



INTRODUCTION

The philosophy of our approach to EEG analysis

As neurologists in charge of the Epilepsy Unit at the University Hospital in Montpellier (France), our aim is to improve the knowledge of EEG analysis for junior collaborators, neurologists, neuropediatricians and EEG technologists. EEG analysis could be compared to a child who is growing up as, in both cases, maturing is a long process. For EEG analysis, the stages are as follows:

- stage I: nothing makes any sense,
- stage II: you think you understand but you see abnormalities everywhere,
- stage III: you gain more hindsight. You recognize a spike but wonder if it is actually significant,
- stage IV: you are finally able to form your own opinion, even if it is different from your teacher's. This last stage is the sign you have matured. You have acquired enough experience to have your own opinion and to discuss an EEG.

Although the valuable help of your teacher is undoubtedly a prerequisite to start out in EEG analysis, it is basically up to you to do the work. The more EEGs you interpret, the more questions you ask yourself, the more you will learn. When in doubt, having the curiosity to open a book or ask a colleague for his advice will greatly benefit your learning process.

When analyzing an EEG, you must ask yourself what the referring physician is expecting from the test, and how your analysis can help the patient. If I were the prescribing doctor and I received this clinical report, how would it be useful for me? The writing up of an EEG report corresponds to a formal and orderly process. In the first part, the recordings must be described (background activity, hyperventilation, intermittent photic stimulation, physiological sleep patterns, abnormalities...) then a conclusion must be given. Are the abnormalities significant? Is the pattern pathological? Your opinion must be clearly expressed, and therefore you must accept that you will sometimes be mistaken. It is also important to state that the EEG is normal whenever the case. Above all, avoid hastily jumping to conclusions or giving your opinion about patient management before seeing the patient or discussing the case with the prescribing doctor.

The EEG is a tool used to confirm clinical hypotheses. A patient should never be diagnosed as "epileptic" based merely on observation of spikes or similar abnormalities but in absence of any semiological evidence. In epileptology, it is preferable to claim the presence of too few rather than too many abnormalities. If the patient does actually have epilepsy, the clinical diagnosis will eventually make itself known. Indeed, the consequences of such a diagnosis for the patient are too serious to risk diagnosis of epilepsy due to misinterpretation. When in doubt, it is recommended to be cautious before attributing pathological significance to findings. Complementary recordings should be performed, including sleep recordings in particular. Needless to say, this critical attitude does not apply to all fields in neurology. For instance, encephalitis or acute focal dysfunction call for immediate intervention, which is why brain imaging has currently replaced EEGs as the firstline investigation in these emergency situations.

In the first volume of this collection, we will describe the normal awake and sleep EEGs, the activation procedures, the unusual rhythms, and the artifacts required to establish whether an activity is physiological or pathological. Pathological EEGs will be dealt with mainly in upcoming volumes. With this atlas, our aim is to provide a useful tool which we would have liked to have when we were learning how to analyze EEGs and when we started teaching EEG analysis ourselves. Each chapter begins with a review of the technical features and a description of the physiological EEG patterns. After that, these patterns are illustrated with full-size EEG plates. We hope this atlas will thus be useful for the electroencephalographer who is having trouble analyzing a tracing. We have intentionally left the original plates without any notes so that this book can be used for self-study. The comments on the plates can be used by the reader as a key to visual analysis.

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