

# Non-invasive, Quantitative, Measurements of Autonomic Nervous System Activity Levels: III. Improved ANS Balance Improves Clinical Outcomes

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## ABSTRACT

**Introduction:** Autonomic Nervous System (ANS) monitoring has come of age. Over the past decade several leading medical associations have called for ANS monitoring as part of the standard of care for their chronic, progressive disease patients.

**Methods:** Over a three year period, a total of 1552 chronic patients were serially tested in the clinic, samples of which are presented with follow-up data.

**Results:** One of the most significant findings is that the oppositional relationship that has historically been assumed between the two ANS branches can be misleading. Observations from simultaneous, independent measures of both ANS branches has suggested a more interactive regulatory and responsive relationship between the parasympathetic and sympathetic branches of the ANS, respectively. There is also a physiologic buffer driven by various system responses to ANS challenge and their influence on ANS reaction. Therefore, in the presence of ANS dysfunction (with or without a previous clinical condition) there appears to be paradoxical and/or exaggerated responses of one or both ANS branches which can result in a positive feedback loop created by ANS and organ system reaction leading to symptoms and clinical syndromes. Also, as both branches weaken, the aging effect seems to accelerate, further weakening the ANS. Since quality of life (*e.g.*, GI motility, bladder control and sexual function) and ultimately life itself is dependent on some level of function within the ANS, working to preserve the ANS and prevent further decline is a significant issue. Chronic ANS dysfunction may also *lead* to disease states such as Diabetes (type-II), Hypertension, Renal disease, Cardiomyopathy, and Multiple System Atrophy. Tighter disease control, anti-oxidants, and healthier life styles (diet and exercise) have all been observed to help protect and in some early cases even improve ANS health.

**Discussion:** Our team has observed that ANS dysfunction, particularly parasympathetic abnormality, could be a primary abnormality or a secondary physiologic manifestation. This is not surprising considering the interrelationship between the ANS and various body systems such as the GI tract, vascular systems, and the endocrine system. It was also observed that ANS dysfunction could be an early indicator of more serious clinical conditions. The authors have found that modifying and resetting ANS dysfunction can be

achieved using conventional drugs and non-pharmaceutical therapies known to effect the sympathetic and parasympathetic nervous systems (*e.g.*, central adrenergic or cholinergic antagonists, and exercise and diet).

**Conclusions:** Resetting ANS to normalcy or close to normalcy not only resulted in resolution or avoidance of clinical symptomatology but has lead to, in our experience, improvements in the primary disease manifestations and better responses to treatment. ANS monitoring was found to positively impact treatment and therapy. It helps to individualize or customize treatment by allowing treatment plans to be tailored and titrated based on the details and specific analyses of each ANS test.