

A Glossary of Terms Used for PLEDs (Periodic Lateralized Epileptiform Discharges) and Related EEG Patterns

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ABSTRACT. *Since the term periodic lateralized epileptiform discharges (PLEDs) was first coined by Chatrian et al. in 1964, there has been an evolution of terms used to describe variants of this EEG pattern. This article is an attempt to collect and define various terms used to describe these patterns.*

KEY WORDS. *Periodic lateralized epileptiform discharges, PLEDs.*

INTRODUCTION

The occurrence of the periodic and quasi-periodic epileptiform discharges was noted by several authors (Alajouanine et al. 1955, Le Beau and Dondey 1959, Meyer and Portmoy 1959, Pagni et al 1960, Chatrian 1961, Barolin et al. 1962, and Fischer-Williams 1963), but the term PLEDs or periodic lateralized epileptiform discharges was first coined by Chatrian et al. in 1964. Since then, the terms used for PLEDs have evolved and many different terms are used to describe variants of this EEG pattern. We reviewed the literature and collected the following glossary of terms used to describe variants of PLEDs:

Pseudo-rhythmic recurrent sharp waves

The term previously used to describe periodic lateralized epileptiform discharges PLEDs (Chatrian 1961).

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PLEDs

Periodic epileptiform discharges that occur in a focal or lateralized manner over one hemisphere (Chatrjian et al. 1964, Schwartz et al. 1973, Erkuhvrawatr 1977, Young et al. 1988).

PRFD

Periodically recurring focal discharges (Hughes and Schlagenhauff 1965).

Cerebral bigeminy

Alternating ipsilateral periodic lateralized epileptiform discharges (Madison and Niedermeyer 1970, Cobb 1979, Aldrich and Pugh 1985, Bertolucci and Silva 1992). Two separate foci of periodic activity with alternating amplitudes and morphology are present over the same area or hemisphere.

PLPD

Pseudoperiodic lateralized paroxysmal discharges (Markand and Daly 1971). PLEDs in which the repetition rate is not precisely regular.

BIPLEDs

Bilateral, independent PLEDs (de la Paz and Brenner 1981, Brenner and Schaul 1990). PLEDs that occur independently between the cerebral hemispheres.

PSPA

Periodic sinusoid paroxysmal activity (Beaumanoir 1985, Beaumanoir et al. 1996). Bursts of sinusoid activity around 7–9 Hz, usually followed by a slow wave, lasting less than 500 ms, with a period less than 2 s. Mainly over the posterior head regions, associated with confusional state.

Chronic PLEDs

Persistent PLEDs over long periods of time (Westmoreland et al. 1986).

PEDIM

Periodic epileptiform discharges in the midline (Frere et al. 1989, Westmoreland et al. 1997). Periodic epileptiform discharges arising from the centro-parietal midline sagittal region.

Poly PLEDs

Periodic lateralized epileptiform discharges followed by afterdischarges occurring in clusters (Grand'Maison et al. 1991).

PLEDs Plus

PLEDs with associated rhythmical discharges (Reiher et al. 1991). They are more likely to be associated with clinical seizures.

PLEDs Proper

PLEDs with no associated rhythmical discharges (Reiher et al. 1991).

Sequential PLEDs

PLEDs that occur sequentially between consecutive seizures (Grand'Maison et al. 1991).

Trifocal PLEDs

PLEDs that occur in three independent sites (Reeves and Thompson 1993).

TRI-PLEDs:

Trifocal independent periodic lateralized epileptiform discharges (Reeves and Thompson 1993, Hughes et al. 1998). Periodic discharges occurring independently in three different areas.

IpsiIPs/Ipsi PLEDs

Ipsilateral independent PLEDs (Silbert et al. 1996). Periodic discharges arising from ipsilateral independent foci.

Multifocal PLEDs

PLEDs that occur in at least three independent sites and involve both hemispheres (Hughes et al. 1998, Lawn et al. 2000).

Unpublished terms used in personal communications of the Mayo Clinic staff: (Sharbrough FW, Westmoreland BF, and Klass DW)

Mono PLEDs/ Simple PLEDs/ Monomorphic PLEDs

Monophasic PLEDs that are simple in configuration and similar in morphology whenever they occur.

Diplo PLEDs

PLEDs that are diphasic in configuration.

Pleomorphic PLEDs/ Polyphasic PLEDs/ Complex PLEDs

PLEDs with complex and varying morphology of the waveforms. May include PLEDs Plus.

Quasiperiodic PLEDs

PLEDs that are not fully periodic in occurrence.

Intermittent PLEDs

Brief runs of PLEDs occurring in an intermittent and non-continuous fashion. This is usually associated with resolving PLEDs, but also can occur with evolving PLEDs.

Resolving PLEDs

In sequential recordings, when PLEDs are not persistent and occur only in short segments of the record.

Evolving PLEDs

In sequential recordings or in the course of a recording, the changes of PLEDs in various stages of acuteness. Evolution of PLEDs from being associated with

electrographic seizures, into PLEDs Plus and then PLEDs Proper. The evolving PLEDs are usually initially intermittent and then become more continuous.

Recurrent PLEDs

PLEDs, which after resolution recur at a later stage of the illness.

PLIDDs

Periodic long-interval, diffuse discharges, typically seen in subacute sclerosing panencephalitis (SSPE).

PSIDDs

Periodic short-interval, diffuse discharges, typically seen in Creutzfeldt-Jakob disease (CJD).

REFERENCES

- Alajouanine TH, Lecasble R, Remond A. Elements graphiques paroxystiques lents de survenue periodique. Correlations electrocliniques. *Rev Neurol* 1955; 93:477-78.
- Aldrich MS, Pugh JE. Cerebral bigeminy: alternating periodic epileptiform discharges. *Electroenceph Clin Neurophysiol* 1985; 61:23-25.
- Barolin C, Scherzer E, Naquet R, Gastaut H. Etude electroniques des "etats de mal" epileptiques survenant chez les apopleptiques. *Rev Neurol* 1962; 107:242-43.
- Beaumanoir A, Andre-Obadia N, Nahory A, Zerbi D. Special types of periodic lateralized epileptiform discharges associated with confusional state in cerebral circulation insufficiency. *Electroenceph Clin Neurophysiol* 1996; 99:287-92.
- Beaumanoir AR. L'EEG dans les accidents vasculaires cerebraux. In: Beaumanoir AR, and Hausler R, editors. Explorations fonctionnelles electrophysiologiques du systeme nerveux. Geneve: Med. Et Hygiene; 1985. p. 98-111.
- Bertolucci PH, Silva AB. Alternating periodic lateralized epileptiform discharges (cerebral bigeminy). *Clin Electroenceph* 1992; 23:177-79.
- Brenner RP, Schaul N. Periodic EEG patterns: classification, clinical correlation, and pathophysiology. *J Clin Neurophysiol* 1990; 7:249-67.
- Chatrian GE, Shaw C-M, Leffman H. The significance of periodic lateralized epileptiform discharges in EEG: an electrographic, clinical and pathological study. *Electroenceph Clin Neurophysiol* 1964; 17:177-93.
- Chatrian GE. An EEG pattern: Pseudo-rhythmic recurrent sharp waves. Its relationships to local cerebral anoxia and hypoxia. *Electroenceph Clin Neurophysiol* 1961; 13:144.
- Cobb WA. Evidence on the periodic mechanism in herpes simplex encephalitis. *Electroenceph Clin Neurophysiol* 1979; 46:345-50.
- de la Paz D, Brenner RP. Bilateral independent periodic lateralized epileptiform discharges: clinical significance. *Arch Neurol* 1981; 38:713-15.
- Erkulvrawatr S. Occurrence, evolution and prognosis of periodic lateralized epileptiform discharges in EEG. *Clin Electroencephalogr* 1977; 8:89-99.
- Fischer-Williams M. Burst-suppression activity as an indication of undercut cortex. *Electroencephalogr Clin Neurophysiol* 1963; 15:723-24.

- Frere RC, Westmoreland BF, Klass DW. Periodic epileptiform discharges in the midline [abstract]. *Epilepsia* 1989; 30:665.
- Grand'Maison F, Reiher J, Leduc CP. Retrospective inventory of EEG abnormalities in partial status epilepticus. *Electroencephalogr Clin Neurophysiol* 1991; 79:264-70.
- Hughes JR, Schlagenauff RE. The periodically recurring focal discharge. *Epilepsia* 1965; 6:156-66.
- Hughes JR, Taber J, Uppal H. TRI-PLEDs: a case report. *Clin Electroencephalogr* 1998; 29:106-8.
- Lawn ND, Westmoreland BF, Sharbrough FW. Multifocal periodic lateralized discharges (PLEDs): EEG features and clinical correlations. *Clin Neurophysiol* 2000; 111:2125-29.
- Le Beau J, Dondey M. Importance diagnostique de certaines activites electroencephalographiques lateralisees, periodiques ou a tendance periodique au cours des abcès du cerveau. *Electroencephalogr Clin Neurophysiol* 1959; 11:43-58.
- Madison D, Niedermeyer E. Epileptic seizures resulting from acute cerebral anoxia. *J Neuro Neurosurg Psychiat* 1970; 33:381-86.
- Markand ON, Daly DD. Pseudoperiodic lateralized paroxysmal discharges in electroencephalogram. *Neurology* 1971; 21:975-81.
- Meyer JS, Portnoy HD. Post-epileptic paralysis. A clinical and experimental study. *Brain* 1959; 82:162-85.
- Pagni CA, Vitale A, eCassinari V. Su alcuni casi di tracciati caratterizzati da elementi parassistici a ricorrenza ritmica periodica o pseudoperiodica. *Riv Neurol* 1960; 30:580-91.
- Reeves RR, Thompson SW. Trifocal independent periodic lateralized epileptiform discharges. *Clin Electroencephalogr* 1993; 24:114-17.
- Reiher J, Rivest J, Grand'Maison F, Leduc CP. Periodic lateralized epileptiform discharges with transitional rhythmic discharges: association with seizures. *Electroencephalogr Clin Neurophysiol* 1991; 78:12-17.
- Schwartz MS, Prior PF, Scott DF. The occurrence and evolution in the EEG of a lateralized periodic phenomenon. *Brain* 1973; 96:613-22.
- Silbert PL, Radhakrishnan K, Sharbrough FW, Klass DW. Ipsilateral independent periodic lateralized epileptiform discharges. *Electroencephalogr Clin Neurophysiol* 1996; 98:223-26.
- Westmoreland BF, Frere RC, Klass DW. Periodic epileptiform discharges in the midline. *J Clin Neurophysiol* 1997; 14:495-98.
- Westmoreland BF, Klass DW, Sharbrough FW. Chronic periodic lateralized epileptiform discharges. *Arch Neurol* 1986; 43:494-96.
- Young GB, Goodenough P, Jacono V, Schieven JR. Periodic lateralized epileptiform discharges (PLEDs): electrographic and clinical features. *Am J EEG Technol* 1988; 28:1-13.