

Facial Expression of Emotion in Human Frontal and Temporal Lobe Epileptic Seizures

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While there is evidence of an impaired perception of emotion in verbal and facial expression in epileptic patients with unilateral focal resection of frontal, temporal, or parieto-occipital cortex,¹ there is up to now a lack of research on the encoding aspects of facial expressions during seizure. In this study the video recordings of 146 seizures of 20 patients with temporal lobe epilepsy (12 females and 8 males) and 9 patients with frontal lobe epilepsy (2 females and 7 males) were analyzed using the Facial Action Coding System (FACS). Seizures were recorded in a standard hospital setting. Each video was paired with an EEG recording in order to ascertain the relationship between the clinical manifestations and the ictal discharge. The hypothesis was that, during the seizure, in addition to well-established facial expressions such as the “blank stare” during a “petit mal” absence with impaired consciousness, and the grimaces (unilateral or bilateral jerking and tonic contractions of the facial musculature), the facial displays can show a coherent pattern that is comparable to the facial expressions of emotions as they appear in normal subjects. Coherent patterns of facial expressions of emotions during the ictal event (see FIG. 1) can emerge as a result of the activa-

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FIGURE 1. Facial expressions of happiness (A) and fear (B), occurring during the seizure and ending with the ictal event itself. (F.A.C.S. by P.E. Ricci-Bitti & M. Costa, Department of Psychology, University of Bologna, Italy.)

tion of selective inborn motor patterns.² Further displays of emotional patterns during temporal lobe seizures are recognizable in the ictal laughing, (gelastic seizure), characterized by forced and unmotivated laughter; and the dacrytic seizure, characterized by forced and unmotivated crying.³ These data confirm a crucial role of the limbic system both in the recognition and expression of emotion.⁴

REFERENCES

1. KOLB, B. & L. TAYLOR. 1981. Affective behavior in patients with localized cortical excisions: role of lesion site and side. *Science* **214**: 89–91.
2. TASSINARI, C.A., E. GARDELLA, S. MELETTI & G. RUBBOLI. 2003. The neuroethological interpretation of motor behaviors in “nocturnal-hyperkinetic-frontal seizures”: emergence of “innate” motor behaviors. *In Frontal Seizures and Epilepsy in Children*. A. Beaumanoir *et al.*, Eds.: 43–48. John Libbey Eurotext. Montrouge, France.
3. MARCHINI, C., D. ROMITO, B. LUCCI & E. DEL ZOTTO. 1994. Fits of weeping as an unusual manifestation of reflex epilepsy induced by speaking: case report. *Acta Neurol. Scand.* **90**: 218–221.
4. MELETTI, S., F. BENUZZI, G. RUBBOLI, *et al.* 2003. Impaired facial emotion recognition in early-onset right mesial temporal lobe epilepsy. *Neurology* **60**(3): 426–431.