Toxicity of Autonomic Ganglia and Plexi: Diagnosis and Treatment

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Introduction:

Many aspects of acupuncture and the physiology of the autonomic nervous system are identical. Much of what is known in acupuncture is true for the ANS. Acupuncture is a metaphorical description of the ANS physiology.
Every chronic illness is preceded by ANS dysfunction. Without ANS dysfunction no chronic illness (Ricker, 1920). The traditional Chinese doctor was using pulse diagnosis (ANS) to detect ANS dysfunction early and treat the illness before it manifested in the physical reality. We use ART (autonomic response testing) to achieve the same goal. Most illnesses start with localized or systemic dysautonomia (Klinghardt D, Lehrbuch der Psychokinesiologie, INK Verlag, 1995). Every other aspect of illness follows this initiating primary dysfunction.

Anatomy: the ANS is subdivided into 3 divisions (Langley, 1920):

- SNS (sympathetic Nervous System)
- PSNS (parasympathetic nervous system)
- ENS (enteric nervous system)

The vagus nerve carries the cranial portion of the PSNS and is subdivided into 3 branches originating from different brainstem nuclei:

- n. ambiguus (smart vagus, Porges, 1997)
- dorsal motor nucleus
- nucleus solitarius

The ANS-nerves have 4 portions:

- central (CNS)
- axon from CNS to ganglion in periphery

- ganglion (the SNS ganglia are mostly just outside the spine (paraspinal ganglia), the PSNS ganglia are mostly near or even inside the organs they supply)
- postganglionic projections/axons (often in the form of a “plexus”)

Ganglia are accumulations of nerve cells in a small confined area which looks to the naked eye like a small knot (Greek: Ganglion). Most ganglia contain thousands of nerve cells, which communicate with each other, produce neuropeptides, think, feel and remember. **Ganglia are small brains outside the brain.**

Physiology:
There are 3 basic means of information “transport” in the ANS:

1. propagation of electric fields along the axon (normal nerve transmission)

2. axonal transport of neuropeptides and other informational substances (slow and fast axonal transport)

Besides acetylcholine and noradrenalin there are over 80 currently identified other neuropeptides playing significant roles in the function of the ANS. CGRP (Calcitonin-Gene- Related-Peptide is specific to the PSNS). Without the nurturing influence of these neuropeptides the organs to which the ANS fibers lead become ill. When Irvin Korr PhD (collected papers, Univ of Kirksville Osteopathic Med School, 1975) ligated the ANS fibers leading to the kidney of a lab animal, the kidneys silently atrophied within a few months. The significance of the ANS in health has been largely underestimated and misunderstood.

3. biophoton-mediated bi-directional information transfer (F.A.Popp)
Recent research has demonstrated significant infrared biophoton-light emissions over the ANS pathways (“meridians”). Biophotons are highly polarized, coherent and “squeezed” and are able to store and communicate infinite amounts of information.

Currently well-Known functions of ANS:
- Temperature regulation (width of vessels in skin, sudomotor regulation = sweat glands)
- Blood, venous and lymph flow in each body compartment, including the brain
- Muscle tone regulation of both smooth and skeletal muscle (basis of ART testing)
- Activation/deactivation/information of cells of immune system (most white cells are under control of the ANS. They have receptors for ANS neuropeptides in their cell wall)

- Regulation of transport mechanisms of all cell walls (voltage dependent calcium and sodium channels, etc.)
- Regulation of most mechanisms of epi-genome – activation/deactivation of genes (Rossi E)
- Expression of emotion (Porges, 1997)
- Innervation of vocal chords (voice)
- Regulation of brain activity - via the superior cervical ganglion, otic ganglion and especially the spheno-palatine ganglion (see article on sphenopalatine ganglion)
- Energetic sensory system constantly scanning the environment (via electromagnetic phenomena)

Toxicity of ANS ganglia: a brief history

A.D. Speransky: applied toxic croton oil in the early 1930s to cavities in dog teeth: observed axonal transport of toxin and subsequent destruction of hypothalamus and facial autonomic ganglia.
A basis for the theory of medicine. International Publishers, New York and Moskau, 1935

R.Voll: used electrodermal measurements in the early 50s and found that specific acupuncture points on the hand related to specific autonomic ganglia. Was able to establish first list of environmental toxins found in ganglia non-invasively and also found effective antidotes
Testsatz fuer toxische Belastung der autonomen Ganglien. Stauffen Pharma, Goeppingen, Germany

P.Stoertebecker: neurologist at the Karolinska Institute in Sweden repeated in the early 70s Speransky's earlier experiments and published on axonal transport of mercury from the oral cavity to the facial ANS ganglia and trigeminal ganglion.
Mercury Poisoning from Dental Amalgam. BioProbe, Orlando, Florida,1985

D.Klinghardt: used muscle tone biofeedback together with the "direct resonance phenomenon" in mid 1980s (autonomic response testing) to diagnose specific toxins in specific ganglia and establish safe and effective detoxification protocols.

Lehrbuch der Psychokinesiologie, INK Verlag, 1995, Stuttgart, Germany
Johann Lechner: Stoerfelder im Trigeminusbereich und Systemerkrankungen. Verlag fuer ganzheitliche Medizin, Koetzing, Germnany, 1999, pg:.412 ff

The Klinghardt hypothesis:

Multiple chemical sensitivity (MCS), environmental illness and many neurological illnesses of the brain and nervous system are caused by neurotoxin accumulation inside the brain.

The astrocytes are creating a very effective barrier shielding the brain from substances circulating through the brain in the blood vessels. The "first strike" of brain neurotoxicity occurs when unmyelinated nerves, such as the autonomic nerves of the face, jaw, neck and cranium become contaminated with toxic metals (such as mercury vapor from dental amalgam fillings) and transport these toxins straight into the brain axonally, bypassing the vigilant astrocytes and the blood brain barrier. The astrocytes become toxic when they are trying to clean up the mess. Once they are toxic themselves they start failing in their important role in the blood brain barrier. Also the axons of the nerves themselves become injured (the tubulin, especially by mercury, Haley B). An injured nerve and the nerves it is closely connected to become hypersensitive to chemicals (Cannon: "The hypersensitivity of denervated structures", 1935). This is model for MCS not discussed before. The role of the myelinated sensory and motor nerves in neurotoxicity (such as the trigeminal nerve) has been overemphasized. Once the astrocytes can no longer protect the brain from the unwanted substances in the brain (such as certain foods, chemicals, metals, microbes, viruses etc.), the person or animal will become ill. This can explain simple symptoms such as memory loss and food sensitivities, but also illnesses such as autism, Parkinson's disease, Alzheimer's disease and cancer of the brain.

Review of the literature: Metals commonly found in ANS ganglia

ALUMINUM

Correlation of drug-related aluminum intake and dialysis treatment with deposition of argyrophilic aluminum-containing inclusions in CNS and in organ systems of patients with dialysis-associated encephalopathy

REUSCHE E; KOCH V; FRIEDRICH H J; NUENNINGHOFF D; STEIN P; ROB P M
Institute of Pathology, Laboratory of Neuropathology, Institute of Statistics and Clinic for Internal Medicine I, Medical University, Luebeck, Germany

Clinical Neuropathology, 1996, 15 (6) 342-347

- CNS tissue and peripheral organs of 50 autopsy cases with chronic renal failure (CRF) and dialysis treatment were evaluated for aluminum- (Al) containing argyrophilic inclusions
- Morphological alterations were correlated with the amount of prescribed Al-containing drugs for better control of hyperphosphatemia
- Significant correlations were found between the degree of morphological alterations and Al intake.
- The most sensitive structure for CNS deposits were choroid epithelia, followed by glial cells and autonomic ganglia, heart, ovary/testis, parathyroid, adrenal, and pituitary
- The deposition of Al-containing proteinaceous inclusions is apparently irreversible
- After renal transplantation, with termination of drug-related Al intake and normalized renal Al excretion, the Al-induced argyrophilic degradation products remained in the cellular cytoplasm in unchanged fashion up to 10 years.

CADMIUM

Strain differences in the toxicity of cadmium to trigeminal ganglia in mice

HABEEBU Sultan S; YAPING LIU; PARK Jung D; KLAASSEN Curtis D
Center for Environmental and Occupational Health, Department of Pharmacology, Toxicology, and Therapeutics, University of Kansas Medical Center, Kansas City, Kansas 66160-7417, United States

Journal: Toxicology and applied pharmacology, 2001, 177 (3) 200-207

- Cadmium (Cd) is toxic to autonomic and sensory ganglia in many animal species.
- Cadmium uptake is low in the central nervous system, but it distributes preferentially to peripheral sensory and autonomic ganglia.

LEAD

Alteration of rat submandibulary gland secretion of protein, calcium and N-acetyl- beta -D-glucosaminidase activity by lead

ABDOLLAHI M; DEHPOUR A R; FOOLADGAR M
Faculty of Pharmacy and Medicine, Tehran University of Medical Sciences, P. O. Box 14155-6451, Tehran, Iran

General Pharmacology, 1997, 29 (4) 675-680

Effects of various doses of long-term lead treatment on rat submandibular saliva were investigated in this study. Both

submandibular ducts were cannulated intraorally and saliva was collected from lead treated and control rats.

- Saliva protein concentration was found to be reduced in lead treated groups.
- Saliva calcium concentration had a significant reduction in the lead treated group.
- The secretion of the lysosomal enzyme, N,acetyl- beta -D-glucosaminidase (NAG) in saliva decreased significantly in the lead -treated groups.
- There was a correlation between blood and submandibular saliva lead levels, and the saliva/blood ratio was constant for all treated groups.
- With respect to the ability of lead to substitute for calcium in several intracellular regulatory events, explanation for these alterations in
- submandibular saliva composition can be made

Autonomic nervous system dysfunction in workers exposed to lead, zinc, and copper in relation to peripheral nerve conduction : a study of R-R interval variability

MURATA K; ARAKI S
Univ. Tokyo, fac. medicine, dep. public health, Bunkyo-ku, Tokyo 113, Japan

Journal*: American journal of industrial medicine, 1991, 20 (5) 663-671*

- Lead and toxic doses of zinc and copper cause abnormal HRV recordings

Effect of lead on cardiac parasympathetic function

TERUYA K; SAKURAI H; OMAE K; HIGASHI T; MUTO T; KANEKO Y
Kyorin univ., school medicine, dep. hygiene, Mitaka-shi Tokyo 181, Japan

International archives of occupational and environmental health, 1991, 62 (8) 549-553

- lead causes abnormal parameters of cardiac parasympathetic function

LEAD-STIMULATION EFFECTS ON HUMAN CARDIAC ORIENTING AND BLINK REFLEXES (EFFET DE LA STIMULATION SUR LES REFLEXES PALPEBRAUX ET LE RYTHME CARDIAQUE CHEZ L'HOMME)

GRAHAM F K; PUTNAM L E; LEAVITT L A
DEP. PSYCHOL., UNIV. WISCONSIN, MADISON,WIS. 53706

J. EXPER. PSYCHOL., HUM. PERCEPT. PERFORM., 1975, 104 (2) 161-169

- lead causes pathological changes in the ANS

Autonomic and central nervous system effects of lead in female glass workers in China
MURATA K; ARAKI S; YOKOYAMA K; NOMIYAMA K; NOMIYAMA H; YONG-XIAN TAO; SHI-JIE LIU
Univ. Tokyo, fac. medicine, dep. public health, Bunkyo-ku, Tokyo 113, Japan

American Journal of Industrial Medicine, 1995, 28 (2) 233-244

- Lead causes dysautonomia in affected workers

Assessment of central, peripheral, and autonomic nervous system functions in lead workers: neuroelectrophysiological studies
MURATA K; ARAKI S; YOKOYAMA K; UCHIDA E; FUJIMURA Y
Univ. Tokyo, fac. medicine, dep. public health, Bunkyo-ku, Tokyo 113, Japan, International symposium on neurobehavioral methods and effects in occupational and environmental health, 4 (Tokyo JPN) 1991-07-08

Environmental Research : (New York, NY), 1993, 61 (2) 323-336

To assess the effects of lead on central, peripheral, and autonomic nervous systems, the visual-, short-latency somatosensory-, and brainstem auditory-evoked potentials (VEP, SSEP, and BAEP), event-related potential (P300), distribution of nerve conduction velocities (DCV),and electrocardiographic R-R interval variability (CVRR), were measured in the lead workers. The lead workers consisted of 22 gun metal foundry workers occupationally exposed to lead, zinc, and copper

- Significant pathological changes in HRV indicating autonomic damage

Assessment of thyroid, testes, kidney and autonomic nervous system function in lead-exposed workers
GENNART J P; BERNARD A; LAUWERYS R
Catholic univ. Louvain, industrial toxicology occupational medicine unit,1200 Brussels, Belgium
International archives of occupational and environmental health, 1992, 64 (1) 49-57

MERCURY

Cardiac autonomic activity in methylmercury neurotoxicity: 14-year follow-up of a Faroese birth cohort
GRANDJEAN Philippe; MURATA Katsuyuki; BUDIZ-JOERGENSEN Esben; WEIHE Pal

Institute of Public Health, University of Southern Denmark, Odense, Denmark; Department of Biostatistics, Institute of Public Health, University of Copenhagen, Copenhagen, Denmark; Department of Environmental Health, Harvard University School of Public Health, Boston, Massachusetts, United States; Division of Environmental Health Sciences, Akita University School of Medicine, Akita, Japan; Department of Occupational Medicine and

Public Health Faroese Hospital System, Torshavn, Faroe Islands

The Journal of Pediatrics, 2004, 144 (2) 169-176

- Objective:

To determine whether heart function in childhood is affected by exposure to methylmercury (MeHg)from seafood.

- Examination:

at ages 7 and 14 years included blood pressure, heart rate variability (HRV) and its frequency components of autonomic origin, and brainstem auditory evoked potentials (BAEPs). Mercury concentrations were determined in cord blood and in the child's hair.

- Conclusion:

Methylmercury exposure was associated with decreased sympathetic (LF) and parasympathetic (HF) modulation of the ANS

Cardiovascular reflexes and low long-term exposure to mercury vapor
PIIKIVI L
Oulu regional inst. occupational health, Oulu 90101, Finland

International Archives of Occupational and Environmental Health, 1989, 61 (6) 391-395

- Many ANS parameters become abnormal after long term Hg exposure

Manganese

Autonomic function in manganese alloy workers
BARRINGTON W W; ANGLE C R; WILLCOCKSON N K; PADULA M A; KORN T
University of Nebraska Medical Center, Omaha, Nebraska 68198-6055, United States; Private practice, Omaha, Nebraska, United States

Environmental Research : (New York, NY), 1998, 78 (1) 50-58

Cardiovascular autonomic function (and cognitive and emotional neurotoxicity) in eight manganese alloy welders and machinists.
Subjects:

- 1 case of manganese dementia
- his four co-workers in a "frog shop" for gouging, welding, and grinding repair of high manganese railway track
- three “mild” steel welders with lesser manganese exposure with cognitive or autonomic symptoms.

Method:

- electrocardiographic (Holter) monitoring was used to determine the temporal variability of the heart rate (RR' interval) and the rates of change at low frequency and high frequency.

Results:

- The five frog shop workers had abnormal sympathovagal balance with decreased high frequency variability

- Seven of the eight workers had symptoms of autonomic dysfunction and significantly decreased heart rate variability
- Mood or affect was disturbed in all with associated changes in short-term memory and attention in four of the subjects
- There were no significant correlations with serum or urine manganese.

Conclusion:

- Power spectrum analysis of 24-h ambulatory ECG indicating a decrease in parasympathetic high frequency activation of heart rate variability may provide a sensitive index of central autonomic dysfunction reflecting increased exposure to manganese, although the contribution of exposures to solvents and other metals cannot be excluded.
- Neurotoxicity due to the gouging, welding, and grinding of mild steel and manganese alloys merits air manganese and surveillance including autonomic function by Holter monitoring of cardiovagal activation.

Pesticides commonly found in ANS ganglia

Effect of chronic mixed pesticide exposure on peripheral and autonomic nerve function

RUIJTEN M W M M; SALLE H J A; VERBERK M M; SMINK M
Univ. Amsterdam, acad. medical cent., coronel lab., 1105 AZ Amsterdam, Netherlands

Archives of Environmental Health, 1994, 49 (3) 188-195

- Study Design:

131 flower bulb farmers (mean age=43 y) and 67 well-matched controls, peripheral and autonomic nerve functions were examined.
The study group had been exposed during a period of 20 y (standard deviation= 7) and applied a similar pesticide package.

- Result:

Exposure-related decreased autonomic, motor and sensory nerve conduction velocity

DIABETES MELLITUS ASSOCIATED WITH AUTONOMIC AND PERIPHERAL NEUROPATHY AFTER VACOR RODENTICIDE POISONING: A REVIEW

GALLANOSA A G; SPYKER D A; CURNOW R T
UNIV. VIRGINIA, SCH. MED./CHARLOTTESVILLE VA 22908,USA

CLIN. TOXICOL., 1981, 18 (4) 441-449

A 42 year old woman develops diabetic neuropathy and autonomic dysfunction alter exposure of a rodenticide(N-3-PYRIDYLMETHYL N-P-NITROPHENYLUREE)

Low level exposures to organophosphorus esters may cause neurotoxicity

Toxicology and sustainable development - meeting the challenge: proceedings of the IXth International Congress of Toxicology, Brisbane, Australia, July 8-12, 2001

JAMAL Goran A; HANSEN Stig; JULU Meter; O WRIGHT Paul F
Division of Neurosciences, Imperial College of Science, Technology and Medicine, University of London, London, United Kingdom; South Glasgow University Hospitals NHS Trust, Glasgow, United Kingdom
Key Centre for Toxicology, Royal Melbourne Institute of Technology (RMIT-University), Latrobe St., Melbourne, Victoria, 3000, Australia
ICT-IX International Congress of Toxicology, 9(Brisbane AUS) 2001-07-08

Toxicology : (Amsterdam), 2002, 181-18 23-33

A large number of published studies support the notion that long term, low level (LTLL) exposure to organophosphorus (OP) esters may cause autonomic, neurological and neurobehavioral effects.

The question addressed in this particular review is whether LTLL exposure to OP may produce neurotoxicity.

- 11 studies support the existence of a positive link between exposure to OP and neurotoxicity; Appearance of neurotoxicity does not seem to be related to the number or the intensity of acute cholinergic attacks.
- Additional five studies using experimental animals, all of which showed a positive link between OP and neurotoxicity.
- seven additional case studies without controls, some involving large numbers of patients, concluded that there is a positive link between OP and neurotoxicity.
- 19 additional studies investigated such a link using cases and control groups. Of these, 15 studies (about 80%) showed a positive link and only four failed to identify any link between OP and neurotoxicity.
- ***There is a characteristic pattern of involvement of 15 functional indices of the autonomic nervous system***
- The peripheral nerve involvement in OP exposure is predominantly sensory in nature affecting both small and large fiber populations. Neurobehavioral involvement of mainly cognitive dysfunction and other features are also described in other studies.

Latent Dichlorvos Neurotoxicity Detected by Vagal Tone Monitoring in Dogs

DELLINGER J A; MCKIERNAN B C; KORITZ G D; RICHARDSON B C
Univ. Illinois, dep. veterinary biosci., Urbana IL 61801, USA

Neurobehavioral Toxicology and Teratology, 1987, 9 (3) 197-201

Other toxins commonly found in ANS in my experience

Mycotoxins: stachybotrys, aspergillus species, mucor racemosus, penicillum species

Bacterial endo-and exotoxins: borrelia burgdorferi, ehrlichiosis, babesia, bartonella, mycoplasma species, ureoplasma urealyticum, streptococcinum, staph toxins, rickettsia, chlostridial toxins, salmonella

Worm toxins: ascaridin, taenia and threadworm toxins

Dento-facial toxins: Jaw bone toxins (thioethers and mercaptans), toxic root filling materials, dental plastics, metals and glues

Diagnosis of ANS Toxicity

a) Clinical diagnosis by understanding and interpreting autonomic syndromes

alpha-adrenergic syndrome
- hypertension with reflex bradycardia
- dilated pupils
- phenylephrine, phenylpropanolamine, methoxamine

beta-adrenergic syndrome
- beta-2 mediated vasodilation with hypotension
- tachycardia
- albuterol, caffeine, theophylline

mixed alpha and beta-adrenergic syndrome
- hypertension with tachycardia
- dilated pupils
- sweaty skin but dry mucous membranes
- amphetamines, cocaine

sympatolytic syndrome
- blood pressure and pulse rate decreased
- pinpoint pupils
- decreased peristalis
- clonidine, methyldopa, opiates phenothiazines

nicotinic cholinergic syndromes
- stimulation of nicotinic receptors at autonomic ganglia activates both sympathetic and parasympathetic systems with unpredictable outcome
- initial tachycardia may be followed by bradycardia
- muscle fasciculations followed by paralysis

- nicotine, succinylcholine

b) Clinical diagnosis by manual evaluation/palpation of ganglia and referral "zones"

- osteopathy: specific to location, not underlying problem. Subjective
- chiropractic: segmental pain/tension/dysfunction patterns

c) Thermography

- moderately specific to area, but not to a specific toxin or infection

d) Electrophysiological methods

- HRV (heart rate variability): advantage: reproducible, simple, much published disadvantage: non-specific
- Skin conductance (non-specific)
- EKG changes (QT interval)
- EDS/EAV (Electro-dermal screening/electroacupuncture according to Voll,MD, PhD) advantage: highly specific – can diagnose specific location, toxin, infection and effective treatment
  - *Reinhold Voll: 25 Jahre Elektroakupunktur nach Voll und Medikamententestung. Medizinisch Literarische Verlagsgesellschaft mbH, Uelzen (1982), Germany*

  Disadvantage: slow learning curve, operator dependant
- ART (autonomic response testing):
  Underlying Principle: The "resonance phenomenon between identical substances" was originally discovered by Y. Omura MD of New York. When an identical substance that is stored in a particular location inside the body is held in the field outside this area of the body, an ANS change occurs which can be monitored in a multitude of ways. It will lead to instant HRV changes, a specific longitudinal shift of the radial pulse (vascular autonomic signal, Dr. P. Nogier), a change in skin resistance (electro-dermal testing or electroacupuncture), thermal skin changes (thermography) and to changes in muscle tone (autonomic response testing and bi-digital O-ring test). The autonomic ganglia can be scanned with appropriate dilutions of mercury, lead, organophosphates etc. Whenever the indicative ANS change is observed it can be concluded, that this particular substance is in the scanned area. ART testing is specific also to quantity of a particular toxin (by using different dilutions) and can be utilized to determine the most effective and tolerated detoxification agent.
  - *Using the bi-digital O-ring test to detect dysfunction in the autonomic nervous system Klinghardt, D Abstracts 14th Intl Symposium on Acupuncture and Electro-Therapeutics Intl J of Acup and Electro-Therapeutics Research Vol 23,1998, pg 288 ff*
  - *The formation and basis of the bi-digital O-ring test Yamamoto S Intl J Acup and ElectroTherapeutics Res, Vol 20, #3/4, 1995, pp 247-249*
  - *Somatosensory evoked potential changes during muscle testing Leisman G et al Intern J Neuroscience 1989, Vol 45, pp143-151*
  - *Dietrich Klinghardt: ART I and ART II manuals. Institute of Neurobiology. Bellevue, WA 1994*

- *Dietrich Klinghardt: Lehrbuch der Psychokinesiologie. INK Verlag, Stuttgart, Germany 1995*
- *Joachim Mutter: Amalgam-Risiko fuer die Menschheit. Fit fuers Leben Verlag. 1. Aufl.2000, Weil der Stadt, Germany*
- *Alfred Dietrich: Propaedeutik der ganzheitlichen Medizin und Zahnmedizin. Haug Verlag Heildelberg, 1998*

Advantage: ART is highly specific. More accurate then EDS. More reproducible. Each autonomic ganglion can be tested specifically.
Disadvantage: slow learning curve. Similar, but highly inaccurate systems ("kinesiology")

Treatment of Toxic ANS Ganglia

- Systemic treatment (oral agents, trans-and intradermal agents, intravenous/intramuscular injections)
  - *Mercury Toxicity and Systemic Elimination Agents; Klinghardt D and Mercola J J Nutr &Environmental Med 2001*
  - *Neural Therapy B manual and video www.neuraltherapy.com*
- Electric microcurrent stimulation (and iontophoresis)
- Acupuncture
- Low level laser therapy (and photophoresis)
- Light therapy
- Sound therapy and (phonophoresis)
- Neural Therapy (ganglion and plexus injections)

- *Peter Dosch: Manual of Neural Therapy Haug Publishers, Heidelberg, Germany, 1964*
- *Neural Therapy Klinghardt D J Neurol Orthop Med Surg (1993) 14:109-114*
- *Gernot Badtke, Ilona Mudra: Neuraltherapie, Ullstein- Mosby, 1994*
- *Mathias Dosch: Illustrated Atlas of the Techniques of Neural Therapy with Local Anesthetics, Haug Publishers, 1979*
- *Dietrich Klinghardt: Neural Therapy A and B course manuals and videos, Institute of Neurobiology, Bellevue, WA (2001)*

Principles of treatment:

- Procaine and other local anesthetics restore normal functioning and resting potentials of the misfiring dysfunctional neurons (after injection of the ganglion with appropriate technique)
- Procaine also has a moderate detoxifying effect which can be enhanced by adding injectable antidotes (mesotherapy):

- Reduced glutathione, DMPS, Ca EDTA, Vitamin C, N-acetyl-cystein, Desferal, phospholipids, homeopathic preparations (traumeel, homeopathic DMPS, diluted hydrochloric acid and others)
    - Neural Therapy B manual and video D Klinghardt www.neuraltherapy.com
- Local and systemic hyperthermia (sauna therapy)
    - HB Lovejoy et al: Mercury exposure evaluations and their correlation with urine mercury excretion: elimination of mercury by sweating. J Occup Med 15: 590-591 (1973)
- Pulsed microcurrent is very effective when the correct amperage, voltage and pulse-frequency is used (KMT technology). The electrodes have to be applied to the anatomic position closest to the ganglion or to the related acupuncture points
    - *FL Jenkner: Transcutaneous Electric Nerve Block , Springer Verlag Wien-New York 1986*

Examples/Clinical Cases

Case 1: 46 yr female patient with intractable hypertension. BP around 180/100 since 8 years after psychological trauma (death of child):
after applying microcurrent to the stellate ganglia for 55 minutes daily for 3 weeks with the opposing electrodes over the acupuncture point stomach 36 (related to hypothalamus and pituitary gland) BP was 124/70 without further treatment. Observation period: 3 years. During the treatment the client relived circumstances of trauma and felt trauma "lifting"

Case 2: Male 28 yr Patient with complex regional pain syndrome after foot surgery. Had undergone several medication trials at local pain clinic without results.
ART exam revealed pelvic ganglionic infection with ureoplasma urealyticum. Series of 8 weekly pelvic procaine injections (Frankenhauser ganglia) with highly diluted doxycycline, intraarterial procaine to the femoral artery on the involved side brought complete and lasting relief. (Observation period 6 years)

Case 3: 42 y o woman with recent diagnosis of Sjogren's syndrome. Severe dryness of mouth and eyes. Lost 45 pounds of weight in 4 months.
ART exam shows mercury storage in otic, sphenopalatine and submandibular ganglia. Twice weekly injections to the 6 ganglia with a total of 10 ml procaine, 1 ml DMPS and 1 ml glutathione (distributed into 6 ganglia) together with working an oral detoxification program (cilantro, chlorella and phospholipids) resolved the clinical symptoms completely and lastingly. She received a total of 12 injection procedures (observation period: 15 years)