

Cannon, Walter B. (1939). A Law of Denervation. *The American Journal of the Medical Sciences*. December. The Hughlings Jackson Memorial Lecture, delivered at the Montreal Neurological Institute, McGill University, Wednesday, April 19, 1939.

About 55 years ago Hughlings Jackson discriminated a hierarchy of functions in the central nervous system that could reasonably be regarded as having been developed in the course of vertebrate evolution. He pointed out that when there is a destructive lesion affecting higher functional levels dissolution takes place, characterized by loss of control of the higher over the lower, and by an increased activity of the lower levels, now released from dominance from above. The idea that this excessive neuromuscular display could be explained by "irritation", though it has persisted, was set at naught by Jackson's schema. He, himself, did not reject the concept of neuronal instability, produced by blocking of blood vessels, growth of tumors, or other pathological processes. Thus, he explained the discharge of nerve impulses in the form of epilepsy which is known under his name. That he ever thought that the two conditions--release and hyperexcitability, both due to permanent damage--might combine to produce inordinate movement, is not clear. That possibility exists (p.737)...That law may be stated as follows. When in a series of efferent neurons a unit is destroyed, an increased irritability to chemical agents develops in the isolated structure or structures, the effect being maximal in the part directly denervated. (p.738).

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Cannon's *Law of Denervation* is the neurophysiological principle that underlies the variety of emotional-behavioral pathologies associated with Somatosensory Affectional Deprivation (SSAD)--a special case of *functional* denervation that results in lowered thresholds to sensory stimulation. Depression, violence, drug abuse and addiction must be understood within this context. Cannon's *Law of Denervation* explains the neurophysiological mechanisms that mediate the long-term damage of early sensory deprivation trauma. This writer is indebted to Professor Austin H. Riesen for bringing this relationship to his attention. Following are additional sources that can be consulted (jwp).

Cannon, W.B. and Rosenbleuth, A. (1949). *The Supersensitivity of Denervated Structures*. MacMillan, NY

Sharpless, S.K. Isolated and deafferented neurons: Disuse supersensitivity (1969).  
In: *Basic Mechanisms of the Epilepsies* (Jasper, Ward & Pope (Eds). Little Brown & Co., NY 329-355.

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Prescott, J.W. (1980). Somatosensory affectional deprivation (SAD) theory of drug and alcohol use. In: *Theories On Drug Abuse: Selected Contemporary Perspectives*. Dan J. Lettieri, Mollie Sayers and Helen Wallenstien Pearson, Eds.) NIDA Research Monograph 30, March 1980. National Institute on Drug Abuse, Department of Health and Human Services. Rockville, MD.