

Neurological Rehabilitation: Acupuncture and Laser Acupuncture To Treat Paralysis in Stroke and Other Paralytic Conditions and Pain in Carpal Tunnel Syndrome

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This report reviews acupuncture and laser acupuncture to treat paralysis in stroke, cerebral palsy, spinal cord injury, and peripheral facial paralysis (Bell's palsy), and pain in carpal tunnel syndrome.

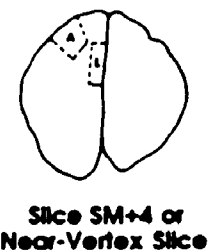
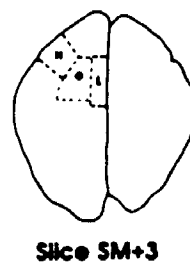
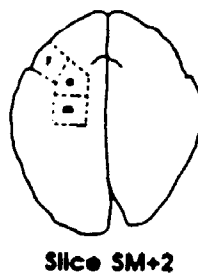
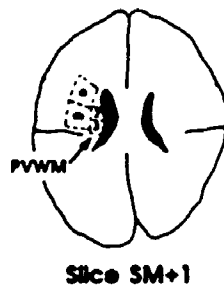
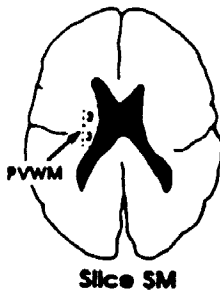
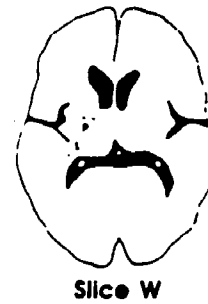
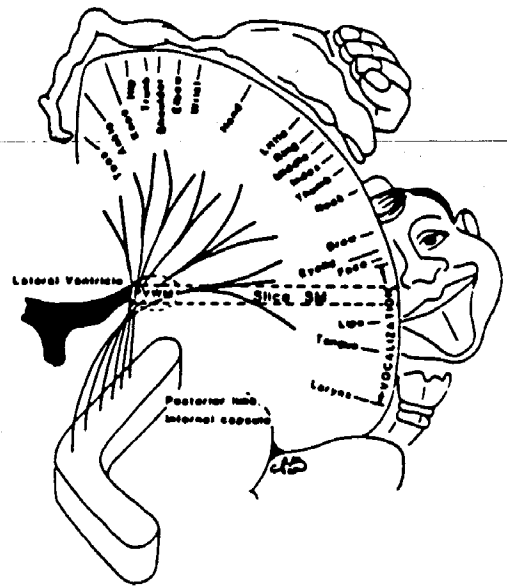
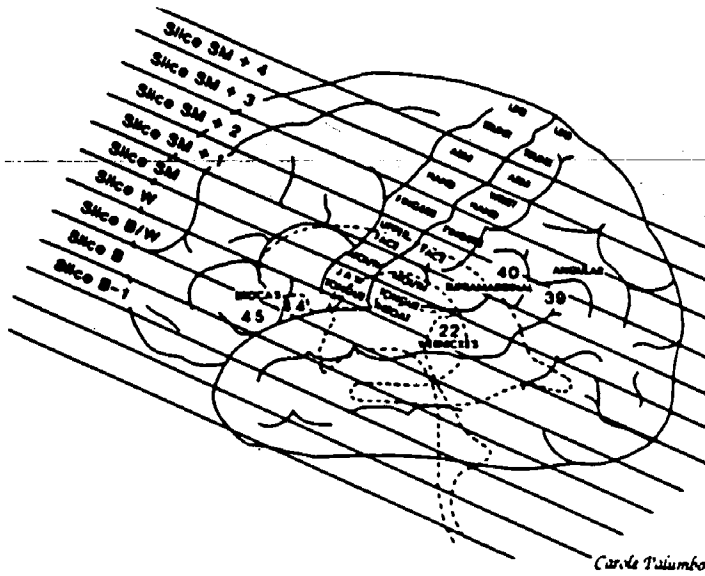
Acupuncture or Laser Acupuncture To Treat Paralysis in Stroke

Stroke is the major cause of disability among adults in the United States (Weinfeld, 1981). Every day, more than 1,200 Americans suffer a stroke, and 400 of these patients are permanently disabled. Today, more than 2 million Americans suffer long-term disabilities from stroke, and stroke costs more than \$25 billion each year (NIH Report, NINDS, 1992).

Recently, there have been 10 studies in which acupuncture was used to treat paralysis in stroke patients. Sham acupuncture (insertion of needles into nonacupuncture points on the limbs) was performed in only one study (Naeser, Alexander, Stiassny-Eder, et al., 1992). This study observed significantly more acute stroke patients with arm or leg paralysis to have good response following real acupuncture than following sham acupuncture if the computed tomography (CT)-scan lesion site was a variable ($p < .013$). When there was lesion in less than one-half of the motor pathway areas on a CT scan (especially the PVWM area, as shown in figure 1), acupuncture was effective in increasing limb range of motion (ROM) in these patients with mild to moderate paralysis. Good response postacupuncture was defined as an increase of at least 10 percent in isolated active ROM, on at least two arm or leg tests (shoulder abduction, knee flexion, or knee extension, etc.). No patients who received sham acupuncture had good response, whatever the lesion. All patients in this study were treated with acupuncture beginning at 1 to 3 months poststroke.

Acute and chronic stroke cases with arm or leg paralysis of mild to moderate severity who had lesion in less than one-half of the motor pathway areas on a CT scan were observed to have a significant increase in shoulder abduction, knee flexion, and knee extension ($p < .04$ and beyond) following 20 to 40 acupuncture treatments over a 2- to 3-month period (Naeser, Alexander, Stiassny-Eder, et al., 1994a). Cases with some isolated finger movement have the best prognosis for improvement in upper extremity ROM following acupuncture treatments. Severe hemiplegia patients with lesion in more than one-half of the motor pathway areas on CT scan had little or no increase in limb ROM following acupuncture treatments; however, they did have a beneficial effect where a decrease in spasticity was observed (arm, leg, or hand spasticity) (Naeser, Alexander, Stiassny-Eder, et al., 1994a).

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Lateral, coronal and cross-sectional diagrams showing location of neuroanatomical areas visually assessed for extent of lesion (amount of infarction) on CT scan, containing, in part, descending pyramidal tract pathways. The deep, subcortical periventricular white matter area (PVWM) is outlined in the upper right coronal diagram and shown on CT scan slices SM and SM+1 (arrows). The total extent of lesion in the 2nd and 3rd quarters of the PVWM area was related to Good Response, versus Poor Response, following Real acupuncture treatments. Key to abbreviations: L = leg cortex area; A = arm cortex area; 2 = 2nd quarter PVWM; 3 = 3rd quarter PVWM; PL = posterior limb, internal capsule (continues on slices B and B/W). (CT scan angle is 20 degrees to the cantho-meatal line.)

Naeser MA, Alexander MP, Stiassny-Eder D, Galler V, Hobbs J, Bachman D: Real versus Sham Acupuncture in the Treatment of Paralysis in Acute Stroke Patients - A CT Scan Lesion Site Study. *Journal of Neurologic Rehabilitation*. 1992;6:163-173.

Figure 1. CT scan lesion site anatomy and acupuncture research in the treatment of arm/leg and hand paralysis in stroke patients.

All acute and chronic stroke cases who had no major arm or leg paralysis but only a milder hand paresis (all with lesion in less than one-half the motor pathway areas on CT scan) had significant improvement in finger/hand strength and dexterity tests ($p < .04$ and beyond), even if acupuncture was initiated as late as 6 to 8 years poststroke (Naeser, Alexander, Stiassny-Eder, et al., 1994b). Across these three studies performed by Naeser and colleagues, all cases ($n = 18$) who had lesion in less than one-half of the motor pathway areas had good response, and overall 19 of 31 cases (61 percent) had good response. On followup testing in 11 stroke patients at 2 months after the last acupuncture treatment, 72 percent to 83 percent of the improved hand, arm, or leg tests were stable or better (Naeser, Alexander, Stiassny-Eder, et al., 1994a, 1994b).

In a recent study in Sweden, when 20 acupuncture treatments were initiated at 4 to 10 days postonset in acute stroke cases, there was significantly better outcome (walking, balance, activities of daily living, quality of life) at 1, 3, and 12 months poststroke in cases receiving acupuncture plus physical therapy compared with cases receiving physical therapy alone ($p < .01$ and beyond) (Johansson, Lindgren, Widner, et al., 1993; Johansson, 1993). There was an estimated savings of \$26,000 per stroke patient treated with acupuncture resulting from fewer days in nursing homes and rehabilitation facilities. Followup on these cases 2 years later showed significantly better postural control for the acupuncture group ($p < .01$) (Magnusson, Johansson, Johansson, 1994).

In Japan, a special form of scalp needle acupuncture, Yamamoto New Scalp Acupuncture (YNSA), is used with stroke patients (Yamamoto, Maric-Oehler, 1991). Small, one-half-inch acupuncture needles are inserted into specific areas on the scalp immediately before a physical therapy (PT) or occupational therapy (OT) session. Often patients are able to gain better ROM and greater benefit from PT or OT with this technique; the needles are left in place for the rest of the day.

In studies in Norway, Taiwan, and China, acupuncture plus PT versus PT alone reported that with acute, subacute, or chronic stroke cases, those patients who received acupuncture early postonset (within 36 hours of stroke onset) had significantly better outcome (Sallstrom, Kjendahl, Osten, et al., 1995; Hu, Chung, Liu, et al., 1993; Zhang, Li, Chen, et al., 1987). Early complementary treatment with acupuncture poststroke (< 36 hours) was especially important in patients with severe paralysis in the very acute stage (Hu, Chung, Liu, et al., 1993). A study by Li and colleagues (1989) observed that acupuncture could be initiated within 24 hours postonset, even in acute cerebral hemorrhage cases, after the bleeding was controlled. Acupuncture's effect to increase cortisol (Cheng, McKibbin, Roy, et al., 1980; Shi, Bu, Lin, 1992) may contribute to less brain swelling, hence less brain damage, in acute stroke cases treated in the very early stage poststroke. This is an area for more research.

Naeser and colleagues (1995) used painless, noninvasive low-level laser light (780 nm, 20 mW) instead of needles to stimulate acupuncture points as a treatment for paralysis in stroke patients. The results were similar to those observed with needle acupuncture in stroke cases with similar CT scan lesion sites. Laser acupuncture is desirable especially for hand paresis cases because the patients can be trained to perform additional home treatment with a 5-mW red-beam diode laser pointer, under the supervision of a licensed acupuncturist trained in laser acupuncture

(Naeser, Wei, 1994). Laser acupuncture is considered investigational by the Food and Drug Administration, and informed consent is required.

In summary, comparisons were available between a control group and an acupuncture group in 8 of the 10 stroke studies reviewed here. The acupuncture groups had significantly better outcome levels ($p < .05$ and beyond). Overall, 128 of 193 cases, or 66.6 percent, had an outcome level of good response or markedly effective, following 20 to 40 acupuncture treatments over a 2- or 3-month period. The patients who received acupuncture very early postonset (within 24 to 36 hours poststroke or 4 to 10 days) had the best outcome levels at 1 and 3 months and again at 1 and 2 years later, with one study showing a savings of \$26,000 per patient who began acupuncture at 4 to 10 days poststroke because of fewer days in hospitals and rehabilitation facilities. No adverse reactions were reported. Moreover, acupuncture may improve cerebral circulation (see below).

Possible Mechanisms for Acupuncture's Effectiveness in Stroke

The mechanism through which acupuncture may produce improvement in motor function or reduce spasticity in stroke patients with paralysis is not understood at this time. It is hypothesized that it may increase cerebral blood flow or promote vasodilation (Alavi, LaRiccia, Sadek, et al., 1996, 1997; Chen, Erdmann, 1977; Omura, 1975). A blood-flow brain single photon emission computed tomography (SPECT) scan study is currently in progress in the author's neuroimaging section at the Boston Department of Veterans Affairs (VA) Medical Center and the West Roxbury VA Medical Center, where blood flow is measured before and immediately after one acupuncture treatment (needles with electroacupuncture and laser acupuncture) on the same day. Three of four chronic stroke cases examined thus far showed an increase in blood flow to the thalamus and hand primary motor cortex area, especially ipsilateral to the paralysis (contralateral to the lesion) following the acupuncture treatment, ranging from 3 percent and 4 percent to 24 percent. The latter increase of 24 percent was observed in a patient (case WM) who had already had 3 years of acupuncture treatments, whereas this was the first acupuncture treatment for the other two cases (see figure 2). The studies by Alavi and colleagues (1996, 1997) had observed an increase of approximately 23 percent in blood flow postacupuncture in the brainstem and thalamus areas in four of five chronic pain patients who had previously had several weeks of acupuncture treatments. Thus, the greater increase of 24 percent in the patient who had received 3 years of acupuncture treatments versus the smaller increases in the patients for whom this was the first treatment deserves further research. This increase may indicate that acupuncture promotes a maximal alteration in blood flow patterns following a series of treatments over time.

An increase in regional cerebral glucose metabolism on positron emission tomography (PET) scans has been observed in the thalamus and primary motor cortex areas (sometimes bilateral) in stroke patients who have had good spontaneous recovery from paralysis within a few months poststroke (nonacupuncture studies) (Frakowiak, Weiller, Chollet, et al., 1991; Weiller, Chollet, Friston, et al., 1992; Weder, Knorr, Herzog, et al., 1994; Binkofski, Seitz, Arnold, et al., 1996; Bookheimer, Cohen, Dobkin, et al., 1995). After a series of acupuncture treatments over several weeks, if acupuncture does significantly increase blood flow or regional glucose

Percent Blood Flow Referenced to Cerebellum Ipsilateral to the Lesion

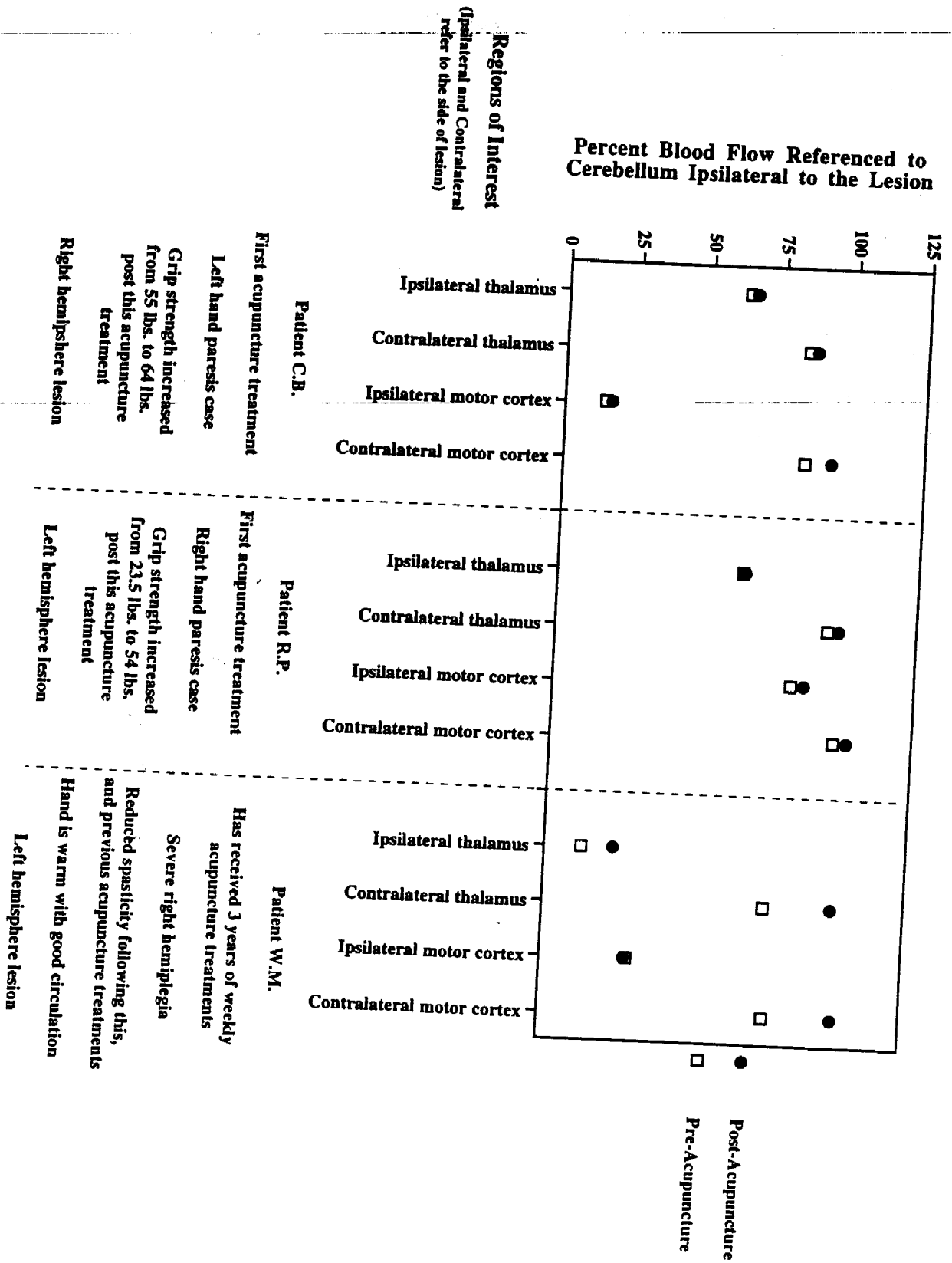


Figure 2. Percent blood flow on brain SPECT scans, pre- and post-acupuncture treatment in stroke patients.

metabolism in the thalamus and primary motor cortex area (and possibly other areas) in stroke patients with paralysis, this acupuncture-induced alteration may promote more rapid and improved brain reorganization for motor control poststroke. Additional brain imaging studies are recommended.

Acupuncture or Laser Acupuncture To Treat Cerebral Palsy in Babies and Children

Cerebral palsy (CP) may be defined as a chronic disability originating in the central nervous system and characterized by aberrant control of movement or posture, appearing early in life and not the result of a progressive disease. It is estimated to occur in 0.1 percent of births (approximately 250,000 cases in the United States). It is more frequently observed in babies born with a low birthweight (less than 2,500 grams) (Cummins, Nelson, Grether, et al., 1993).

Several studies have recently been conducted to study the effects of acupuncture on cerebral palsy. Two studies compared acupuncture with a control treatment—limb massage only in one study (Xiao, Meng, 1995) or vitamins and Chinese herbs only in the other (Ma, Zhang, 1995); each study observed better outcome in the acupuncture group ($p < .01$). Laser acupuncture was included in two other studies (Filipowicz, 1994; Likicka, Hegyi, 1991); both studies observed stimulation of acupuncture points with low-level, red-beam laser to help reduce spasticity and improve motor function for sitting, crawling, and walking. Laser acupuncture may be performed in the home by the mother with a 5-mW red-beam diode laser pointer, under supervision from a licensed acupuncturist trained in laser acupuncture. Home laser acupuncture treatment has been observed to reduce the number of seizures, thus allowing a CP child to require less medication (Agatha Colbert, M.D., personal communication). This condition requires lifelong treatment; adjunctive home treatment with laser acupuncture could reduce some of these costs. Studies recommend initiating acupuncture very early (preferably 2 weeks postbirth or less than 1 year of age) (Lidicka & Hegyi, 1994; Lao, 1992).

In summary, the results across these seven studies indicate an outcome level of good response or markedly effective in 190 of 279 cases (68 percent) of the babies and children treated with acupuncture or laser acupuncture. These treatments are especially helpful in reducing spasticity. Plasma cortisol levels were reported to be significantly increased in 77 percent of the children treated with acupuncture for cerebral palsy (Shi, Bu, Lin, 1992).

Acupuncture To Treat Paralysis in Spinal Cord Injury

In America, approximately 200,000 persons are now permanently confined to wheelchairs because of spinal cord injury. Each year, approximately 10,000 more people are injured, suffering paralysis and loss of sensation. Most of these people (two-thirds) are younger than 30 years of age. The specialized care that is required for these people costs approximately \$5 billion each year in the United States (NIH Report, NINDS, 1992).

Result of three acupuncture studies are summarized here. None had a control group. Overall, 340 of 360 cases, or 94.4 percent, had an outcome level of beneficial progress, including

reduction in muscle spasms, some increased level of sensation, and improved bladder and bowel function. Patients were treated for longer periods, from 5 months to 2 to 3 years. The acupuncture treatments were also helpful in the treatment of bedsores with these patients. Red-beam laser acupuncture may be used on the hands or feet to help reduce muscle spasms (Naeser, personal observation; Naeser, Wei, 1994). These authors recommend beginning acupuncture as soon as possible after spinal cord injury, even during acute stage of spinal cord shock, to help reduce development of spasms.

Acupuncture or Laser Acupuncture To Treat Peripheral Facial Paralysis (Bell's Palsy)

Bell's palsy is the most common disease of the facial nerve. It is presumably due to an inflammatory reaction in or around the facial nerve near the stylomastoid foramen. Adams and Victor state, "Fully 80 percent of patients recover within a few weeks or in a month or two" (1977).

Results of five acupuncture studies are summarized below. None had a control group. Overall, 983 of 1,009 cases (97.4 percent) had an outcome level of cured or markedly effective. Cases were treated ranging from 1 day to several years postonset. When acupuncture was initiated within 3 days postonset in 684 cases, 100 percent of the patients were cured or there was a marked effect (Liu, 1995). Even 80 percent of cases who were treated starting at more than 2 months postonset and 83 percent of severe cases were cured or had excellent effect (Gao, Chen, 1991). Red-beam laser acupuncture was also effective in mild to moderate cases; it was combined with needle acupuncture in severe cases (Wu, 1990). Most patients were treated for 2 to 4 weeks (up to 8 weeks).

Laser Acupuncture or Acupuncture To Treat Pain in Carpal Tunnel Syndrome

Carpal tunnel syndrome (CTS) is an entrapment neuropathy of the median nerve at the wrist (Rosenbaum, Ochoa, 1993). Patients have pain in the wrist that radiates into the hand and sometimes into the forearm, with numbness and tingling in the thumb and index and middle fingers and weakness in the hand. The exact etiology is unknown; however, CTS occurs more commonly in workers whose tasks involve repetitive hand movements, such as operating machinery, working on assembly lines, and typing on computer keyboards. CTS is a particularly severe example of repetitive strain injury (RSI).

In 1995, the Bureau of Labor Statistics, U.S. Department of Labor, reported that half of all workers afflicted with CTS missed 30 days or more of work. In 1996, the incidence of CTS was 2 million cases (N.Y. Times, Feb. 28, 1996). Conservative treatments are first used (adjusting work environment, using wrist splints, and nonsteroidal anti-inflammatories) (Mackinnon, Novak, 1994). If steroid injection is later necessary, between 65 percent and 90 percent of patients have recurrence of symptoms, usually after 2 to 4 months (Slater, Bynum, 1993). Approximately 40 percent of cases have surgical release across the transverse carpal ligament, with variable success. Workers' compensation figures suggest a cost of \$6,000 to

\$10,000 per case for medical management (Dimmitt, 1995). One firm estimates that it costs a company \$37,000 in lost work time, medical treatments, and rehabilitation for each worker who develops CTS (Respondex Systems, Dixon, IL, personal communication). There is a need for a less expensive, painless, noninvasive, nonsurgical treatment for CTS.

Results of four studies where laser acupuncture and microamps TENS or needle acupuncture were used to treat CTS are presented below. It is possible to conduct controlled acupuncture research with use of low-level laser and microamps TENS to stimulate acupuncture points because each device produces no feeling—no heat, no cold, no pain. The patient's hand is treated behind a curtain, and the patient is not aware whether either device is turned on or off. In a randomized, double-blind, placebo-controlled, cross-over study, a 15-mW, red-beam, HeNe laser (1 to 7 joules) and a microamps TENS device (< 900 microamps) were used to stimulate acupuncture points on the hand and arm areas in nine patients with CTS. A significant reduction in pain was observed following 9 to 12 real treatments ($p < .01$), but not following 9 to 12 sham treatments (Naeser, Hahn, Lieberman, 1996, 1997). Patients were able to resume prior work (keyboard, handyman) with less or no pain. Three other cases were treated in an open protocol with home treatment using a 5-mW red-beam diode laser pointer and microamps TENS; all cases resumed work (secretarial) without pain after 4 to 6 weeks. The advantage of the red-beam diode laser pointer and microamps TENS device is home treatment under the supervision of a licensed acupuncturist trained in laser acupuncture for less than \$1,100 per case (diode laser pointer, \$142; microamps TENS, \$895; treatment training, \$60).

Red-beam laser and microamps TENS may increase ATP levels on the cellular level (Passarella, Casamassima, Molinari, et al., 1984; Cheng, Van Hoof, Bockx, et al., 1982), and red-beam laser may have an anti-inflammatory effect (Mester, Toth, Mester, 1982) and promote an increase in serotonin levels (Walker, 1983). Use of an 830-nm infrared laser to stimulate (9 joules) at five points (not specified as acupuncture points) along the median nerve has been observed in an uncontrolled study to normalize latencies in 10 of 14 nerves and to reduce pain in 9 of 11 cases of CTS treated in an open protocol for 6 to 15 visits (Weintraub, 1996).

Branco (in preparation) has used the laser acupuncture protocol (5 mW, red-beam, 670 nm diode laser pointer) and microamps TENS protocol of the Naeser, Hahn, and Lieberman study (1996), to successfully treat CTS pain in 21 of 23 cases (91.3 percent) in an open protocol for 12 to 15 treatments. Eight cases had previously failed to obtain pain relief following surgical release of the transverse carpal ligament; two cases had failed surgery twice. All cases who had previously failed surgery were successfully treated with laser acupuncture and microamps TENS in the Branco study. Needle acupuncture or 904-nm infrared laser acupuncture was also used on the shoulder and neck areas in cases where cervical compression was present. All cases who were not retired returned to their work (photographer, nurse's aide, auto mechanic, retail manager, artist/painter, computer operator, nail technician, secretary, lobsterman).

Two studies that used needle acupuncture, electroacupuncture, moxibustion, and Chinese herbs are also reviewed (Chen, 1990; Wolfe, 1995). These studies reported success rates of 97.2 percent and 87.5 percent, respectively. The Chen study reported followup in 29 cases at 2.5 years to 8.5 years postacupuncture, where 24 of 29 cases (82.5 percent) were still pain-free at a mean of 5.1 years postacupuncture treatment.

In summary, 77 of 84 CTS cases (91.6 percent) were successfully treated with laser acupuncture, microamps TENS, or needle acupuncture. The treatments with laser, microamps TENS, and needle acupuncture are often performed in the acupuncture office; however, the laser acupuncture and microamps TENS treatments may be performed by the patient in a home treatment program with a red-beam diode laser pointer and microamps TENS device under the supervision of a licensed acupuncturist trained in laser acupuncture (Naeser, Hahn, Lieberman, 1997; Naeser, Wei, 1994). The cost for a home treatment program is approximately \$1,100. The current estimated workers' compensation average cost for medical management including surgery is \$8,000 per case. Home treatment with laser acupuncture would represent a savings of \$6,900 per CTS case. If half the current 2 million cases of CTS in the United States were successfully treated using laser acupuncture and microamps TENS with home treatment, this would represent a savings of \$6.9 billion dollars per year in the treatment of carpal tunnel syndrome. The savings are about the same if the laser acupuncture treatments or needle acupuncture treatments are provided in the acupuncture office (15 visits at \$60 per visit = \$900) or if the laser acupuncture treatments are performed by the patient at home, where the equipment is purchased by the patient (\$1,100); this is compared with \$8,000 for current medical treatments.

Overall Summary and Recommendations for Future Areas of Research

Stroke. Acupuncture or laser acupuncture was effective to reduce severity of paralysis in 66.3 percent of the 193 cases reviewed. The best results were observed when acupuncture treatments were initiated within 24 to 36 hours poststroke onset in ischemic infarct cases and after bleeding was controlled in hemorrhagic cases. Acupuncture's effect to increase cortisol levels (Cheng, McKibbin, Roy, 1980; Shi, Bu, Lin, 1992) may contribute to less brain edema in acute stroke, hence less brain damage. Acute patients are treated at least 3 times per week, and chronic patients 2 times per week for 20 to 40 treatments over a 2- or 3-month period. The Swedish study observed that when acupuncture was initiated 4 to 10 days poststroke, there was a savings of \$26,000 per stroke patient as a result of fewer days in hospital and rehabilitation facilities (Johansson, Lindgren, Widner, et al., 1993; Johansson, 1993). These patients also had better motor function, activities of daily living, and quality of life measures at 1 and 3 months and 1 year poststroke as well as better postural control at 2 years poststroke compared with those cases treated only with PT beginning at 4 to 10 days poststroke ($p < .01$ and beyond).

Acupuncture is beneficial for chronic as well as acute stroke cases. It is an excellent complementary treatment for stroke patients with paralysis, and it is recommended that it be used as an adjunctive treatment with current therapies. Often patients are able to gain better ROM and greater benefit from PT and OT when acupuncture is administered immediately before a therapy session. In Japan, with the Yamamoto New Scalp Acupuncture method, short acupuncture needles are left in place on specific points on the scalp of the stroke patient for the duration of the day, including during PT or OT sessions (Yamamoto, Maric-Oehler, 1991).

Severity of paralysis in stroke patients is quite variable. In general, for patients with mild to moderate paralysis, improvement in knee flexion and extension and shoulder abduction is expected, and in mild cases where some isolated finger movement is present (acute or chronic mild hand paresis), improvement in finger/hand strength and dexterity is expected. Injection of

long-term outcome at 1 and 2 years later. A chronic CT scan obtained after 3 months poststroke onset would be helpful, however, for understanding the specific type of improvement expected following a series of acupuncture treatments initiated at that time. Stroke patients receiving acupuncture often benefit in other areas besides paralysis such as better sleeping or better control of hypertension (Naeser, personal observation), and acupuncture should not be withheld based on CT scan lesion site information. The lesion site information is helpful for providing realistic expected benefits, but it is not necessary to have a CT scan performed prior to acupuncture treatment in chronic stroke cases.

Possible mechanisms for acupuncture's effectiveness—neuroimaging studies. It is possible that acupuncture and laser acupuncture alter or increase blood flow to specific areas of the brain, including the thalamus and primary motor cortex areas in stroke patients with paralysis. Research with acupuncture and neuroimaging studies where cerebral blood flow or regional glucose metabolism are monitored following a series of acupuncture treatments is recommended. This information will help provide a better understanding of the physiological mechanisms that may underlie the benefits gained from acupuncture to treat paralysis in stroke patients. It is also recommended that neuroimaging research be conducted with acute stroke patients given acupuncture treatment in the very early phase of stroke onset (24 to 36 hours poststroke) to better understand why this early intervention appears to be so important regarding later outcome. One hypothesis is that acupuncture improves or attempts to normalize blood flow in the brain and reduces brain swelling. However, sophisticated neuroimaging techniques, such as PET or functional MRI that can best measure these early changes, are expensive imaging techniques at this time.

Results from neuroimaging studies may also help to explain why acupuncture appears to be helpful in the treatment of other paralytic conditions reviewed in this report, including cerebral palsy, spinal cord injury, and peripheral facial paralysis (Bell's Palsy), and paralytic conditions not reviewed in this report but reviewed in a previous report for the National Institutes of Health's Office of Alternative Medicine, for example, head injury, multiple sclerosis, pseudobulbar palsy, and reversal of coma (Naeser, 1996). In all areas reviewed, acupuncture was helpful in the majority of cases, and it was recommended that acupuncture (or laser acupuncture) treatments should be initiated as soon as possible after onset.

Cerebral palsy. Acupuncture or laser acupuncture was effective to reduce spasms and improve motor function in 68 percent of the 279 cases reviewed. Treatments were especially effective when initiated within a few weeks or 1 year postbirth. Initially, treatments are administered daily or three times per week. Later, the frequency may be reduced. Cerebral palsy is a lifelong condition, and acupuncture treatments should be continued over several years, as necessary. Laser acupuncture with a red-beam diode laser pointer should be considered for adjunctive home treatment programs under the supervision of a licensed acupuncturist trained in laser acupuncture; this may help reduce overall treatment cost.

Future recommended research would include performing red-beam laser or needle acupuncture beginning at 2 weeks postbirth (or within the first year of life) on babies who were hypoxic at birth and who are at high risk for developing cerebral palsy.

Spinal cord injury. Acupuncture was effective in reducing muscle spasms, increase the level of sensation, and improve bladder and bowel function in 94.4 percent of the 360 cases reviewed. It was recommended that acupuncture be initiated as soon as possible after spinal cord injury and that treatments continue for 2 to 3 years, or even 5 years. Electroacupuncture along the bladder meridian (paravertebral) area is especially recommended. Laser acupuncture can also be applied in a home treatment program to help reduce muscle spasms in the hands and feet. Research with both needle electroacupuncture and laser acupuncture are recommended in this field, especially when the treatments can be initiated as soon as possible after the spinal cord injury.

Peripheral facial paralysis (Bell's palsy). Acupuncture or laser acupuncture was effective to cure or markedly improve peripheral facial paralysis in 97.4 percent of the 1009 cases reviewed. It was 100 percent effective (cured or marked effect) when initiated within 3 days following onset of the facial paralysis. It was also helpful in 80 percent of cases who were greater than 2 months postonset and in 83 percent of severe cases. Thus, the overall success rate with needle acupuncture or laser acupuncture is very high, especially when the acupuncture treatments are initiated at less than 3 days postonset. The current recovery rate without acupuncture is 80 percent within 2 months of onset. The rate of success with acupuncture initiated at 2 months postonset, however, is an additional 80 percent. Therefore, it would seem that early intervention with acupuncture or laser acupuncture is clinically indicated in cases of Bell's palsy.

Carpal tunnel syndrome. Laser acupuncture, microamps TENS, or needle acupuncture produced outcome levels of good-to-excellent pain relief in 91.6 percent of the 84 cases reviewed. There is a laser acupuncture and microamps TENS home treatment program that can be used over a 4- to 6-week period for a cost of approximately \$1,100, including equipment and training in home treatment under the supervision of a licensed acupuncturist trained in laser acupuncture. Use of this treatment program with half of the current 2 million cases of CTS in the United States could represent a savings of \$6.9 billion dollars per year for treatment of CTS. The savings are about the same whether laser acupuncture or needle acupuncture treatments are provided in the acupuncture office (15 visits at \$60 per visit = \$900) or the laser acupuncture treatments are performed by the patient at home, where the equipment must be purchased by the patient (\$1,100), compared with \$8,000 for current medical treatments.

Future research with laser acupuncture or needle acupuncture to treat CTS should focus on large-scale clinical trials of this form of treatment. The high success rate reported in the studies reviewed for this report indicate that laser acupuncture or needle acupuncture is a successful and cost-effective treatment for CTS. Additional research would better define exactly when to intervene with this form of treatment (e.g., during conservative management and prior to surgery) and in which specific level of severity (e.g., prior to development of severe muscle atrophy). This research has great potential for significantly decreasing the cost of current medical management of carpal tunnel syndrome and repetitive strain injury in the United States

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M. Haese

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Table 1. Acupuncture or Laser Acupuncture to Treat Paralysis in Stroke

Authors	No. Cases Real Acupuncture	Number Control Cases Sham or No Acptr.		Significance Level between Groups and/or Number of Cases with Outcome Level of Good Response/Markedly Effective																
<p>Naeser, Alexander, Stiassny-Eder, Galler, Hobbs, Bachman, 1992</p> <p>Boston Univ. Sch. Med Boston VA Medical Ctr</p>	<p>10 Acute <u>Arm/Leg</u> Cases, Starting at 1 - 3 Months poststroke, 20 Real Tx.'s, 4 Wks.</p>	<p>6 Acute <u>Arm/Leg</u> Cases, 1 - 3 Mo.'s poststroke, 20 Sham Tx.'s 4 Wks.</p>		<p>p < .013, with CT Scan Lesion Site as a Variable</p> <p>4/10 Good Response, Real Acptr. 0/6 Good Response, Sham Acptr.</p>																
<p>Naeser, Alexander, Stiassny-Eder, Galler, Hobbs, Bachman, 1994a</p> <p>Boston Univ. Sch. Med Boston VA Medical Ctr</p>	<p>10 Acute 10 Chronic <u>Arm/Leg</u> Cases, Starting Acute: 1 - 3 Mo. Chronic: 4 Mo. to 6 Yr. poststroke, 20 - 40 Tx.'s, 2 - 4 Months</p>	<p>Acute <u>Arm/Leg</u> Control Cases, see above study with Sham Acptr.</p>	<p>3 Chronic <u>Arm/Leg</u> Cases, No Acptr.</p>	<p>p < .003 (Chronic Cases), with CT Scan Lesion Site as a Variable</p> <p>3/10 Good Response, Chronic Cases, Real Acptr. 0/3 Good Response, Chronic Cases, No Acptr. 5/10 Good Response, Acute Cases, Real Acptr.</p> <p><u>Isolated Active ROM for 8 Good Response Cases:</u></p> <table border="0"> <tr> <td></td> <td><u>-20 Tx.'s p level</u></td> <td></td> <td><u>-40 Tx.'s p level</u></td> </tr> <tr> <td>Shoulder Abd.</td> <td>+7 % < .04</td> <td>+12 %</td> <td>< .04</td> </tr> <tr> <td>Knee Flexion</td> <td>+19 % < .02</td> <td>+22 %</td> <td>< .03</td> </tr> <tr> <td>Knee Extens.</td> <td>+19 % n.s.</td> <td>+28 %</td> <td>< .01</td> </tr> </table>		<u>-20 Tx.'s p level</u>		<u>-40 Tx.'s p level</u>	Shoulder Abd.	+7 % < .04	+12 %	< .04	Knee Flexion	+19 % < .02	+22 %	< .03	Knee Extens.	+19 % n.s.	+28 %	< .01
	<u>-20 Tx.'s p level</u>		<u>-40 Tx.'s p level</u>																	
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<p>Naeser, Alexander, Stiassny -Eder, Lannin, Bachman, 1994b</p> <p>Boston Univ. Sch. Med Boston VA Medical Ctr</p>	<p>3 Acute 8 Chronic <u>Hand</u> Cases Acute: 1 - 3 Mo. Chronic: 4 Mo. - 8 Yr., 20 - 40 Tx.'s</p>		<p>2 Chronic Cases, No Acptr.</p>	<p>p < .022 (Chronic Cases)</p> <p>All Acptr. Cases, Good Response, 11/11 = 100% 0/2 Good Response, Chronic Cases, No Acptr.</p> <p><u>Finger Strength Testing for 8 Chronic Acptr. Cases</u></p> <p>Tip Pinch: +3 lbs., -40 Tx.'s, p < .04 Palmar Pinch: +3 lbs., -20 Tx.'s, p < .01</p>																
<p>Johansson, Lindgren, Widner, Wiklund, Johansson, 1993</p> <p>Lund Univ., Sweden</p>	<p>38 Acute Cases, 4 - 10 days poststroke, 20 Tx.'s (twice per week, 10 weeks) + P.T.</p>		<p>40 Acute Cases, 4-10 Days poststroke, P.T. Only</p>	<p>Savings of \$26,000 per Acupuncture Patient due to reduced number of days in Rehab. Facilities</p> <p>p < .01 and beyond for: Walking and Balance at 1 Mo. and 3 Mo. Activities of Daily Living at 3 Mo. and 12 Mo. Quality Life, Mobility and Emotion at 3,6,12 Mo.</p>																
<p>Magnusson, Johansson, Johansson, 1994</p> <p>Lund Univ., Sweden</p>	<p>21 Acute Cases from above Johansson study</p>		<p>21 Acute Cases from above study</p>	<p>Follow-up on Postural Control 2 Yrs. later: p < .01, greater Postural Control for Cases Tx.'d with Acupuncture beginning 4 - 10 days poststroke</p>																
<p>Sallstrom, Kjendahl, Osten, Stanghelle, Borchgrevink, 1995</p> <p>Oslo, Norway</p>	<p>24 Subacute Cases, 40 days poststroke, 18 - 24 Tx.'s, 6 Weeks</p>		<p>21 Subacute Cases, 40 Days poststroke, P.T. Only</p>	<p>Cases who received Acupuncture were better after 6 weeks on the following:</p> <p>Motor Function, p = .002 Activities of Daily Living, p = .02 Quality Life, Nottingham Health Profile, p = .009</p>																
<p>Hu, Chung, Liu, et al., 1993</p> <p>Taipei, Taiwan</p>	<p>15 Acute Cases, Acupuncture Treatments started within 36 hours poststroke</p>		<p>15 Acute Cases, No Acptr.</p>	<p>Neurologic Outcome better at 1 Mo. p = .02, and at 3 Mo. p = .009 for Acute Cases Tx.'d with Acupuncture within 36 hours poststroke</p> <p>Results significant for <u>Severe</u> Subgroup at 1 Mo. p = .009, and at 3 Mo. p = .013; but not significant for <u>Mild-Moderate</u> Subgroup.</p>																

Continued on next page

Table 1, Cont'd. Acupuncture or Laser Acupuncture to Treat Paralysis in Stroke

Authors	No. Cases Real Acupuncture	Number Control Cases Sham or No Acptr.		Significance Level between Groups and/or Number of Cases with Outcome Level of Good Response/Markedly Effective
<p>Zhang, Li, Chen, Zhang, Wang, Fang, 1987</p> <p>Shanghai Medical Univ. China</p>	<p>53 Acute and Chronic Cases, 24 Tx.'s, 6 Tx.'s per Week, for 6 Weeks</p>		<p>41 Acute and Chronic Cases</p>	<p><u>Acupuncture Group</u>: 44/53 Cases, 83%, increased muscle strength by 1 - 2 grades at 6 joints: shoulder, elbow, wrist, hip, knee, ankle</p> <p><u>No-Acupuncture Group</u>: 26/41 Cases, 63%</p> <p>Difference between Groups: $p < .05$</p>
<p>Li, Li, Wei, Zhao, Lu, 1989</p> <p>Shanxi College Traditional Chinese Medicine, Shanxi, China</p>	<p>Acute Cerebral Hemorrhage, Two Groups Received Two Types of Acupuncture: <u>Group 1</u> (n=46), Midline, base of skull, GV 16, GV 15, plus body points <u>Group 2</u>, (n=46), body points only 42 - 56 Tx.'s, daily</p>			<p>Cases were treated within 24 hours, to a week, post-hemorrhage. Most bleeding completed within 4 hours in acute cerebral hemorrhage cases.</p> <p><u>Group 1</u>: 38/46 Cases, 82.6%, Markedly Effective</p> <p><u>Group 2</u>: 17/46 Cases, 37%, Markedly Effective</p> <p>Difference between Groups: $p < .01$</p> <p>Acupuncture points GV 15 and GV 16 highly recommended in acute cerebral hemorrhage cases.</p>
<p>Naeser, Alexander, Stiassny-Eder, Galler, Hobbs, Bachman, Lannin, 1995</p> <p>Boston Univ. Sch. Med Boston VA Medical Ctr</p>	<p><u>Laser Acupuncture</u> 5 Arm/Leg Cases, 2 Hand Cases, (6 Chronic, 10 Mo. to 6.5 Yr. poststroke; and 1 Acute Case), 20 - 60 Tx.'s, over 2 - 4 Mo., 20 mW, 780 nm 1 Joule per point</p>			<p>5/7 Cases (71%) Good Response</p> <p>Results similar to results with needle acupuncture where similar CT scan lesion sites were observed.</p>

Overall, Good Response Post-Acupuncture, 128/193 Cases = 66.3%

Table 2. Acupuncture or Laser Acupuncture to Treat Cerebral Palsy in Babies and Children

Authors	No. Cases Real Acupuncture	Number Control Cases Sham or No Acptr.		Significance Level between Groups and/or Number of Cases with Outcome Level of Good Response/Markedly Effective
Filipowicz, 1991 Warsaw, Poland Toronto, Canada	65 Babies and Children, age 40 days to 4 Years, Acupressure, Needle Acptr., Laser Acptr. (2-10 mW, red-beam Laser), Electroacptr., 2-3 Tx.'s per week, over a 5-Year period			65/65 Cases, 100%, Considerable Improvement 4 Cases, "Complete Recovery" when Acptr. Tx.'s started at less than 6 months of age. The earlier the Acptr. Tx.'s initiated, the greater the reduction in spasticity. Laser Acptr. especially effective to treat contractures of Achilles tendon; after 30 - 60 seconds of exposure, "considerable and immediate improvement."
Lao, 1992 New York City	10-month old baby, Needle Acptr., 50 Tx.'s, over a 5-Month period			<u>Pre-Acptr.</u> : Unable to sit up (with or without assistance); Achilles tendons tight, bilaterally <u>Post-10 Acptr. Tx.'s</u> : Able to sit, started to crawl, spasticity alleviated <u>Post-50 Acptr. Tx.'s</u> : At 15 months of age, walking independently, similar to children his age.
Shi, Bu, Lin, 1992 Shanghai Medical Univ. Shanghai, China	117 children, age 6 Mo. to 10 Yr., 30 Acptr. Tx.'s, 4 - 5 Months			63/117 Cases, 53.8%, Markedly Improved or Better
Xiao & Meng, 1995 Beijing, China	30 children, age 1 - 14 Yr., 30 Tx.'s, 66-day period Ear Stimulation + Limb Massge.		30 children 1 - 14 Yr., 30 Tx.'s, 66-days, Only Limb Massage	<u>Ear Stimulation + Massage</u> : 16/30 Cases, 53%, Improved <u>Massage Only</u> : 4/30 Cases, 13.3%, Improved Difference between groups: $p < .01$
Ma & Zhang, 1995 Clinic of Lanzhou Brewery, Gansu, China	48 children, age 1 - 6 Yr.; and 12, over 6 Yr., Acptr. Tx.'s, 1 - 4 Months		9 children age 1-6 Yr, 3, >6 Yr. Vitamins and Herbs, 1-3 Month	<u>Acptr. Group</u> : 39/60 Cases, 65%, Markedly Improved <u>Vitamins & Herbs Group</u> : 2/12 Cases, 16.6%, Markedly Improved Difference between Groups: $p < .01$
Spears, 1979 Chatham, NJ	5, teenage 1 child, 4.8 Yr., ElectroAcptr., Ear Stimulation At least 8 Tx.'s			6/6 Cases, 100%, Less spasticity, loosened Achilles tendon, control of drooling
Lidicka & Hegyi, 1991 Prague, Czech Republic Budapest, Hungary	<u>Laser Acupuncture</u> 5 mW, red-beam 145 children, age 2 Wks. to 5 Yr., Tx'd for several Mo's.-Yr.'s.			Majority of Cases, Less Spasticity, Improved Motor Function for Sitting, Crawling, and Walking Recommend Laser Acptr. Tx.'s be used with babies likely to develop cerebral palsy, starting at 2 weeks post birth; 2 years of age is considered late to begin Acptr. Tx.'s.

Overall, Good Response Post-Acupuncture, 190/279 Cases = 68.1%

Table 3. Acupuncture to Treat Paralysis in Spinal Cord Injury

Authors	No. Cases Real Acupuncture	Number Control Cases Sham or No Acptr.		Number of Cases with Outcome Level of Beneficial Progress
<p>Gao, 1984</p> <p>Yuci City Institute of Paralysis, Shanxi Province, China</p>	<p>17 Inpatients, with Complete Traumatic Paraplegia, Acute Cases, 1 Mo. postonset and Chronic Cases, 5 Yrs. postonset, Tx. 'd over a 2 - 3 Yr. Period</p>			<p>15/17 Cases, 88%</p> <p>Includes improvement in the following: Reduction in muscle spasms Increased level of sensation Improved bladder and bowel function</p> <p>Recommends beginning acupuncture as soon as possible after spinal cord injury, even during early stage of spinal cord shock, in order to reduce occurrence of spasms. Younger patients had better outcome.</p>
<p>Wang, 1992</p> <p>Institute Health Preserv. Beijing, China</p>	<p>82 Cases, Treated with Acupuncture/ ElectroAcptr., along the Bladder Meridian (paravertebral) for 5 Months</p>			<p>76/82 Cases, 93%, "Effective"</p> <p>Includes improvement in the following: Improvement in lower limb paralysis Improved bladder and bowel function</p>
<p>Gao, Gao, Gao, Han, Han, Han, Han, 1996</p> <p>Yuci City Paralysis Institute, Shanxi Province, China</p>	<p>261 Cases, Treated beginning at 1 Mo. postonset to over 5 Yrs. postonset</p>			<p>249/261, 95%, "Effective"</p> <p>"Effective" defined as: <u>Basic Recovery of functions of the nervous system</u> with ability to walk freely, and almost voluntary urination (3% of cases). <u>Marked Effectiveness</u> with partial recovery of functions of nervous system, with ability to walk on crutches and restoration of urinary bladder reflex (35.2%). <u>Improvement of functions of nervous system</u> with some limb movement, defecation and/or urination (57.1%).</p> <p>Recommend beginning acupuncture as soon as possible after the spinal cord injury.</p>

Overall, Beneficial Progress Post-Acupuncture, 340/360 Cases = 94.4%

Table 4. Acupuncture or Laser Acupuncture to Treat Peripheral Facial Paralysis (Bell's Palsy)

Authors	No. Cases Real Acupuncture	Duration of Paralysis	Duration of Acupnctr Treatmnt	Number of Cases with Outcome Level of Cured or Markedly Improved
Gao & Chen, 1991 Beijing College of Traditional Chinese Medicine, Beijing, China	60 Cases Mild, n = 30 Severe, n = 30	3 Days to 30 Years < 2 Mo., n = 40 > 2 Mo., n = 20	10 Tx.'s, every other day	Overall, 59/60, 98% <u>Mild Cases:</u> Cured, 93%; Excellent, 7% <u>Severe Cases:</u> Cured, 70%; Excellent, 13%; Improved, 13%; Failed, 3%. < 2 Mo. Duration: Cured, 92.5%; Excellent, 5%; Improved, 2.5%; > 2 Mo. Duration: Cured, 60%; Excellent, 20%; Improved, 15%; Failed, 5% Recommend starting Acupuncture soon postonset
Cui, 1992 Tangshan Hospital of Traditional Chinese Medicine, Hebei Pvince, China	100 Cases 9 were Recurrent Cases	1 - 5 Days, n = 62 6-30 Days, n = 3 1 - 6 Mo., n = 6 > 6 Mo., n = 2	5 to 40 Tx.'s, Daily 94/100 Cases, Rec'd 30 Tx.'s over a 1-Month Period	90/100 Cases, 90%, Cured or Markedly Improved
Liu, 1995 Shandong College of Traditional Chinese Medicine, Jinan, China	718 Cases	All Cases, less than 4 Days	1 - 2 Months of Treatment	715/718 Cases, 99.6%, Cured or Marked Effect < 48 Hours: 572/572 Cases, 100% 2-3 Days: 112/112 Cases, 100% 3-4 Days: 31/34 Cases, 91.2%
Cheng, Zhao, Zhang, Yao, 1991 Chinese Academy of Traditional Chinese Medicine, Beijing, China	31 Cases 3 Mild 6 Moderate 22 Severe with Spasm eyelids, cheeks, both mouth corners	1 Week to 20 Years 27/31 Cases, >1 Year	Acptr. plus <u>Laser Acptr</u> Red-Beam 15 mW, HeNe Laser 20 Min., Spasmodic Area	26/31 Cases, 84%, Basically Controlled, Markedly Effective or Improved. <u>Basically Controlled:</u> 8/31 Cases, 25.8% <u>Markedly Effective:</u> 8/31 Cases, 25.8% <u>Improved:</u> 10/31 Cases, 32.3% <u>Ineffective:</u> 5/31 Cases, 16.1%
Wu, 1990 Puyang City People's Hospital, Henan Province, China	100 Cases	<3 Day, 39 <10 Day, 33 Cases 6 Mo., 6 < 1 Yr., 2	<u>Laser Acptr</u> Red-Beam 6 - 9 mW, HeNe Laser 2 - 4 Weeks	93/100 Cases, 93%, Cured <u>Completely Recovered in 2 Weeks:</u> 54/100, 54% <u>Completely Recovered in 4 Weeks:</u> 39/100, 39% With most severe cases, needle Acptr. also used

Overall, Cured or Markedly Improved Post-Acupuncture, 983/1009 Cases = 97.4%

Table 5a. Clinical Experience with Laser Acupuncture and Microamps TENS to Treat Pain in Carpal Tunnel Syndrome. Kenneth Branco, Lic.Ac., Westport, MA August 21, 1997

<u>Case</u>	<u>Age</u>	<u>Previous Surgery</u>	<u>Duration of Pain</u>	<u>Melzack Pain Score Pre-Laser Acptr.</u>	<u>Melzack Pain Score Post-Laser Acptr.</u>	<u>Number of Laser Acptr. Treatments</u>	<u>Hand(s) Treated</u>	<u>Profession</u>
E.B. m	78	No	1 Year	25	0	15	Right	Retired
M.C. m	49	No	2 Years	8	0	12	Right	Photographer
S.K. m	81	No	3 Years	30	30	15	Right	Retired
M.S. f	81	No	5 Years	8	0	15	Right	EMG, +10, Severe Case Retired
S.D. f	48	Yes, failed surgery twice	5 Years	47 47	0 0	12 12	Right and Left	Nurse's Aid Still Pain Free 2 Years Later
D.H. m	31	No	3 Years	33	0	12	Right	Auto-Body Mechanic
B.R. m	76	Yes	18 Years	51	0	12	Right	Retired
C.C. f	27	Yes	2 Years	16	0	12	Right	Maintenance Worker
B.F. f	80	No	3 Years	33	0	12	Right	Retired, Laser Acptr. also helped her severe arthritis
D.H. m	31	No	1 Year	36	0	12	Left	Retail Manager
P.H. f	48	No	1 Year	42	0	15	Right	Artist, Painter
B.J. f	56	No	6 Months	39	0	12	Right	Proprietor Ice Cream Server Hands were very cold, Pre-Tx., but circulation much improved, Post-Tx.
M.H. m	26	No	8 Months	29 29	0 0	12 12	Right and Left	Repair Service
C.M. f	46	Yes	7 Months	26	0	15	Right	Computer Operator
C.D. f	45	Yes	7 Months	36	0	15	Right	Computer Operator
D.R. m	47	No	2 Years	28	20	15	Right	Computer Operator
V.S. f	54	Yes	5 Years	41	12	15	Right	Office Manager
C.V. f	49	Yes	1 Year	27 27	0 0	12 12	Right and Left	Nail Technician
A.H. f	46	Yes, Left Hand, 3 surgeries; Right Hand, 1 surgery	3 Years	41 41	0 0	15 15	Right and Left	Secretary
K.P. f	24	No	3 Months	28	0	5	Right	Secretary
R.T. f	38	No	5 Months	32	0	15	Left	Housewife
A.L. m	66	No	7 Years	48	14	15	Left	Retired, (Lobsterman-Hobby)
C.D. f	34	No	6 Years	32	0	15	Right	Secretary with Thoracic Outlet Syndrome Infrared-Laser used on Neck

Table 5. Laser Acupuncture or Acupuncture to Treat Pain in Carpal Tunnel Syndrome

Authors	No. Cases Real Treatment	Number Cases Sham Treatmnt.	Duration of Pain Pre- Tx.	Significance Level between Groups and/or Number of Cases with Outcome Level of Good-to-Excellent Pain Relief, Satisfactory Outcome, Reduction of Pain by > 50%																				
<p>Naeser, Hahn, Lieberman, 1996, 1997</p> <p>Boston Univ. Sch. Med Boston V.A. Med. Ctr.</p>	<p>9 Cases</p> <p>Real Laser Acptr. and Microamps TENS, 9 - 12 Tx.'s,</p> <p>Red-Beam Laser 15 mW, HeNe 1 - 7 Joules per Acptr. point</p>	<p>9 Cases</p> <p>Sham Laser Acptr. & Microamps TENS 9 - 12 Tx.'s</p>	<p>3 Months to 2 Years</p>	<p><u>Melzack Pain Scores</u></p> <table border="1"> <thead> <tr> <th></th> <th><u>Pre-Treatment</u></th> <th><u>Post-Treatment</u></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Mean, S.D.</td> <td>Mean, S.D.</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Real Tx. Group:</td> <td>17.7 12.2</td> <td>4.5 6.2</td> <td>p < .01</td> <td></td> </tr> <tr> <td>Sham Tx. Group:</td> <td>16.2 10.6</td> <td>12.7 13.8</td> <td>n.s.</td> <td></td> </tr> </tbody> </table> <p><u>Post Real Treatment:</u> 7/9 Cases, 77.7%, with Less Pain or No Pain</p> <p><u>Post Sham Treatment:</u> 2/9 Cases, 22.2%, with Less Pain or No Pain</p>		<u>Pre-Treatment</u>	<u>Post-Treatment</u>			Mean, S.D.	Mean, S.D.				Real Tx. Group:	17.7 12.2	4.5 6.2	p < .01		Sham Tx. Group:	16.2 10.6	12.7 13.8	n.s.	
	<u>Pre-Treatment</u>	<u>Post-Treatment</u>																						
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<p>Branco, (In Preparation)</p> <p>Westport, Mass.</p>	<p>23 Cases, (8 Cases previously failed surgery; 2 Cases failed surgery twice)</p> <p>Laser Acptr., and Microamps TENS, 12 - 15 Tx.'s, Red-Beam Laser 5 mW, 670 nm, diode pointer 1 - 7 Joules per Acptr. point</p>		<p>3 Months to 18 Years</p>	<p><u>Melzack Pain Scores</u></p> <table border="1"> <thead> <tr> <th></th> <th><u>Pre-Treatment</u></th> <th><u>Post-Treatment</u></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Mean, S.D.</td> <td>Mean, S.D.</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Laser Acupuncture and Microamps TENS Cases:</td> <td>32.1 11.1</td> <td>3.3 7.9</td> <td>p < .0005</td> <td></td> </tr> </tbody> </table> <p><u>Post-Treatment with Laser Acupuncture and Microamps TENS:</u> 21/23 Cases, 91.3%, with Less Pain or No Pain</p> <p>All cases with previously failed surgery, were successfully treated with Laser Acupuncture and Microamps TENS</p>		<u>Pre-Treatment</u>	<u>Post-Treatment</u>			Mean, S.D.	Mean, S.D.				Laser Acupuncture and Microamps TENS Cases:	32.1 11.1	3.3 7.9	p < .0005						
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<p>Chen, 1990</p> <p>Birmingham, Alabana</p>	<p>36 Cases, (14 Cases, previously failed surgery) Needle Acptr. and ElectroAcptr., 4 - 29 Tx.'s, 2 Weeks to 2 Months</p>		<p>2 Months to 10 Years</p>	<p>35/36 Cases, 97.2%, Good-to-Excellent Outcome</p> <table border="1"> <thead> <tr> <th></th> <th><u>Mean</u></th> <th><u>S.D.</u></th> </tr> </thead> <tbody> <tr> <td>Grip Strength, Pre-Acptr.</td> <td>51.8 Kg</td> <td>34.1</td> </tr> <tr> <td>Grip Strength, Post-Acptr.</td> <td>58.5 Kg</td> <td>29.7</td> </tr> </tbody> </table> <p>(n = 14 Observations)</p> <p>p < .005</p> <p><u>Follow-Up</u> in 29 Cases at 2.5 Yrs. to 8.5 Years (Mean, 5.1 Years) Following the last Acupuncture Treatment:</p> <p>24/29 Cases, 82.8%, Still Pain Free</p>		<u>Mean</u>	<u>S.D.</u>	Grip Strength, Pre-Acptr.	51.8 Kg	34.1	Grip Strength, Post-Acptr.	58.5 Kg	29.7											
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<p>Wolfe, 1995</p> <p>Boulder, Colorado</p>	<p>16 Cases</p> <p>Needle Acptr., ElectroAcptr., Moxibustion and Chinese Herbs</p>			<p>14/16 Cases, 87.5%, "Effective" Rate</p> <p>Cured (Still Pain Free at ≥1 Year), 2/16, 12.5%</p> <p>Great Improvement, 9/16, 56.2%</p> <p>Some Improvement, 3/16, 18.8%</p> <p>No Improvement, 2/16, 12.5%</p>																				

Overall, Good-to-Excellent Pain Relief Post-Acupuncture, 77/84 Cases = 91.6%



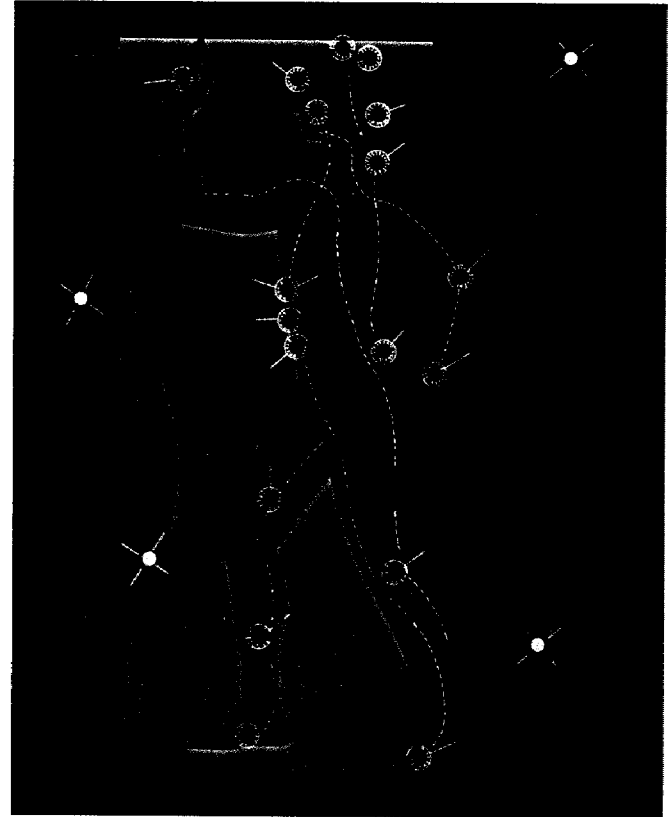
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NIH Consensus Statement

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Acupuncture

NATIONAL INSTITUTES OF HEALTH
Office of the Director

Can further insight into the biological basis for acupuncture be gained?

Mechanisms that provide a Western scientific explanation for some of the effects of acupuncture are beginning to emerge. This is encouraging and may provide novel insights into neural, endocrine, and other physiological processes. Research should be supported to provide a better understanding of the mechanisms involved, and such research may lead to improvements in treatment.

Does an organized energetic system that has clinical applications exist in the human body?

Although biochemical and physiologic studies have provided insight into some of the biologic effects of acupuncture, acupuncture practice is based on a very different model of energy balance. This theory might or might not provide new insights to medical research, but it deserves further attention because of its potential for elucidating the basis for acupuncture.

Conclusions

Acupuncture as a therapeutic intervention is widely practiced in the United States. There have been many studies of its potential usefulness. However, many of these studies provide equivocal results because of design, sample size, and other factors. The issue is further complicated by inherent difficulties in the use of appropriate controls, such as placebo and sham acupuncture groups.

However, promising results have emerged, for example, efficacy of acupuncture in adult post-operative and chemotherapy nausea and vomiting and in post-operative dental pain. There are other situations such as addiction, stroke rehabilitation, headache, menstrual cramps, tennis elbow, fibromyalgia, myofascial pain, osteoarthritis, low back pain, carpal tunnel syndrome, and asthma for which acupuncture may be useful as an adjunct treatment or an acceptable alternative or be included in a comprehensive management program. Further research is likely to uncover additional areas where acupuncture interventions will be useful.

Findings from basic research have begun to elucidate the mechanisms of action of acupuncture, including the release of opioids and other peptides in the central nervous system and the periphery and changes in neuroendocrine function. Although much needs to be accomplished, the emergence of plausible mechanisms for the therapeutic effects of acupuncture is encouraging.

The introduction of acupuncture into the choice of treatment modalities readily available to the public is in its early stages. Issues of training, licensure, and reimbursement remain to be clarified. There is sufficient evidence, however, of its potential value to conventional medicine to encourage further studies.

There is sufficient evidence of acupuncture's value to expand its use into conventional medicine and to encourage further studies of its physiology and clinical value.





October 13, 1998

Margaret A. Naeser, Ph.D., L.Ac., Dipl.Ac.
Research Professor of Neurology
Boston University School of
Medicine and Veterans Affairs Medical Center
Neuroimaging Section, Boston University
Aphasia Research Center
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150 South Huntington Avenue, 116-B
Boston, MA 02130

Dear Dr. Naeser:

Enclosed is a printed copy of the Statement from the Consensus Development Conference on Acupuncture. I am pleased to inform you that this statement will be published in the November 4, 1998, issue of the *Journal of the American Medical Association*.

Thank you once again for all your hard work on the conference.

Sincerely,

A handwritten signature in black ink, appearing to read "William H. Hall", written over a horizontal line.

William H. Hall
Director of Communications
Office of Medical Applications of Research

Enclosure