

# OPTIMAL HEALTH UNIVERSITY™

Presented by Katie Gravesen, DC

## Chiropractic & the Autonomic Nervous System Part II: the Research

*The autonomic nervous system (ANS) regulates organ function and overall balance of the body's systems (homeostasis). Optimal functioning of the ANS is crucial to health and vitality.*

*In part one of this two-part series, Dr. Gravesen provided an overview of the ANS and explained how the ANS may be impeded by vertebral subluxations, or, conversely, facilitated by chiropractic care. Now, in part two of this series, Dr. Gravesen delves into related research in greater detail.*



### How Do Scientists Test If Vertebral Subluxations Influence ANS Activity?

To determine if vertebral subluxations and chiropractic adjustments influence the ANS, scientists look at two factors: 1) If these events are related to conditions affecting the organs. 2) If these events produce specific, often immediate, changes characteristic of ANS activity, such as alterations in heart rate variability (HRV), blood pressure, blood flow, breathing and eye pupil dilation.

Read on to learn about data Dr. Gravesen has collected detailing several specific studies — most of which were published within the past few

years.

### Chiropractic Helps Conditions Affecting Organs

Visceral conditions are those affecting organs and structures *other* than muscles and bones (nonmusculoskeletal conditions).

The ANS regulates organ function. Consequently, evidence that chiropractic care alleviates visceral conditions may also demonstrate that chiropractic benefits the ANS.

One review article pooled data from 179 scientific reports addressing 50 different nonmusculoskeletal conditions (*J Altern Complement Med* 2007;13:491-512).

Findings showed that “evidence from controlled studies and usual practice supports chiropractic care (the entire clinical encounter) as providing benefit to patients with asthma, [neck-related] vertigo, and infantile colic. Evidence was promising for potential benefit of manual procedures for children with otitis media [ear infection] and elderly patients with pneumonia.” (*J Altern Complement Med* 2007;13:491-512.)

### Chiropractic Adjustments Influence Heart Rate

Heart rate variability is a key indicator of autonomic nervous system activity.

In one published experiment, 51 participants were randomly assigned to a control group, two experimental groups, or two sham groups. The experimental groups both received chiropractic adjustments to a spinal segment in the low-back, using two separate chiropractic techniques.

The study's authors explain that “the purpose of this study was to examine heart rate variability (HRV) in the presence or the absence of pain in the lower back.” (*J Manipulative Physiol Ther* 2009;32:277-86.)

Results revealed that chiropractic adjustments decrease HRV — indicating activation of the parasympathetic branch of the ANS.

The investigators conclude that “adjusting the lumbar vertebrae affected the lumbar parasympathetic nervous system output for this group of participants.”

They also found that “the group differences found in the modulation of the HRV would seem to be related to the presence or absence of pain. The autonomic nervous system response may be specific and sensitive to its effectors organ.” (*J Manipulative Physiol Ther* 2009;32:277-86.)

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## **Area of Spine Adjusted May Predict ANS Response**

Another analysis reveals that the autonomic nervous system is affected by chiropractic adjustments.

What's more, the area of the spine adjusted may influence whether the adjustment triggers a parasympathetic or a sympathetic response. This may be because nerves supplying the two systems tend to be concentrated in different parts of the spine, say scientists.

The analysis enrolled 40 patients between the ages of 25-55 years. All participants were symptom-free — and free of high blood pressure and cardiovascular disease.

The patients received a chiropractic adjustment to one of two spinal areas: 1) the spine of the neck (cervical spine), or 2) the spine of the mid-back (thoracic spine).

“Patients were evaluated pre- and post-chiropractic adjustment for the following autonomic responses: blood pressure and pulse rate. Seven patients were measured for heart rate variability.” (*J Chiropr Med* 2008;7:86-93.)

Chiropractic adjustments to the neck sparked changes indicative of parasympathetic system (“rest and digest”) activation, whereas adjustments to the mid-back produced changes indicative of the sympathetic system (“fight or flight”).

“It is preliminarily suggested that cervical adjustments may result in parasympathetic responses, whereas thoracic adjustments result in sympathetic responses,” conclude the study's authors. “Furthermore, it appears that these responses may demonstrate the relationship of autonomic responses in association to the particular segment(s) adjusted.” (*J Chiropr Med* 2008;7:86-93.)

## **Chiropractic Adjustments Decrease High Blood Pressure**

A report in the *Journal of Human Hypertension*, one of Nature Publishing Group's journals, reveals that chiro-

practic adjustments lower blood pressure (BP). This is indicative of an ANS response, because the ANS helps regulate BP.

The double blind, placebo-controlled study enrolled 50 patients with mild hypertension, who were not taking medication for the condition. During an eight-week period, half of the subjects underwent chiropractic care. A control group received a sham procedure (*J Hum Hypertens* 2007;21:347).

Compared with members of the placebo group, individuals undergoing chiropractic care enjoyed significant drops in both systolic BP (top number) and diastolic BP (bottom number). These findings suggest that chiropractic adjustments influence the ANS.

The reductions in blood pressure were as significant as those produced by commonly-used medication. However, unlike medication, no adverse reactions were linked with chiropractic.

The study's authors conclude that chiropractic care “is associated with marked and sustained reductions in BP similar to the use of two-drug combination therapy.” (*J Hum Hypertens* 2007;21:347-52.)

## **Chiropractic Adjustments Increase Intracranial Blood Flow**

One study looked specifically at the effect of chiropractic adjustments on blood flow to the brain, another marker of ANS activity.

The experiment, which included 20 healthy chiropractic students, used Doppler Ultrasound technology to track the effects of a single chiropractic adjustment on blood flow. Findings revealed a “small, transient increase in blood flow immediately following an adjustment” in the middle cerebral artery, which supplies blood to the brain (*J Vertebral Subluxation Res* 2007:1-8).

## **More Research from Japan**

Researchers in Japan have also found that spinal manipulation to the neck affects heart rate, further illustrating that chiropractic may affect the ANS.

As part of the study, a cohort of healthy adults underwent either spinal manipulation or a “sham” procedure. Findings revealed that, compared with the sham procedure, spinal manipulation “produced significant alterations in both heart rate and measures of heart-rate variability.” (*Autonomic Neurosci* 2001;91:96-9.)

## **Chiropractic Adjustments Affect Eye Pupil Dilation**

Researchers at Victoria University in Melbourne, Australia, have uncovered that chiropractic adjustments trigger changes in the way that eye pupils respond to light. Specifically, they looked at a reflex called edge light pupil cycle time (ELPCT).

According to the investigators, “studies have shown ELPCT to be a measurable constant, unaffected by visual acuity, refractive error, eye color, pupil size, or sex. Control of this reflex occurs through the autonomic nervous system.” (*J Manipulative Physiol Ther* 2000;7:165-9.)

As part of the experiment, 13 men without a history of eye disease or nervous system disease had their ELPCT measured before and after receiving a chiropractic adjustment (manipulation) to the spine of the upper neck.

“ELPCT measures demonstrated a significant difference for both eyes before and after manipulation.”

“This suggests that ELPCT, which is mediated through the autonomic nervous system, can be directly influenced by high-velocity manipulation to the upper cervical spine.” (*J Manipulative Physiol Ther* 2000;7:165-9.)

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