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Title: Quantification of high pressure nervous syndrome (HPNS) tremor in the guinea pig

Authors: Gruenau, SP
Ackerman, MJ

Keywords: hyperbaric
high pressure nervous syndrome
tremor
animal
guinea pig

Issue Date: 1978

Citation: Undersea Biomed Res. 1978 Mar;5(1):95-104.

Abstract: Previous studies have demonstrated two tremorgenic systems that involve separate brain mechanisms and exhibit different peak frequencies. One system (the thalamo-cortical) generates low frequency (4--8 Hz) tremor; the other (the olivo-cerebellar) produces high frequency (10--18 Hz) tremor. Based on this evidence, the present study focused on determining whether one or both of these tremor systems is involved in the high pressure nervous syndrome (HPNS). Specifically, the concern was to identify and to quantify amplitude and frequency characteristics of HPNS tremor in 8 guinea pigs breathing helium-oxygen during compression (40 ft/min) in a chamber dive to 61.6 ATA (2000 fsw) with a bottom time of 1 h. Rectal temperature was recorded and maintained at 39 degrees C +/- 1 degree. Leg tremor was recorded by magnetic inductance and stored on magnetic tape for power spectral analysis. Frequency histograms of the tremor data revealed development of a biphasic response. From surface to about 31.3 ATA (1000 fsw), a low-power, single, 4- to 6-Hz component was evident, which resembled fine or moderate tremor. Between 34.3 ATA (1100 fsw) and 61.6 ATA, a 12- to 18-Hz component emerged abruptly with a dramatic increase in power, which reflected coarse, uncontrollable tremors. In the first 5 to 10 min after the animals arrived at maximum pressure, relative power of the high frequency component dropped to and remained near base-line levels. These results support the

hypothesis that HPNS tremor consists of two components and possibly two separate tremor systems. Animals *Atmospheric Pressure Disease Models, Animal Guinea Pigs Helium/*adverse effects Hyperbaric Oxygenation/*adverse effects Male Neuromuscular Diseases/*physiopathology Support, U.S. Gov't, Non-P.H.S. Tremor/*chemically induced

Description: Undersea and Hyperbaric Medical Society, Inc. (<http://www.uhms.org>)

URI: [PMID: 636079](https://pubmed.ncbi.nlm.nih.gov/636079/)
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