Non epileptic transients along life: adults and elderly

Jaime Godoy MD
Division of Neurosciences
Pontificia Universidad Católica de Chile

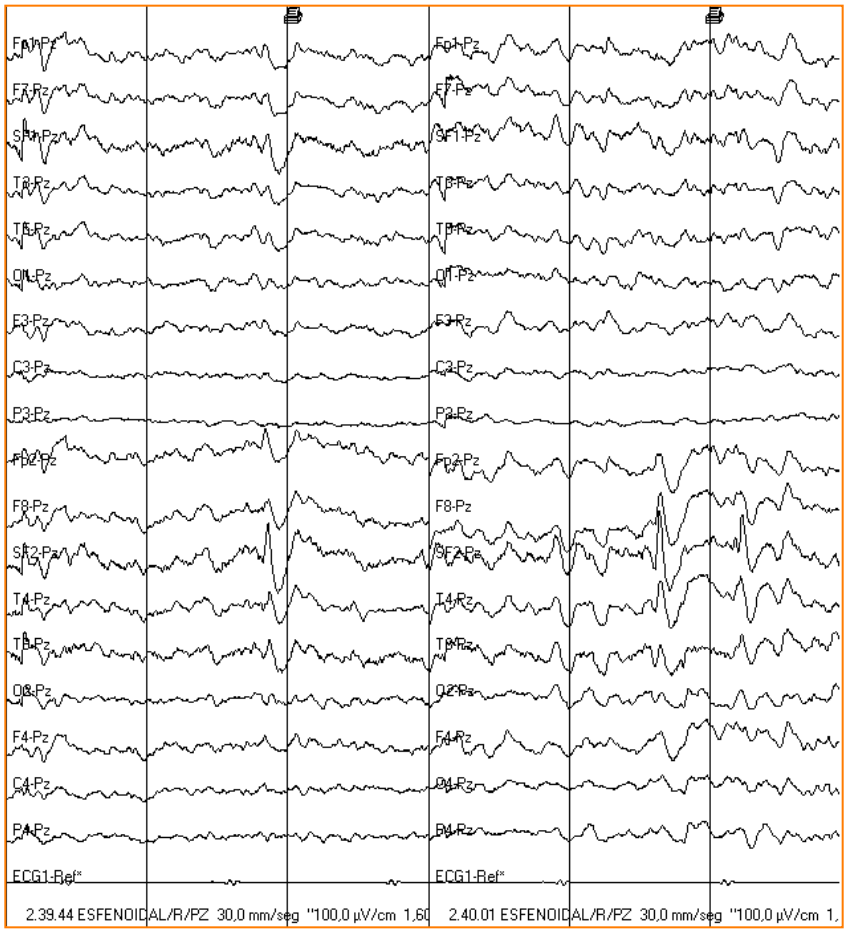
jgodoy@med.puc.cl

Disclosure

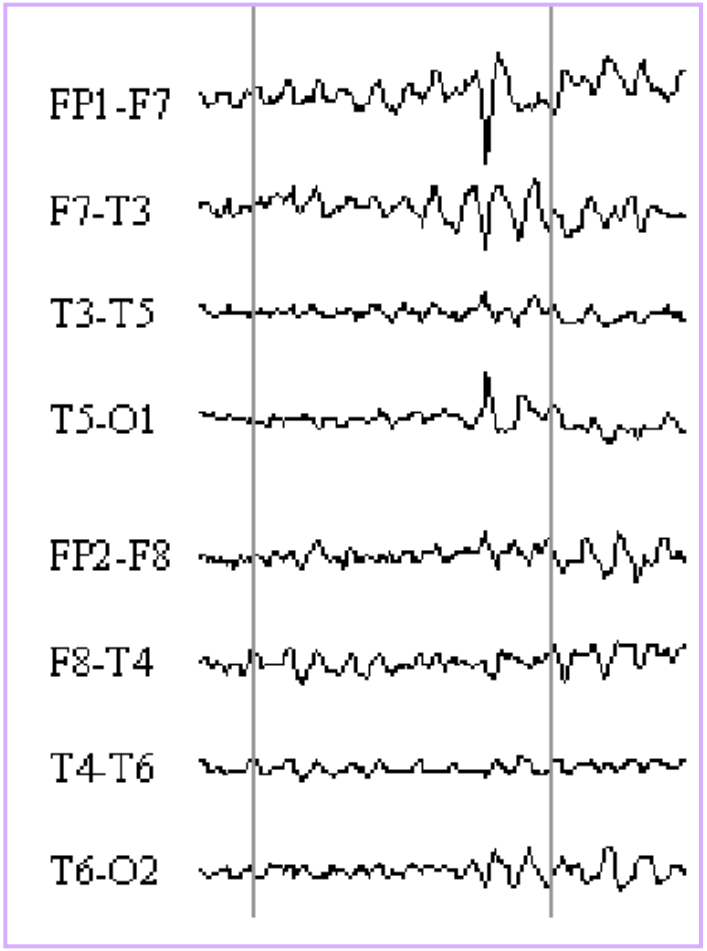
- Nothing to disclose

Learning Objectives

- To define “normal epileptiform variant”
- To describe the general features of normal variants
- To identify the most common normal variants
- To recognize the electrical differences with genuin interictal epileptiform discharges and ictal patterns

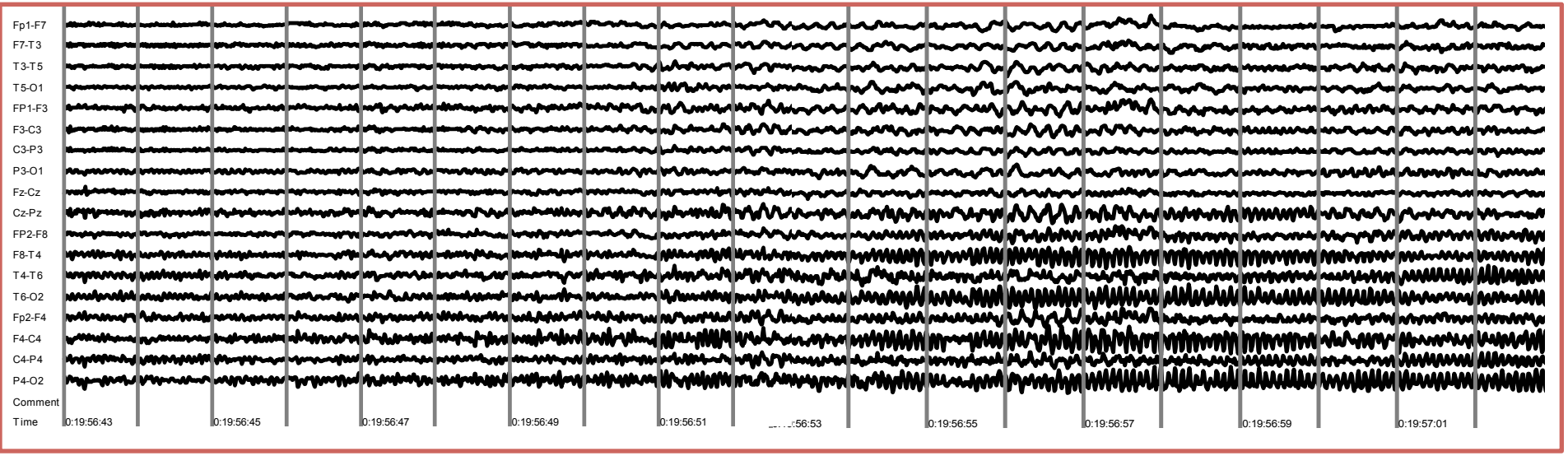


High association with clinical epilepsy

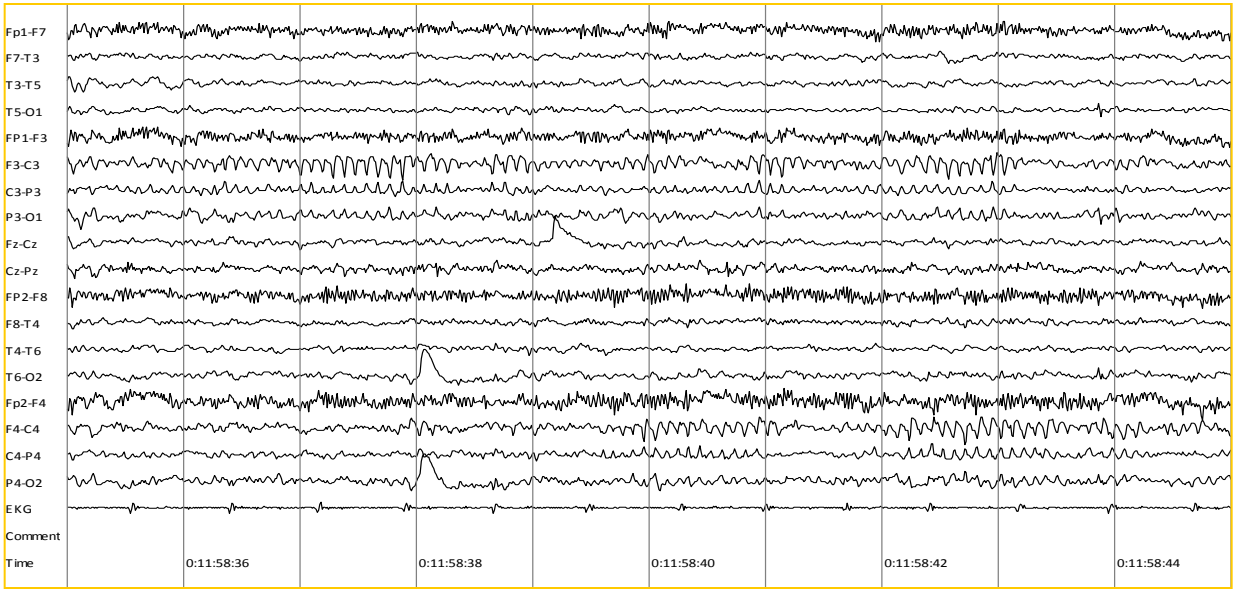


No association with clinical epilepsy

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE



EEG Seizure



Normal variant

NEUROLOGY 2005;64:1879–1883

Clinical and EEG features of patients with EEG wicket rhythms misdiagnosed with epilepsy

G.L. Krauss, MD; A. Abdallah, BA; R. Lesser, MD; R.E. Thompson, PhD; and E. Niedermeyer, MD

Journal of Clinical Neurophysiology
20(1):42–44, Lippincott Williams & Wilkins, Inc., Philadelphia

Overintepretation of EEGs and Misdiagnosis of Epilepsy

Selim R. Benbadis and William O. Tatum

Recognizing normal variants

- General features
  - Normal EEG background
  - Most of them mainly in light sleep
  - Characteristic age
  - Typical topographic distribution, frequency and polarity

EEG variants that can be confused with epileptiform discharges

A. Isolated or brief bursts
   - Unilateral or bilateral asynchronous
     1) Wicket Spikes
     2) 14 and 6 positive spikes
     3) Small Sharp transients of sleep (SSS o BETS)
   - Bilateral
     4) Phantom spikes

B. Rhythmic patterns
     1) Rhytmic midtemporal discharges
     2) Subclinical rhythmic discharges of adults

C.- Other

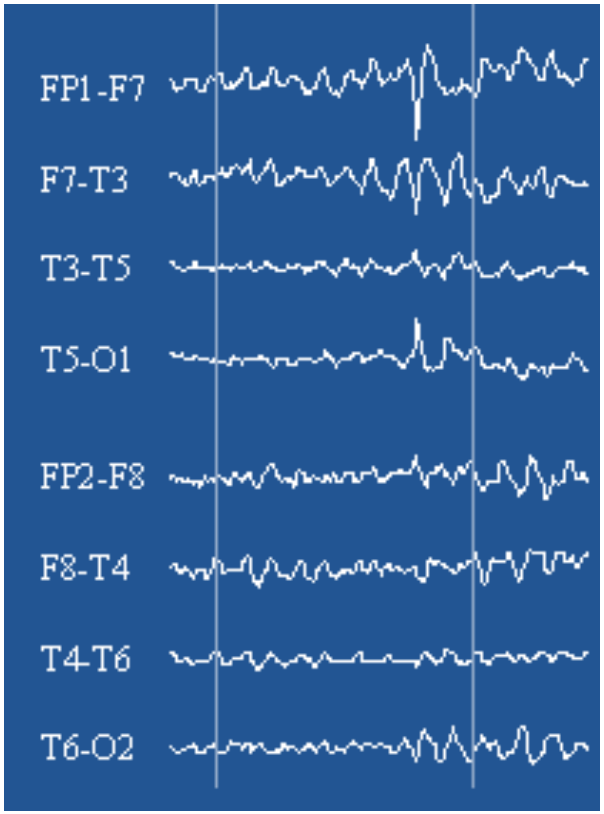
1) Slow waves of youth
2) μ rhythm
3) Posts
4) Lambda waves
5) Slow alpha variant

A.1 Wicket spikes

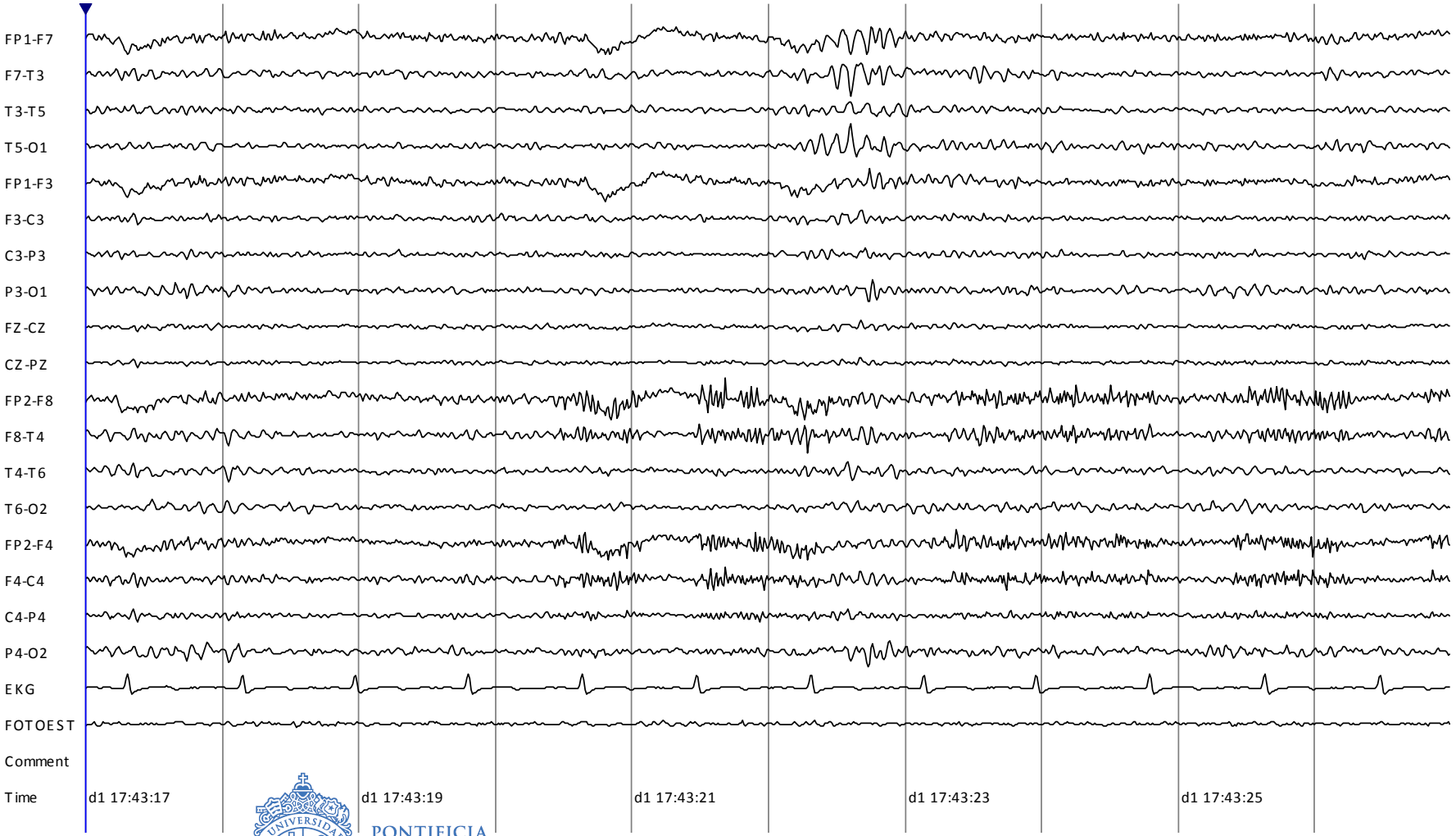
- Lebel y Reiher 1976
- 0.9 % población laboratorio
- Adults, over 50 y.o.
- Light sleep
- Excepcionally in wakefulness
- Midtemporal region

Wicket Spikes

- Monophasic, sharp waves
  - comb-like
  - without slow wave
- 6-11 Hz, negative polarity
- Uni or bilaterales, asynchronous
- Mid to high amplitude
- Isolated or brief rhythm



Wicket Spikes



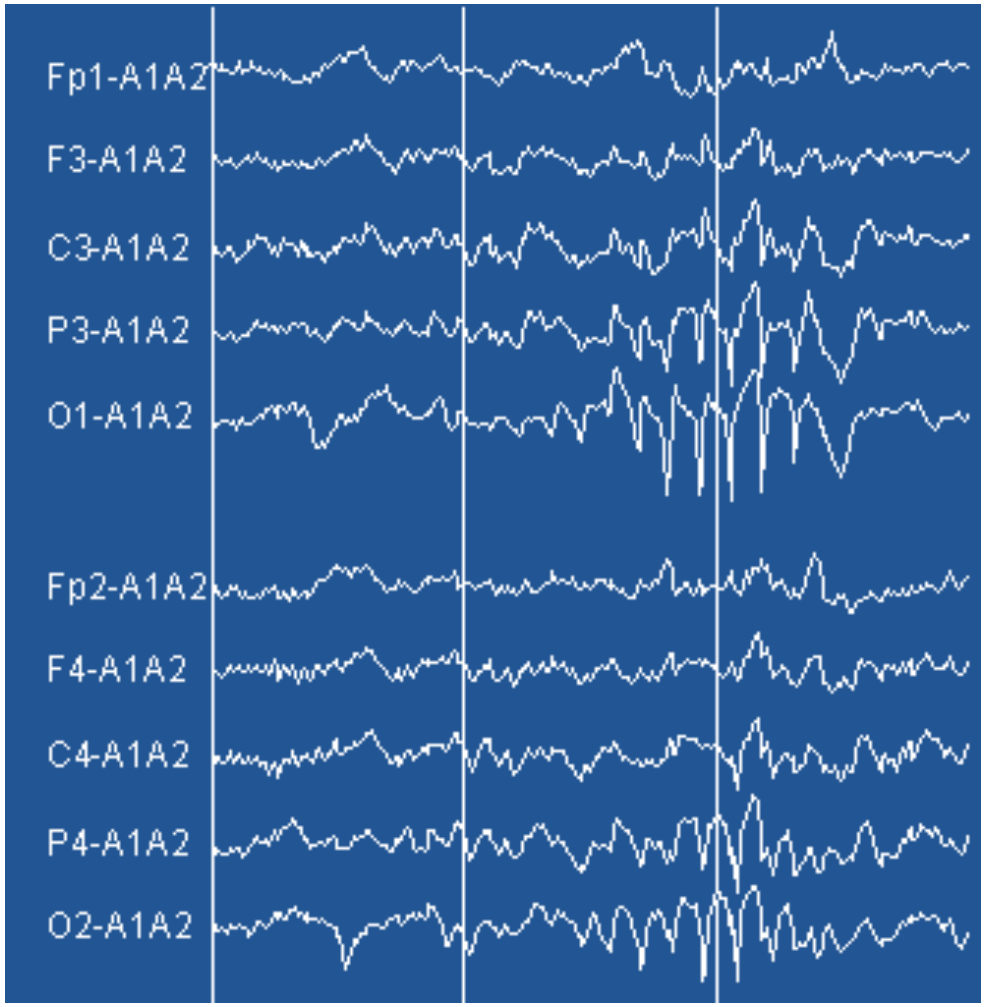
A.2 14 and 6 Positive Spikes

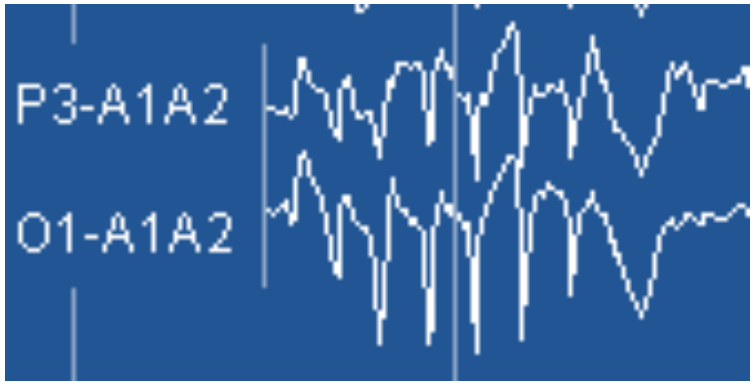
- Gibbs y Gibbs (1951)
- Children and adolescents (6-16 y.o.)
- Light sleep
- Rarely in wakefulness (<10%)

14 and 6 Positive Spikes

- Bilateral, but lateralized
  - ocasionally unilateral
- Posterior temporal maximum
- Both frequencies (14 Hz or 6 Hz) mixed or only one

14 and 6 positive spikes





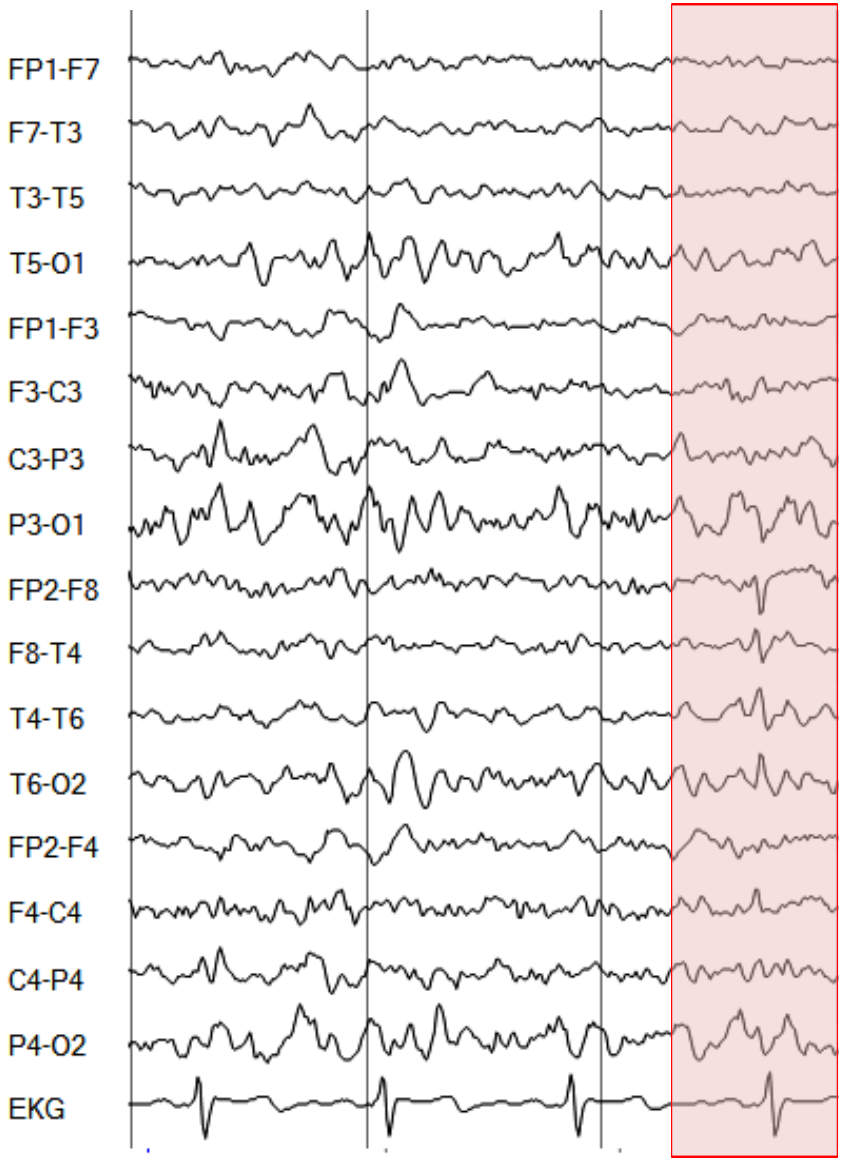
Positivity in Grid 1 (P3 and O1)

A.3 SSS/BETS

- Gibbs and Gibbs, 1964
- Small Spikes of Sleep (SSS)
- Benign Epileptiform Transients of Sleep (BETS)
- Gibbs and Gibbs (1964)
- Up to 20% in population studies

SSS/BETS

- Features
  - Light sleep
  - Morphology:
    - Fast spike (65 msec or less)
    - Small amplitude
    - No slow wave
    - Stereotyped
  - Wide distribution
    - Temporal Maximum
      - Uni or bilateral independent


FP1-F7
F7-T3
T3-T5
T5-O1
FP1-F3
F3-C3
C3-P3
P3-O1
FP2-F8
F8-T4
T4-T6
T6-O2
FP2-F4
F4-C4
C4-P4
P4-O2
EKG

A.4 Phantom spikes

- 6 Hz spike and wave
- Low amplitude
- Brief bursts (1-2 sec)
- In drowsiness and light sleep
- Posterior
- Uncertain sginificance if:
    - Anterior
    - In wakefulness
    - Higher amplitude

B.1 Rhytmic Midtemporal Discharges

- Formerly: “psychomotor variant”
- Young adults and adolescents
- Somnolence
- Bursts of médium voltaje rhythmic theta, 5-7 hz, mid (posterior) temporal
- Uni or bilateral
- Resembles an ictal pattern


FP1-F7
F7-T3
T3-T5
T5-O1
FP1-F3
F3-C3
C3-P3
P3-O1
FZ-CZ
CZ-PZ
FP2-F8
F8-T4
T4-T6
T6-O2
FP2-F4
F4-C4
C4-P4
P4-O2

B.2 SREDA

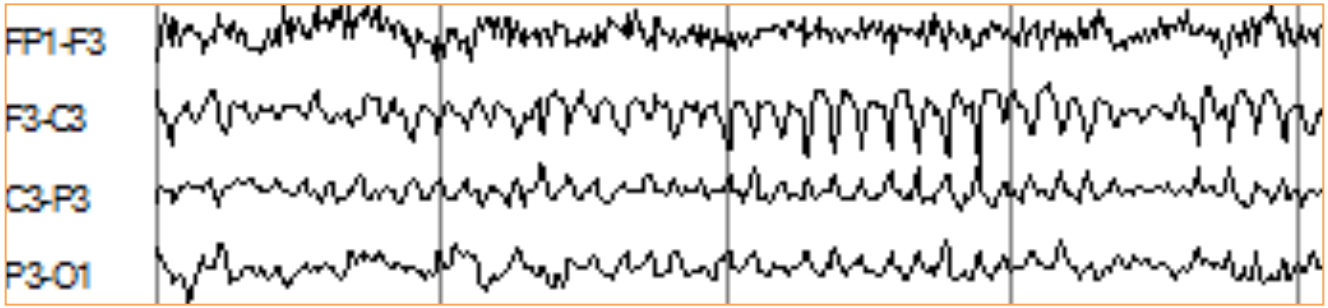
- Uncommon
- Rhythmic theta, sharp contoured, 20-60 sec.
- Bilateral posterior maximum
- 20-60 sec., shows certain evolution
  - resembles a seizure pattern
- Waking adults (over 50 y.o.)

C.1 Slow waves of youth

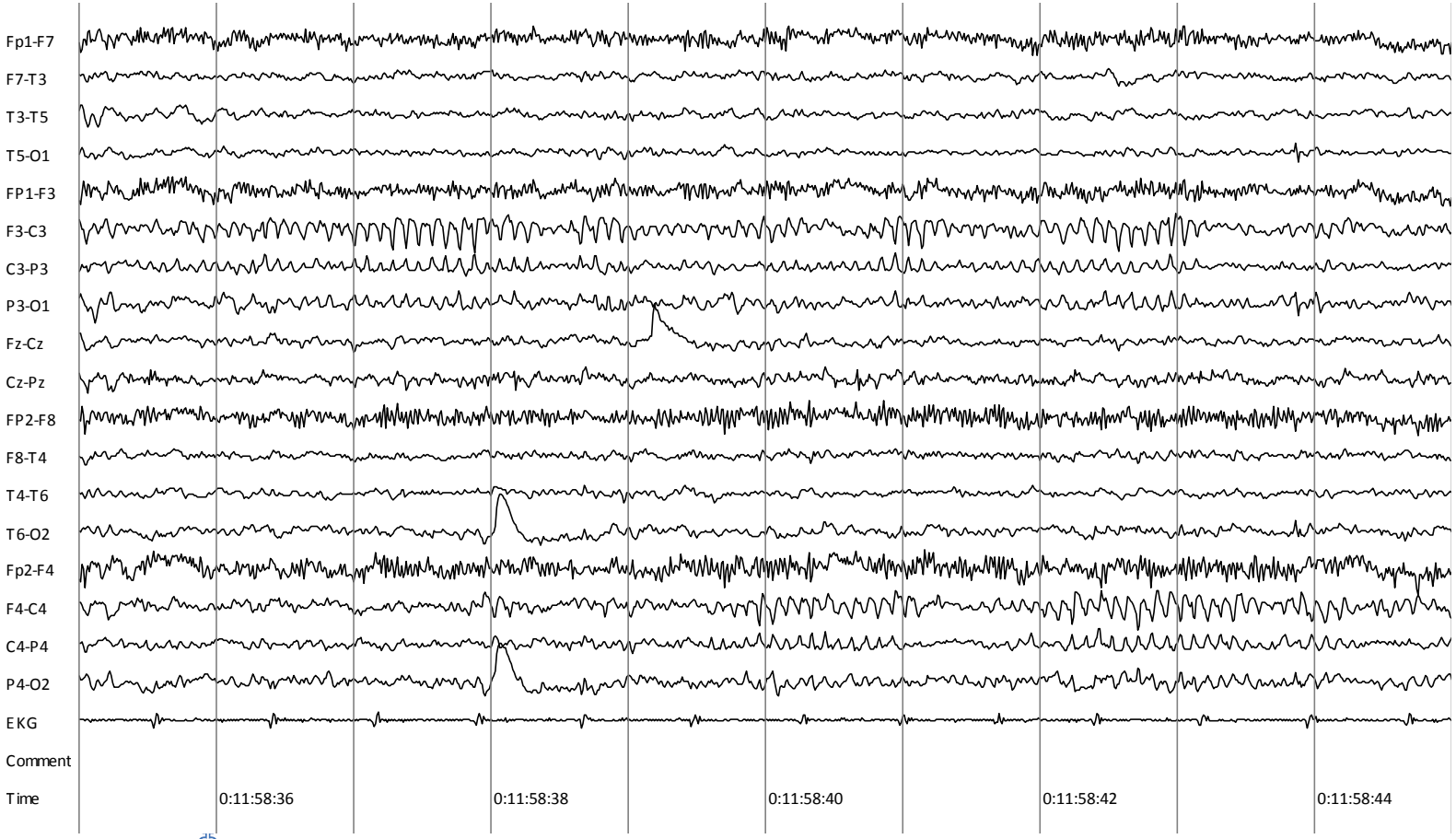
- Posterior delta waves
- Reactive
- Midvoltage
- Superimposed on alpha
  - Mix might appear sharp

C.2 μ Rhythm

- Brief arciform rhythm
- Central maximum
- Uni or bilateral, asymmetric, asynchronous
- Alpha frequency
- Medium amplitude
- Reactive to contralateral hand movement

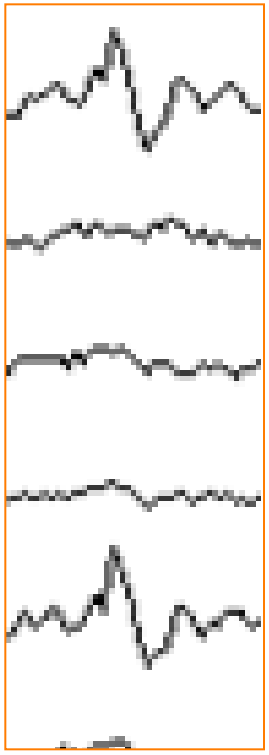


μ Rhythm


Fp1-F7
F7-T3
T3-T5
T5-O1
FP1-F3
F3-C3
C3-P3
P3-O1
Fz-Cz
Cz-Pz
FP2-F8
F8-T4
T4-T6
T6-O2
Fp2-F4
F4-C4
C4-P4
P4-O2
EKG
Comment
Time
0:11:58:36
0:11:58:38
0:11:58:40
0:11:58:42
0:11:58:44

Positive Occipital Sharp Transients of Sleep (POSTS)

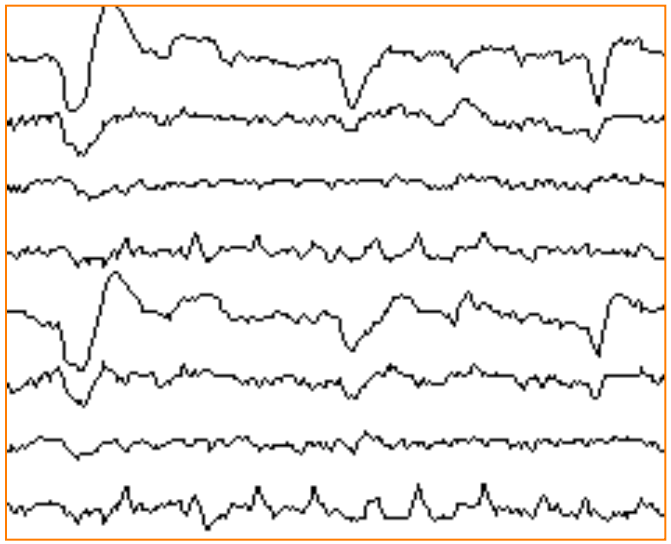
- Any age
- Light sleep
- Positive polarity
- Maximum occipital
- Triangular shape
- Isolated or in brief trains
- Can be asymmetric
  - Rarely unilateral



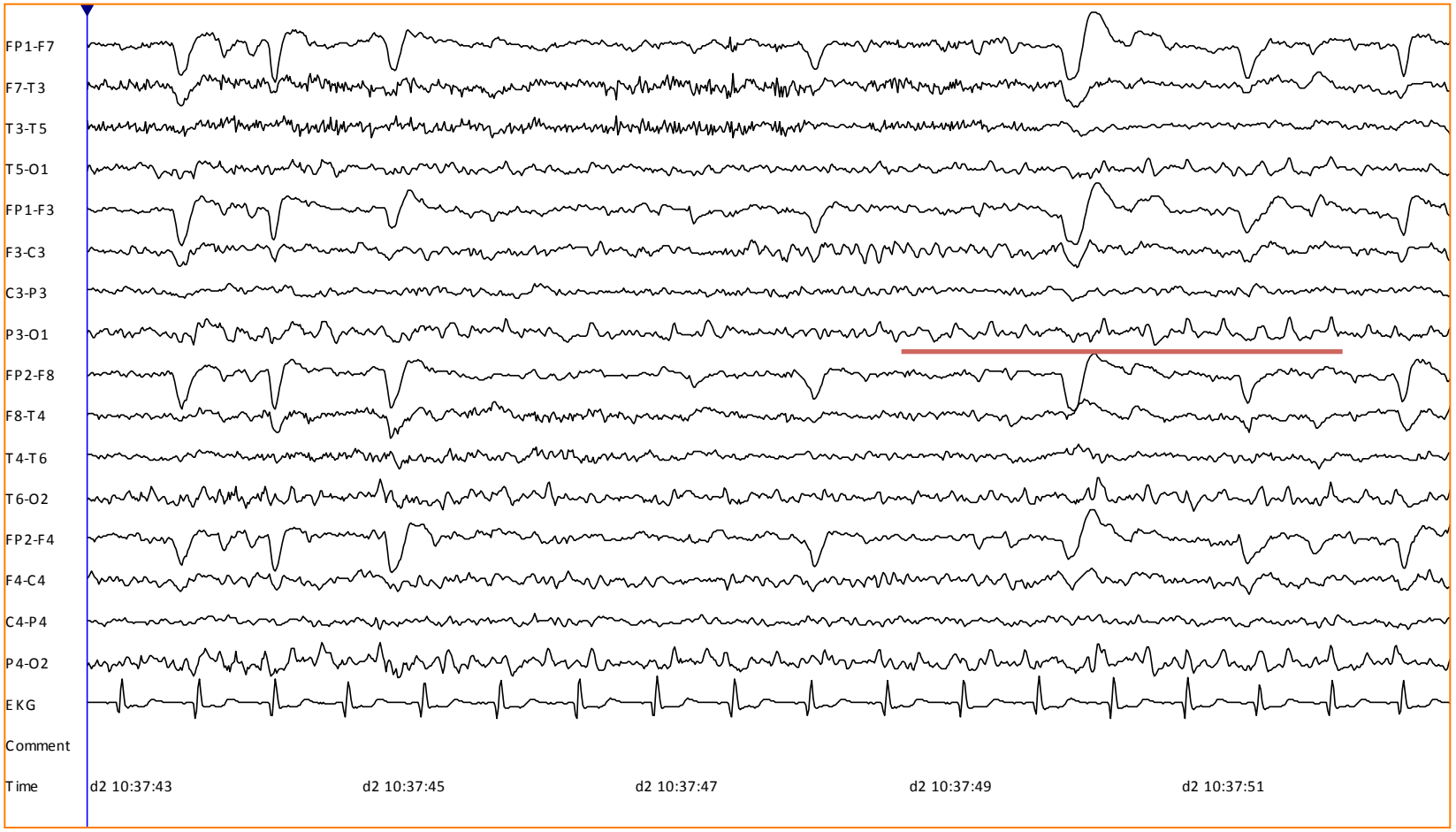
C.3 Positive Occipital Sharp Transients of Sleep (POSTS)

C.4 Lambda Waves

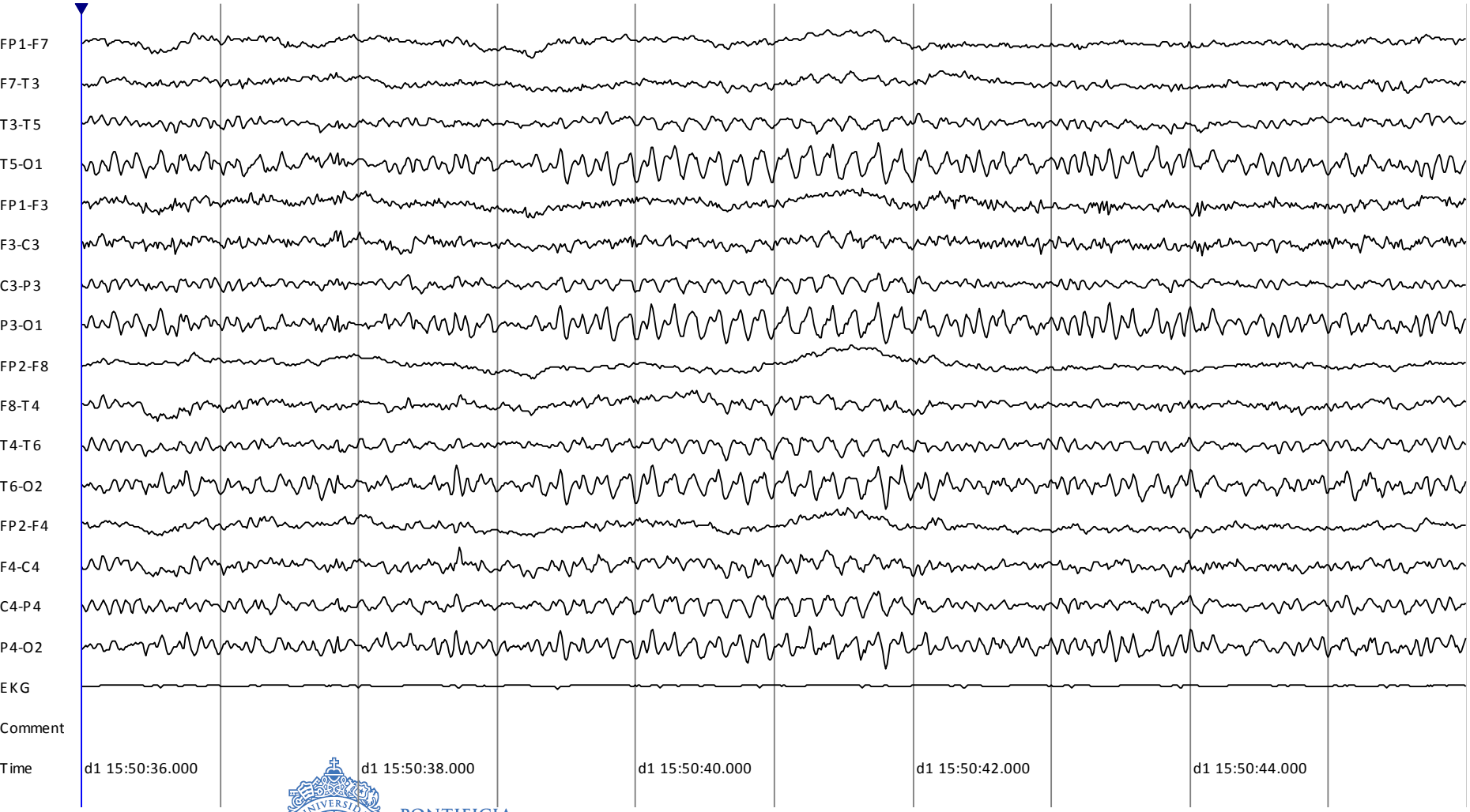
- During wakefulness
- Morphology similar to Posts
- Surface positive
- Occipital, bilateral
- Sharply
- During visual scanning: reading
- May be asymmetric



Lambda Waves



C.5 Slow alpha variant



Key points

- There are several EEG focal and sharp transients which have no association with epilepsy
- Normal variants can be confused with both interictal epileptiform discharges and ictal patterns
- Most of them appear at certain age, during sleep, in otherwise normal EEGs
- Differentiation from genuine pathological epileptiform discharges is very relevant clinically