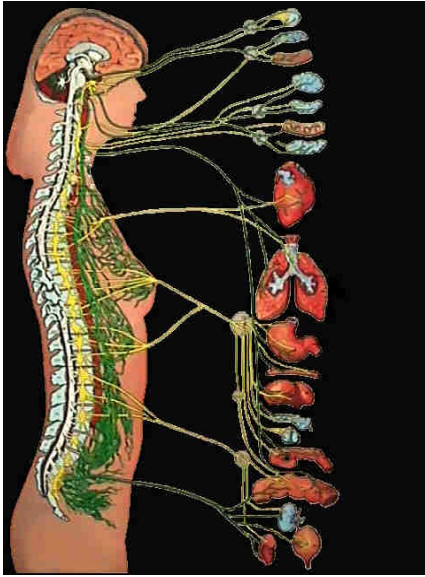


Health and Disease



To better understand care at our office, one must understand the intimate role of the nervous system in the injury and disease processes. The human brain communicates through a vast network of nerves connecting different systems of the body (like telephone wires connecting multiple phones). When not connected directly by a nerve, the brain still "talks" to a particular system by producing chemical "messengers" known as hormones, neuropeptides, and cytokines. (1-5). This constant communication to and from the brain is essential for the proper function and health of every system in the body (32).

The spinal cord represents the main thoroughfare by which information is transmitted between the brain and the body. It is housed and protected by the numerous bony segments that make up the spinal column or "backbone". Alterations in the normal relationship between spinal segments can irritate the adjacent

nerves ("short circuit") by means of elaborate reflexes occurring between their joints and the spinal cord (6-11). Many patients think of this as pressure on the nerve, although that is not the most accurate description. This irritation causes the nerve to function improperly and can contribute to other nervous system disorders, poor healing of injuries, inflammation, headaches, numerous pain syndromes, decreased immune function, and stress to the gastrointestinal, endocrine, and cardiovascular systems among others (1-5,12-31).

No region demonstrates the magnitude of this relationship as the upper cervical (upper neck) spine. Because of its unique design, the upper cervical complex is the most mobile area of the entire spine. This renders the area particularly vulnerable to injury, making it the most common location for spinal problems to occur. Additionally, the amount of nerve information transmitted from the upper cervical spine into the spinal cord and brain is the greatest in the entire body. This increases the likelihood that a nerve will be irritated, thus decreasing the quality of communication between the brain and body. The proximity of the upper cervical spine to the skull also allows for several unique problems. First, this spinal region has the unique ability to produce the greatest single influence on brain activity (32-37). Second, virtually all nerve signals must pass through the upper cervical region in order to reach lower portions of the body. Consequently any and all functions of the body can be affected by the spine at this level (32). For these reasons, the upper cervical spine is critical to the proper nervous system function and so too, for maintaining good health.



1. Wick, G., et al. *Immunoendocrine Communication via The Hypothalamus-Pituitary-Adrenal Axis in Autoimmune Diseases*. Endocrine Reviews. 14:539-563, October 1993.
2. Black, P. *Immune System - Central Nervous System Interactions: Effect and Immunomodulatory Consequences of Immune System Mediators on The Brain*. Antimicrobial Agents and Chemotherapy. 38:7-12, January 1994.
3. Ader, R., Cohen, N., Felten, D. *Psychoneuroimmunology: Interactions Between The Nervous System and The Immune System*. Lancet 345:99-103, January 14, 1996.
4. Spiegel, D. *Cancer and Interactions Between Brain and Body*. Journal of the National Cancer Institute. 85:1198-1205, August 4, 1993.
5. Chancellor-Freeland, C., et al. *Substance-P and Stress-Induced Changes in Macrophages*. Annals of the New York Academy of Sciences. 1995
6. Gardner, E. *Pathways to the Cerebral Cortex for Nerve Impulses from Joints*. Acta Anat 1969;56:203-216.

7. Giles LGF. *Innervation of Zygapophyseal Joint Synovial Folds in Low-Back Pain*. Lancet 1987;2:692.
8. Wyke, B. *The Neurology of Joints: A Review of General Principles*. Clin Rheum Dis 1981;7:223-239.
9. Coote, J. *Somatic Sources of Afferent Input as Factors in Aberrant Autonomic, Sensory, and Motor Function*. In: Korr, I., ed. *The Neurobiologic Mechanisms in Manipulative Therapy*. New York: Plenum, 1978:91-127.
10. Denslow, J., Korr, I., Krems, A. *Quantitative Studies of Chronic Facilitation in Human Motorneuron Pools*. Am J Physiol 1987;150:229-238
11. Korr, I. *Proprioceptors and the Behavior of Lesioned Segments*. In: Stark, E. ed. *Osteopathic Medicine*. Acton, Mass.: Publication Sciences Group, 1975:183-199.
12. Sato, A. *The somatosympathetic reflexes: their physiological and clinical significance*. In: Golstein M, ed. *The research status of Spinal Manipulative Therapy*. Washington D.C.: Government Printing Office 1975: 163-172.
13. Sato A, Schmidt RF. *Somatosympathetic reflexes: afferent fibers, central pathways, discharge characteristics*. Phys Review 1973;53:916-947.
14. Kiyomi K. *Autonomic system reactions caused by excitation of somatic afferents: study of cutaneo-intestinal reflex*. In: Korr IM, ed. *The neurobiological mechanisms in manipulative therapy*. New York: Plenum 1978:219-227.
15. Foreman JC, Jordan CC. *Neurogenic inflammation*. Trends in Pharmacological Sci 1984; 5:116-19.
16. Dernow B. *Role of tachykinins in neurogenic inflammation*. J Immunol 1985;135(suppl):834-37.
17. Payan DG, Levine JD, Goetz EJ. *Modulation of immunity and hypersensitivity by sensory neuropeptides*. J Immunol 1984;132:1601-04
18. Payan DC, Brewster DR, Goetz EJ. *Specific stimulation of human T lymphocytes by substance P*. J Immunol 1983;131:1613-15
19. Fidelibus JC. *An overview of neuroimmunomodulation and a possible correlation with musculoskeletal system function*. JMPT 1989;12(4);289-292
20. Galletti R, Procacci P: *The role of the sympathetic nervous system in the control of pain and of some associated phenomenon*. Acta Neurovegetativa 28:495-500, 1966.
21. Korr IM. *Sustained sympathetocotonia as a factor in disease*. In: Korr IM, ed. *The neurobiological mechanisms in manipulative therapy*. New York: Plenum, 1978 229-268.
22. Paterson MM, Steinmetz JE. *Long-lasting alterations of spinal reflexes: a potential basis for somatic dysfunction*. Manual Med 1986;2:38-42.
23. Hunter CR, Mayfield FH. *Role of the upper cervical spine in the production of pain in the head*. Am J Surg Nov 1949; 743-749.
24. Vernon H, Dhami MSI. *Vertebrogenic Migraine*. J Can Chiro Assoc 1983;29(1):20-24.
25. Wright S, Osborn N, Breen AC. *Incidence of ponticulus posterior of the atlas in migraine and cervicogenic headaches*. JMPT, Jan1999;22(1), pp15-20
26. Guyton AC. *Hypertension a neural disease?* Arch Neurol 1988;45:178-179.
27. Ferrara LA, Moscato TS, Pisanti N, Marotta T, Krogh V, et al. *Is the sympathetic nervous system altered in children with familial history of arterial hypertension*. Cardiology 1988;75:200-205.
28. Surwit RS, Feinglos MN. *Stress and autonomic nervous system in type II diabetes: a hypothesis*. Diabetes Care 1988; 11:83-85
29. Blalock JE, Harbour-McMenamin D, Smith EM. *Peptide hormone shared by the neuroendocrine and immunological systems*. J Immunol 1985 135 (suppl):858-61
30. Lewitt K. *The craniocervical junction and disturbances of equilibrium*. Man Med 24:1986;26-29
31. Editors. *Autonomic abnormalities in asthma*. Lancet 1982; 1224-1225.
32. Bach-y-Rita P, ed. *Recovery of function: Theoretical consideration for brain injury rehabilitation*. Baltimore: Univ Park Press 1980: 39-45
33. Vernon H. *Upper Cervical Syndrome*. Williams and Wilkins; 1988: 48-85
34. Krog, J. *Autonomic Nervous Control of The Cerebral Blood Flow in Man*. J. Oslo. City Hosp. 1964; 14: p. 25.
35. Kobayashi, S., Waltz, A. G., Rhoton, A. L. *Effects of Stimulation of Cervical Sympathetic Nerves on Cortical Blood Flow and Vascular Reactivity*. Neurology 1971; 21: pp. 297-302.
36. Meyer, J. S., Yoshida, K., Sakamoto, D. *Autonomic Control of Cerebral Blood Flow Measured by Electromagnetic Flow Meters*. Neurology 1967; 17: pp. 638-648.
37. De La Torre, J. C., Surgeon, J. W., Walker, R. H. *Effects of Locus Ceruleus Stimulation on Cerebral Blood Flow in Selected Brain Regions*. Acta Neurol. Scand. Suppl. 1977; 64, 56: pp. 104-105.