forward flexion, backward extension, rotation to the right and the left, lateral bending to the right and the left, retraction and protraction. These were compared with the H-reflex recorded during comfortable neutral positions. Data were recorded after the subject maintained the position for 30 seconds, to avoid the effect of dynamic postural modification on the H-reflex. Four traces were recorded in each position. During recording, the H-reflex was monitored by the M-response to avoid any changes in the stimulation-recording condition. RESULTS: Repeated multivariate analysis of variance was used to evaluate the significance of the difference among the H-reflex, amplitude, and latency, in various head positions. The H-reflex amplitude showed statistically significant changes ($P < 0.001$) with head postural modification. All head positions, except flexion, facilitated the H-reflex. Extension, lateral bending, and rotation toward the side of the recording produced higher reflex facilitation than the other positions. These results indicate that H-reflex changes may be caused by spinal root compression-decompression mechanisms. It may also indicate that relative spinal root decompression occurs in most head-neck postures except forward flexion. CONCLUSIONS: Head postural modification significantly influences the H-reflex amplitude but not the latency. This indicates that the H-reflex is a more sensitive predictor of normal physiologic changes than are latencies. The H-reflex modulation in various head positions may be-caused by relative spinal root compression-decompression mechanisms. **Comment:** In AK, the cervical compaction test was developed to monitor this kind of phenomenon. With compression upon the top of the skull, MMT will reveal weaknesses when cervical spine subluxations, and especially cervical disc syndromes are present. This study measures this dynamic.
Correlation of Applied Kinesiology Muscle Testing Findings with Serum Immunoglobulin Levels for Food Allergies, Schmitt, W., Leisman,	*International Journal of Neuroscience*. 1998; 96:237-244. **Abstract:** The pilot study attempted to determine whether subjective muscle testing employed by Applied Kinesiology practitioners, prospectively determine those individuals with specific hyperallergenic responses. Seventeen subjects were found positive on Applied

G.	Kinesiology (A.K.) muscle testing screening procedures indicating food hypersensitivity (allergy) reactions. Each subject showed muscle weakening (inhibition) reactions to oral provocative testing of one or two foods for a total of 21 positive food reactions. Tests for a hypersensitivity reaction of the serum were performed using both a radio-allergosorbent test (RAST) and immune complex test for IgE and IgG against all 21 of the foods that tested positive with A.K. muscle screening procedures. These serum tests confirmed 19 of the 21 food allergies (90.5%) suspected based on the applied kinesiology screening procedures. This pilot study offers a basis to examine further a means by which to predict the clinical utility of a given substance for a given patient, based on the patterns of neuromuscular response elicited from the patient, representing a conceptual expansion of the standard neurological examination process. **Comment:** This study showed a high degree of correlation between AK procedures used to identify food allergies and serum levels of immunoglobulins for those foods. AK methods in this study consisted of stimulation of taste bud receptors with various foods, and observation of changes in manual muscle testing that resulted. The patient was judged to be allergic to foods that created a disruption of muscle function. Blood drawn subsequently showed that patients had antibodies to the foods which were found to be allergenic through AK assessment.
The effects of a pelvic blocking procedure upon muscle strength: a pilot study, Unger, J.	*Chiropractic Technique,* Nov 1998;10(4) Using a hand-held force transducer, the unit was interposed between the examiner's hand and the subject's appendage being tested. The unit used in this study was interfaced with a computer program that gives statistical analysis for repeated testing reliability. This study found a significant increase in strength in the pectoralis (sternal and clavicular divisions tested separately), anterior deltoid, latissimus dorsi, psoas, tensor fascia lata, adductor, and gluteus medius muscles following the correction of a category II pelvic fault.
Plantar fascitis, Hambrick T.	*Journal of Bodywork and Movement Therapies,* 2001 Jan:49-55 **Abstract:** A case presentation involving plantar fascitis is presented. The structural causes of plantar fascitis are reviewed. The specific muscular factors found on AK examination that produce the dropped longitudinal arch of the foot, the separation of the distal tibia and fibula, and the posterior calcaneus are presented. The inflammatory component of this problem is reviewed, and treatment for disturbances in fatty acid metabolism and adrenal function suggested. The importance of evaluating patient's with plantar fascitis in the weight bearing position and during gait is stressed, and evaluation of muscular function during gait is offered. In AK, the effect of specific acupuncture point stimulation upon the function of the ambulatory muscles is presented. Treatment of each of these factors in this patient proved successful in resolving her problem with plantar fascitis.
The role of the scalenus anticus muscle in dysinsulinism and chronic non-traumatic neck pain, Rogowskey TA.	*Int J AK and Kinesio Med,* 2001;12. **Abstract:** Investigation into why dysinsulinism often relates to symptoms of cervical spine imbalances led to the discovery that the scalenus anticus muscle was conditionally inhibited when tested as part of an applied-kinesiological exam. This conditionally inhibited muscle is implicated in many of the symptoms associated with chronic neck pain, brachial plexus syndromes, and an unstable cervical spine. Treating dysinsulinism facilitates the scalenus anticus muscle and ameliorates the cervical spine related symptoms. Using applied kinesiology, one can tailor a program that is patient-specific for better insulin tolerance.
An applied kinesiology evaluation	*Int J AK and Kinesio Med,* 2001;10:42-45.

of facial neuralgia: a case history of Bell's Palsy, Cuthbert S.	**Abstract:** This case deals with the chiropractic evaluation and treatment of a businesswoman who was referred to my care by her husband. As part of a thorough, whole body evaluation and treatment using applied kinesiology's diagnostic methods, an interesting case of Bell's palsy was treated in this patient, with very satisfying results. Numerous causative problems involving the seventh cranial nerve were found in the evaluation of this patient, and when these causative factors were eliminated, the associated symptomatology disappeared. The anatomy and cranial architecture involved in this case are described. The patient has had no major complaints for over 7 months after the correction of her condition.
Applied Kinesiology Helping Children with Learning Disabilities, Mathews MO, Thomas E, Court L.	*Int J AK and Kinesio Med,* 1999;4. **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.
Evaluating and Treating Functional Hypothyroidism Utilizing Applied Kinesiology, Farkas J.	*Int J AK and Kinesio Med,* 1999;3. Abstract: Although only a very small percentage of patients (approx. 3%) demonstrate thyroid hormone levels which deviate downward from the norm, much clinical evidence suggests that subtler forms of thyroid hypofunction are endemic. This paper reviews thyroid physiology, as well as standard methods for evaluating thyroid function. In addition, an argument will be made for the inclusion of functional thyroid evaluation, as well as the use of non-standard therapies, including those indicated by testing with applied kinesiology.
Jugular Compression in the Diagnosis and Treatment of Cranio-sacral Lesions, Shafer J.	*Int J AK and Kinesio Med,* 1998;2. **Abstract:** Manual compression of the jugular veins (Queckenstedt's Maneuver) is regularly used during routine lumbar puncture procedures. In healthy persons, a rise in CSF pressure is expected at the site of puncture during compression of the veins. The author has observed consistent clinical significance in the use of the maneuver for cranio-sacral and dural membrane evaluation and treatment. In patients with a normal metabolic rate and exhibiting normal cranio-sacral, stomatognathic and dural membrane mechanics, compression of the jugular veins causes no change in pre-compression muscle strength. When dysfunction is present, immediate and significant changes in pre-compression muscle strength has been observed. It is hypothesized that the use of the technique during routine applied kinesiology examination is an invaluable aid to cranio-sacral therapy.
George Goodheart, Jr., D.C., and a history of applied kinesiology, Green, B.N. and Gin, R.H.	*J Manipulative Physiol Ther,* 1997;20(5):331-337 **Abstract:** Applied Kinesiology (AK), founded by Michigan chiropractor George J. Goodheart, is a popular diagnostic and therapeutic system used by many health care practitioners. Many of the components in this method were discovered by serendipity and observation. In 1964, Goodheart claimed to have corrected a patient's chronic winged scapula by pressing on nodules found near the origin and insertion of the involved serratus anterior muscle. This finding led to the origin and insertion treatment, the first method

	developed in AK. Successive diagnostic and therapeutic procedures were developed for neurolymphatic reflexes, neurovascular reflexes and cerebrospinal fluid flow from ideas originally described by Frank Chapman, D.O., Terrence J. Bennett, D.C., and William G. Sutherland, D.O., respectively. Later, influenced by the writings of Felix Mann, M.D., Goodheart incorporated acupuncture meridian therapy into the AK system. Additionally, the vertebral challenge method and therapy localization technique, both based on phenomena proposed by L.L. Truscott, D.C., were added to the AK system. Scholarship has also evolved regarding AK and research on the topic is in its infancy. This paper documents some of the history of AK.
Ear infection: a retrospective study examining improvement from chiropractic care and analyzing for influencing factors, Froehle RM.	*J Manipulative Physiol Ther*. 1996 Mar-Apr;19(3):169-77. **OBJECTIVE:** The aims of this study were to determine (a) if the patients improved while 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.
Applied Kinesiology (AK), Perle, S.	*Chiro Technique*, 7(3);Aug 1995:103-107 **Abstract:** Applied Kinesiology (AK) intends to be a comprehensive interdisciplinary approach to health care. It postulates that human disease can be seen as an alteration in the function in structural, chemical, and/or mental aspects of the body. Unique to AK is the use of manual muscle testing procedures to aid in the diagnosis of the structural, chemical and/or mental aspects of a disease process. After treatment, AK again uses manual muscle testing procedures to determine the effectiveness of the treatment. Therefore, manual muscle testing is used both to diagnose specific dysfunction and to assess outcomes.
Educational Kinesiology with learning disabled children: an efficacy study, Cammisa KM.	*Percept Mot Skills.* 1994 Feb;78(1):105-6. **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. **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.
Somatic dyspnea and the orthopedics of respiration, Masarsky CS, Weber M.	*Chiro Tech* 1991;3(1):26-29. **Abstract:** Several brief cases are presented in which the symptom of dyspnea was alleviated or abolished following the correction of vertebral subluxation complex or other somatic dysfunctions. In discussing such cases, the term "somatic dyspnea" is suggested to denote air hunger or shortness of breath related to somatic dysfunction. Somatic dyspnea is a condition which may accompany other causes of dyspnea (lung pathology, psychogenic or "functional" causes, etc.), or it can exist alone. In our chiropractic practice, most somatic dyspnea is seen as a secondary condition in patients presenting primarily with orthopedic complaints. When the symptom is secondary, the patient will often not mention it until an examination procedure reproduces it or treatment causes it to improve or disappear. The response to manipulative therapy is sometimes so dramatic and rapid that a strong linkage between the dyspnea and the primary presenting complaint is suggested. **Comment:** The treatments used in this study come primarily from AK. The "challenge" method is employed for discovery of articular problems; neurolymphatic and neurovascular reflexes (as described by Goodheart) are employed for the diaphragm muscle; evaluation of the meridian system (as modified by Goodheart and others) is used; cranial manipulation (AK methods) were used; and evaluation and treatment of inhibited muscles involved in respiration described. Masarsky and Weber have also published a paper that showing that AK examination and treatment procedures in the treatment of a patient with chronic obstructive pulmonary disease were also beneficial. Masarsky and Masarsky have explicated in great detail the contention in AK that somato-visceral and viscero-somatic methodologies should be a part of the chiropractic approach to patients in their excellent book *Somato-visceral aspects of chiropractic: an evidence-based approach.*
Failure of the musculo-skeletal system may produce major weight shifts in forward and backward bending, Goodheart, G.	*Proc Inter Conf Spinal Manip,* Washington, DC;May 1990:399-402 Forty patients were evaluated for pre- and post-treatment weight balance. Of the 40 patients, only one had minimal changes in weight upon two scales beneath the feet when both flexing and extending the spine. The treatment protocol employed (applied kinesiology methods) proved to balance the aberrant patterns of weight distribution during flexion and extension of the spine.
Neuromuscular relaxation and CCMDP. Rolfing and applied kinesiology (article in Italian), Santoro, F., Maiorana, C., Geirola, R.	*Dent Cadmos.* 1989 Nov 15;57(17):76-80.
Applied Kinesiology: Muscle Response In Diagnosis, Therapy And Preventive Medicine, Meal G.	*Eur J Chiro,* Jun 1986;34(2):107

Quantification of the Inhibition of Muscular Strength Following the Application of a Chiropractic Maneuver, Perot, D., Goubel, F., Meldener, R.	*Journale de Biophysique et de Biomecanique*. 1986; 32(10):471-474. This study measured the electrical activity in muscles. It established that there was a significant difference in electrical activity in the muscle, and that this corresponded with the difference found between “strong” versus “weak” muscle testing outcomes by AK practitioners. It further established that these outcomes were not attributable to increased or decreased testing force from the doctor during the tests. In addition, the study showed that manual treatment methods used by AK practitioners to reduce the level of tone of spindle cells in the muscle are in fact capable of creating a reduction in tone of the muscle, as had been observed clinically. Response of Tibialis anterior muscle to a "proprioceptive technique" used in applied kinesiology was investigated during manual muscle testing using a graphical registration of both mechanical and electromyographic parameters. Experiments were conducted blind on ten subjects. Each subject was tested ten times, five as reference, five after proprioceptive technique application reputed to be inhibitory. Results indicated that when examiner-subject coordination was good an inhibition was easily registered. Therefore reliability of the proposed procedure is mostly dependent upon satisfactory subject-examiner coordination that is also necessary in standard clinical manual muscle testing.
Applied kinesiology using the acupuncture meridian concept: critical evaluation of its potential as the simplest non-invasive means of diagnosis, and compatibility test of food and drugs – Part I, Omura, Y.	*Int J Acupuncture & Electro-Therapeut Res*, 4:165-183 **Abstract:** By critically evaluating exceptions that may lead to false diagnoses, as well as by improving the currently-used applied kinesiology diagnostic method (="Dysfunction Localization Method"), the author was able to develop the "Thumb-Index Finger Bi-Digital O-Ring Diagnostic Method," ***using the Applied Kinesiology Dysfunction Localization Principle***. By combining the author's "Bi-Digital O-Ring Dysfunction Localization Method" with clinically useful organ representation points in acupuncture medicine (where the presence of tenderness at the organ representation point is used for diagnosis as well as for the location of treatment), it has become possible to make early diagnoses of most of the internal organs, with an average diagnostic accuracy of over 85%, without knowing the patient's history or using any instruments. The method can detect dysfunctioning or diseased organs even before tenderness appears at the organ representation point, with an applied force of less than 1 gm/mm2 on the skin surface, while the detection of tenderness at the organ representation point often requires a minimum applied force of 80-100 gm/mm2. The method was applied to the "Drug and Food Compatibility Test" to determine the probable effects of a given food or drug on individual internal organs without going through time-consuming, expensive laboratory tests. It was also applied to auricular organ representation points and their evaluation, and has succeeded in increasing their diagnostic sensitivity. The method was also used for the evaluation of magnetic fields. Usually the North pole increased muscle strength and the South pole weakened it at most parts of the body. This simple, improved, economical diagnostic method may have invaluable implications in clinical diagnosis, treatment and drug research.
Predictive value of manual muscle testing and gait analysis in normal ankles by dynamic electromyography, Perry, J.P. et al	*Foot Ankle.* 1986 Apr;6(5):254-9. Eight muscles about the ankle of seven normal subjects were assessed by electromyography (EMG) during manual muscle testing (MMT) and walking. Three strength levels (normal, fair, trace) and three gait velocities (free, fast, slow) were tested. The muscles studied included the gastrocnemius, soleus, posterior tibialis, flexor digitorum longus, flexor hallucis longus, anterior tibialis, extensor digitorum longus, and extensor hallucis longus.

	Relative intensity of muscle action was quantitated visually (using an eight-point scale based on amplitude and density of the signal). The data showed that EMG activity increased directly as more muscle force was required during the different manual muscle test levels and increased walking speeds. No MMT isolated activity to the specific muscle though being tested. Instead, there always was a synergistic response. Both the gastrocnemius and soleus contributed significantly to plantarflexion regardless of knee position. The intensity of muscle action during walking related to the manual muscle test grades. Walking at the normal free velocity (meters/min) required fair (grade 3) muscle action. During slow gait the muscle functioned at a poor (grade 2) level. Fast walking necessitated muscle action midway between fair and normal, which was interpreted as good (grade 4).
Diagnosis of thyroid dysfunction: applied kinesiology compared to clinical observations and laboratory tests, Jacobs, G, Franks, T, Gilman, G.	*J Manipulative Physiol Ther,* 1984;7(2):99-104 **Abstract:** Sixty-five patients presenting to three clinics were independently evaluated for thyroid dysfunction by applied kinesiology (AK), a clinical protocol, and laboratory testing. Each was rated on a scale of 1 (unquestionably hypothyroid) to 7 (unquestionably hyperthyroid). AK ratings correlated with laboratory ratings (r_s = .32, $p < .002$) and with laboratory ratings (r_s = .32, $p < .005$). Correlation between clinical and laboratory diagnosis was .47, $p < .000$. Three AK therapy localizations had a significant correlation with the laboratory diagnosis ($p < .05$). Two of these (right neurovascular-left brain and left neurolymphatic-right brain) were points associated with thyroid function. The third, ventral hand on the glabella with the other on the external occipital protuberance, is associated with pituitary function. AK enhanced but did not replace clinical/laboratory diagnosis of thyroid dysfunction. Preliminary evidence indicates that there may be a significant correlation between certain AK tests and an elevated LDH in the serum.
Effects of Manipulation on Gait Muscle Activity: Preliminary Electromyographic Research, Hibbard D.	*ACA J Chiropr* Oct 1983;17(10):49-52. **Abstract:** Electromyographic analysis of lower limb muscle activity during gait was performed on 27 subjects to record any changes in muscle electrical activity following lower extremity manipulation. The 10 control subjects receiving passive treatment showed a small, but statistically significant, decrease in electrical activity post treatment. The 17 test subjects, receiving manipulation to reduce malposition, showed a highly statistically significant change in electrical activity post treatment. A statistically signifiocant relationship was also found between the type of joint malposition present and the direction of muscle activity change following manipulation. **Comment:** In this important study muscles of the lower extremity were systematically tested using the methods of Kendall and Kendall (the method used in AK MMT) until one muscle was found which was found weak compared to the same muscle on the other leg. Articulations upon which this inhibited muscle directly acts were examined for malposition using joint “challenge” as taught in AK methods, as well as static palpation. EMG analysis on the muscle was then carried out. Numerous other papers in this compendium have showed as significant a difference in the electrical activity of peripheral muscles following manipulation to spine and extremities. These data offer further support for the hypothesis held in AK that spinal and extra-spinal manipulative procedures lead to an increase in central motor excitability rather than overall inhibition.
Electromyographic Analysis Following Chiropractic Manipulation of the Cervical Spine: A Model to Study Manipulation-Induced Peripheral Muscle Changes, Rebechini-	*J Manipulative Physiol Ther,* 1981;4(2):61-63. **Abstract:** An electromyographic analysis following chiropractic manipulation of the cervical spine was conducted on twelve subjects for the purpose of constructing a model for the study of the physiological effects of spinal manipulation. These effects may be reflected in electromyograhpically-measured peripheral muscle changes. Twelve out of 12 subjects showed increased muscle activity following manipulation to the cervical spine when

Zasadny H, Tasharski CC, Heinze WJ.	compared to the control subjects, and nine out of 12 subjects showed increased muscle strength when compared to subjects who had received only passive cervical spine movements. It was concluded that this model may serve as an effective tool for further research into the efficacy of chiropractic spinal manipulative therapy. **Comment:** These data offer further support for the hypothesis, long held in AK, that SMT procedures lead to an increase in central motor excitability rather than overall inhibition.
Neurophysiologic Inhibition of Strength Following Tactile Stimulation of the Skin, Nicholas, J.A., Melvin, M., Saraniti, A.J.	*American Journal of Sports Medicine*. 1980; 8:181-186. **Abstract:** A modified shoulder abduction manual muscle test was incorporated in this study to demonstrate strength changes following tactile stimulation of the skin. Resistance was applied to the distal radioulnar joint and the stimulus (scratching) was applied inferior to the clavicle on the clavicular head of the pectoralis major muscle after maximum contraction. An electromechanical device quantified the isotonic (eccentric) measurements. A standard dynamometer system (Cybex II) was used to measure isometric strength. The nondominant side was used as the "control." Two populations, a normal (random) and a strong (athletic) group, were studied. Twenty-three persons (52% women, 48% men; mean age, 27 years; mean height, 67 inches (170 cm); and mean weight, 147 lb (66.7 kg)) were in the "normal" group and 17 persons (100% men; mean age, 25 years; mean height, 74 inches (188 cm); and mean weight, 215 lb (97.5kg)) were in the "strong" group. The random population showed a 19% decrease in strength following tactile stimulation as measured by the manual muscle testing unit; the athletic population showed a 17% decrease in strength. With the isometric measurements, the random population had an 8% decrease in mean strength following the scratch but the athletic population showed no significant decrease. The capability to quantify objectively manual muscle tests is discussed in relation to the importance of the proximal musculature. **Comment:** This study demonstrates a small part of the potentiality of the AK technique called Therapy Localization or TL. In AK, TL is a simple, non-invasive technique to find out where a problem in the body exists. TL doesn't show the physician what the problem is but shows that something under the hand that is contacting the patient's body is disturbing the nervous system. "Neurophysiologic Inhibition of Strength Following Tactile Stimulation of the Skin" states this dynamic precisely. In AK, positive TL always calls for further investigation to the area concerned. The 17% and 8% decrease in strength following TL demonstrated in this study would create a MMT finding of 4 (or inhibited) as graded in the *Guides to the Evaluation of Permanent Impairment*, 4th Edition by the American Medical Association.
An Experimental Evaluation of Kinesiology in Allergy and Deficiency Disease Diagnosis, Scoop A.	*Journal of Orthomolecular Psychiatry*. 1979; 7(2):137-8. **Abstract:** An accurate, reliable, and quick method for determining vitamin-mineral imbalances and food allergies is critical in establishing a balanced behavioral biochemistry. Dr. George Goodheart has clinically observed that whenever a patient was deficient in a specific vitamin or food factor, a specific muscle which he found to be associated with the nutrient was almost always unilaterally weak (weak on right or left side of the body) when the muscle strength was tested using kinesiology procedures (Goodheart, 1976). Goodheart and coworkers have established an association between approximately 50 vitamins and minerals on the one hand, and 50 associated muscles which are weak when the nutrient is deficient. According to Goodheart, chewing or ingestion of the critical food factor results in dramatic restoration of muscle strength within 10 seconds. The purpose of this study was to test some of Goodheart's observations in a more formal manner and to adapt his principles to cerebral allergy testing. 10 naïve subjects were given 10 muscle tests by 6 trained testers. **Pearson Product-Moment Correlation between testers was .91, suggesting that muscle testing is reliable between testers.** Subjects with unilateral weak muscles were then given either a placebo or the nutrient which Goodheart

	believes to be associated with the unilateral muscle. The increase in muscle tone measured approximately 10 seconds after ingestion was 21% for the nutrient group and was statistically significant ($p < .05$) increase in comparison with the placebo group. Muscle tone was measured by a Jaymar dynamometer with the muscle tested according to kinesiology procedures described by Kendall and Kendall. In the cerebral allergy testing part of the study, a 15% decrease in muscle tone of the pectoralis major clavicular was used as the criterion for cerebral allergy. The muscle testing method was then compared to results obtained by a Philpott-type fast with progressive reintroduction of foods**. Correlation between foods identified as provocative by muscle testing and by the fast was .81. Observation of clinical results obtained with muscle testing suggests the method has substantial clinical utility.**
Factors Influencing Manual Muscle Tests in Physical Therapy, Nicholas, J. A., Sapega, A., Kraus, H., Webb, J.N.	*Journal of Bone and Joint Surgery*. 1978; 60-A:186-190. **Abstract:** To determine whether it is the amount or the duration of the force applied manually by the tester, or both, that determines the tester's perception of the strength of the hip flexor or abductor muscles, an electromechanical device was designed which was placed between the tester's hand and the subject's limb. With the device we measured the force applied to the limb, the time interval during which it was applied, and the angular position of the limb during the entire test. In 240 such tests, the testers' ratings of the differences in strength between the right and left sides were correlated with seven variables involving force and time. It was found statistically that the impulse--that is, the duration of the tester's effort multiplied by the average applied force during each test--was the factor that most influenced the tester in the ratings.
Applied kinesiology using the acupuncture meridian concept: critical evaluation of its potential as the simplest non-invasive means of diagnosis, and compatibility test of food and drugs – Part I, Omura, Y.	*Int J Acupuncture & Electro-Therapeut Res,* 4:165-183 **Abstract:** By critically evaluating exceptions that may lead to false diagnoses, as well as by improving the currently-used applied kinesiology diagnostic method (="Dysfunction Localization Method"), the author was able to develop the "Thumb-Index Finger Bi-Digital O-Ring Diagnostic Method," ***using the Applied Kinesiology Dysfunction Localization Principle***. By combining the author's "Bi-Digital O-Ring Dysfunction Localization Method" with clinically useful organ representation points in acupuncture medicine (where the presence of tenderness at the organ representation point is used for diagnosis as well as for the location of treatment), it has become possible to make early diagnoses of most of the internal organs, with an average diagnostic accuracy of over 85%, without knowing the patient's history or using any instruments. The method can detect dysfunctioning or diseased organs even before tenderness appears at the organ representation point, with an applied force of less than 1 gm/mm2 on the skin surface, while the detection of tenderness at the organ representation point often requires a minimum applied force of 80-100 gm/mm2. The method was applied to the "Drug and Food Compatibility Test" to determine the probable effects of a given food or drug on individual internal organs without going through time-consuming, expensive laboratory tests. It was also applied to auricular organ representation points and their evaluation, and has succeeded in increasing their diagnostic sensitivity. The method was also used for the evaluation of magnetic fields. Usually the North pole increased muscle strength and the South pole weakened it at most parts of the body. This simple, improved, economical diagnostic method may have invaluable implications in clinical diagnosis, treatment and drug research.
Evaluation of Muscle-Organ Association, Part I and II, Carpenter SA, Hoffmann, J, Mendel R.	*J Clin Chiro,*1977; II(6):22-33 and III(1):42-60. **Abstract:** A study was performed at the Anglo-European College of Chiropractic to evaluate the muscle-organ association. In 80 subjects, a total of 139 organs were irritated, and the muscle associated with that organ was tested with an instrument. Then a control

	muscle was tested. 4 organ muscle associations were evaluated: the eye, ear, stomach, and lung. The stomach was irritated by placing cold water into it; the eye with chlorinated water; the ear with sound of a controlled frequency and decibel rate; and the lung with cigarette smoke. In all cases, the associated muscle weakened significantly after the irritation. The control muscle also weakened, but to a much lesser degree. **Comment:** This paper is an important contribution to the clinical research concerning AK theory. Louisa Burns, D.O., reported in the first half of the 20th century that structural alterations of spinal vertebra produce immediately observable changes in body tissues. The connection between spinal subluxations and the muscle components that allow this structural distortion to occur are were specifically evaluated in this study. AK proposes that neurological connections exist between muscles and organs, muscles and joints and that these connections may be the basis of the chiropractor's effectiveness in correcting visceral and/or glandular dysfunction. In this study, the fact that the control muscle also weakened parallels the AK finding that general muscles of the body weaken when an insult is placed into the nervous system or other controlling factor of the body.
Relations between occlusal interference and jaw muscle activities in response to changes in head position, Funakoshi, M., Fujita, N., Takenana, S.	*J Dent Res,* 1976;35:684-690 **Abstract:** The jaw muscles responded to changes in the head position. Electromyographic responses to head positions were classified as either of two types--balanced and unbalanced. The balanced type of electromyographic responses of participants with normal occlusion changed to the unbalanced type after being set with an overlay to make a premature contact artificially, and returned to the balanced type after removal of the overlay. The unbalanced type of electromyographic response of participants with occlusal interference turned to the balanced type after occlusal adjustment. **Comment:** In AK examination and treatment, the complexity of the TMJ apparatus is appreciated. The TMJ is part of a complex system including the bones of the skull and cervical spine, the mandible and hyoid bone, the related muscle attachments and other soft tissues, and neurologic and vascular components. This complex is often referred to as the stomatognathic system. The use of AK methods, especially challenge and therapy localization, greatly assists the practitioner in finding concealed or hidden TMJ problems.