
**Abstract:** Noxious stimuli that are applied to different somatic sites interact; often one stimulus diminishes the sensation elicited from another site. By contrast, inhibitory interactions between visceral stimuli are not well documented. We investigated the interaction between the effects of noxious distension of the colorectum and noxious stimuli applied to the jejunum, in the rat. Colorectal distension elicited a visceromotor reflex, which was quantified using electromyographic (EMG) recordings from the external oblique muscle of the upper abdomen. The same motor units were activated when a strong pinch was applied to the flank skin. Distension of the jejunum did not provoke an EMG response at this site, but when it was applied during colorectal distension it blocked the EMG response. Jejunal distension also inhibited the response to noxious skin pinch. The inhibition of the visceromotor response to colorectal distension was prevented by local application of tetrodotoxin to the jejunum, and was markedly reduced when nicardipine was infused into the local jejunal circulation. Chronic sub-diaphragmatic vagotomy had no effect on the colorectal distension-induced EMG activity or its inhibition by jejunal distension. The nicotinic antagonist hexamethonium suppressed phasic contractile activity in the jejunum, had only a small effect on the inhibition of visceromotor response by jejunal distension. It is concluded that signals that arise from skin pinch and colorectal distension converge in the central nervous system with pathways that are activated by jejunal spinal afferents; the jejunal signals strongly inhibit the abdominal motor activity evoked by noxious stimuli.


**Abstract:** Changes in afferent input can alter the excitability of intracortical inhibitory systems. For example, using paired transcranial magnetic stimulation (TMS), both electrical digital stimulation and muscle vibration have been shown to reduce short-interval intracortical inhibition (SICI). The effects following muscle vibration are confined to the corticospinal projection to the vibrated muscles. The results following digital stimulation are less clear and the relative timing of the cutaneous stimulation and TMS is critical. Here we investigated further whether changes in SICI following digit stimulation exhibit topographic specificity. Eleven normal subjects were investigated (age 28.2 +/- 7.5 years, mean +/- SD). Electromyographic recordings were made from the right first dorsal interosseous (FDI), abductor digitii minimi (ADM) and abductor pollicis brevis (APB) muscles. SICI was measured, with and without preceding electrical digit II or digit V cutaneous stimulation. The interval between the digital nerve stimulus and test magnetic stimulus was independently set for each subject and established by subtracting the onset latency of the motor evoked potential (MEP) from the latency of the E2 component of the cutaneomuscular reflex. Therefore, measures of intracortical excitability were made at a time at which it is known that cutaneous input is capable of modulating cortical excitability. Single digital nerve stimuli applied to digit II significantly reduced SICI in FDI but not in ADM. Single digital nerve stimuli applied to digit V significantly reduced SICI in ADM but not in FDI or APB. There was a more generalised effect on intracortical facilitation (ICF) with both digit II and digit V stimulation significantly increasing ICF in FDI and ADM. Digital stimulation (either DII or DV) did not significantly affect SICI/ICF in APB. These findings show that appropriately timed cutaneous stimuli are capable of modulating SICI in a topographically specific manner. We suggest that the selective decrease in SICI seen with cutaneous stimulation may be important for focusing of muscle activation during motor tasks. **Comment:** This study demonstrates also a small part of the potentiality of the AK technique called Therapy Localization or TL. The cutaneomuscular reflexes have been extensively investigated in the scientific literature, and they are part of the mechanism for what is found
Navigating a sensorimotor loop, Fanselow EE, Connors BW.


**Abstract:** Touch is an active process, but how do the body's somatic sensors influence its movement? In this issue of *Neuron*, Nguyen and Kleinfield show that afferent activity from the whiskers on a rat's face trigger rapid and prolonged excitation of the motor neurons that drive movements of the same whiskers. Positive feedback through this sensorimotor loop may serve to optimize the interaction between sensors and stimuli.

**Comment:** This study demonstrates that there exists a sensori-motor loop that may be responsible for changes in muscle strength after tactile stimulation. This paper shows a small part of the potentiality of the AK technique called Therapy Localization or TL. The cutaneomuscular reflexes have been extensively investigated in the scientific literature, and they may be a part of the mechanism for what is found clinically with TL testing.

Evidence for strong synaptic coupling between single tactile afferents from the sole of the foot and motoneurons supplying leg muscles, Fallon JB Bent LR, McNulty PA, Macefield VG.


**Abstract:** It has been known for some time that populations of cutaneous and muscle afferents can provide short-latency facilitation of motoneuron pools. Recently, it has been shown that the input from individual low-threshold mechanoreceptors in the glabrous skin of the hand can modulate ongoing activity in muscles acting on the fingers via spinally mediated pathways. We have extended this work to examine whether such strong synaptic coupling exists between tactile afferents in the sole of the foot and motoneurons supplying muscles that act about the ankle. We recorded from 53 low-threshold mechanoreceptors in the glabrous skin of the foot via microelectrodes inserted percutaneously into the tibial nerve of awake human subjects. Reflex modulation of ongoing whole muscle electromyography (EMG) was observed for each of the four classes of low-threshold cutaneous mechanoreceptors (17 of 21 rapidly adapting type I; 2 of 4 rapidly adapting type II; 7 of 18 slowly adapting type I; and 4 of 10 slowly adapting type II). Reflex modulation of the firing probability in single motor units (5 of 11) was also observed. These results indicate that strong synaptic coupling between tactile afferents and spinal motoneurons is not a specialization of the hand and emphasizes the potential importance of cutaneous inputs from the sole of the foot in the control of gait and posture.

**Comment:** This study demonstrates that stimulation of the skin may be responsible for changes in muscle strength. This paper shows a small part of the potentiality of the AK technique called Therapy Localization or TL. The cutaneomuscular reflexes have been extensively investigated in the scientific literature, and they may be a part of the mechanism for what is found clinically with TL testing.


**BACKGROUND:** As complementary and alternative medicine is gaining popularity among health consumers, diagnostic screening tools based on neuroreflexology are also being developed. These techniques, which are based on the rationale that measurement of electrical impedance of specific dermatomes reflects corresponding internal organ pathologies, have not yet been the subject of conventional scientific research. **OBJECTIVES:** To determine the effectiveness of a neuroreflexology-based screening test, specifically the Medex device (Medex Screen Ltd.), for diagnosing patients undergoing conventional internal organ assessment, in a hospital setting. **METHODS:** Patients admitted to an internal medicine department, who met the inclusion criteria and agreed to participate, underwent conventional medical evaluation that included past medical history and physical examination. Another examination was conducted by a second physician using the Medex device to determine internal organ pathologies. A third researcher compared the actual "conventional" diagnosis with the Medex device output using standard statistical analysis. **RESULTS:** Overall, 150 patients participated in the study. Correlation was significant for all categories (P < 0.01) except for blood and lymphatic disease. A high sensitivity (>70%) was measured for...


**BACKGROUND:** As complementary and alternative medicine is gaining popularity among health consumers, diagnostic screening tools based on neuroreflexology are also being developed. These techniques, which are based on the rationale that measurement of electrical impedance of specific dermatomes reflects corresponding internal organ pathologies, have not yet been the subject of conventional scientific research. **OBJECTIVES:** To determine the effectiveness of a neuroreflexology-based screening test, specifically the Medex device (Medex Screen Ltd.), for diagnosing patients undergoing conventional internal organ assessment, in a hospital setting. **METHODS:** Patients admitted to an internal medicine department, who met the inclusion criteria and agreed to participate, underwent conventional medical evaluation that included past medical history and physical examination. Another examination was conducted by a second physician using the Medex device to determine internal organ pathologies. A third researcher compared the actual "conventional" diagnosis with the Medex device output using standard statistical analysis. **RESULTS:** Overall, 150 patients participated in the study. Correlation was significant for all categories (P < 0.01) except for blood and lymphatic disease. A high sensitivity (>70%) was measured for cardiovascular, respiratory, gastrointestinal and genitourinary diseases. The highest measure of agreement, as represented by the Cohen-Kappa factor, was found for respiratory disease (0.57). **CONCLUSIONS:** Although the exact mechanism is not entirely clear, measurement of electroskin impedance of dermal-visceral zones has the potential to serve as a screening tool for inner organ pathologies. Further research should be conducted to create more evidence to support or dispute the use of this technique as a reliable diagnostic tool. **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.

**New diagnostic and therapeutic approach to thyroid-associated orbitopathy based on applied kinesiology and homeopathic therapy, Moncayo, R., Moncayo, H., Ulmer, H., Kainz, H.**


**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.

**Abstract:** EMG responses evoked in hand muscles by transcranial stimulation over the motor cortex were conditioned by a single motor threshold electrical stimulus to the median nerve at the wrist in a total of ten healthy subjects and in five patients who had electrodes implanted chronically into the cervical epidural space. 2. The median nerve stimulus suppressed responses evoked by transcranial magnetic stimulation (TMS) in relaxed or active muscle. The minimum interval between the stimuli at which this occurred was 19 ms. A similar effect was seen if electrical stimulation was applied to the digital nerves of the first two fingers. 3. Median or digital nerve stimulation could suppress the responses evoked in active muscle by transcranial electrical stimulation over the motor cortex, but the effect was much less than with magnetic stimulation. 4. During contraction without TMS, both types of conditioning stimuli evoked a cutaneomuscular reflex that began with a short period of inhibition. This started about 5 ms after the inhibition of responses evoked by TMS. 5. Recordings in the patients showed that median nerve stimulation reduced the size and number of descending corticospinal volleys evoked by magnetic stimulation. 6. We conclude that mixed or cutaneous input from the hand can suppress the excitability of the motor cortex at short latency. This suppression may contribute to the initial inhibition of the cutaneomuscular reflex. Reduced spinal excitability in this period could account for the mild inhibition of responses to electrical brain stimulation. **Comment:** This study demonstrates also a small part of the potentiality of the AK technique called Therapy Localization or TL. The cutaneomuscular reflexes have been extensively investigated in the scientific literature, and they may be a part of the mechanism for what is found clinically with TL testing.

**Abstract:** The purpose of this study was to investigate the mechanisms of referred pain observed in female patients with pain from the reproductive organs. We developed a model of inflammatory uterine pain in the rat. Inflammation of the uterus in rats pretreated with Evans Blue Dye resulted in dye extravasation in the skin over the abdomen, groin, lower back, thighs, perineal area and proximal tail, thus providing for the first time evidence for the trophic changes observed in the area of referred visceral pain in an animal model of uterine pain. The neuronal pathways mediating the observed dye extravasation in the skin after uterine inflammation may include dichotomizing afferent fibers, afferent-afferent interactions via a spinal cord pathway or a sympathetic reflex. This model will allow us to gain further insight into the mechanisms of referred pain and the trophic changes observed in the area of referred pain in visceral disease. **Comment:** A crucial development in AK occurred when Goodheart observed that if a patient touched an area of dysfunction, the results of MMT changed. Therapy localization has numerous applications in AK including TL to various reflexes, subluxations, meridian points, nerve receptors and other areas. This paper explains part of this fascinating development in the healing arts that has been proven helpful in the diagnosis of physical dysfunctions in patients.
stimulation of the upper limb in painful cervical radiculopathy, Hall T, Quintner J.

Abstract: Clinical and electromyographic (EMG) responses to non-noxious mechanical stimuli were studied in four patients with painful cervical radiculopathy, and in two control subjects. In the symptomatic arm(s), palpation over one or more nerve trunks was painful and accompanied by EMG activity, whereas palpation of adjacent soft tissues was painless and unaccompanied by EMG activity. Electromyographic activity was widespread in three patients when myotatic reflexes were elicited in the symptomatic arm(s). In asymptomatic arms of patients and controls, EMG responses to the myotatic reflexes were more localised. Alldynic nerve trunks in cervical radiculopathy appear to be afferent correlates of central sensitization; the accompanying EMG activity may represent a motor correlate of this same process.

Comment: Muscles throughout the area of the brachial plexus are commonly found inhibited or atrophying after cervical spine injury and inflammation. Patients who have experienced cervical trauma from whiplash and other dynamics often have perplexing symptoms. This leads some doctors who do not evaluate function to conclude that poor response to therapy is psychogenic and often related to the patient's conscious or subconscious effort to gain in the medicolegal process. The standard orthopedic and neurologic examination often does not find a cause for the bizarre symptoms about which some patients complain. Manual muscle testing is a method for evaluating the function of the nervous system; it often reveals the cause, giving an understanding of the patient's many complaints. Hall and Quintner also showed in this paper that in chronic pain patients, light pressure elicits a widespread increase in EMG activity. This indicates that a procedure like therapy localization in AK, where the patient gently touches an area of suspected injury, produces a change in muscle function that can be helpful in diagnosis.

The influence of afferent inputs from skin and viscera on the activity of the bladder and the skeletal muscle surrounding the urethra in the rat, Morrison JF, Sato A, Sato Y, Yamanishi T.


(1) Somato-visceral and viscero-visceral reflex interactions have been studied in the bladder branches of the pelvic nerve and in the electromyographic (EMG) activity of the periurethral skeletal muscles of the anesthetized rat, and by observations of changes in bladder motility. (2) Slow distensions of the bladder caused some elevation of intravesical pressure, and culminated in a micturition contraction. Periurethral EMG activity increased gradually during the bladder distension, and showed an oscillatory marked increase during the bladder contraction. There was a small increase in pelvic nerve efferent activity during slow distension, and there was a substantial increase before, or at the start, of a micturition contraction. (3) Oscillatory bursting activity occurred in recordings of the EMG activity from periurethral skeletal muscle during the rising phase of micturition contraction; this was particularly so during the most rapid rise in intravesical pressure, and periods of electrical silence lasting 80-270 ms alternated with bursts of activity in the periurethral EMG. (4) In the present experiments, the switching mechanism activated by pelvic afferent signals related to intravesical pressure reversed the behavior of a number of reflex pathways. When the bladder pressure was low, nociceptive pinching of the perineal skin usually caused bladder contraction and a rise in pelvic nerve efferent activity and in periurethral EMG activity. When the bladder was full, micturition contractions were present and reduced in size and frequency by pinching of the perineal skin. The pelvic nerve efferent activity was correspondingly reduced, while the EMG activity increased during and following the nociceptive stimulus. Cooling the scrotal skin with ice also decreased the frequency of bladder contractions. (5) When the bladder pressure was low, distension of the anus and colon increased periurethral EMG activity, but did not affect bladder tone. However, when the bladder was full, these stimuli reduced the size and frequency of bladder contractions, associated with a reduction in the pelvic nerve efferent activity. There was usually a simultaneous reduction in the EMG activity in periurethral muscles. Similar results were obtained during distension of the seminal vesicles or vagina, or following injection of 20-60 microliters of saline into the lumen of the vas deferens. Reversal of the responses at extremes of intravesical pressure was observed in every case. (6) Following spinal transection at the upper cervical or thoracic level, micturition contractions were absent at high bladder...
volumes. However the effects described when the neuraxis was intact and the bladder pressure was low were still observed.

**Comment:** A crucial development in AK occurred when Goodheart observed that if a patient touched an area of dysfunction, the results of MMT changed. Therapy localization has numerous applications in AK including TL to various reflexes, subluxations, meridian points, nerve receptors and other areas. This paper explains part of this fascinating development in the healing arts that has been proven helpful in the diagnosis of physical dysfunctions in patients.

**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 $r_s = .47, p < .000$. 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.

**Investigation of over-the-skin electrical stimulation parameters for different normal muscles and subjects, Moreno-Aranda J, Seireg A.**


This study demonstrates a small part of the potentiality of the AK technique called Therapy Localization or TL.

**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 also 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
The use of skin stimulation to produce reversal of motor unit recruitment order during voluntary muscle contraction in man [proceedings]. Buller NP, Garnett R, Stephens JA.

Reversal of recruitment order of single motor units produced by cutaneous stimulation during voluntary muscle contraction in man, Stephens JA, Garnett R, Buller NP.

Cord cells responding to fine myelinated afferents from viscera, muscle and skin, Pomeranz B, Wall PD, Weber WV.

Further Explanation of Surrogate Testing and Therapy Localization, Sprieser P.

Reflex changes in heart rate after mechanical and thermal stimulation of the skin at various segmental levels in cats.

---

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.

This paper demonstrates the specific effect of skin stimulation upon muscle function, and shows the neurological relationships that may be occurring during the therapy localization procedure in AK diagnosis and treatment.

This paper demonstrates the specific effect of skin stimulation upon muscle function, and shows the neurological relationships that may be occurring during the therapy localization procedure in AK diagnosis and treatment.

This paper demonstrates the specific effect of skin stimulation upon muscle function, and shows the neurological relationships that may be occurring during the therapy localization procedure in AK diagnosis and treatment.

Abstract: 1. Micro-electrode recordings were made in the thoracic cord of acute spinal cats. Cells, which were located in the histologically defined lamina 5, responded both to the fine myelinated afferents from the splanchnic nerve and to afferents from the skin. Splanchnic afferents inhibit the effect of converging cutaneous inputs for periods up to 150 msec. Skin stimuli may also inhibit the effect of afferent nerve impulses from viscera. Some cells respond monosynaptically to the splanchnic afferents, others indirectly.

2. Fine myelinated afferents from gastrocnemius (group 3) stimulate lamina 5 cells which also have cutaneous receptive fields. Cutaneous and group 3 muscle afferents interact by mutual inhibition in their effect on the cells.

3. Fine myelinated afferents from skin excite lamina 5 cells. The cutaneous responses of lamina 5 cells contrast with those of lamina 4 cells in the following respects: (a) the receptive fields are larger, (b) they respond with an increased latency to Aβ afferents, (c) there is a low pressure threshold at the edge, (d) they respond to a wide range of pressure stimuli from light brush to heavy pinch applied to the centre of the receptive fields and (e) they respond to Aδ afferents.

4. Lamina 5 cells receive fine myelinated afferents either from viscera or from muscle or from skin. Lamina 4 receives large myelinated afferents from skin and lamina 6 receives large myelinated afferents from muscle. The results suggest the hypothesis that some fine myelinated afferents form a class of afferents which signal the state of tissue, and end on lamina 5 cells.

Comment: This early paper describes the neurology involved in the AK testing method called Therapy Localization. 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.

Further Explanation of Surrogate Testing and Therapy Localization, Sprieser P.

Reflex changes in heart rate after mechanical and thermal stimulation of the skin at various segmental levels in cats.

---

Further Explanation of Surrogate Testing and Therapy Localization, Sprieser P.

Reflex changes in heart rate after mechanical and thermal stimulation of the skin at various segmental levels in cats.

---

Chiro Econ, Jan/Feb 1987:131-135

Kaufman et al have demonstrated that cutaneosympathetic reflexes can be elicited throughout the body. This paper describes some of the neurology involved in the AK testing method called Therapy Localization. In AK, TL is a simple, non-invasive technique to find
<table>
<thead>
<tr>
<th>KAufman A, Sato A, Sato Y, Sugimoto H.</th>
<th>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 neurophysiological 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.</th>
</tr>
</thead>
</table>