

Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience

Allergy Pattern in the EEG

Penny S. Montgomery PhD
Published online: 08 Sep 2008.

To cite this article: Penny S. Montgomery PhD (2006) Allergy Pattern in the EEG, *Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience*, 10:1, 89-92

To link to this article: http://dx.doi.org/10.1300/J184v10n01_09

PLEASE SCROLL DOWN FOR ARTICLE

© International Society for Neurofeedback and Research (ISNR), all rights reserved. This article (the “Article”) may be accessed online from ISNR at no charge. The Article may be viewed online, stored in electronic or physical form, or archived for research, teaching, and private study purposes. The Article may be archived in public libraries or university libraries at the direction of said public library or university library. Any other reproduction of the Article for redistribution, sale, resale, loan, sublicensing, systematic supply, or other distribution, including both physical and electronic reproduction for such purposes, is expressly forbidden. Preparing or reproducing derivative works of this article is expressly forbidden. ISNR makes no representation or warranty as to the accuracy or completeness of any content in the Article. From 1995 to 2013 the *Journal of Neurotherapy* was the official publication of ISNR (www.isnr.org); on April 27, 2016 ISNR acquired the journal from Taylor & Francis Group, LLC. In 2014, ISNR established its official open-access journal *NeuroRegulation* (ISSN: 2373-0587; www.neuroregulation.org).

THIS OPEN-ACCESS CONTENT MADE POSSIBLE BY THESE GENEROUS SPONSORS

SWINGLE
CLINIC



SOUNDHEALTH
PRODUCTS INC.



Applied Neuroscience, Inc.

Seamless Integration of qEEG and EEG Biofeedback

neuroCare



BrainMaster Technologies, Inc.

From the decade of the brain into the new millenium

Allergy Pattern in the EEG

Penny S. Montgomery, PhD

ABSTRACT. This paper describes an EEG pattern the author has found to be associated with an allergic response. A consistent 22 Hz frequency pattern has now been observed in more than 100 cases in recordings made with a bipolar (sequential) montage at F4-T4. Case illustrations with examples of this EEG pattern are provided. doi:10.1300/J184v10n01_09

KEYWORDS. Allergy, brain, EEG, immune, brainwaves, hyperactivity

The electroencephalogram makes its most useful contribution to clinicians in the patterns observed in real time EEG recordings, either analog or all digital. Patterns in analog sleep study EEGs allow the classification of sleep stages 1, 2, 3, 4 and REM (Rechtschaffen & Kales, 1968). According to Kiloh, McComas, and Osselton (1972) patterns also characterize the presence of autism, dementia, Jacob Creutzfeld's Syndrome, Alzheimer's, Picks, Huntington's chorea, hydrocephalus, epilepsy, coma and anxiety. Gibbs and Gibbs (1952) likewise described patterns seen in analog EEGs consistent with clinical entities. Ayers and Montgomery (2004) have identified patterns correlated with clinical entities in recordings from the all digital real time EEG, invented by Ayers and on which she holds several patents. Undistorted EEG recording such as those only seen in real time EEGs reveal many patterns which allow for the correlation of specific patterns with specific clinical entities. About twenty patterns have been identified to date; among them a pattern found in allergy has been identified.

Using all digital real time EEG recordings in the allergy prone Kansas area it became evident that a specific pattern was present in the frontal lobe of individuals suffering from allergy symptoms. Investigation over several months and including more than 100 individuals repeatedly demonstrated this specific 22 Hz EEG activity present concomitant with allergy symptoms. It was further noticed that this fast, high voltage, 22 Hz activity was present in the frontal lobes of children with a diagnosis of hyperactivity and may be one of several causes of hyperactivity. Figure 1 illustrates the pattern at a frequency of 22 Hz.

The following series of EEGs illustrate changes in the prevalence of the allergy pattern when medication is used to reduce allergy symptoms. The EEGs were recorded in all instances with a bipolar (sequential) montage at F4-T4. This allergy pattern was not seen with a T4-C4 placement, but only when a frontal site was included. Thus, we know that it is a frontal lobe response.

The first example is the EEG of an eight-year-old boy diagnosed with ADHD. His

Penny S. Montgomery is in private practice.
Address correspondence to: Penny S. Montgomery, 10623 Bloomfield Street, North Hollywood, CA 91602
(E-mail: pennymont@aol.com).

allergies have been controlled with injections over the past year. The frontal lobe activity displayed in Figure 2 is on the day prior to receiving an injection.

In Figure 3 we can readily see the change in the EEG in the same boy the day following his injection. Note the decrease in 22 Hz activity.

Figure 4 displays the frontal EEG activity from the same boy several days after his injection. Note the return of the 22 Hz activity.

It can be seen from the series above that brain wave activity responds to the presence or absence of an allergic reaction. The immune system is challenged in an allergic reaction and the frontal lobe is involved in immune system function (Miller & Cummings, 1999). Thus, the

frontal lobe activation is seen during an immune challenge.

The following series demonstrates the effect of ingesting an allergic substance on frontal lobe activity. Figure 5 displays EEG from the frontal lobe of an 11-year-old boy with a diagnosis of ADHD. It contains several episodes of 22 Hz activity.

This boy's parents believed that he might be allergic to chocolate or sugar. Therefore, he was given a chocolate bar and Figure 6 displays his EEG two hours later. The dramatic frontal lobe change seen in Figure 6 was accompanied by hyperactive behavior.

As seen from these examples, the EEG activity associated with an allergic reaction is

FIGURE 1. The Allergy Pattern

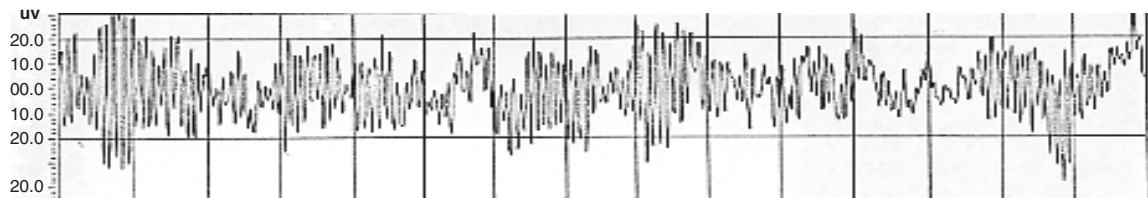


FIGURE 2. Frontal Lobe Activity Prior to an Injection for Allergies

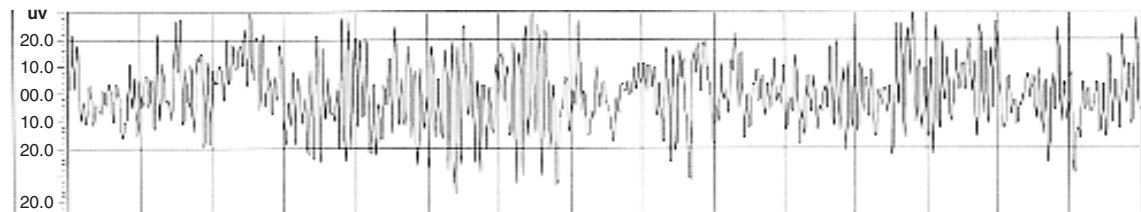


FIGURE 3. EEG Activity Following an Injection for Allergies

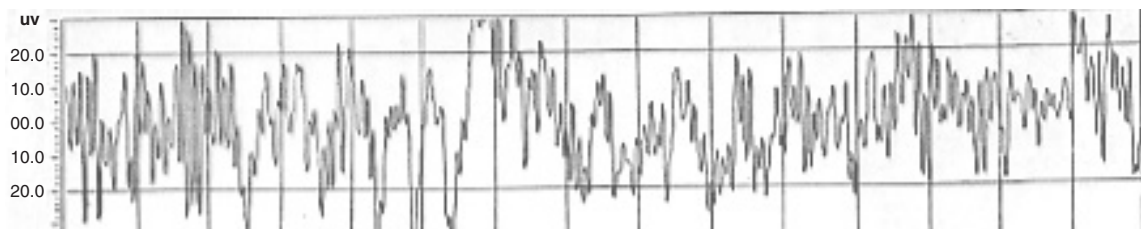


FIGURE 4. Return of the Allergy Pattern

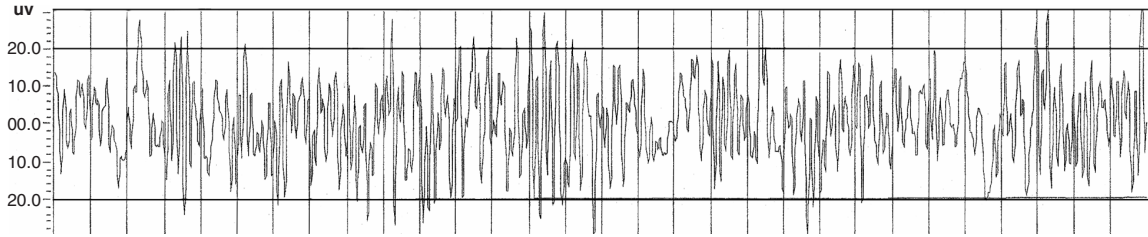


FIGURE 5. EEG Prior to Exposure to an Allergen

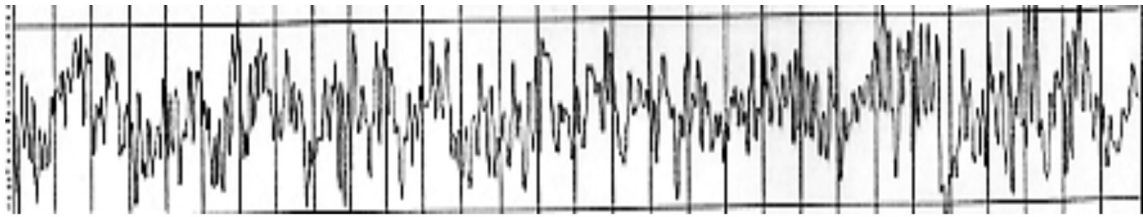
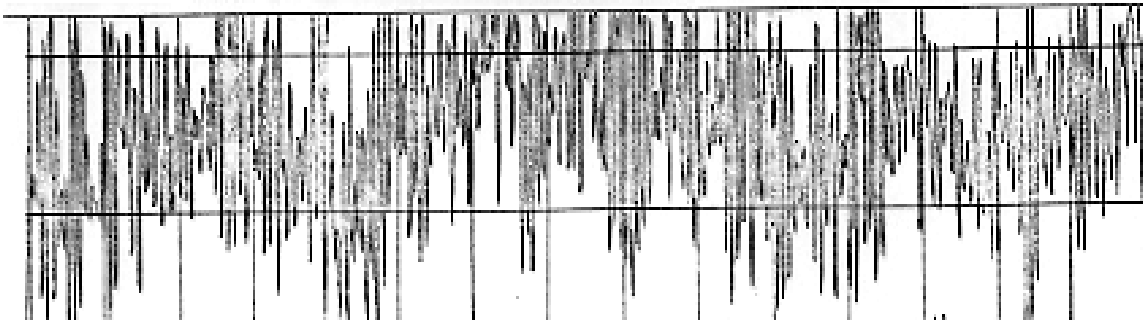


FIGURE 6. EEG Pattern Two Hours Following Exposure to an Allergen



unique. It is a frequency, not a rhythm, and it can easily be distinguished from muscle tension artifact. An EEG rhythm is described as spindle (Kiloh et al., 1972). It resembles a slinky on its side and the waveforms are equal in amplitude and occur as a specific frequency. A frequency, on the other hand, appears as a series of waves of the same frequency but at various amplitudes. The allergy pattern is 22 Hz and varies in amplitude but not in frequency. Thus it may not be called a rhythm, but

rather a frequency. Muscle tension, by contrast is seen as high voltage, fast activity and varies both in amplitude and frequency. This comparison distinguishes the allergy pattern from muscle tension.

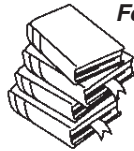
The ability to see patterns in the EEG is essential for precise clinical judgments. It should be emphasized that such patterns are only seen in real time EEG recordings. QEEGs or other Fast Fourier EEG recordings do not reveal such patterns due to destruction of primary EEG data.

REFERENCES

- Ayers, M. E., & Montgomery, P. S. (2004, August). *All digital real time EEG patterns*. Presentation at the Neuropathways Conference, Manhattan Beach, CA.
- Gibbs, E. L., & Gibbs, F. A. (1952) *Atlas of electroencephalography*. Vol. 2. Cambridge, MA: Addison-Wesley.
- Kiloh, L. G., McComas, A. J., & Osselton, J. W. (1972). *Clinical Electroencephalography* (3rd ed., pp. 179-189). Great Britain: Butterworth & Co.
- Miller, L. M., & Cummings, J. L. (Eds.). (1999). *The human frontal lobes* (pp. 406-407, 470). New York & London: The Guilford Press.
- Rechtschaffen, A., & Kales, A. (Eds.). (1968). *A manual of standardized terminology, techniques and scoring system for sleep stages of human subjects*. U.S. Department of Health, Education and Welfare, Public Health Services–National Institutes of Health, National Institute of Neurological Diseases and Stroke. Neurological Information Network: Bethesda, MD.

RECEIVED: 11/07/05
 REVISED: 01/20/06
 ACCEPTED: 02/15/06

doi:10.1300/J184v10n01_09



For FACULTY/PROFESSIONALS with journal subscription recommendation authority for their institutional library . . .

If you have read a reprint or photocopy of this article, would you like to make sure that your library also subscribes to this journal? If you have the authority to recommend subscriptions to your library, we will send you a free complete (print edition) sample copy for review with your librarian.

1. Fill out the form below and make sure that you type or write out clearly both the name of the journal and your own name and address. Or send your request via e-mail to getinfo@haworthpress.com including in the subject line "Sample Copy Request" and the title of this journal.
2. Make sure to include your name and complete postal mailing address as well as your institutional/agency library name in the text of your e-mail.

[Please note: we cannot mail specific journal samples, such as the issue in which a specific article appears. Sample issues are provided with the hope that you might review a possible subscription/e-subscription with your institution's librarian. There is no charge for an institution/campus-wide electronic subscription concurrent with the archival print edition subscription.]

YES! Please send me a complimentary sample of this journal:

(please write complete journal title here—do not leave blank)

I will show this journal to our institutional or agency library for a possible subscription.

Institution/Agency Library: _____

Name: _____

Institution: _____

Address: _____

City: _____ State: _____ Zip: _____

Return to: Sample Copy Department, The Haworth Press, Inc.,
 10 Alice Street, Binghamton, NY 13904-1580