

Identification and Classification of Seizures

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‘Tis very like: he hath
the falling sickness.

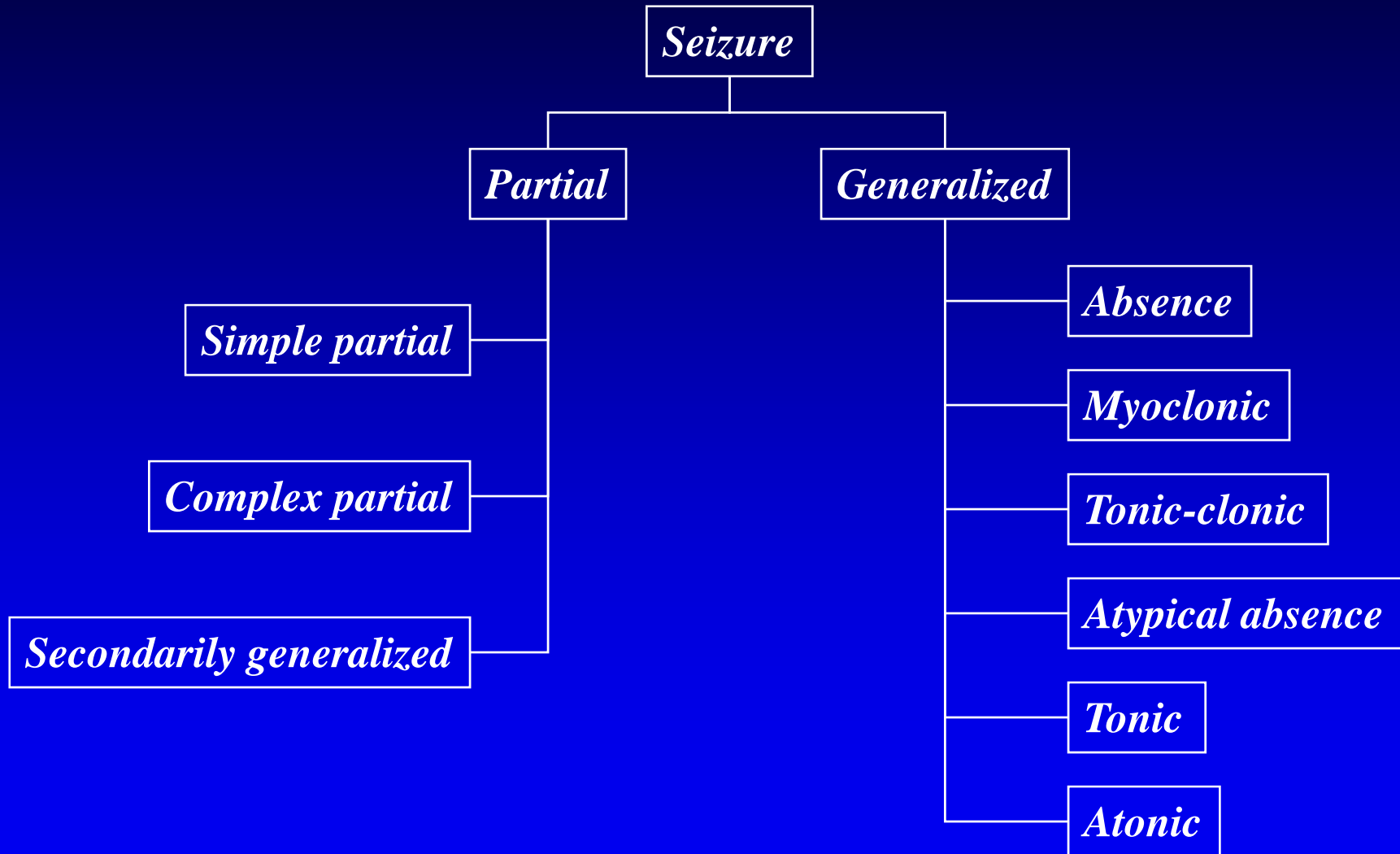
-Brutus

William Shakespeare, Julius Caesar, Act 1, Scene 2

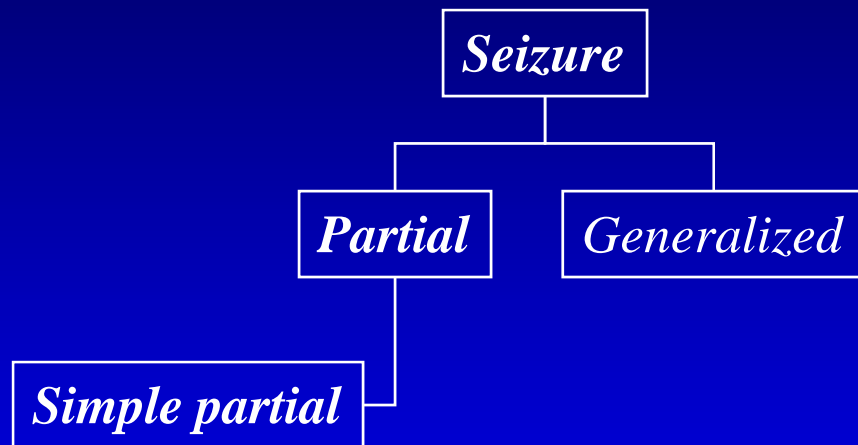
Seizure versus Epilepsy

- Seizure: brief, uncontrolled discharge of the nerve cells of the brain
 - Incidence: approximately 80/100,000 per year
 - Occurs in 8-10% of people in their lifetime (1/3 febrile)
- Epilepsy: a tendency toward recurrent, unprovoked seizures
 - Incidence: approximately 45/100,000 per year
 - Occurs in 3-4% of people in their lifetime
 - About 1 in 200 people have epilepsy

ILAE Classification of Seizures

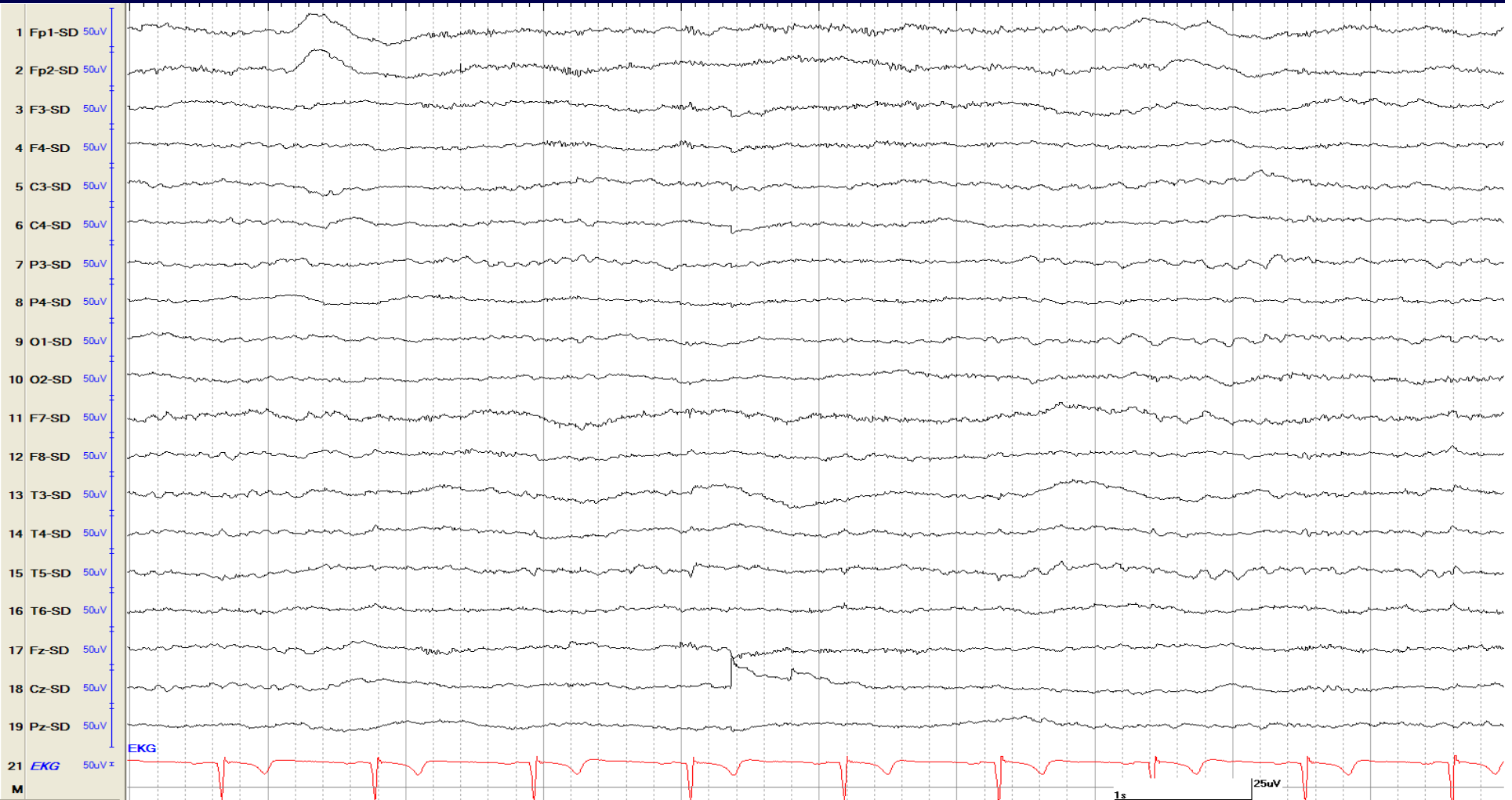


ILAE Classification of Seizures: SPS



- Clinical symptoms
 - No impairment of awareness
 - Somatosensory or special sensory
 - Motor
 - Autonomic
 - Psychic or experiential
- Electrographic
 - 40-50% chance of electrographic change

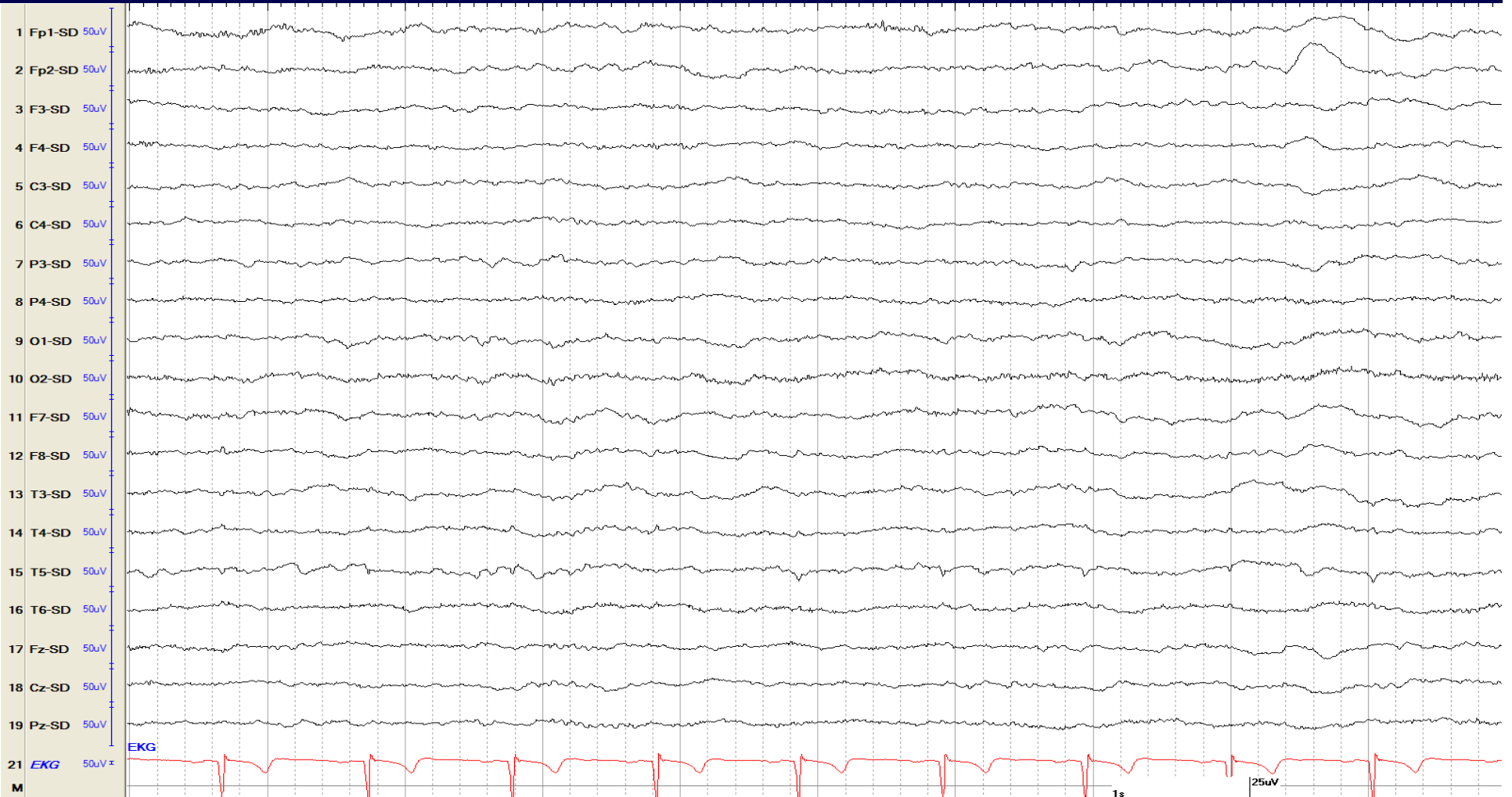
Special Sensory SPS, p1



Burdette

T.C.- 1.0 sec
H.F.F. - 70 Hz

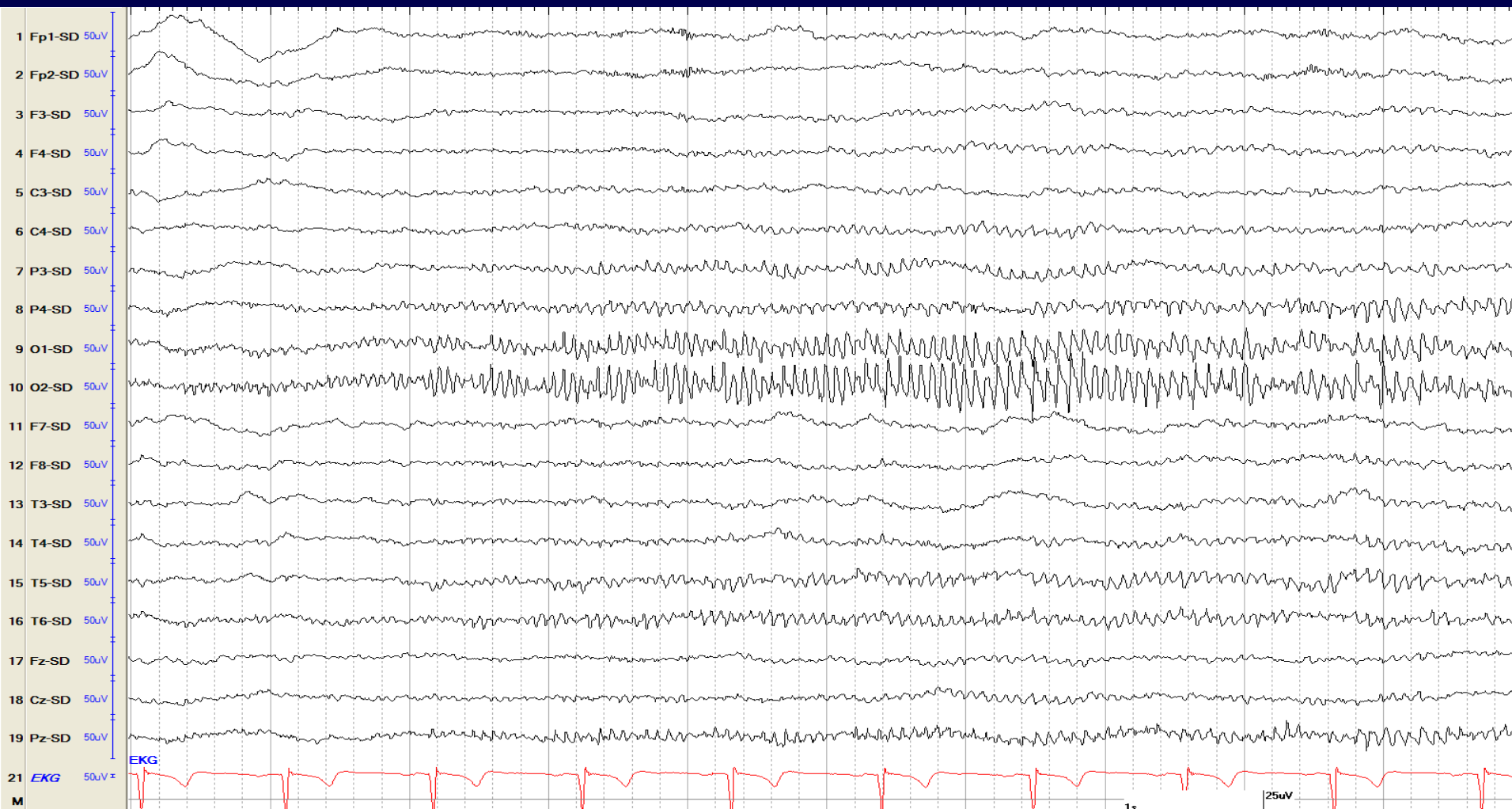
Special Sensory SPS, p2



Burdette

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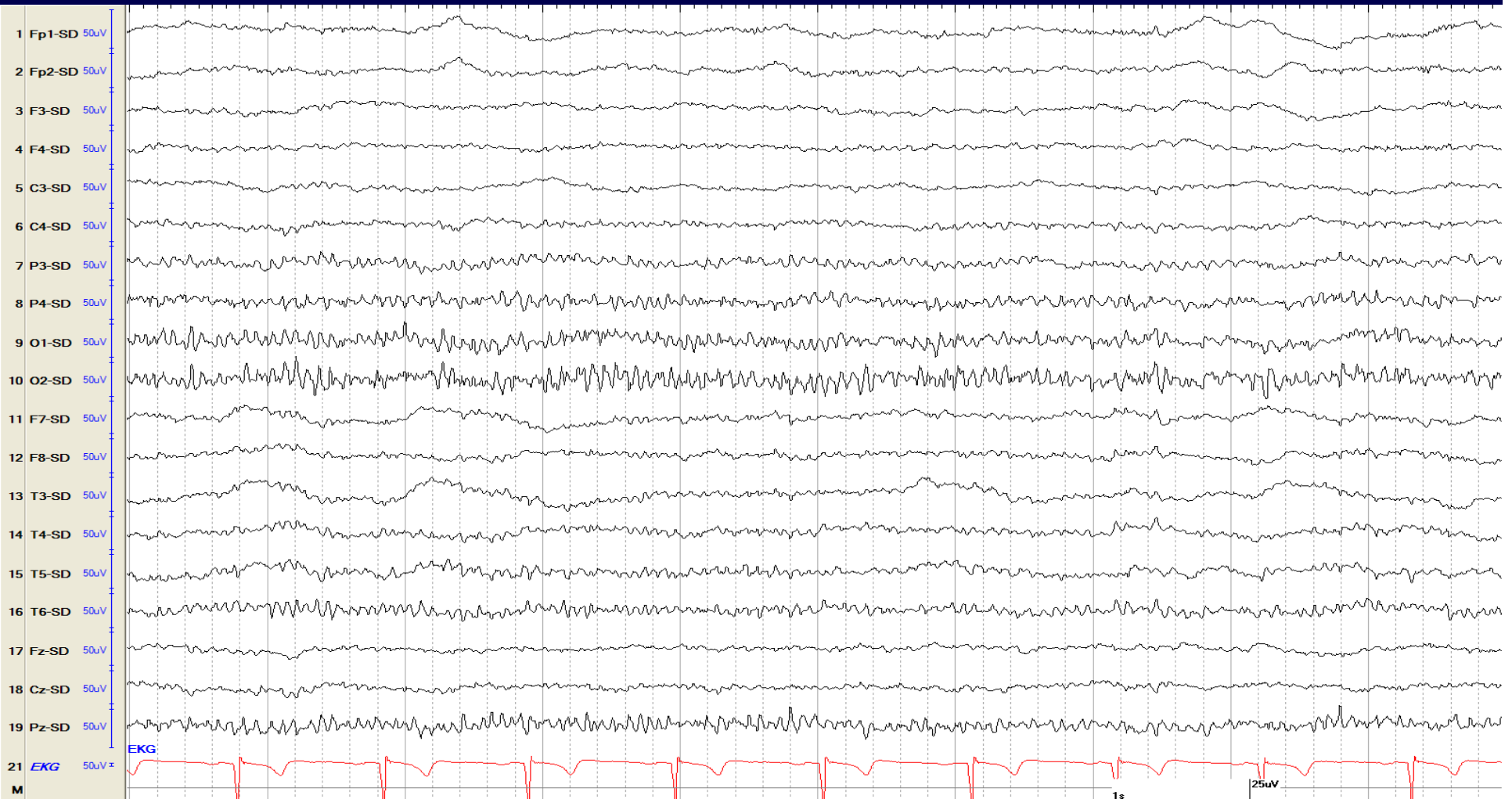
Special Sensory SPS, p3



Burdette

T.C.- 1.0 sec
H.F.F. - 70 Hz

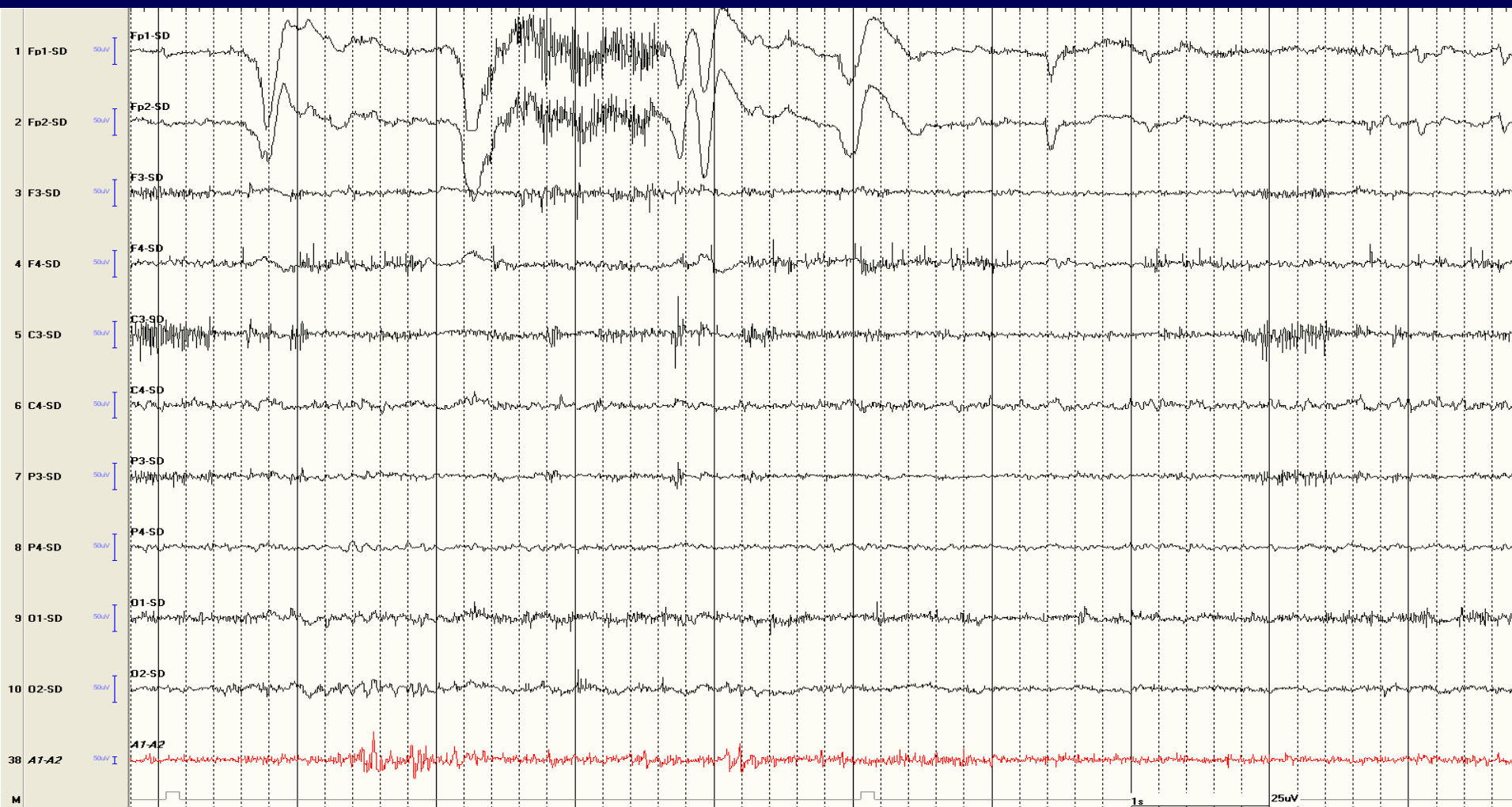
Special Sensory SPS, p4



Burdette

T.C. - 1.0 sec
H.F.F. - 70 Hz

Motoric SPS with Fisting/Posturing, p1



Burdette

T.C.- 0.1 sec
H.F.F. - 70 Hz

Motoric SPS with Fisting/Posturing, p2



Burdette

T.C.- 0.1 sec
H.F.F. - 70 Hz

Motoric SPS with Fisting/Posturing, p3



Burdette

T.C. - 0.1 sec
H.F.F. - 70 Hz

Motoric SPS with Fisting/Posturing, p4



Burdette

T.C.- 0.1 sec
H.F.F. - 70 Hz

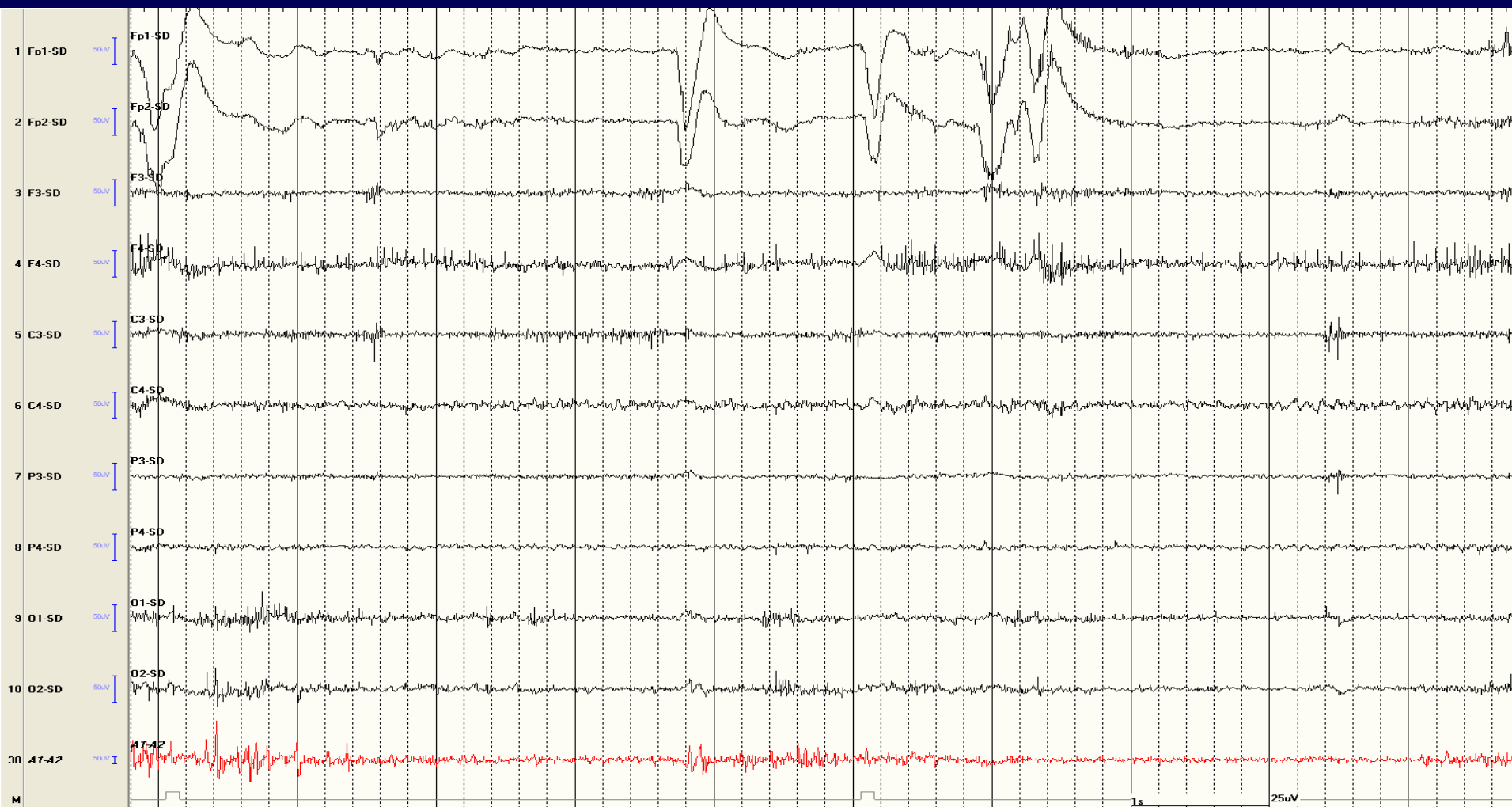
Motoric SPS with Fisting/Posturing, p5



Burdette

T.C.- 0.1 sec
H.F.F. - 70 Hz

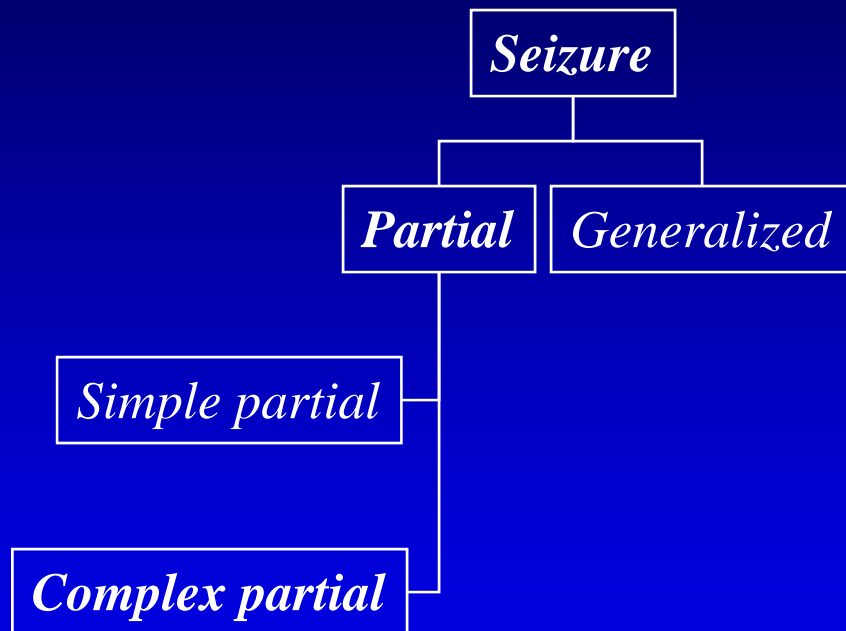
Motoric SPS with Fisting/Posturing, p6



Burdette

T.C. - 0.1 sec
H.F.F. - 70 Hz

ILAE Classification of Seizures: CPS

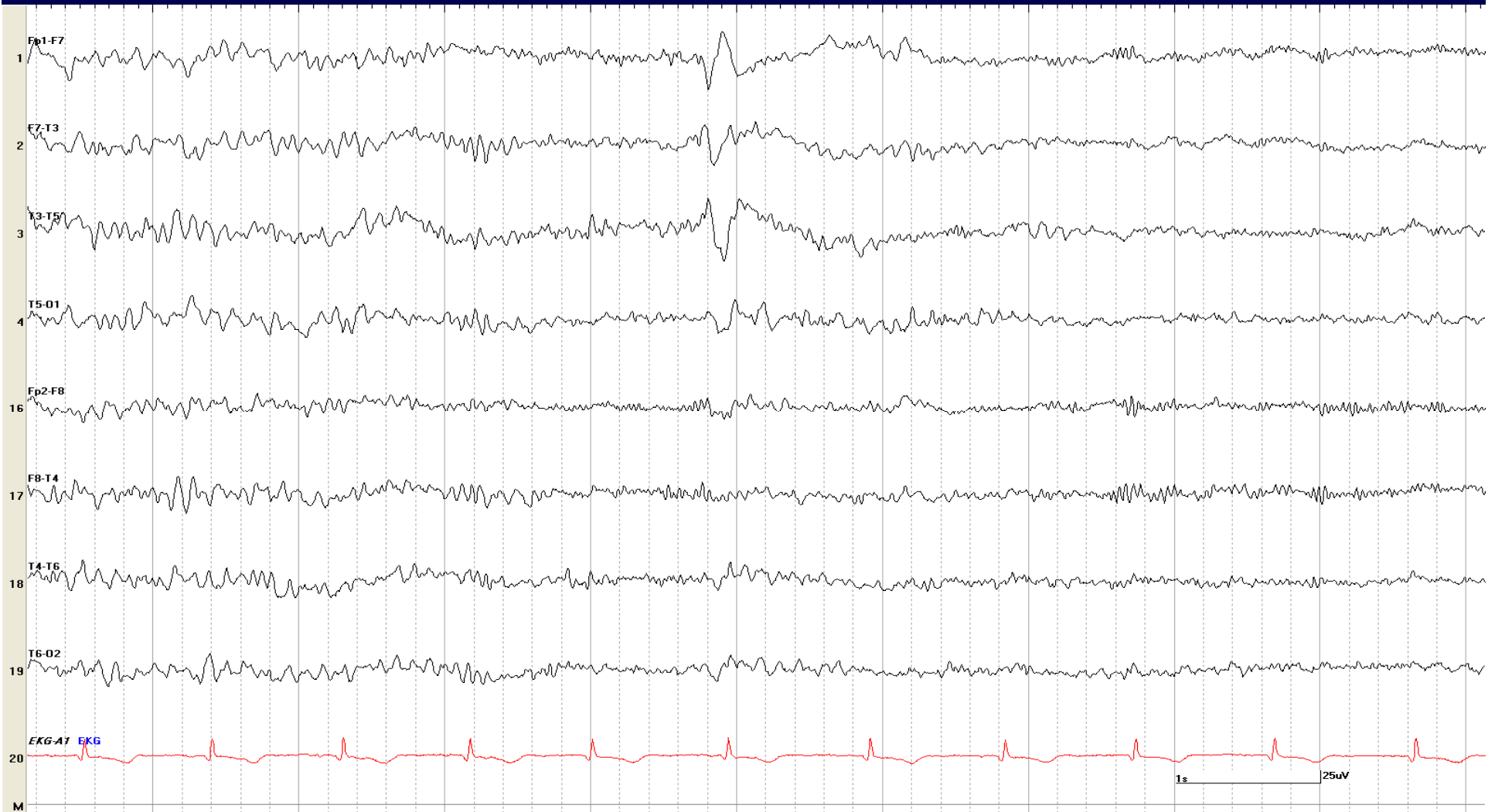


- ♦ Impaired consciousness
- ♦ Clinical manifestations vary with site of origin and degree of spread
 - Presence and type of aura
 - Automatism
 - Other motor activity
- ♦ Duration typically < 2 minutes
- ♦ Often post-ictal confusion

Partial (Localization-related) Epilepsy

- Two broad categories from the standpoint of epilepsy surgery:
 - Temporal
 - Greatest likelihood of resection freedom from seizures
 - Extratemporal
 - Lower likelihood of post-resection freedom from seizures

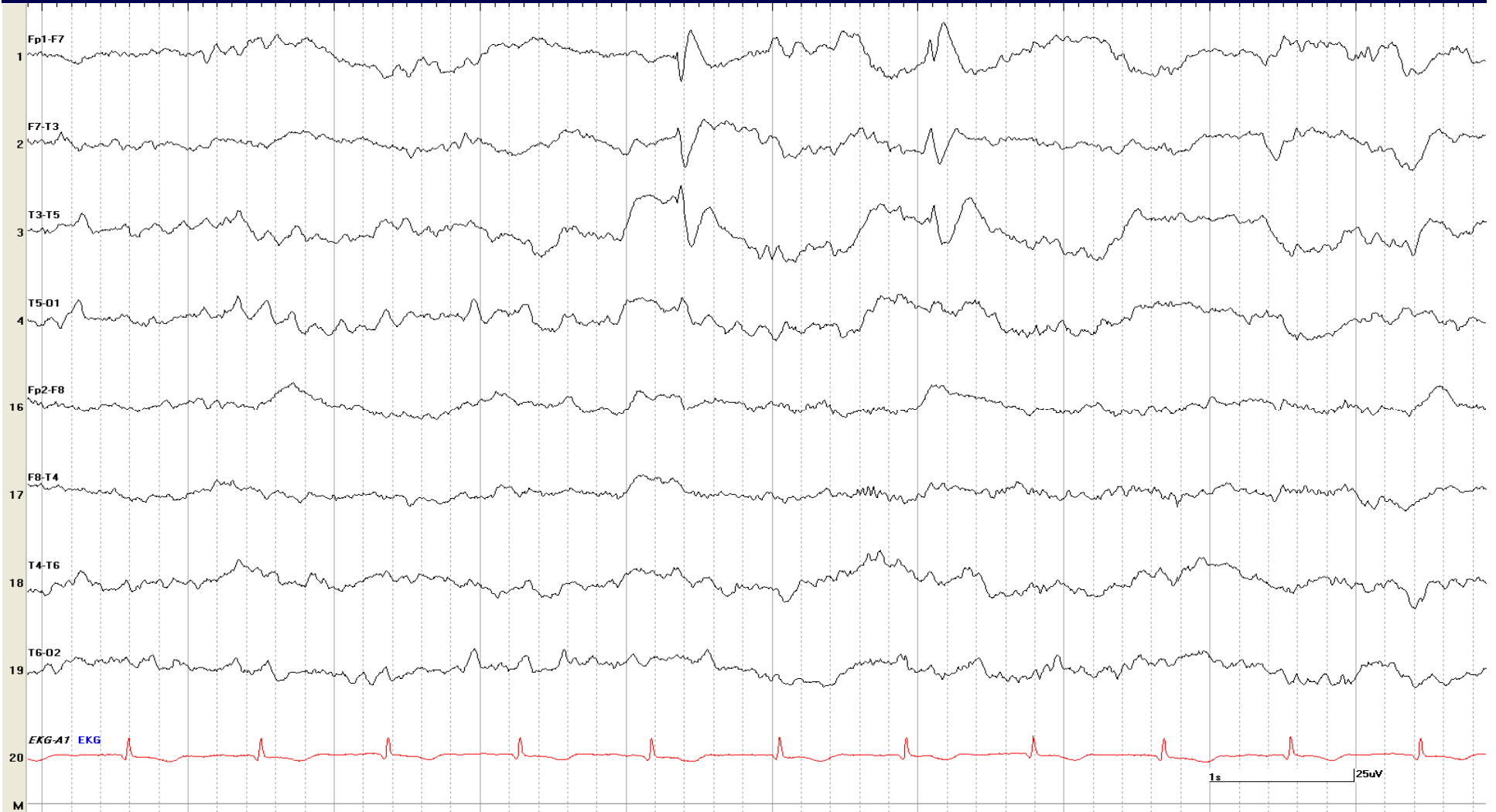
Interictal Discharges: Sharp-slow



Burdette

T.C. – 0.6 sec
HFF – 70 Hz

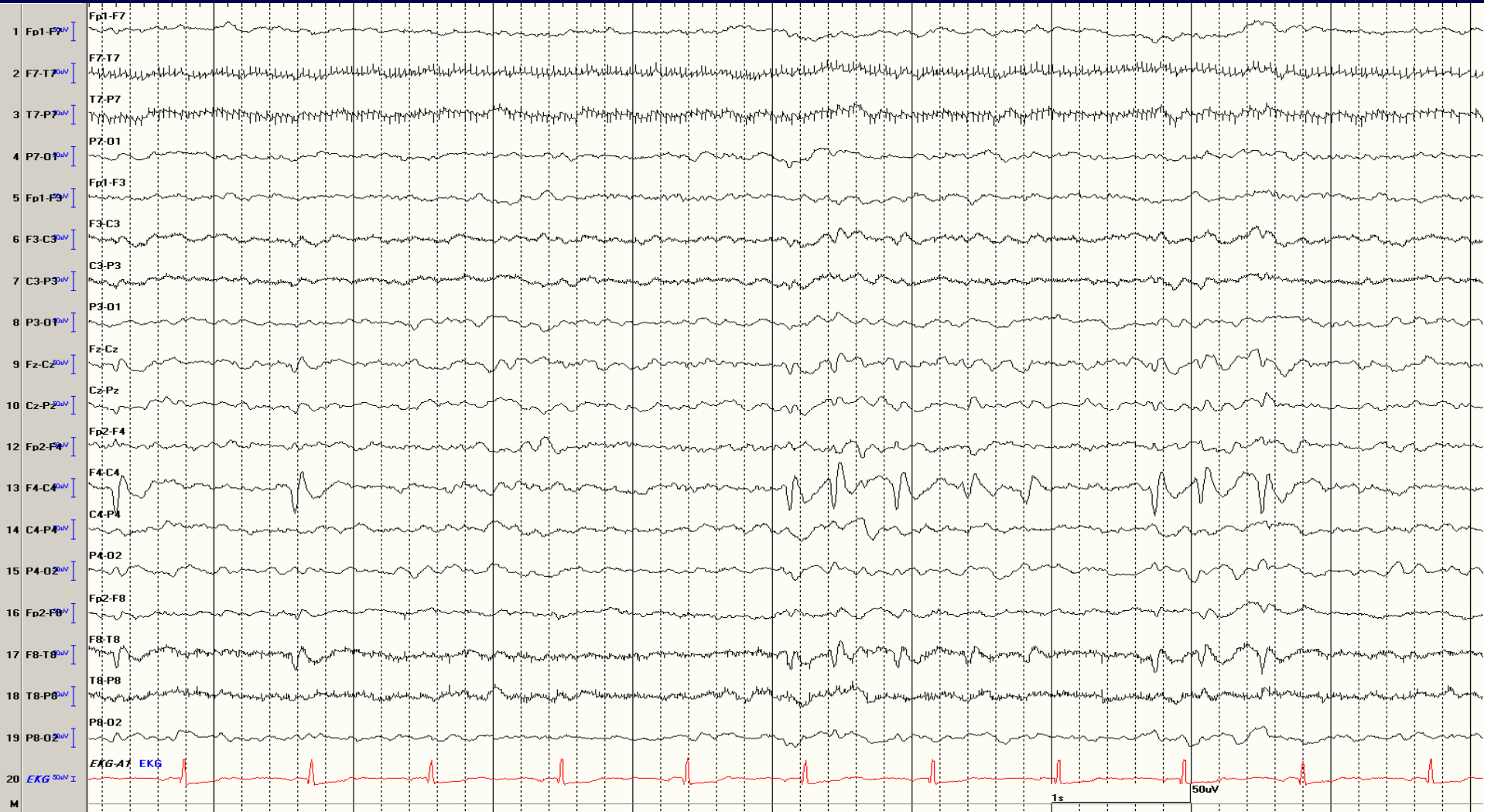
Interictal Discharges: Spike-wave



Burdette

T.C. – 0.6 sec
HFF – 70 Hz

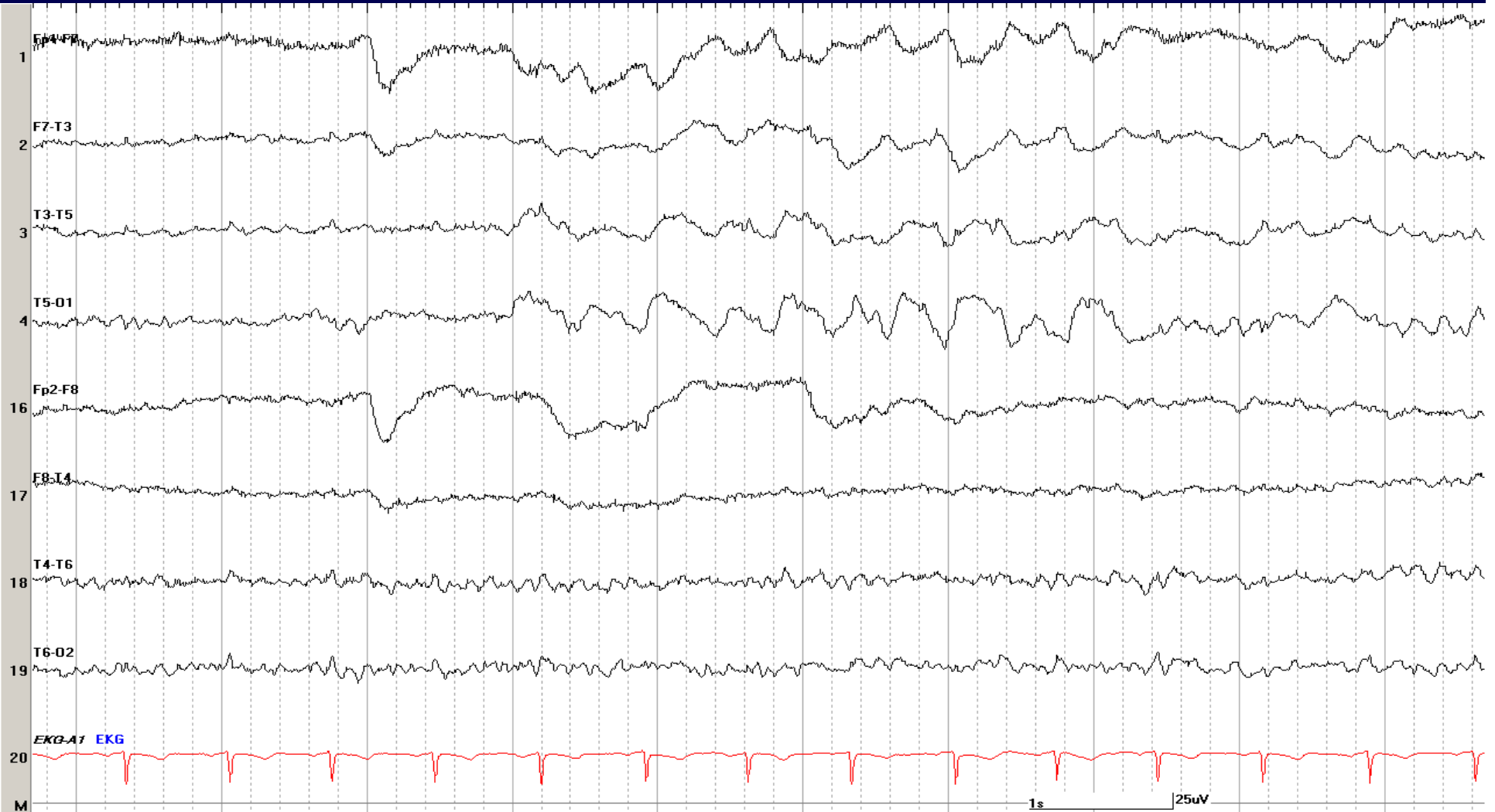
Interictal Discharges: BRE



Burdette

T.C. – 0.1 s
H.F.F. – 70 Hz

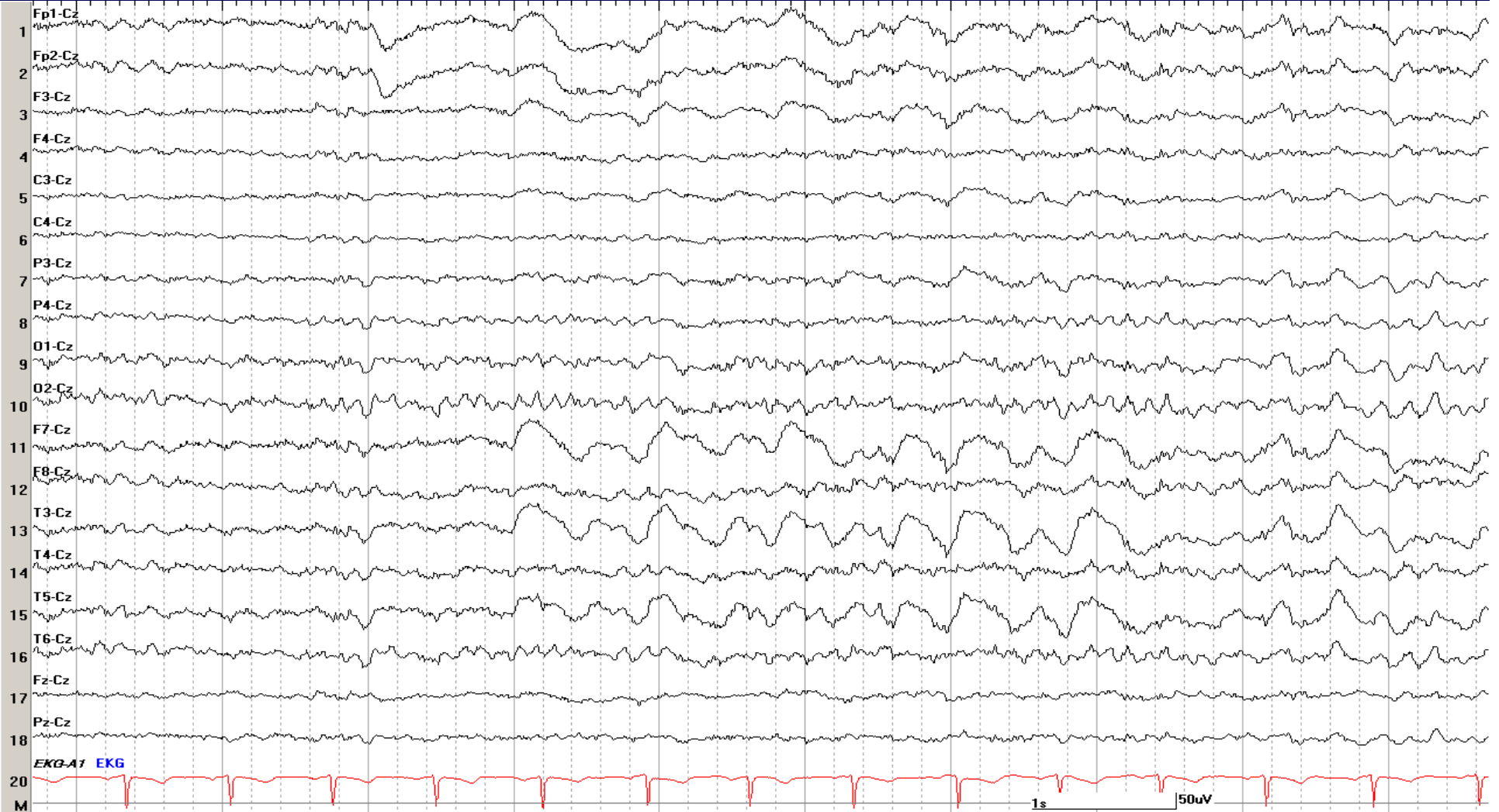
Interictal Discharges: TIRDA



Burdette

T.C. – 1.0 sec
H.F.F. – 70 Hz

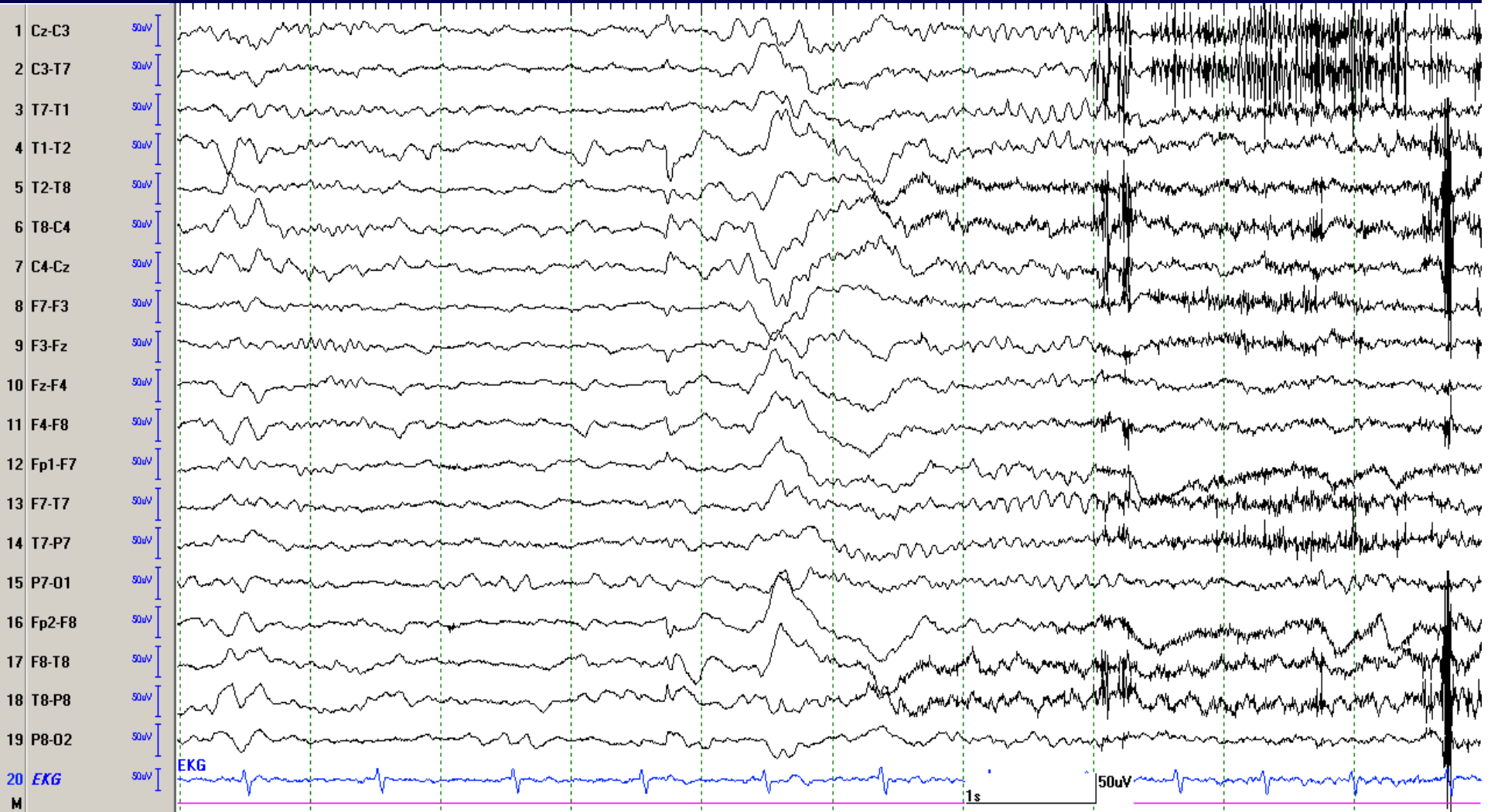
Interictal Discharges: TIRDA



Burdette

T.C. – 1.0 sec
H.F.F. – 70 Hz

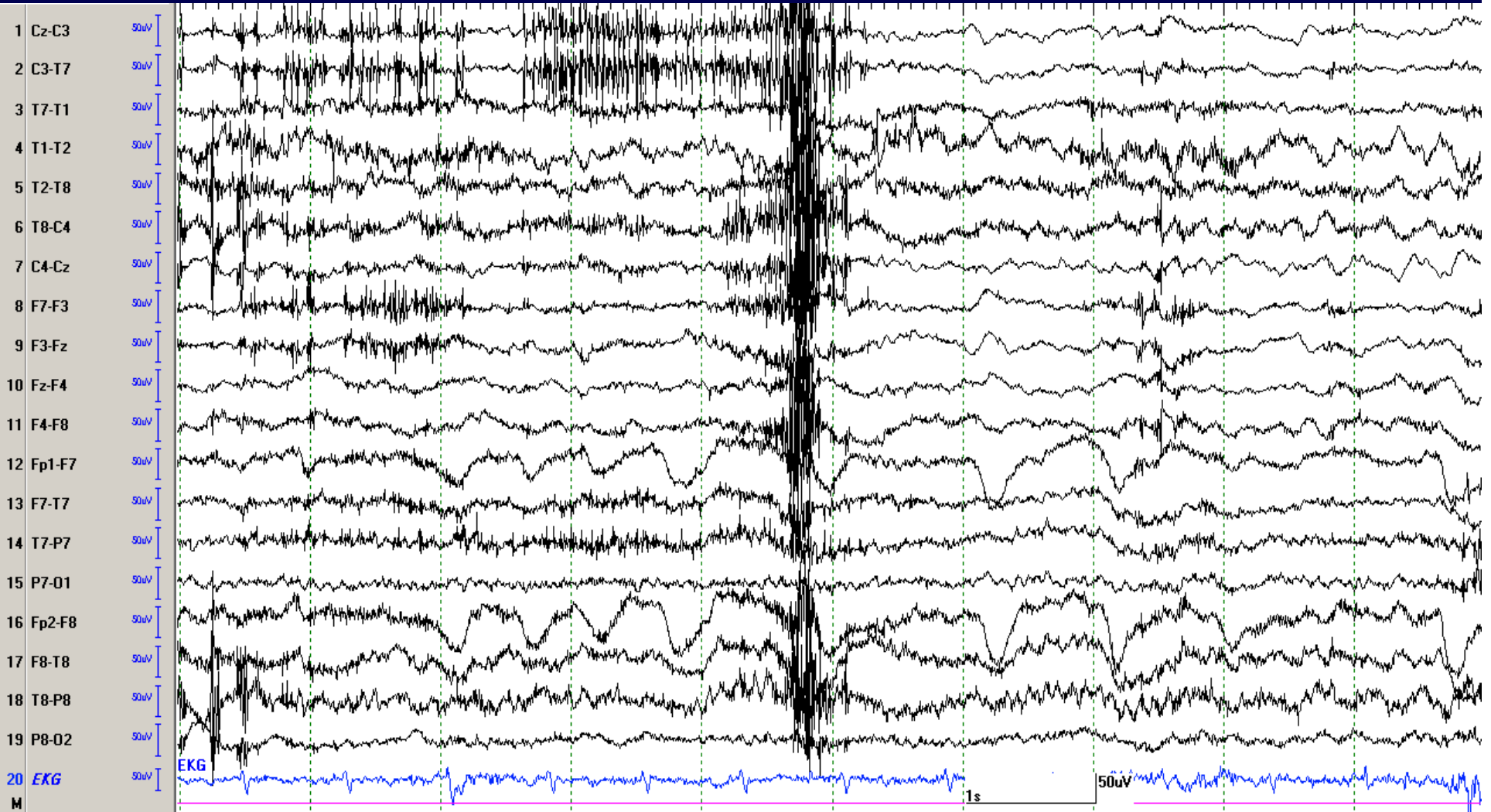
Temporal Lobe CPS, p1



Burdette

TC – 0.3 s
HFF – 70 Hz

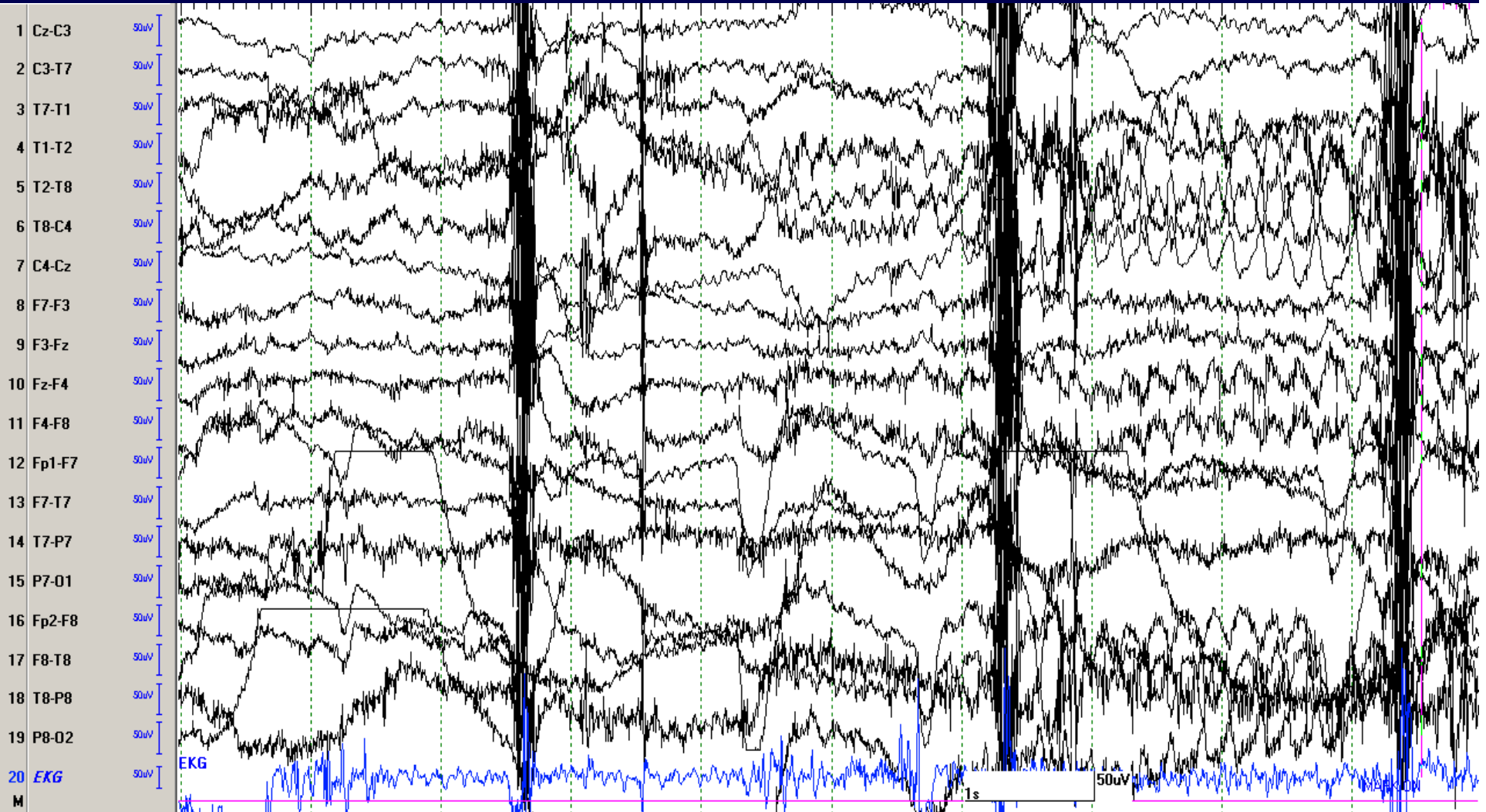
Temporal Lobe CPS, p2



Burdette

TC - 0.3 s
HFF - 70 Hz

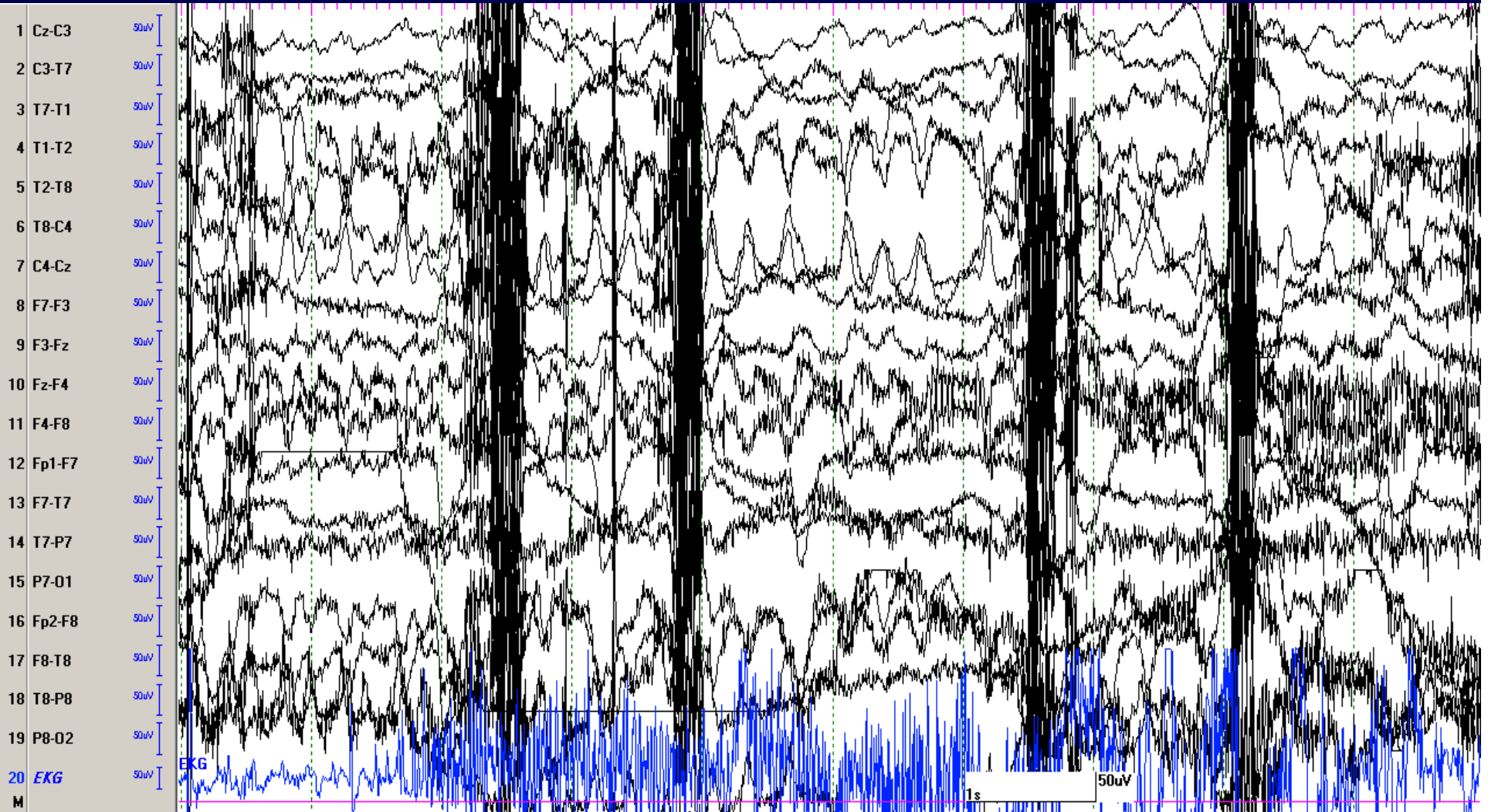
Temporal Lobe CPS, p3



Burdette

TC - 0.3 s
HFF - 70 Hz

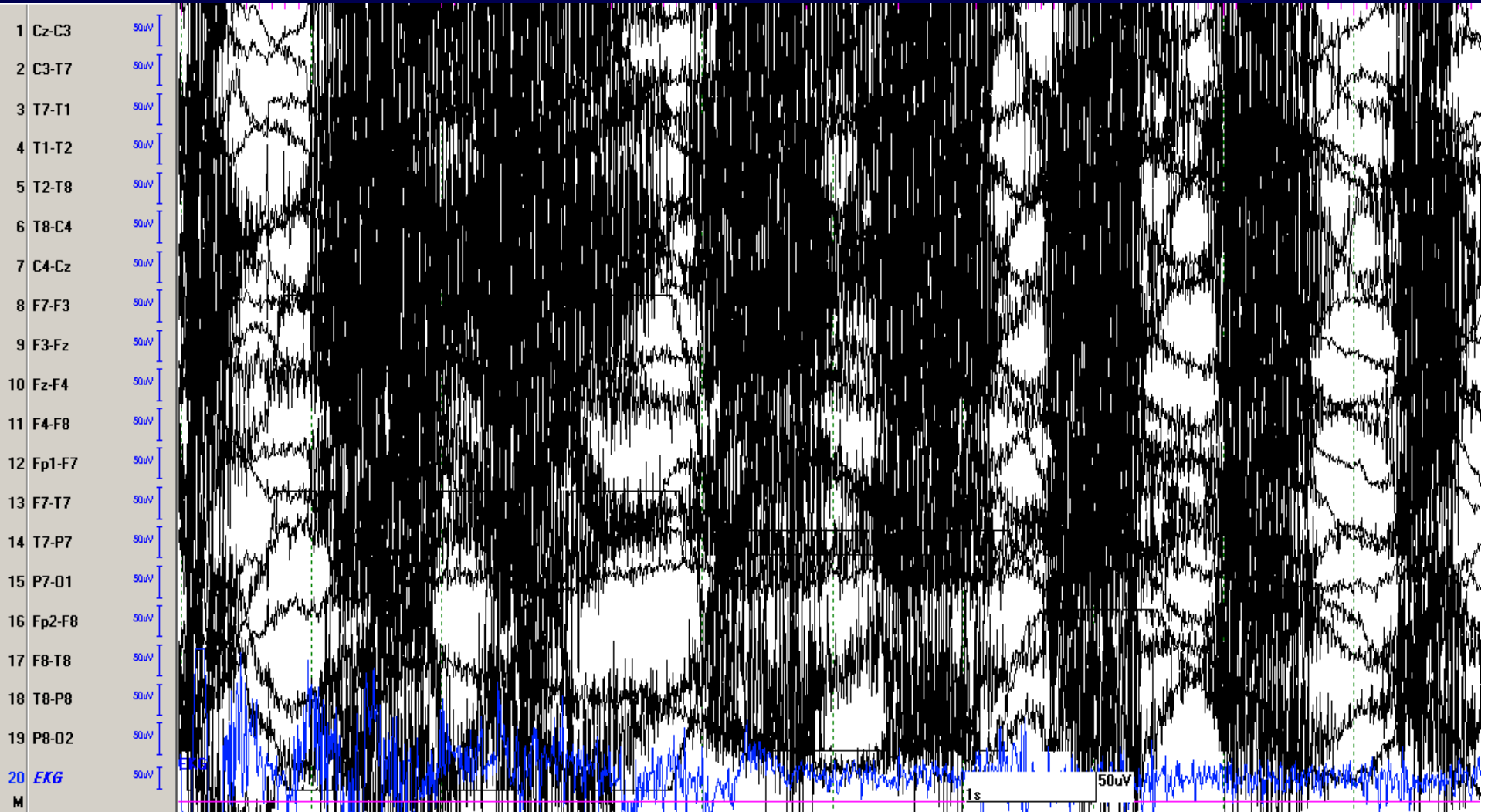
Temporal Lobe CPS, p4



Burdette

TC - 0.3 s
HFF - 70 Hz

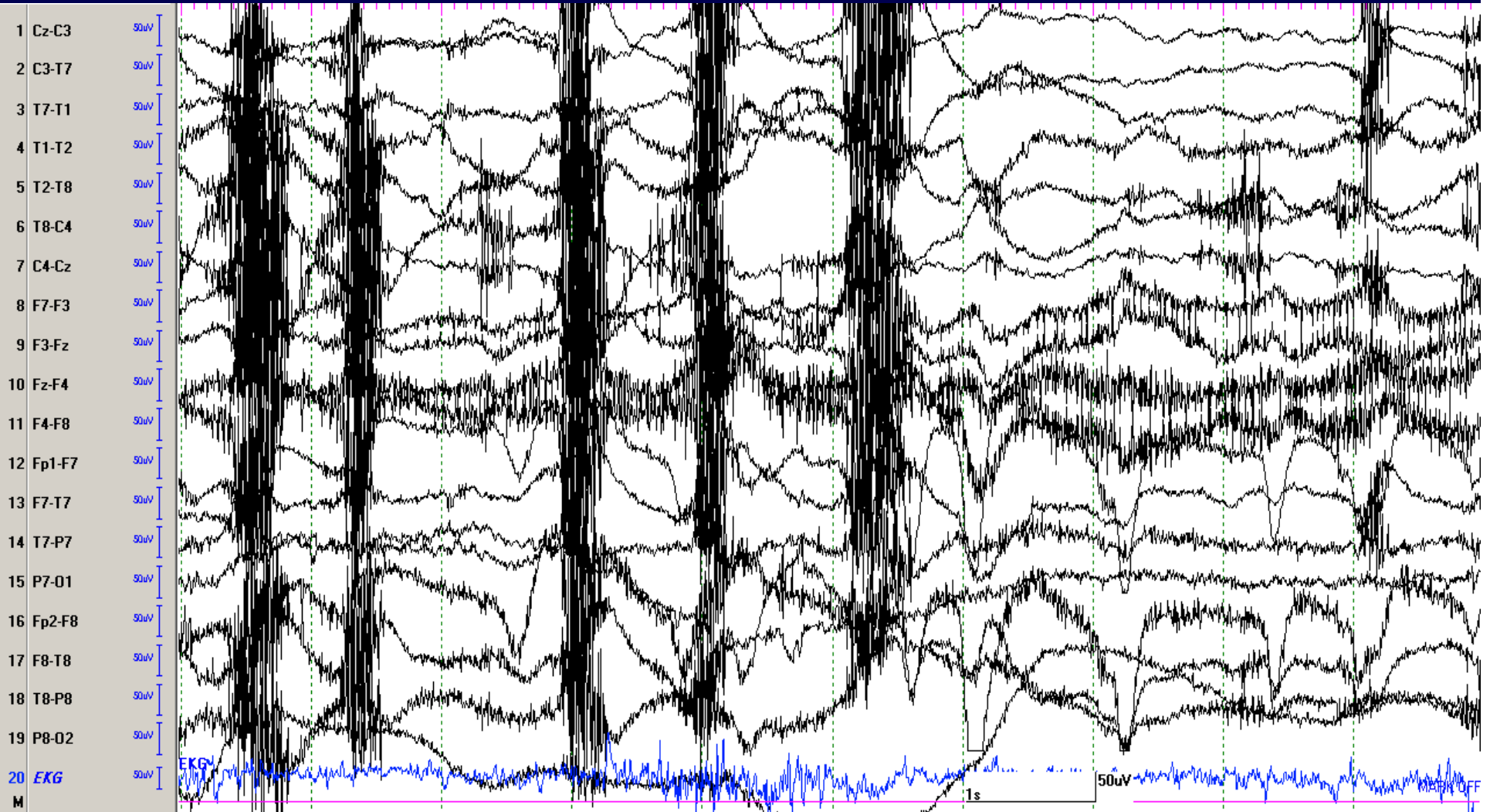
Temporal Lobe CPS, p5



Burdette

TC – 0.3 s
HFF – 70 Hz

Temporal Lobe CPS, p6



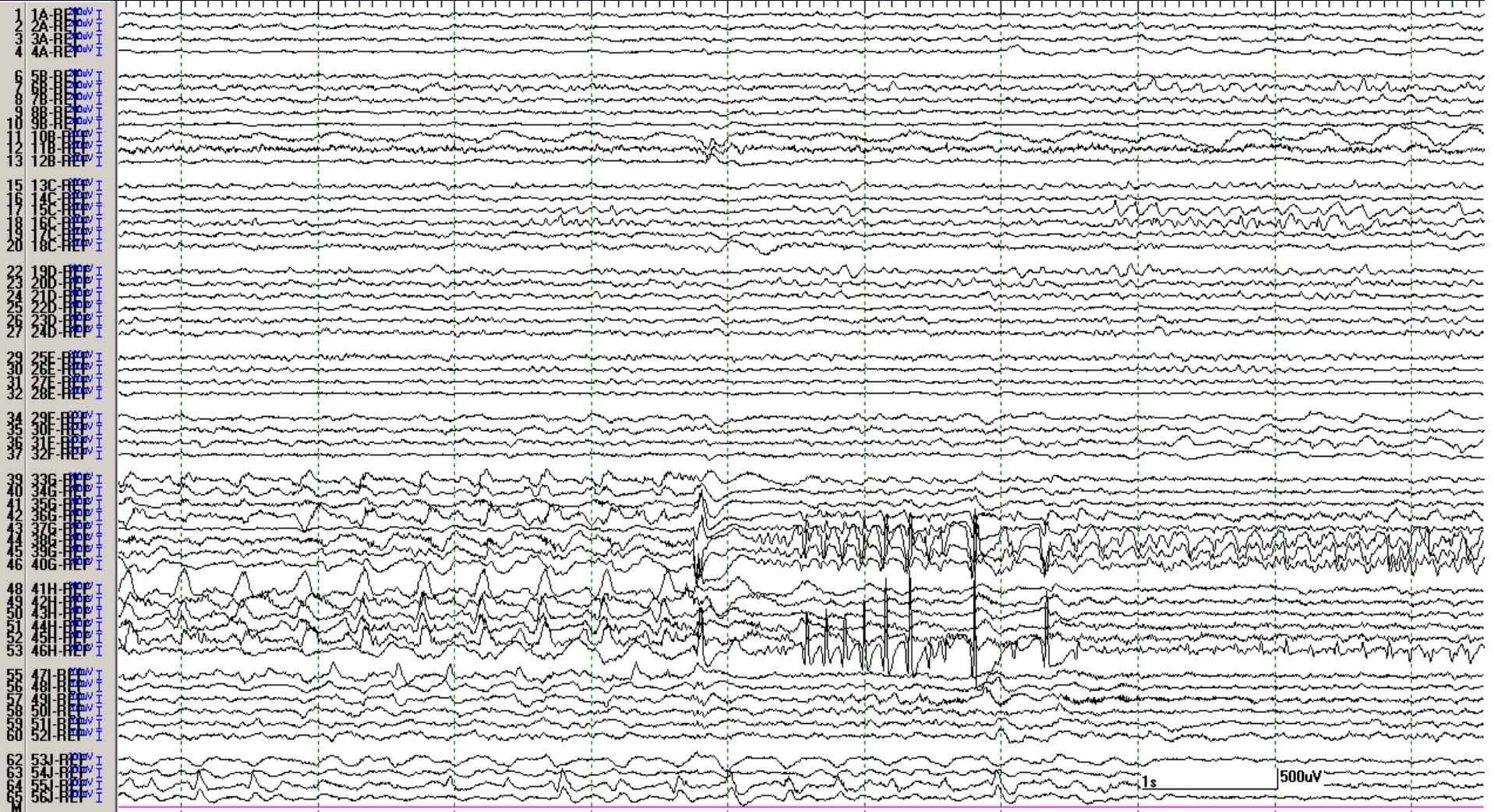
Burdette

TC - 0.3 s
HFF - 70 Hz

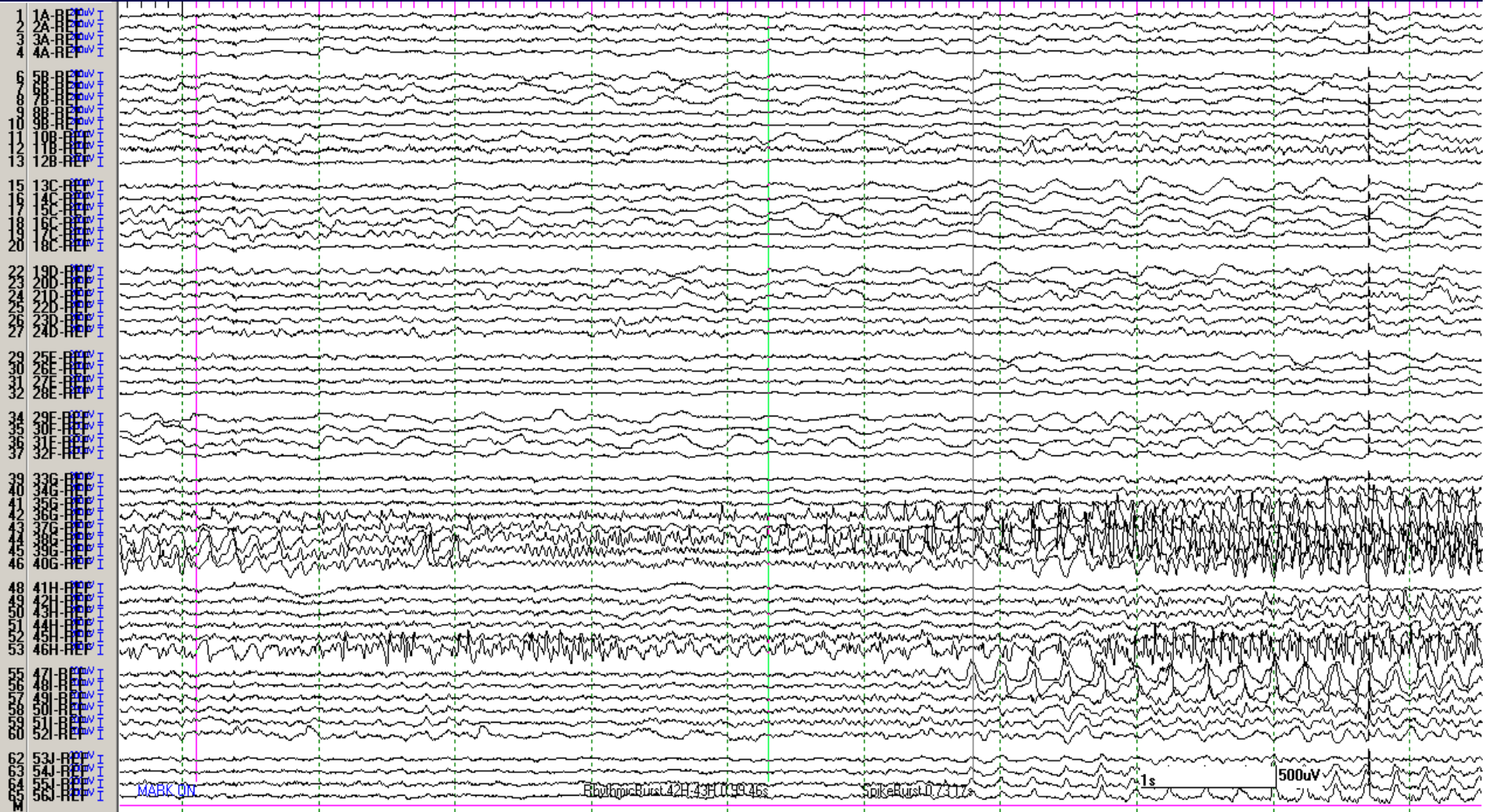
Intracranial Recording: Temporal Lobe Onset



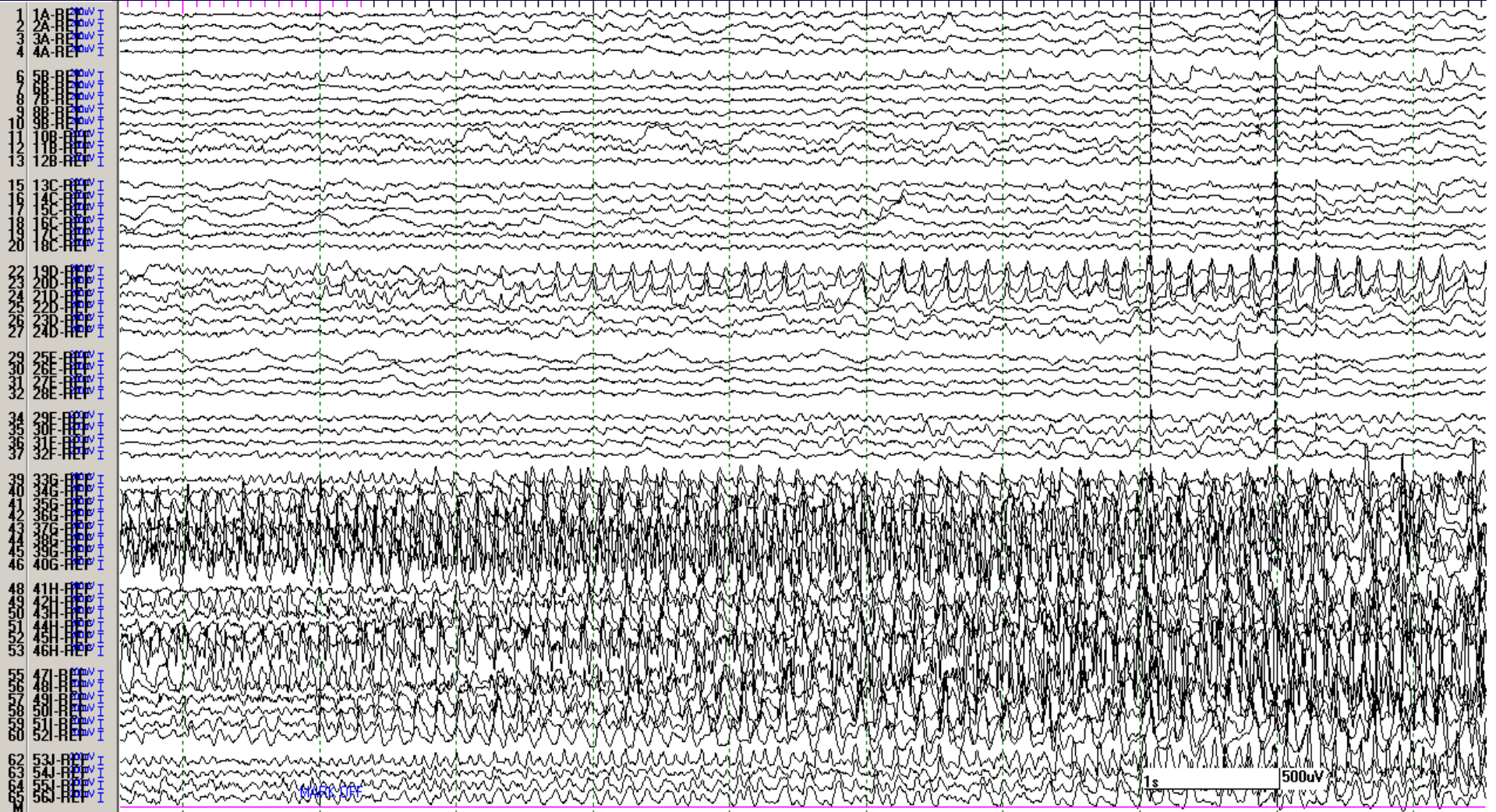
Intracranial Recording: Temporal Lobe Onset



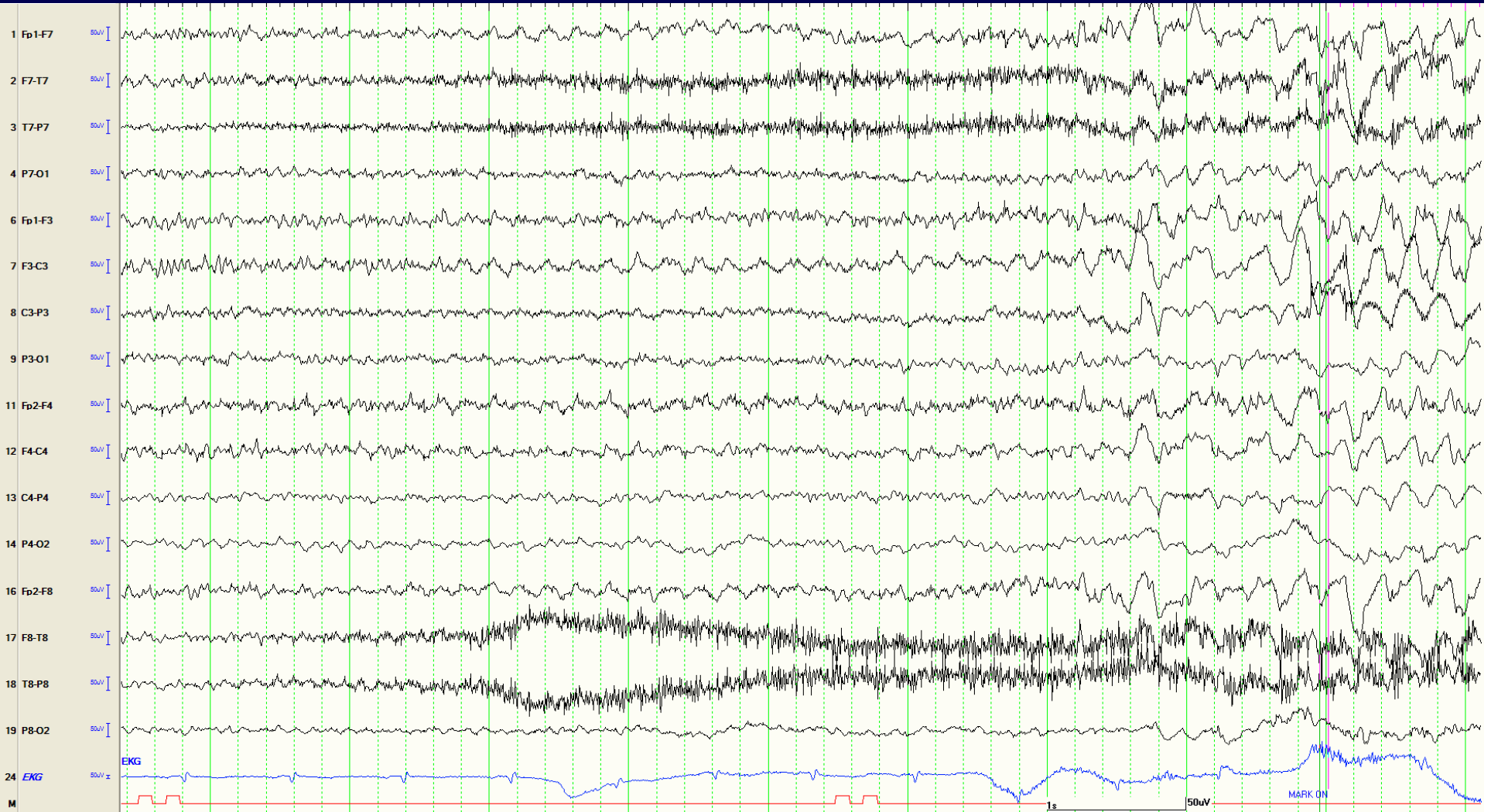
Intracranial Recording: Temporal Lobe Onset



Intracranial Recording: Temporal Lobe Onset



Frontal Lobe Seizure, p1



Burdette

TC - 0.3 s
HFF - 70 Hz

Frontal Lobe Seizure, p2



Burdette

TC – 0.3 s
HFF – 70 Hz

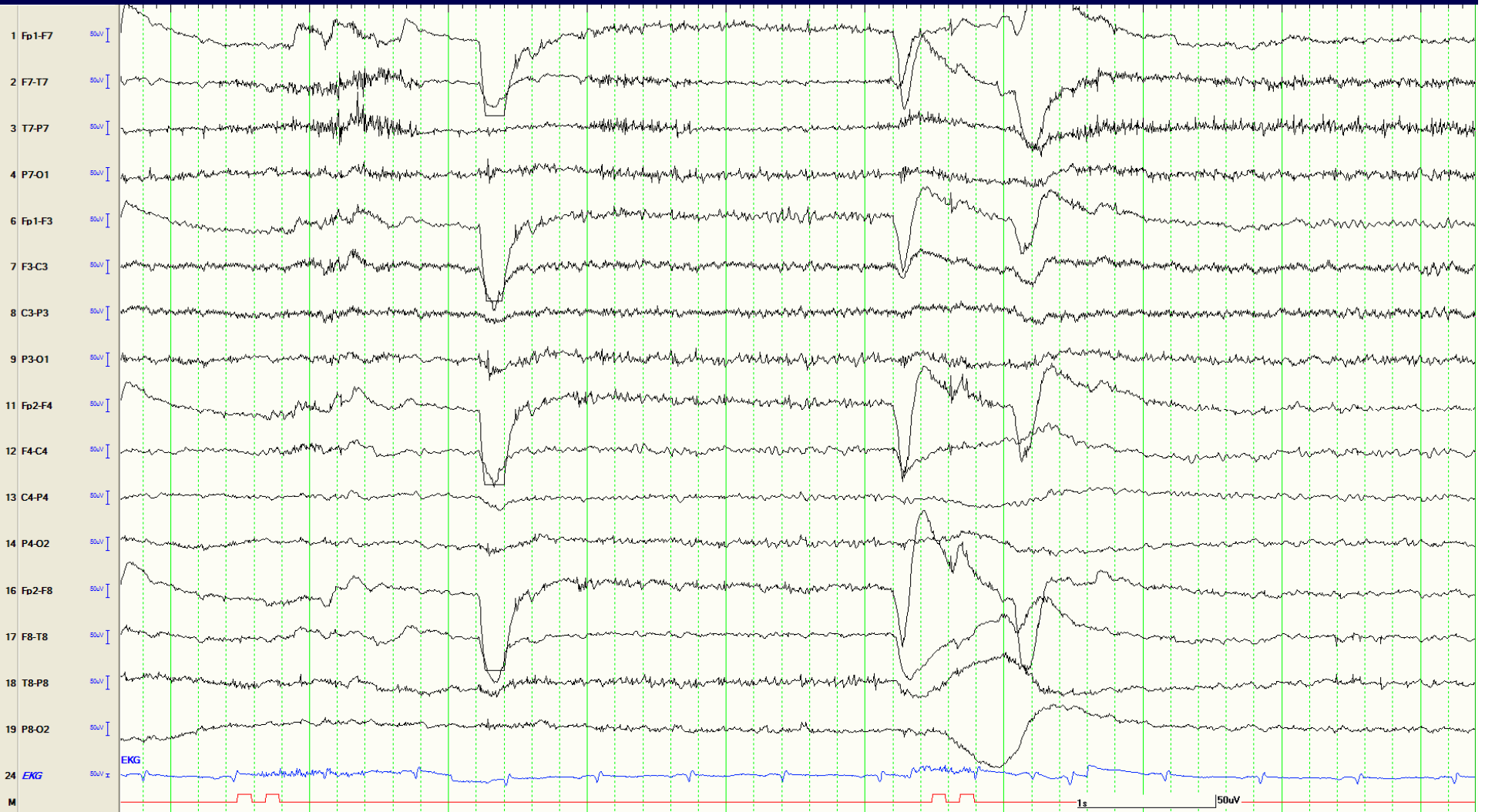
Frontal Lobe Seizure, p3



Burdette

TC - 0.3 s
HFF - 70 Hz

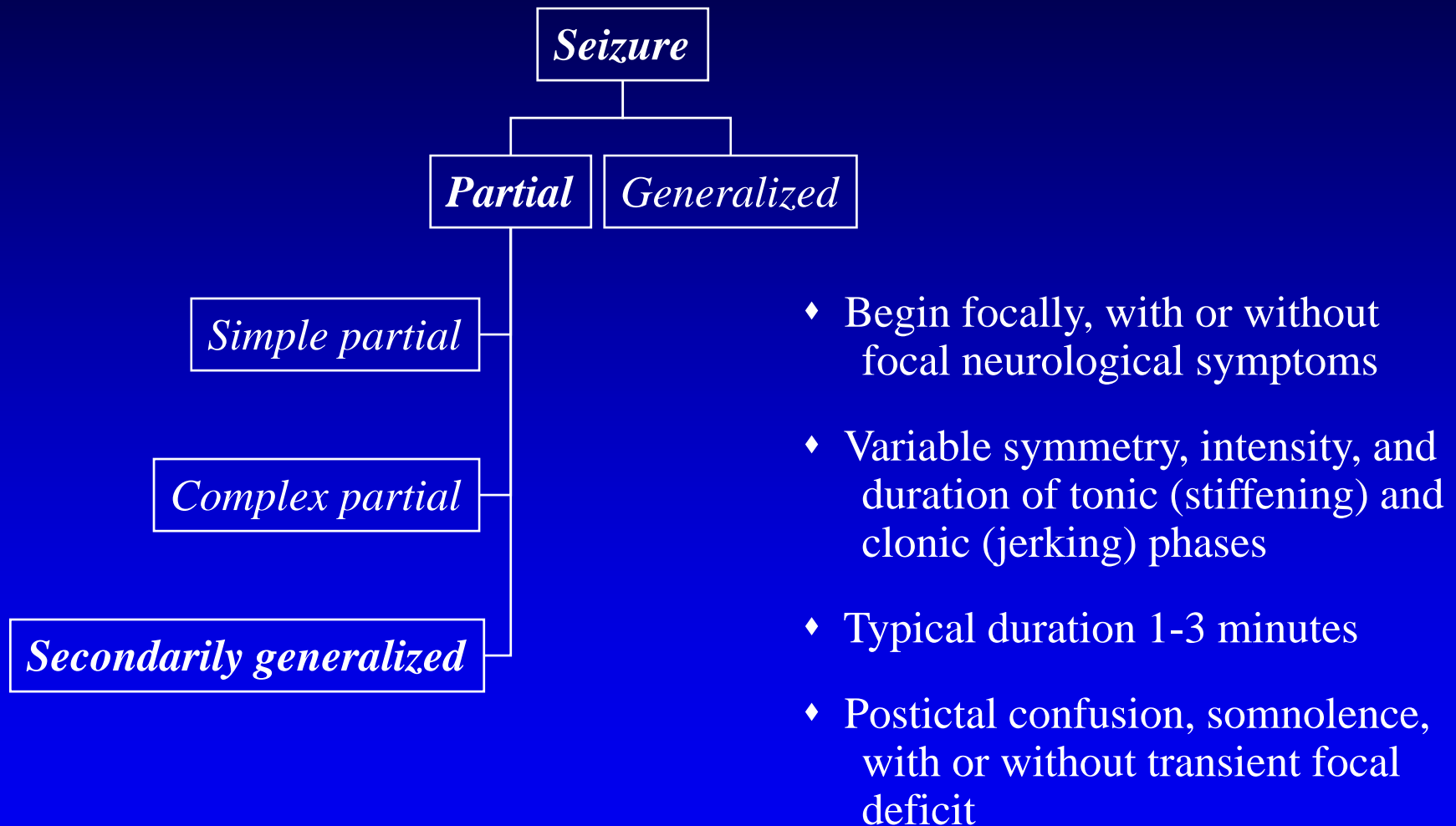
Frontal Lobe Seizure, p4



Burdette

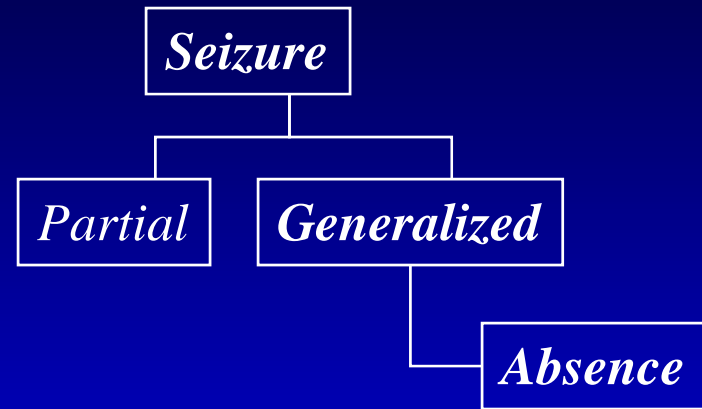
TC - 0.3 s
HFF - 70 Hz

ILAE Classification of Seizures: 2°GTC

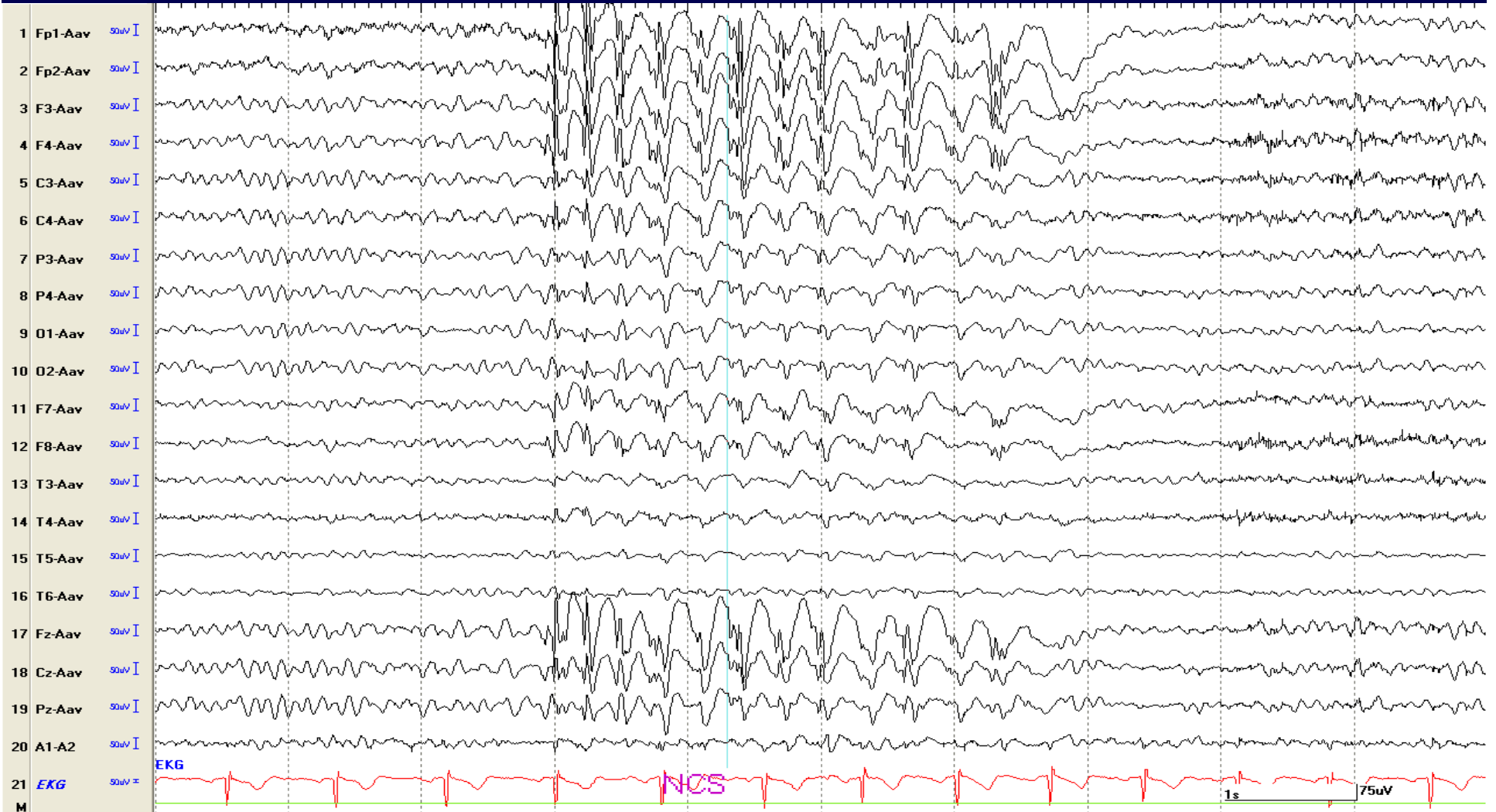


ILAE Classification of Seizures: Absence

- Unresponsive/minimally responsive staring
 - Impaired awareness
 - 3-20 seconds
 - Rapid onset and resolution
 - Often provoked by hyperventilation
 - Onset usually between 4 and 14 years of age
 - Often resolve by age 18
- Normal development and intelligence
- EEG – 3 Hz spike-wave discharges

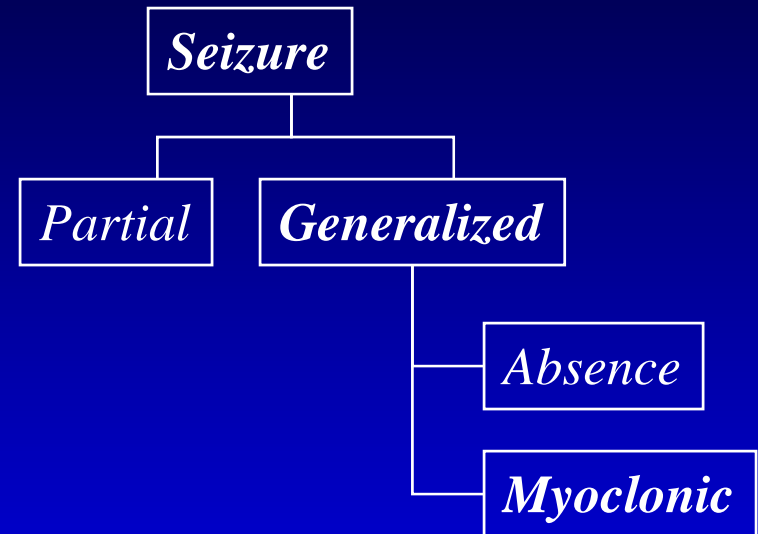


Absence Seizure

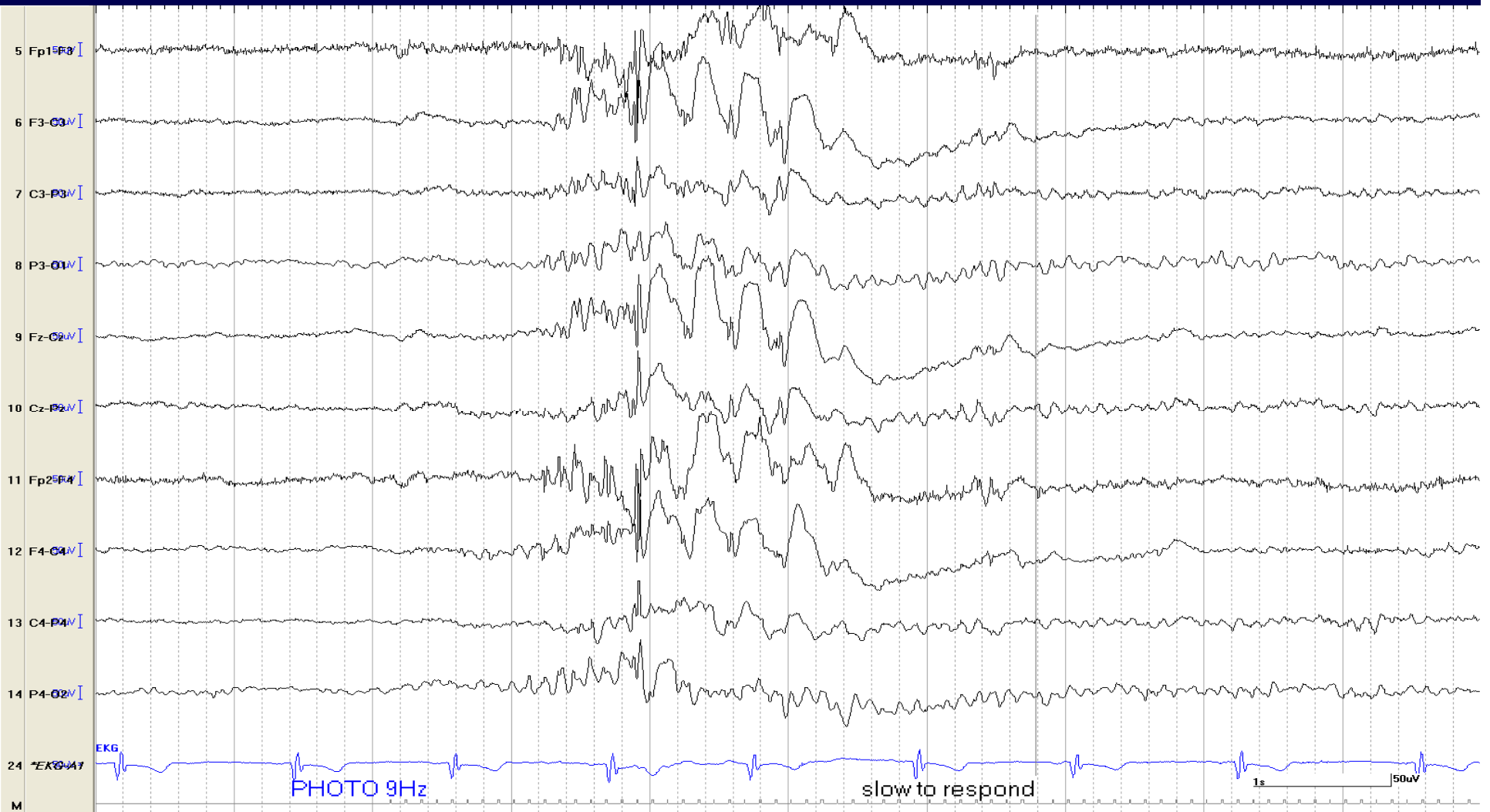


ILAE Classification of Seizures: Myoclonic

- Myoclonus - Brief jerk of muscle or group of muscles
- Benign, nonepileptic myoclonus (*e.g.*, sleep associated) - no EEG change
- Epileptic myoclonus
 - May be focal or bilaterally synchronous
 - Impairment of consciousness difficult to assess (<1 second)
 - Clonic seizure – repeated myoclonic seizures (may have impaired awareness)
 - Normal IQ – IGE/JME
 - Decreased IQ – SGE
- EEG - Generalized 4-6 Hz polyspike wave discharges



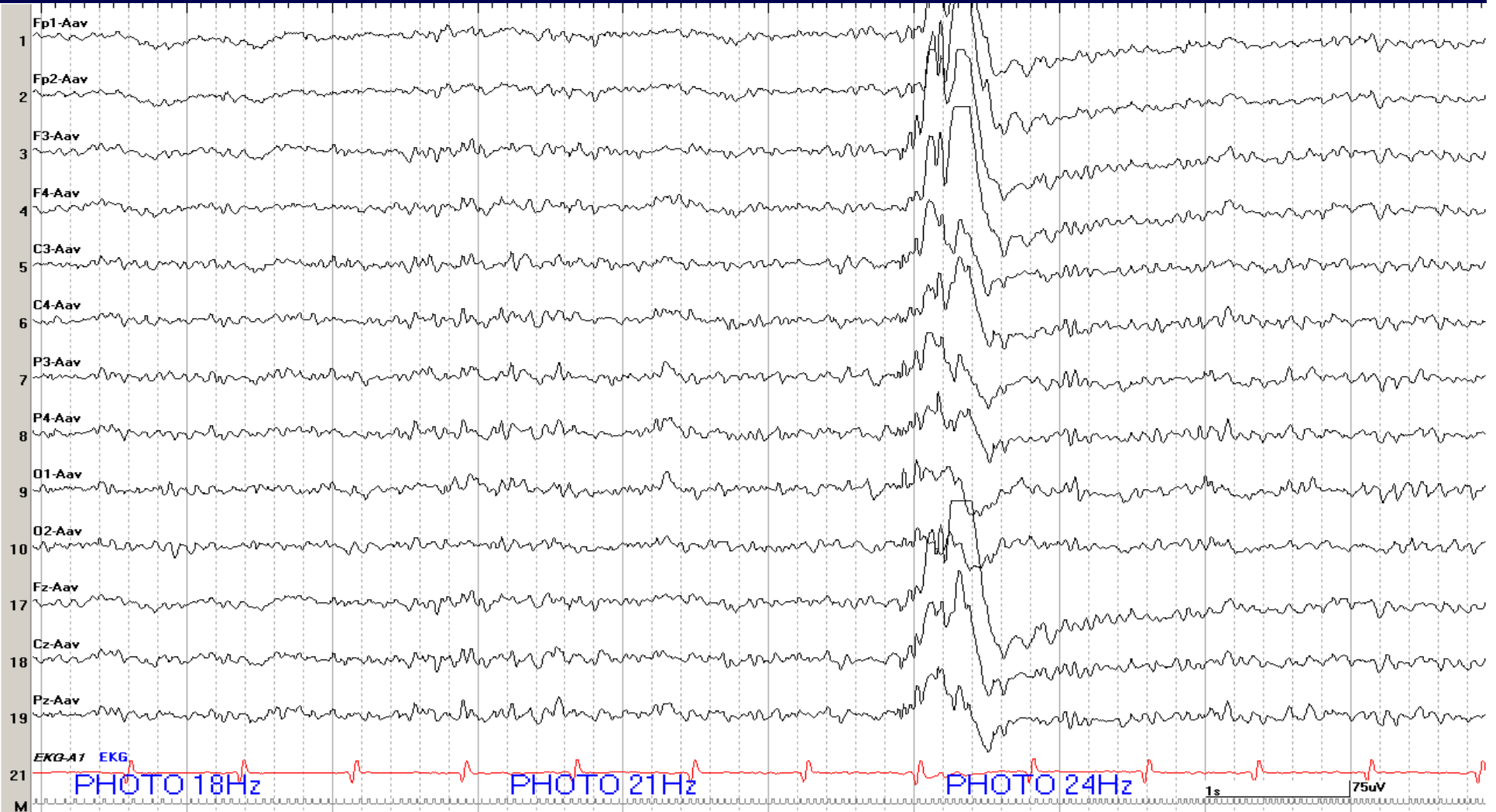
Interictal Photoparoxysmal Response



Burdette

T.C. – 1 sec
H.F.F. – 70 Hz

JME – Random Interictal Discharge During Photic Stimulation



Burdette

T.C. – 1.0 sec
H.F.F. – 70 Hz

Myoclonic Seizure

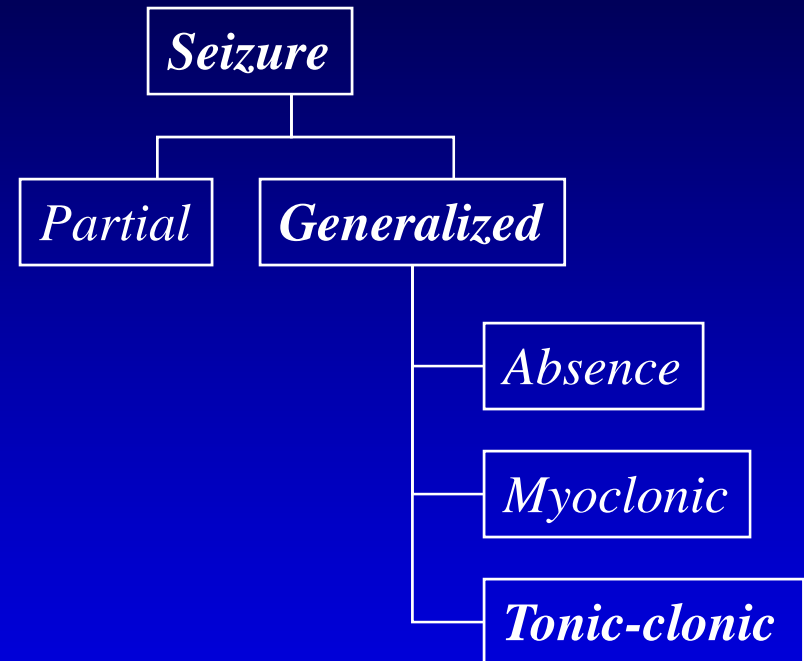


Burdette

T.C. - 0.3 s
H.F.F. - 70 Hz

ILAE Classification of Seizures: GTC

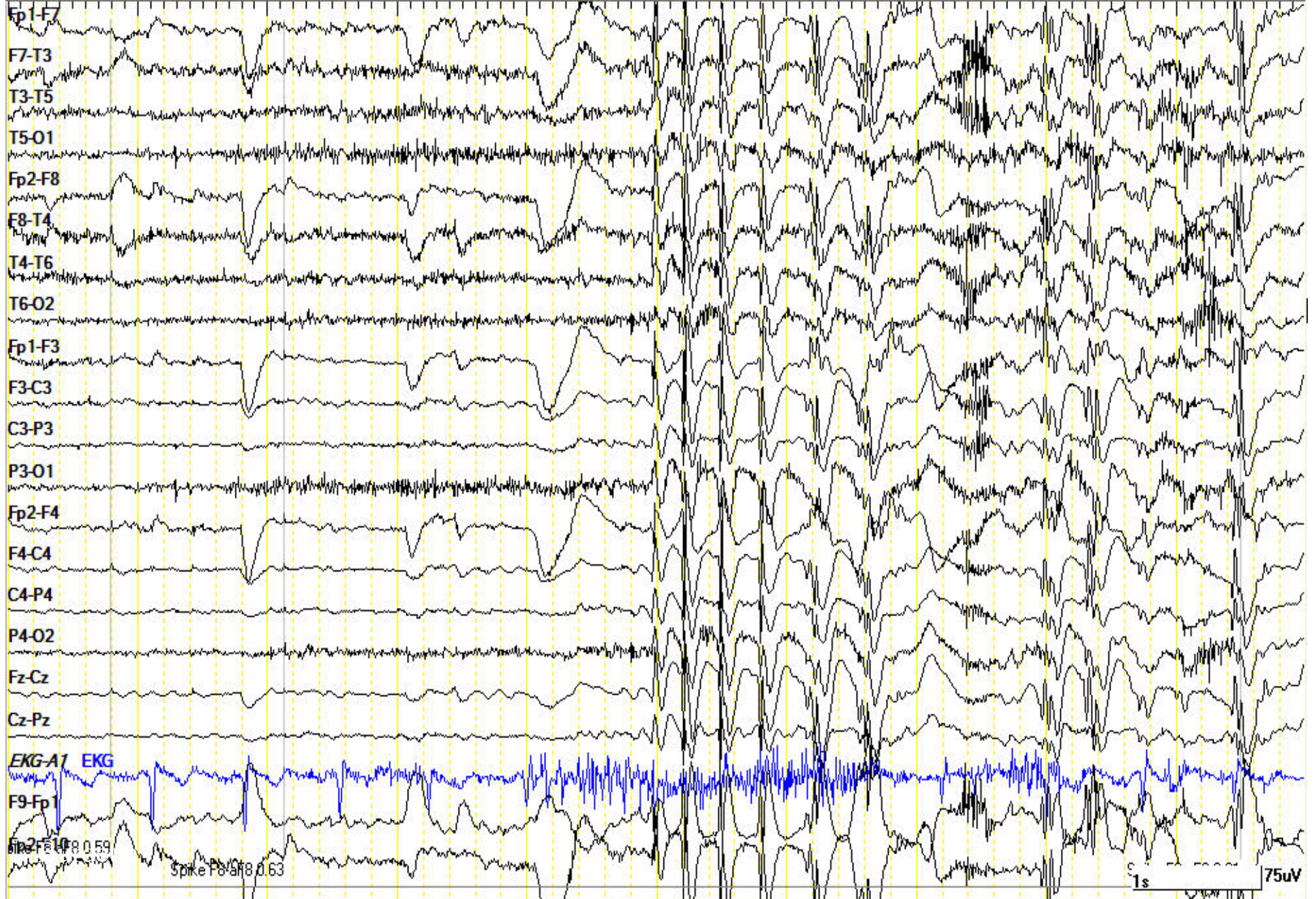
- Loss of consciousness and post-ictal lethargy/confusion
- 30-120 seconds
- Tonic phase
 - Stiffening and fall
 - Often with ictal yell
- Clonic phase
 - Rhythmic extremity jerking
- EEG – generalized polyspikes



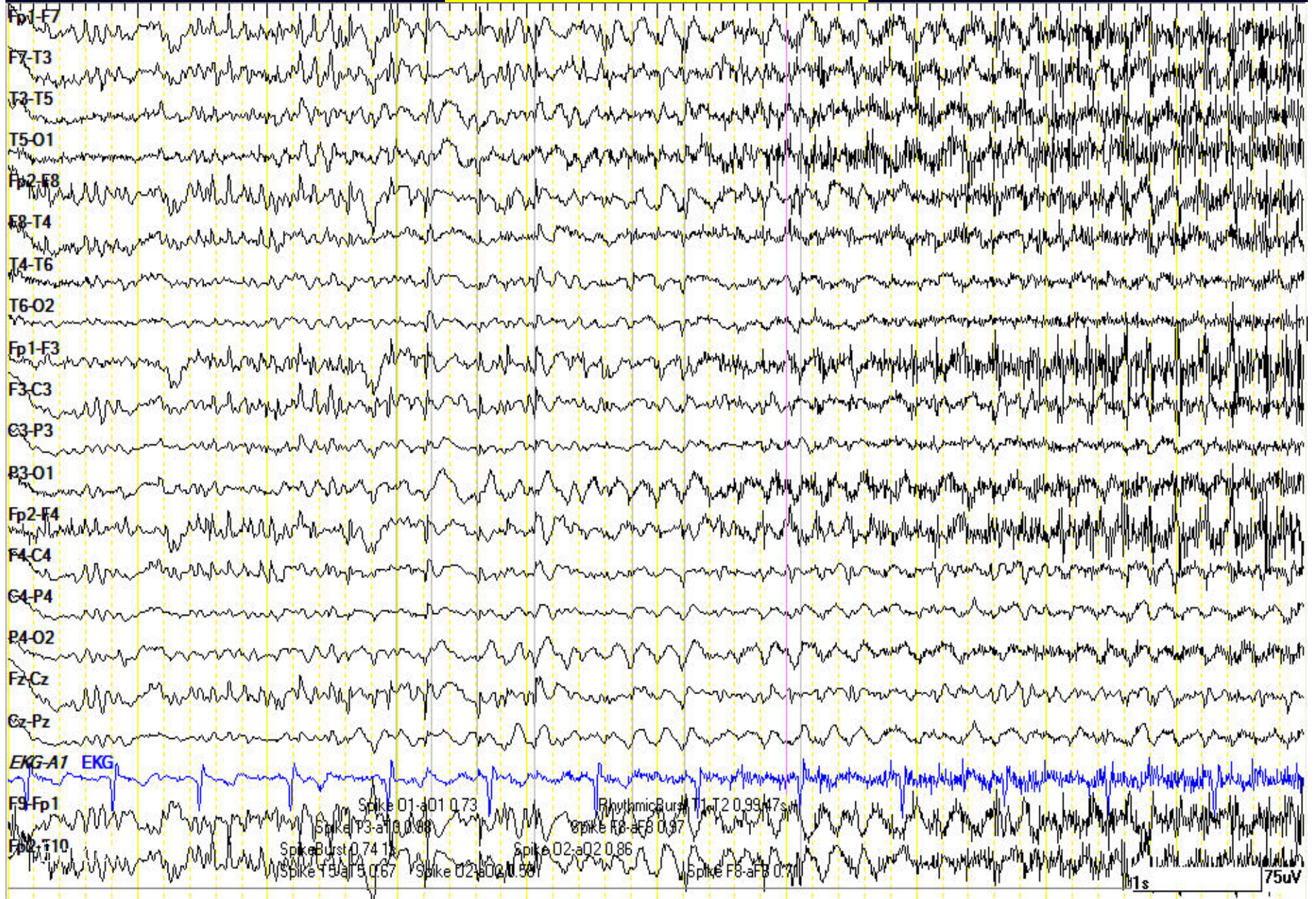
Interictal EEG



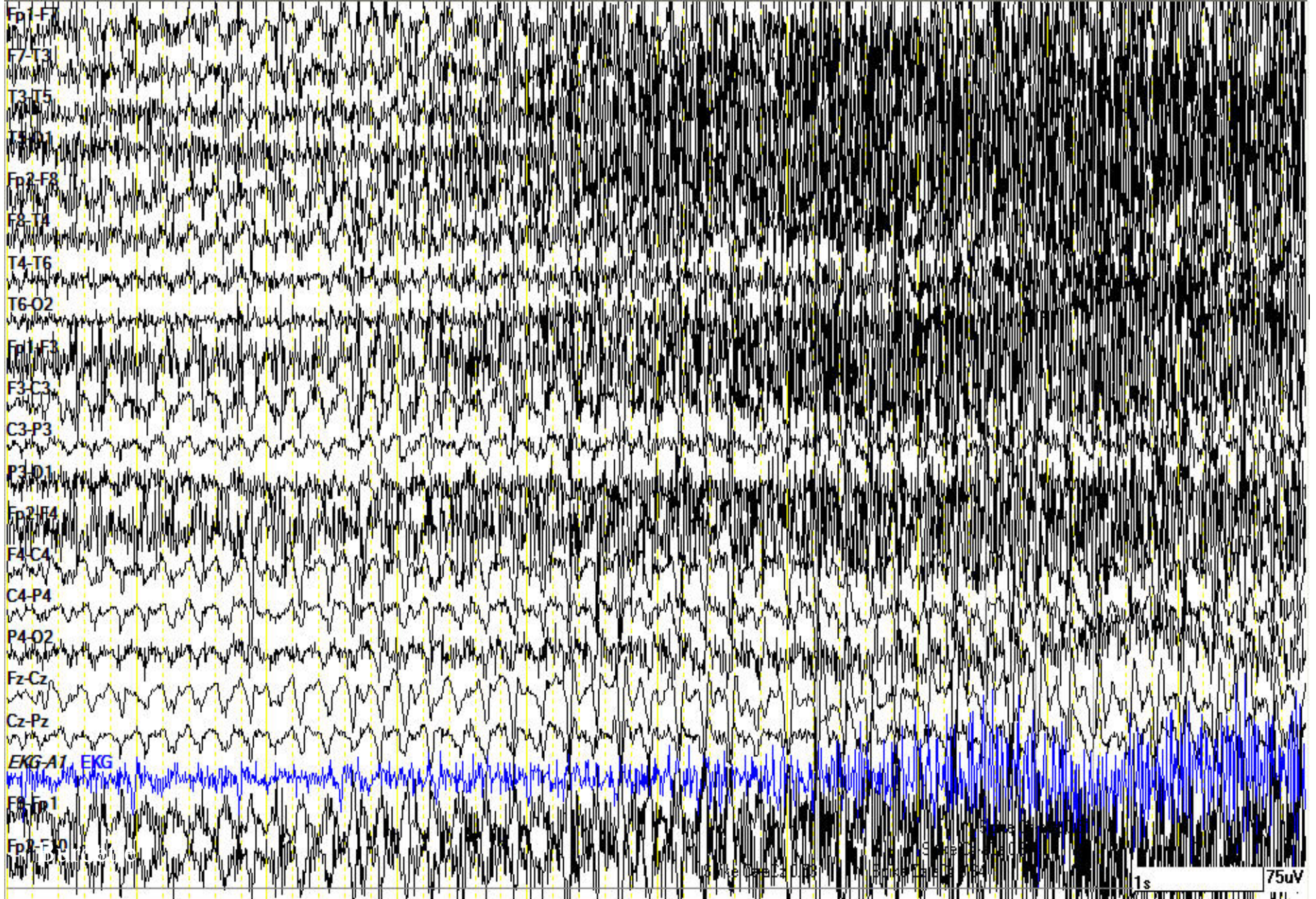
PGTC Seizure, p1



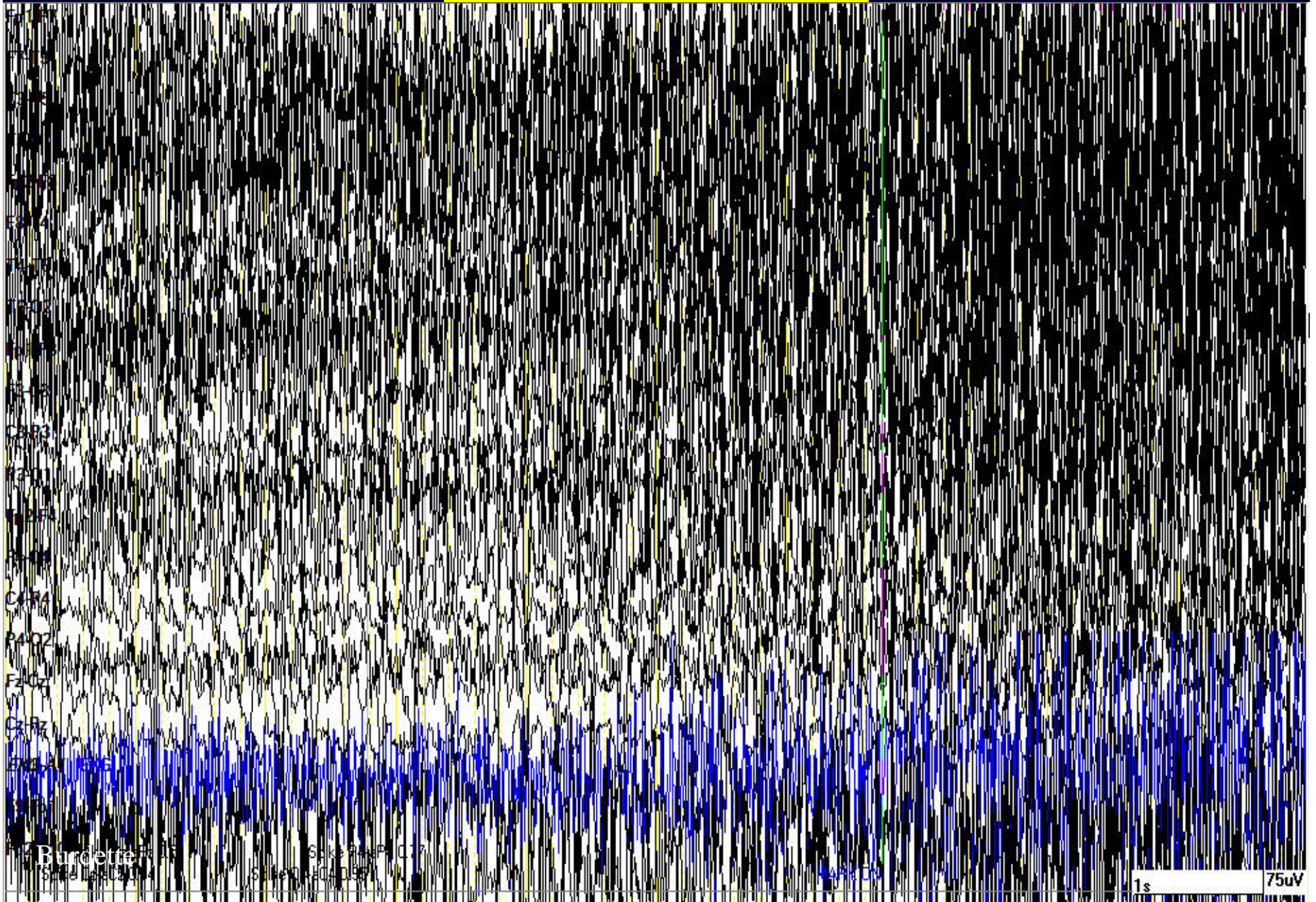
PGTC Seizure, p2



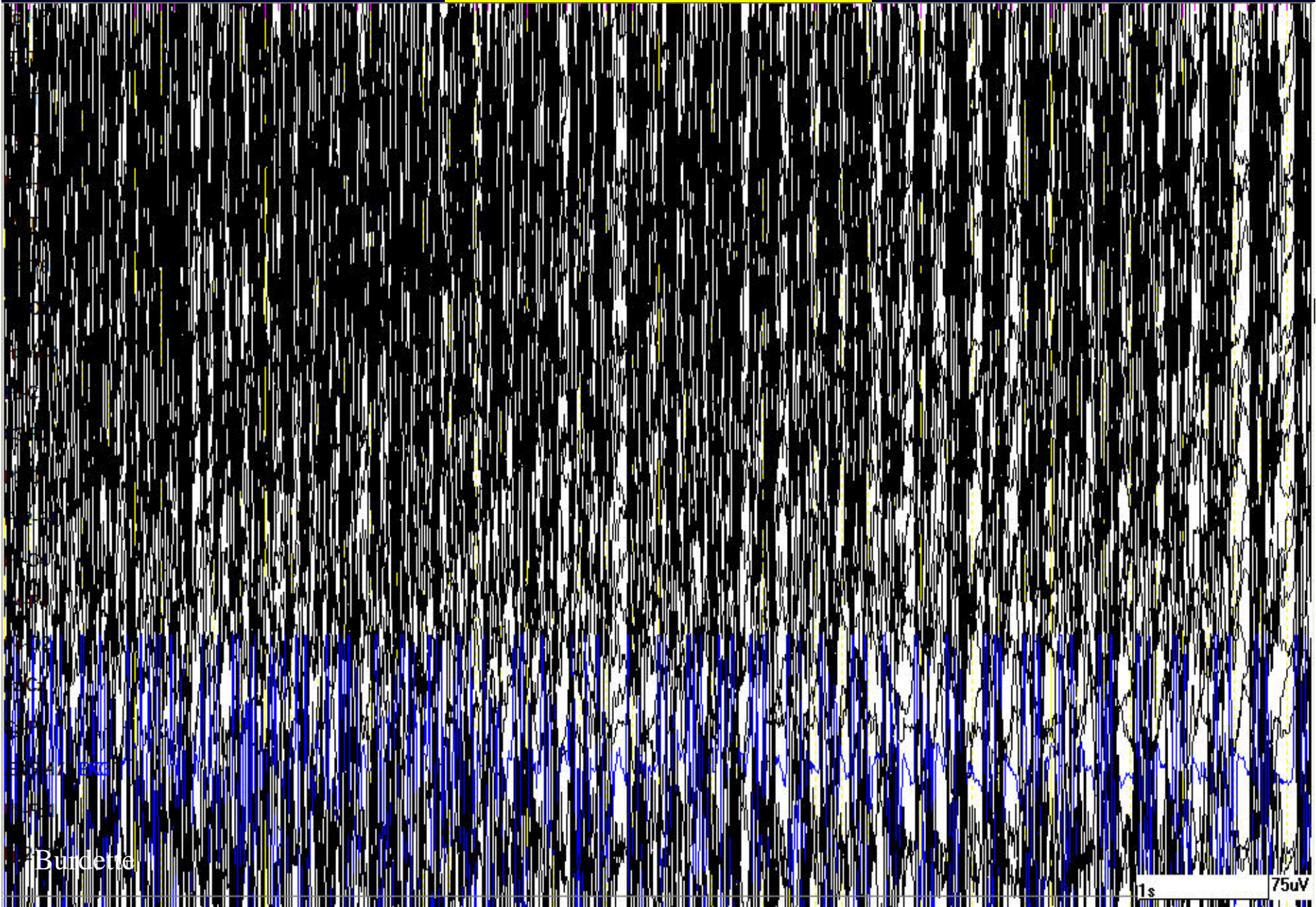
PGTC Seizure, p3



PGTC Seizure, p4

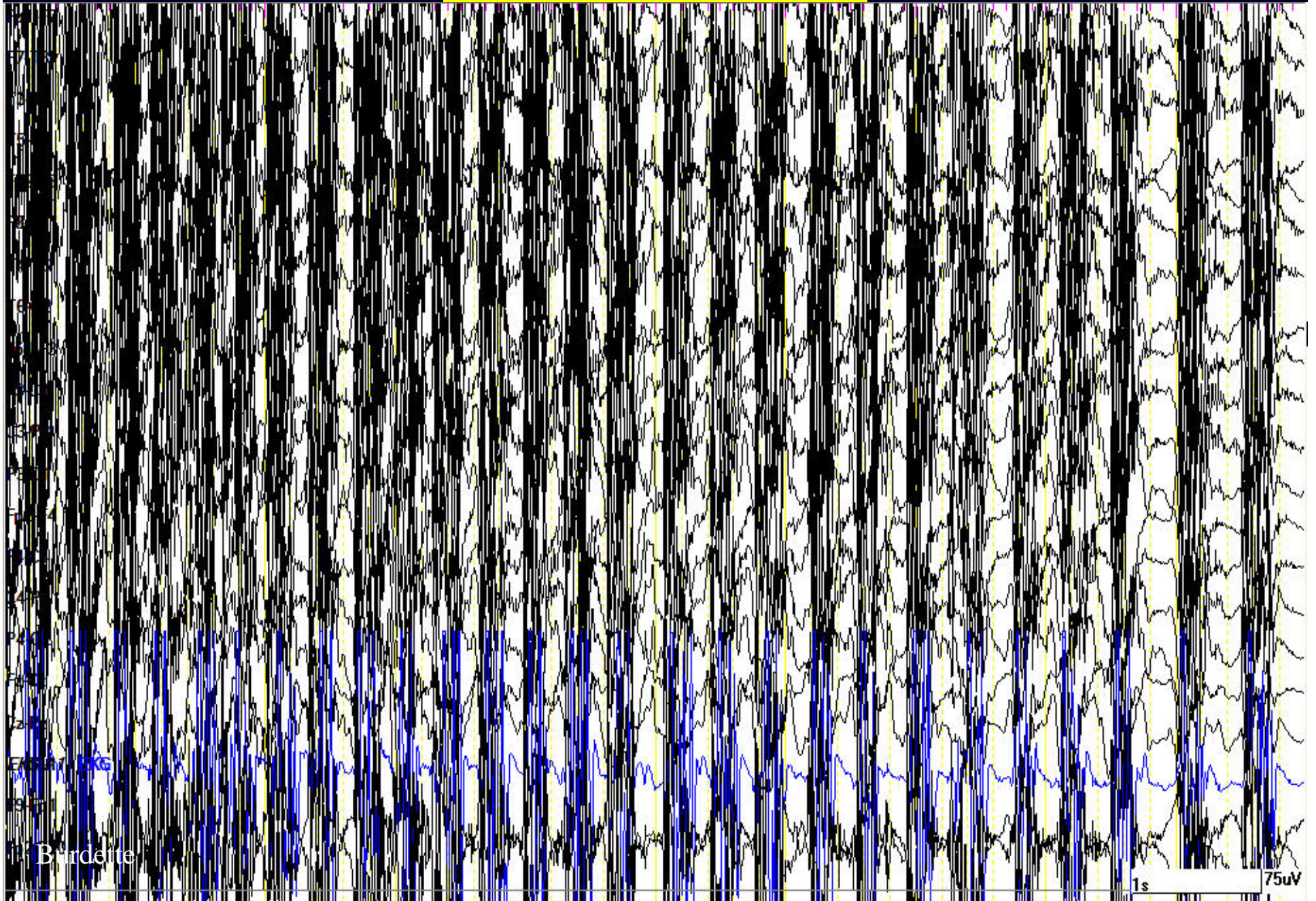


PGTC Seizure, p5

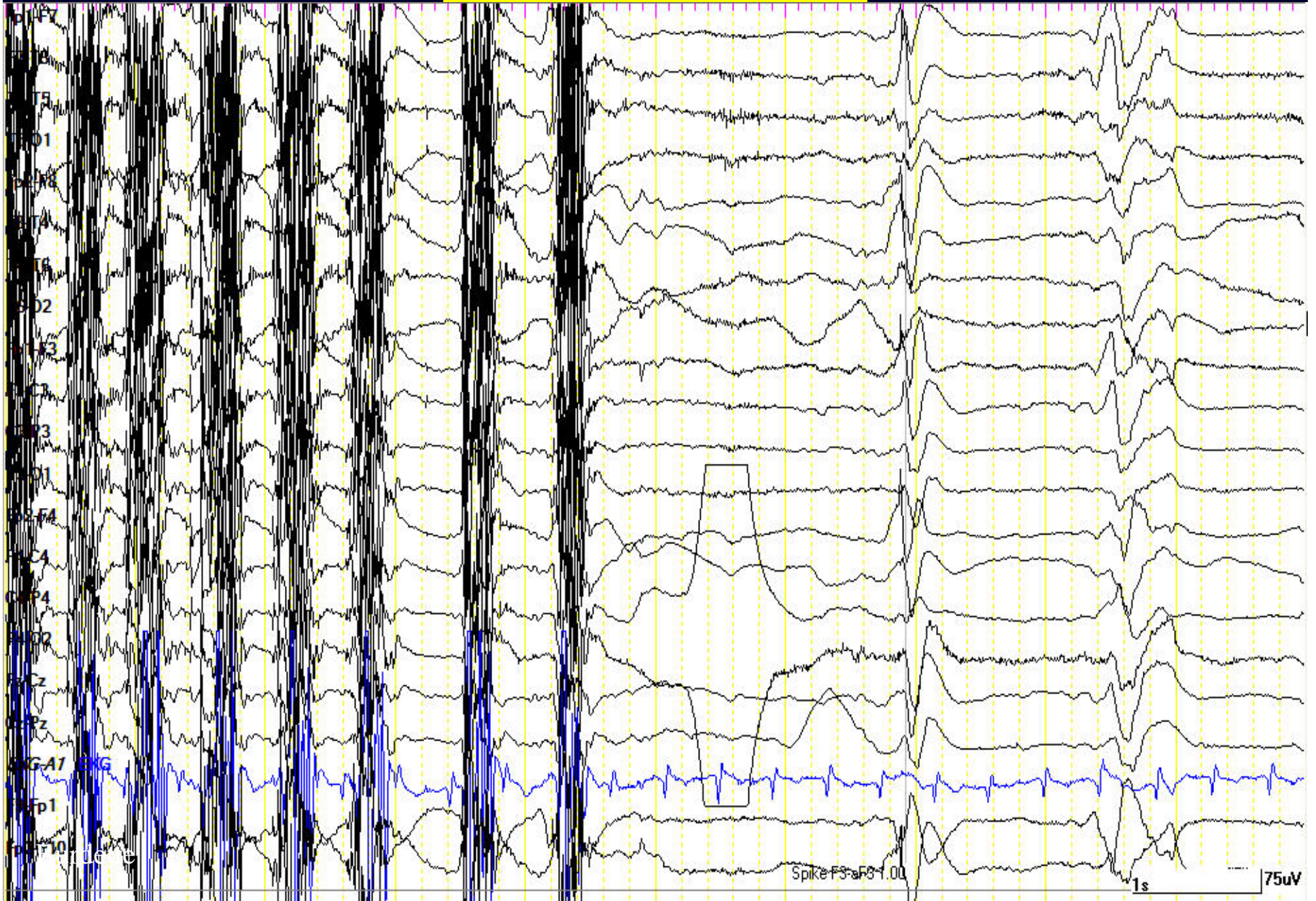


Burdette

PGTC Seizure, p6

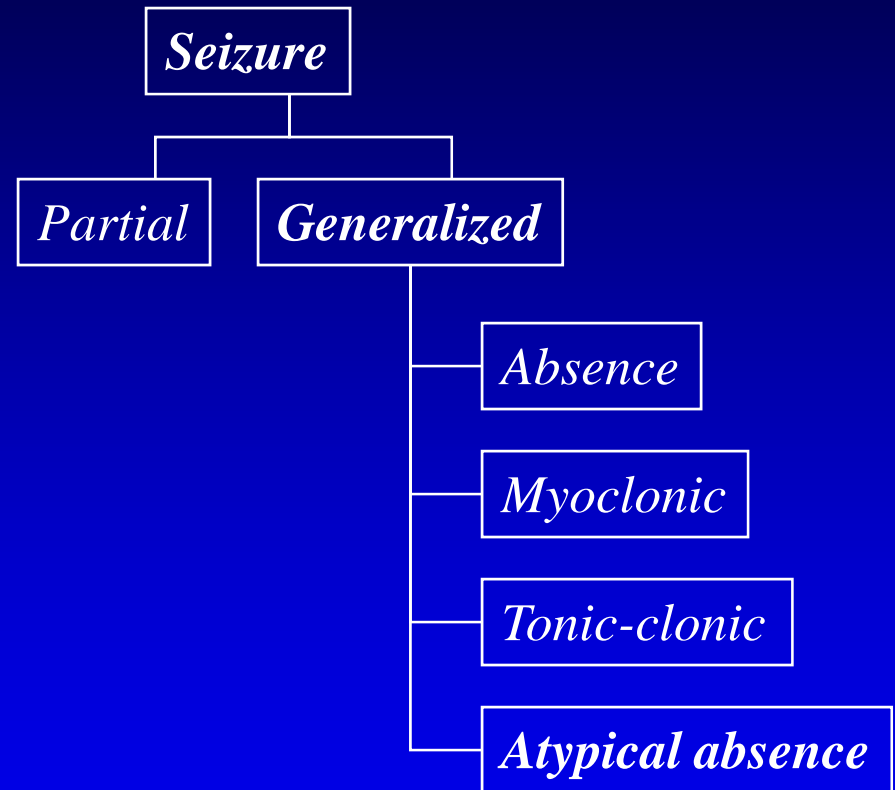


PGTC Seizure, p7

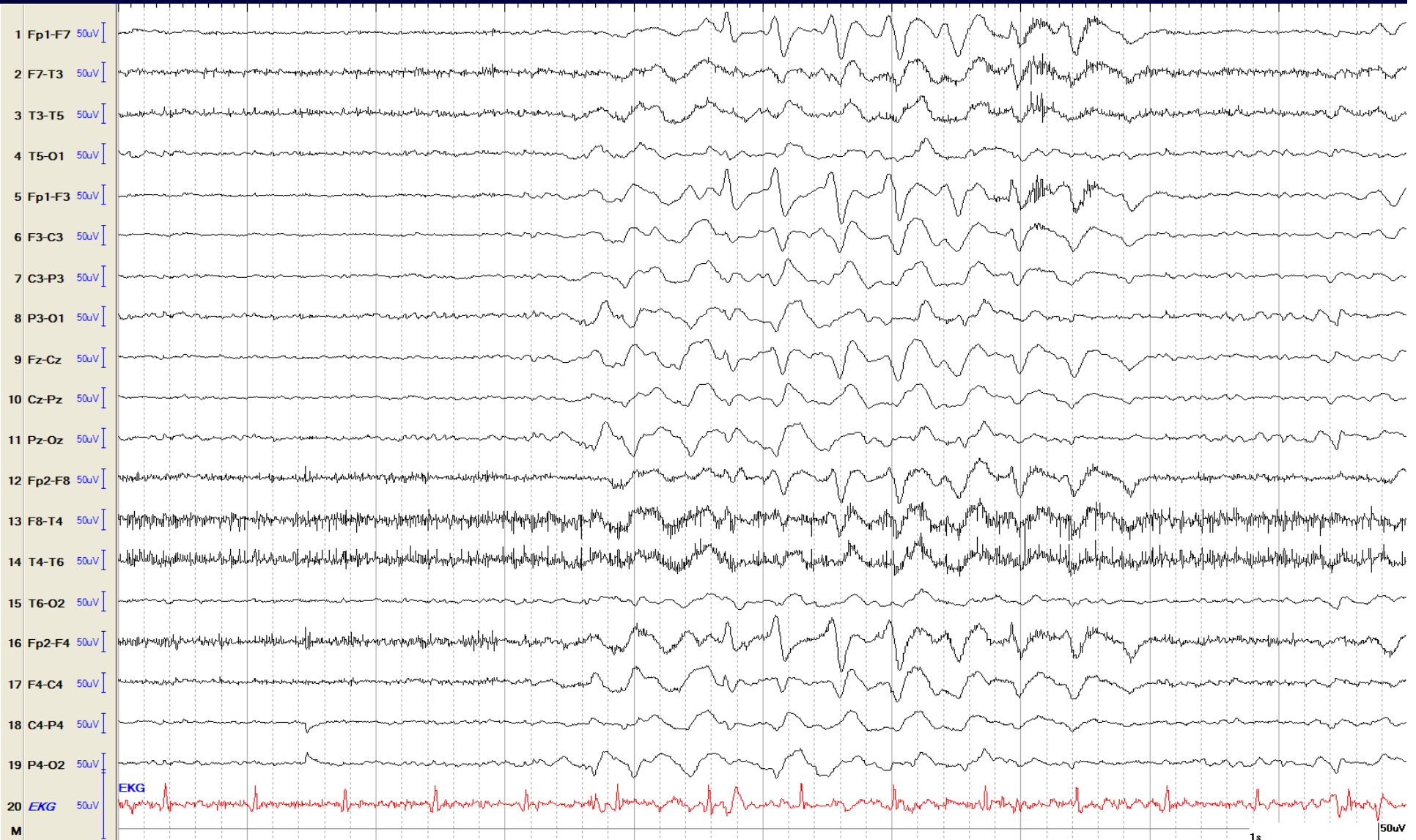


ILAE Classification of Seizures: Atypical Absence

- Staring with variable responsiveness
 - 5-30 seconds
 - Gradual (seconds) onset and resolution
 - Usually not provoked by HV
 - Onset often after the age of 6 years
- Associated with global cognitive impairment
 - SGE
- EEG – slow spike-wave (<2.5 Hz)



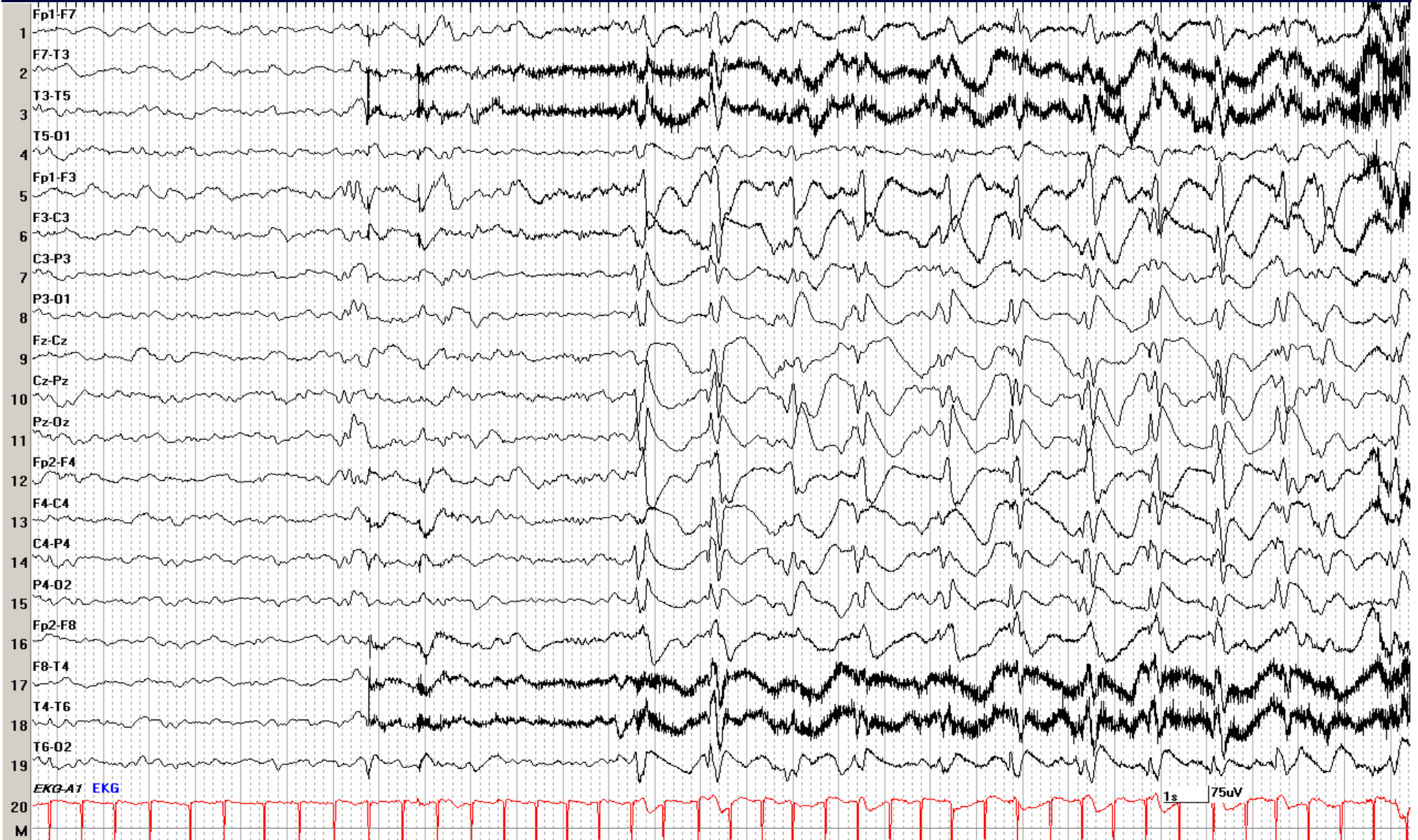
Slow Spike-Wave Discharge – Atypical Absence



Burdette

T.C.- 0.1 sec
H.F.F. – 70 Hz

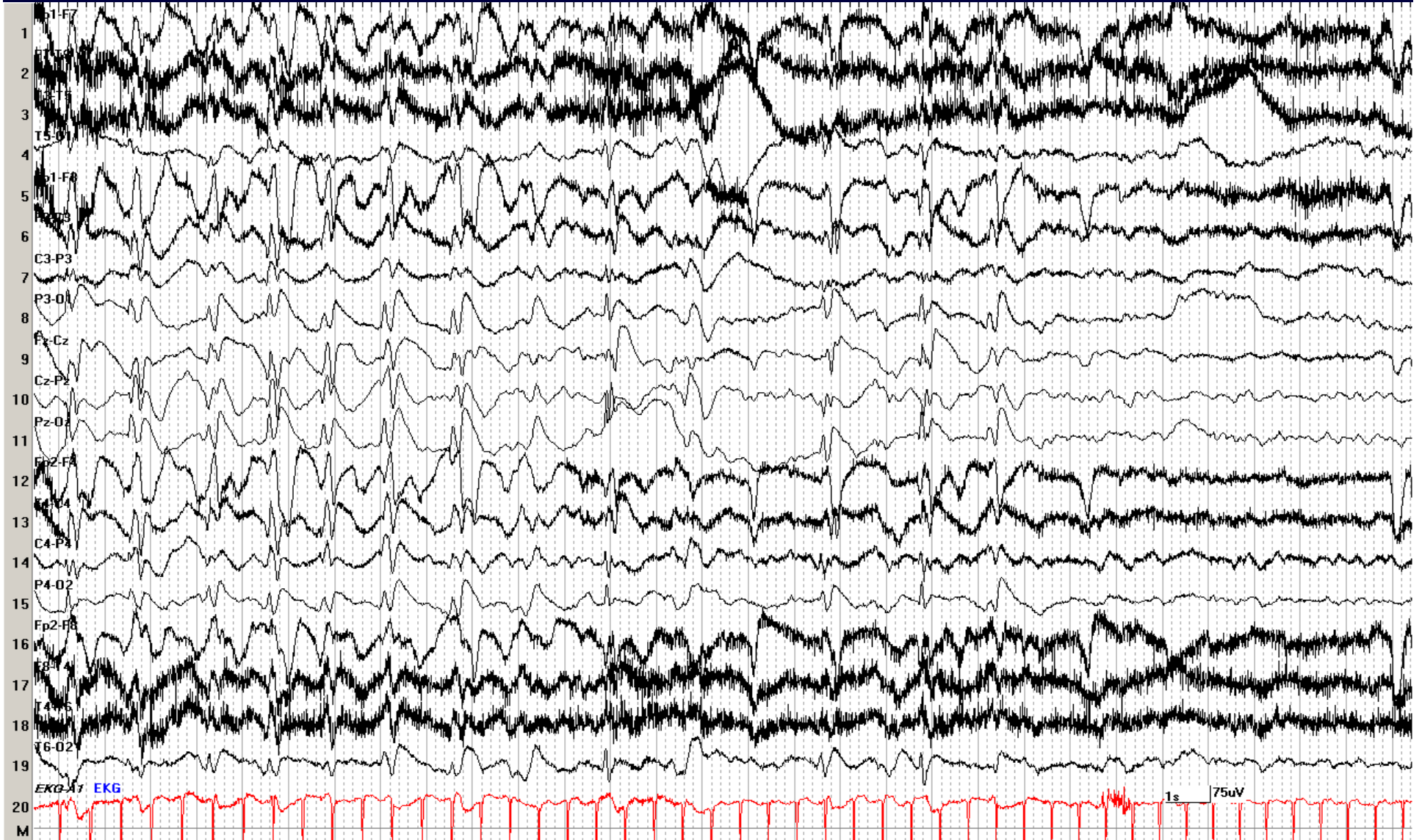
Atypical Absence Seizure, p1



Burdette

T.C. – 0.3 sec
H.F.F. – 70 Hz

Atypical Absence Seizure, p2

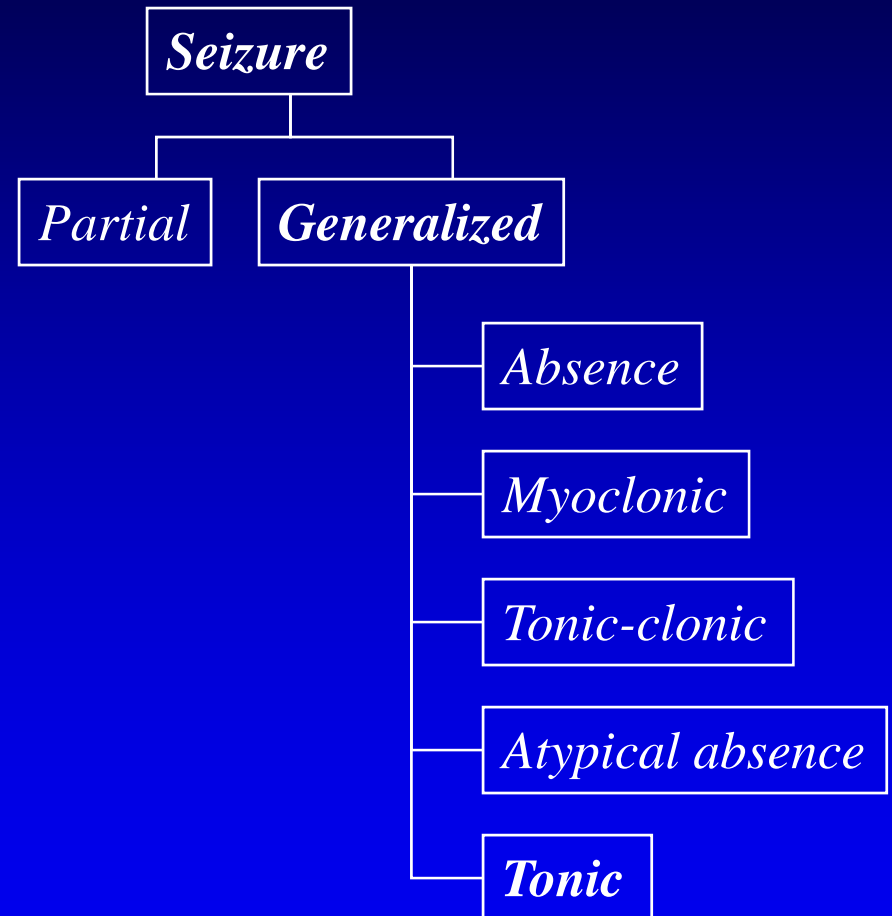


Burdette

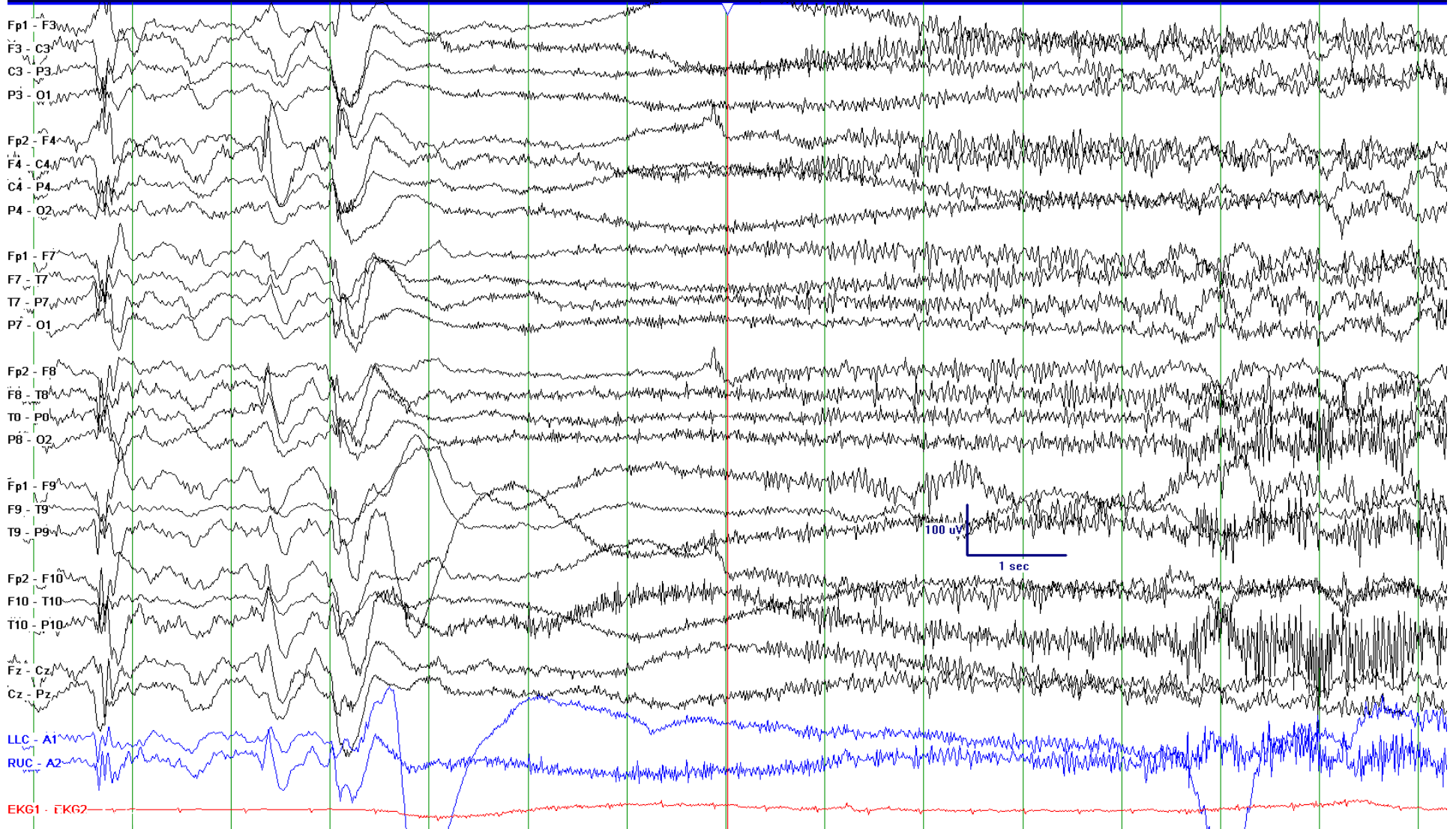
T.C. – 0.3 sec
H.F.F. – 70 Hz

ILAE Classification of Seizures: Tonic

- Symmetric, tonic contraction of axial and appendicular muscles
 - 2-20 seconds
 - Impaired consciousness
- Cognitive impairment
 - SGE
- EEG – sudden attenuation with generalized, low voltage fast activity (most common) or generalized polyspike-wave

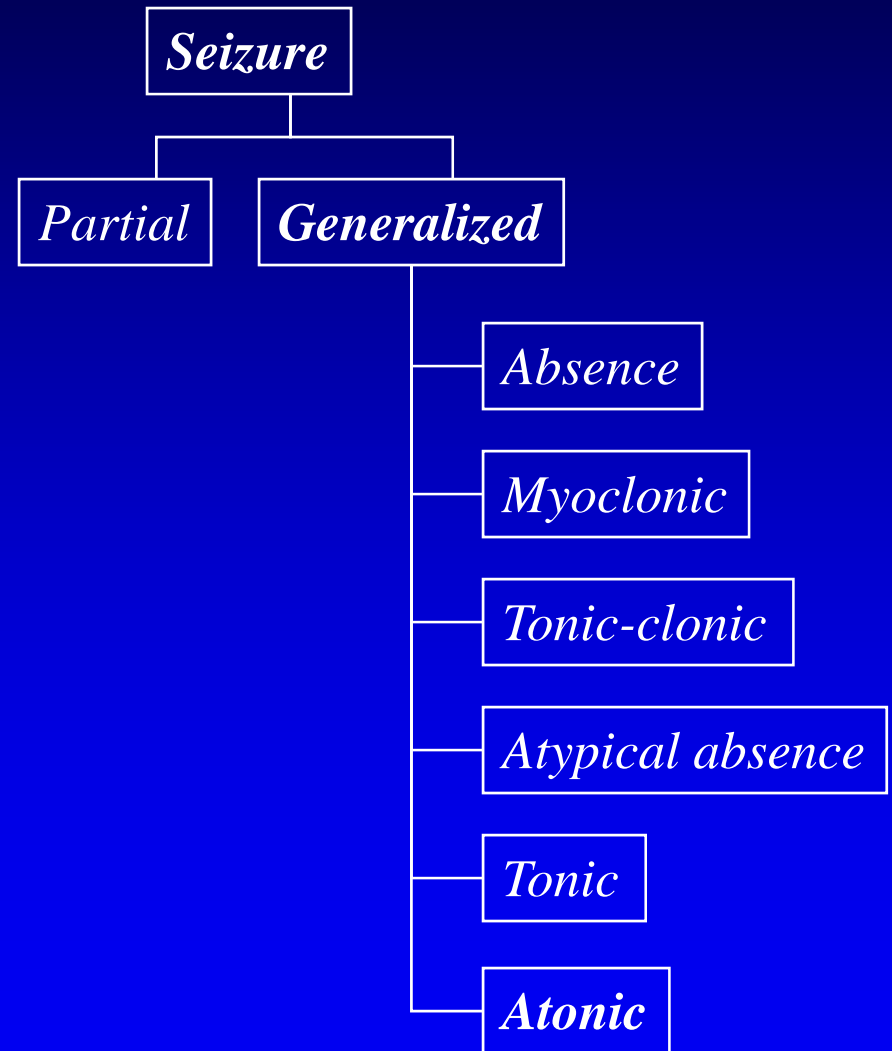


Tonic Seizure



ILAE Classification of Seizures: Atonic

- Sudden loss of postural tone
 - Usually seconds, rarely up to a minute
 - Impaired consciousness
 - Mild – head nod or jaw drop
 - Severe – fall in unprotected fashion
- Cognitive impairment
 - SGE
- EEG – sudden diffuse attenuation or generalized polyspike-wave



Atonic Seizure

