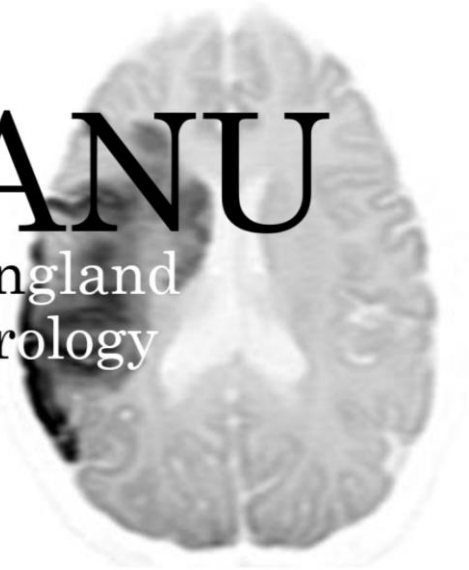
NEANU
North of England
Acute Neurology
Update



Blackouts

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MANCHESTER 1824
The University of Manchester

Manchester Centre for
Clinical Neurosciences

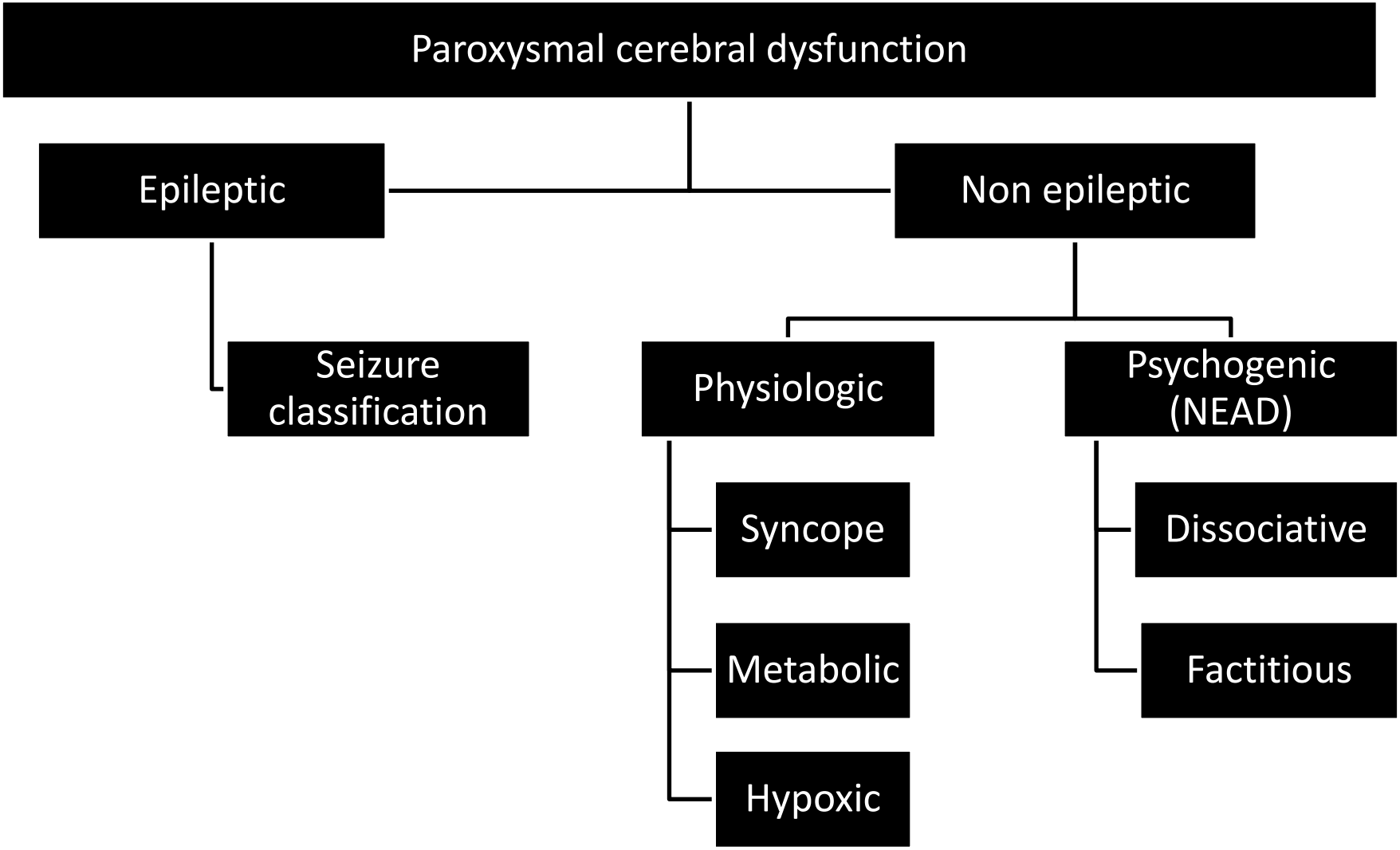
Salford Royal NHS
NHS Foundation Trust

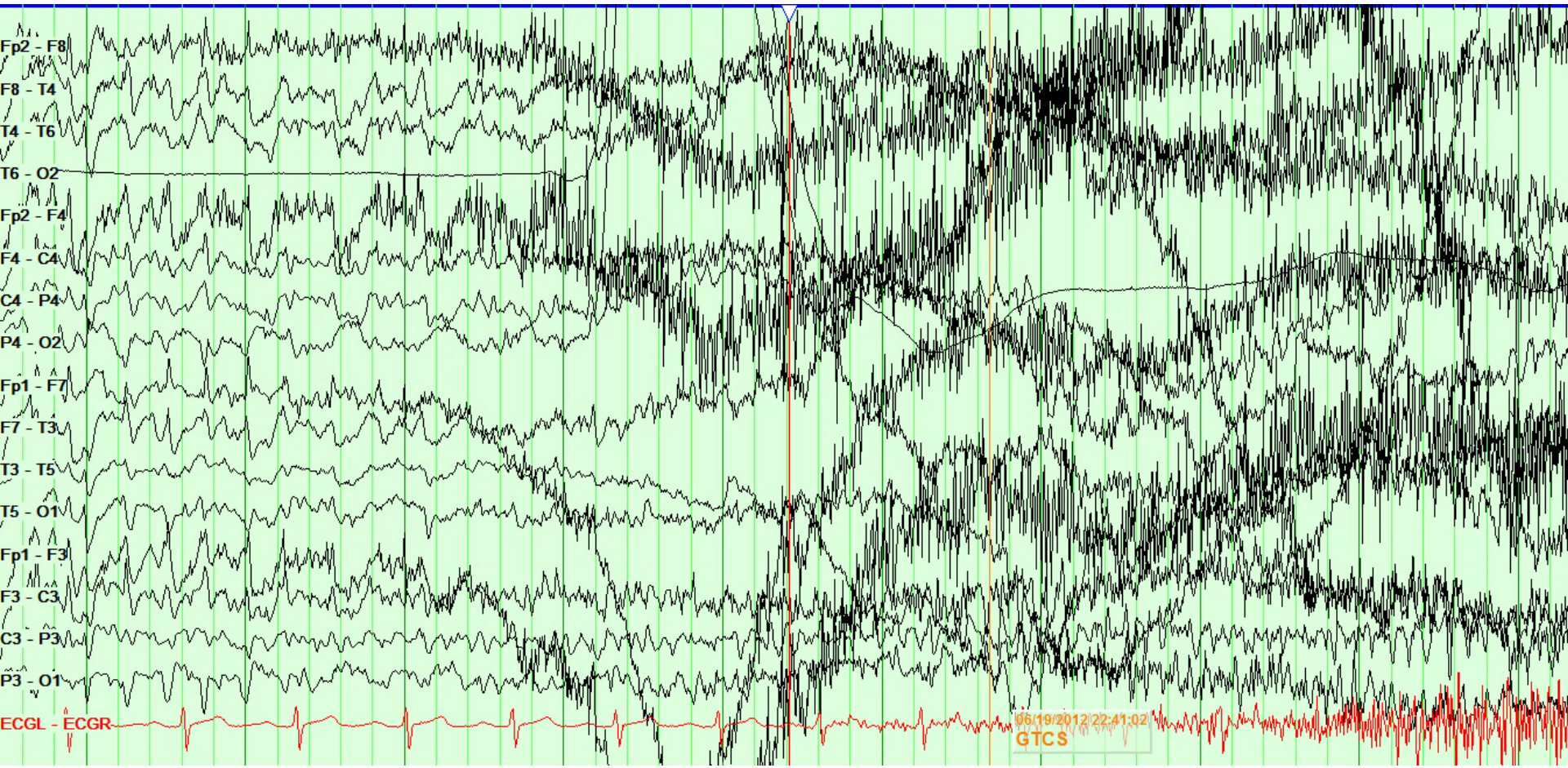
Making a diagnosis

- To make a diagnosis in blackouts
  - Reconstruct the event from descriptions (collateral from eyewitness). Before, during, after.
  - Obtain video
  - Video EEG
- 12 lead ECG in all patients
- Judicious use of imaging and EEG
- Discussion with neurology / epilepsy service
- First seizure clinics
- Discussion around driving / employment

'a routine inter-ictal EEG is one of the most abused investigations in clinical medicine and is unquestionably responsible for great human suffering'

Chadwick D. Diagnosis of epilepsy. Lancet. 1990;336:291–5


Paroxysmal cerebral dysfunction
Epileptic
Non epileptic
Seizure classification
Physiologic
Psychogenic (NEAD)
Syncope
Metabolic
Hypoxic
Dissociative
Factitious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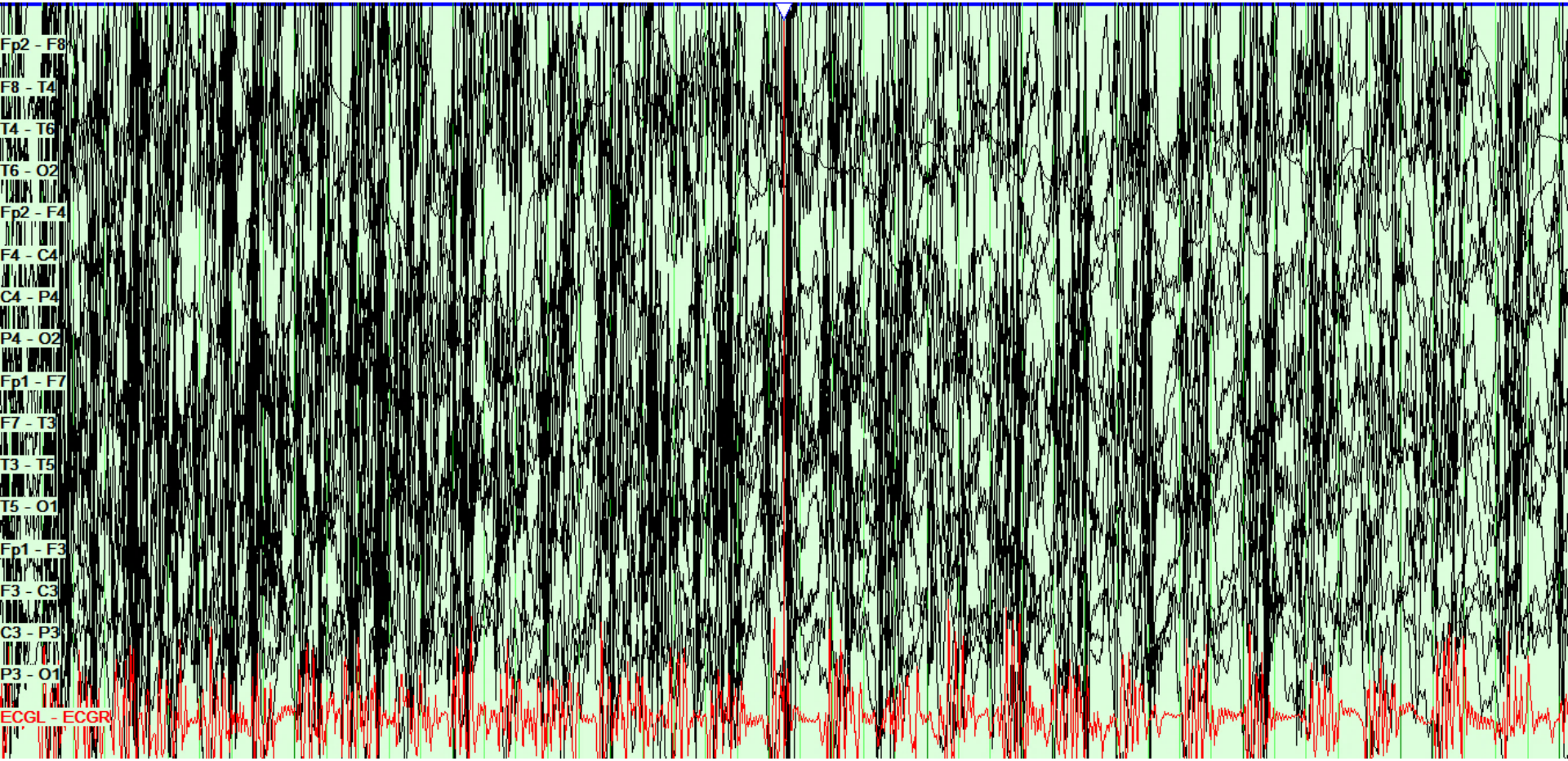
F8 - T4
T4 - T6
T6 - O2
Fp2 - F4
F4 - C4
C4 - P4
P4 - O2
Fp1 - F7
F7 - T3
T3 - T5
T5 - O1
Fp1 - F3
F3 - C3
C3 - P3
P3 - O1
ECGL - ECGR
06/19/2012 22:41:02
GTCS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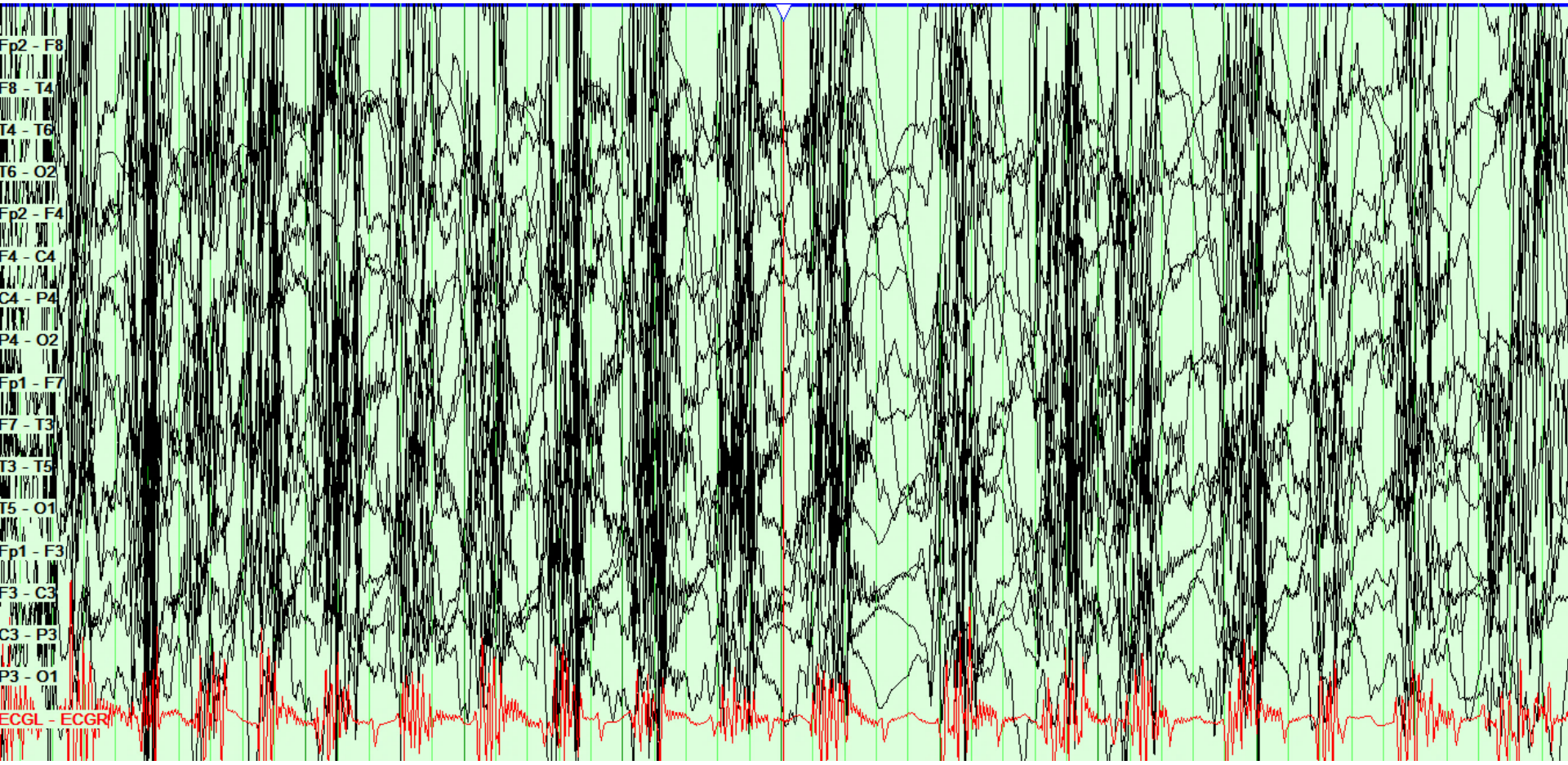
F3 - C3
C3 - P3
P3 - O1
ECGL - ECGR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C3 - P3
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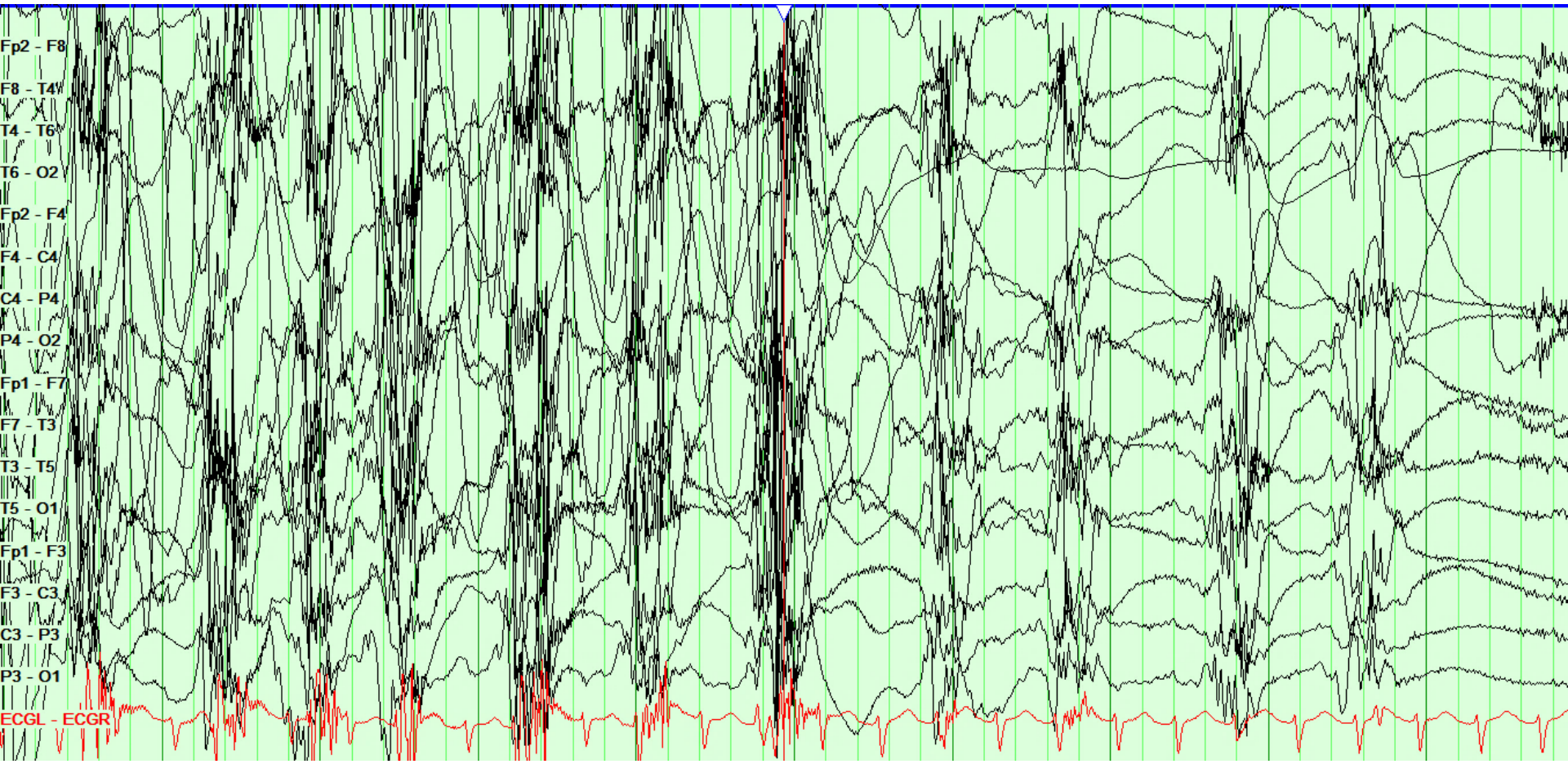
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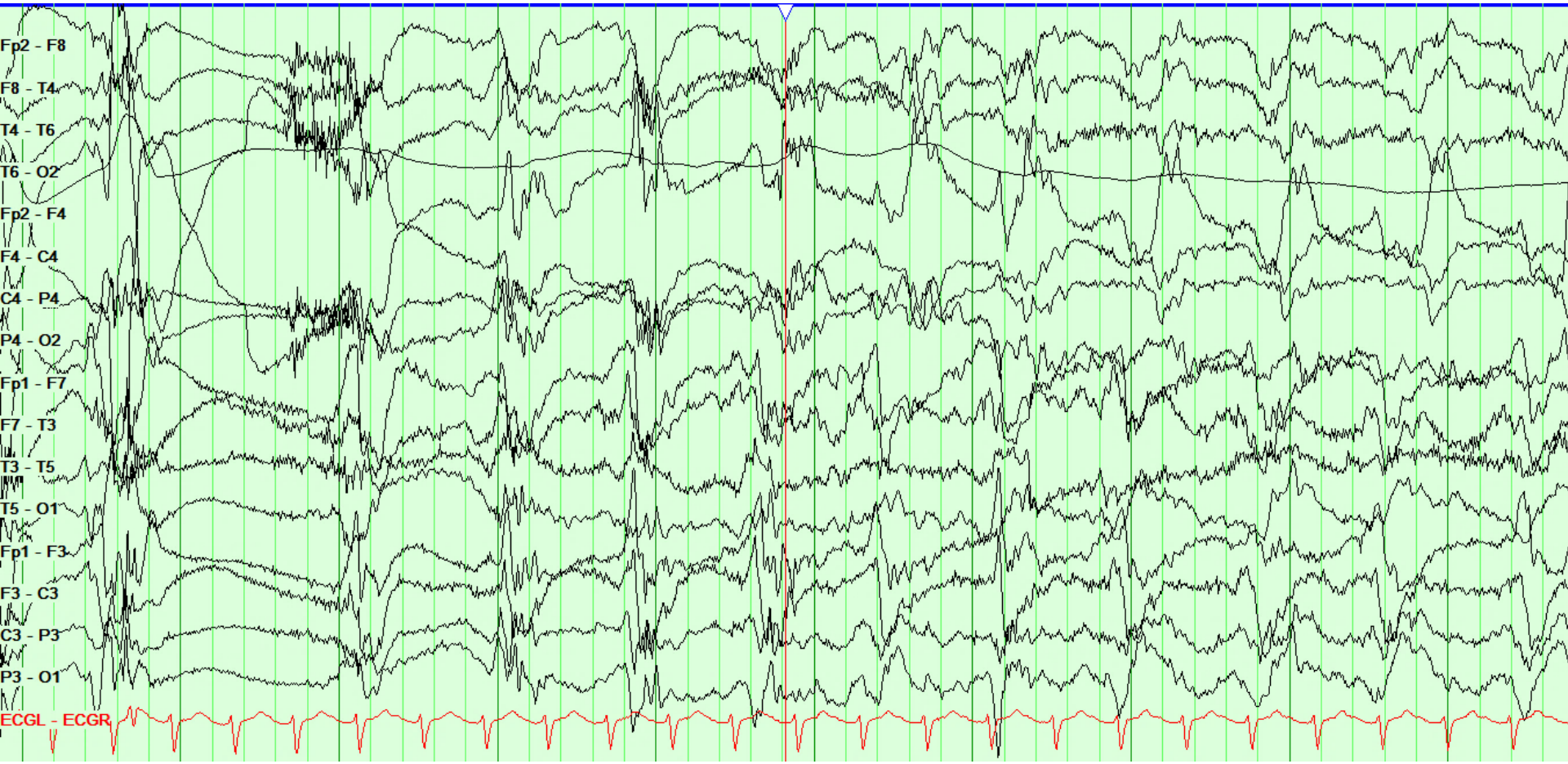
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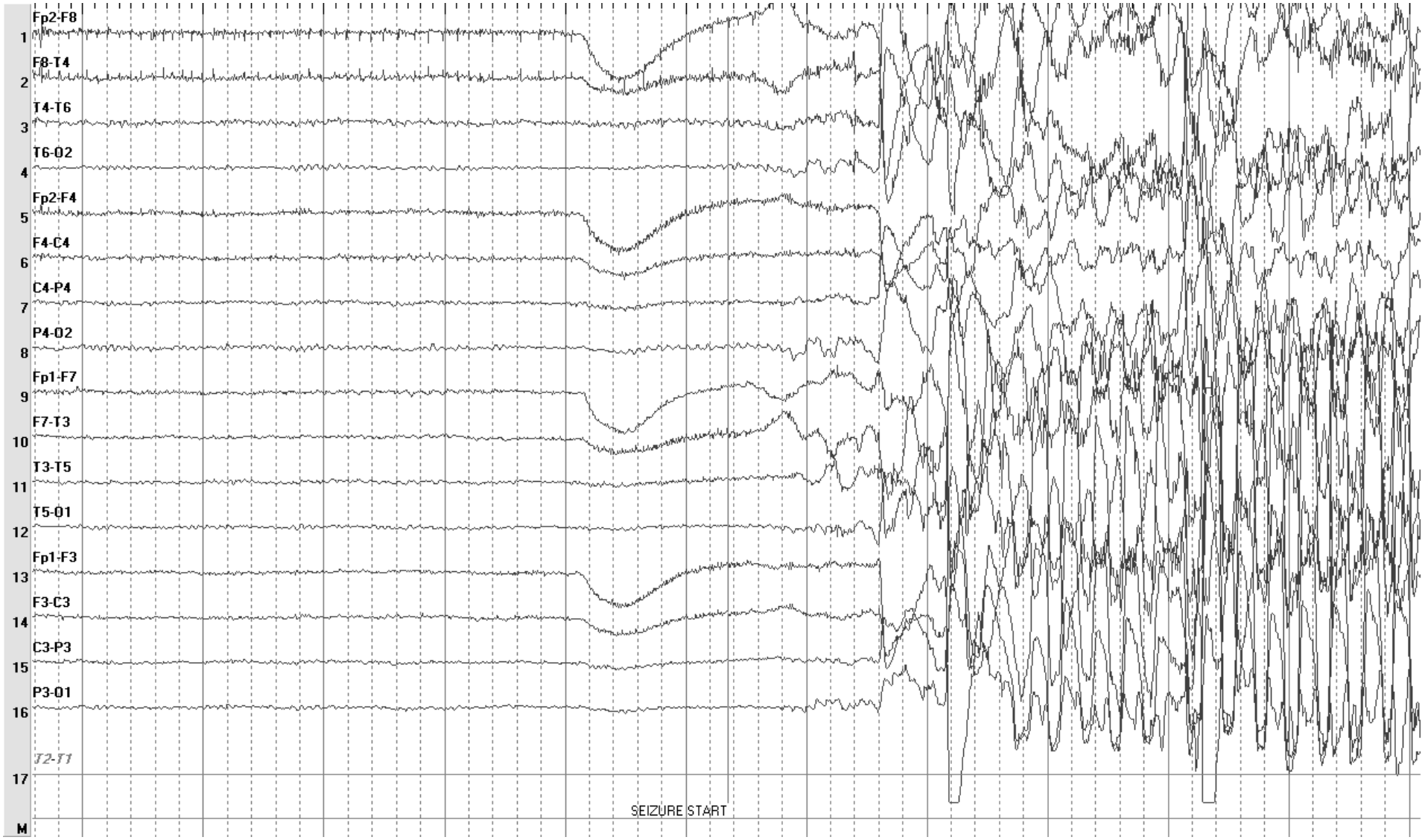
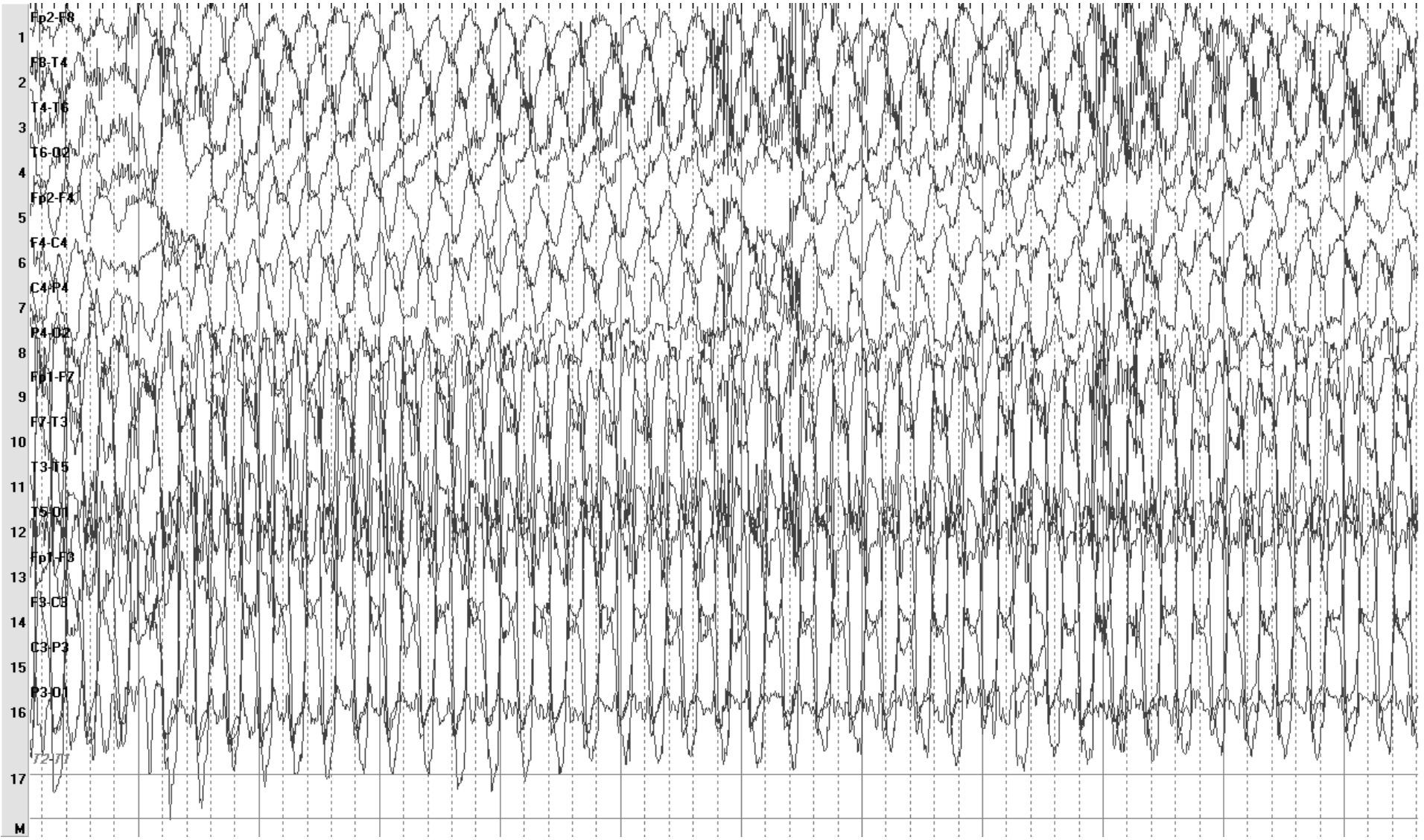
EEG during dissociative event



A sudden onset of completely obscured EEG with a mixture of movement and muscle artefact.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F7-T3
T3-T5
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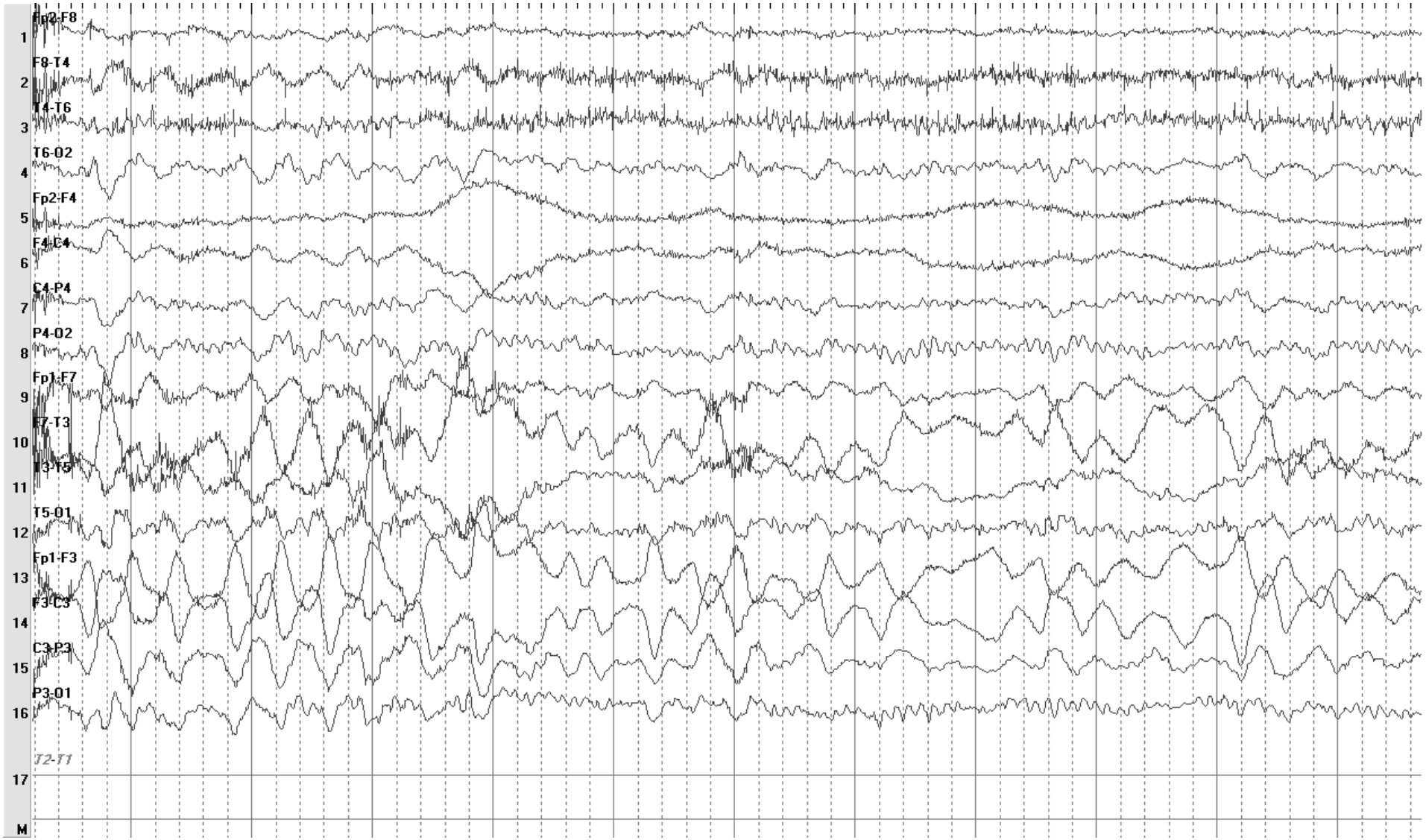


Abrupt termination of convulsive episode. When the artefact disappears there is no postictal slowing or suppression, there is normal alpha rhythm.

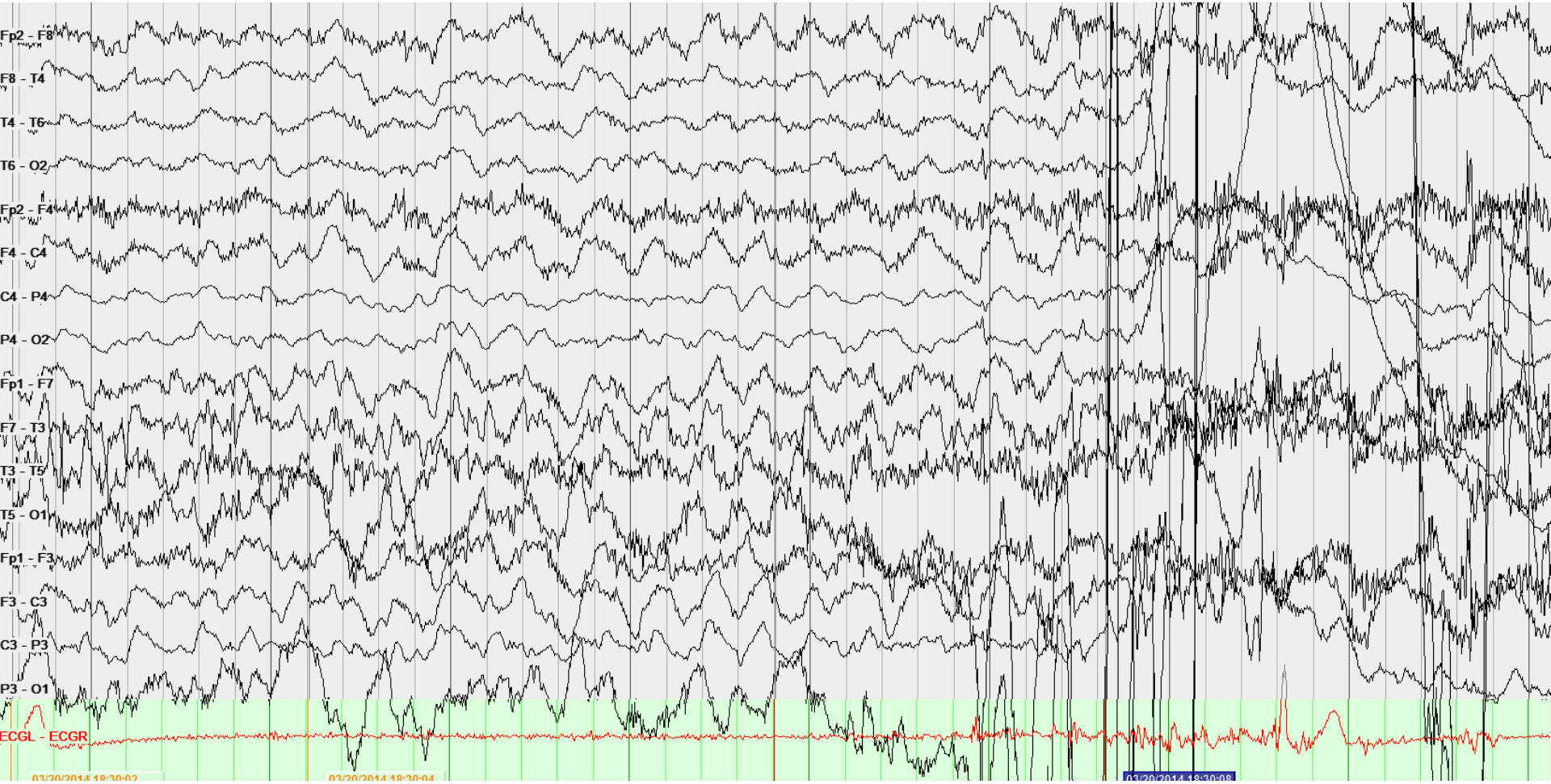
Non epileptic attack disorder (NEAD)
Psychogenic non epileptic seizures (PNES)
Dissociative attacks

- High frequency of events
- Prolonged events (A significant proportion of apparent ‘status’ in inpatients)
- Attacks in medical situations (waiting room, scanner)
- History of other unexplained medical conditions
- Very gradual onset or termination
- Pseudosleep (prolonged eye closure associated with complete unresponsiveness)
- Discontinuous (stop-and-go)
- Irregular, or asynchronous (out-of- phase) activity including side-to-side head movement
- Pelvic thrusting and opisthotonic posturing
- Post-ictal crying

Plug L, Reuber M. Making the diagnosis in patients with blackouts: it's all in the history. Pract Neurol. 2009; 9: 4-15.
Brown et al. Psychogenic nonepileptic seizures. Epilepsy and behaviour. 2011
Images: Bourneville DM, Regnard P. Iconographie photographique de la Salpêtrière. Paris: Progrès Medical; 1877.

Syncope

- Some motor activity is common
  - Multifocal twitching
  - Occasionally stiffening
- More pronounced in
  - Prolonged (not recumbent)
  - Severe (cardiogenic)
- Distinguishing from GTCS
  - Typical prodrome in vasovagal syncope
  - Brevity
  - Lack of post ictal features



Ictal asystole / Temporal lobe syncope

ILAE classification of SE 2015

With prominent motor symptoms

- **Convulsive SE (CSE, synonym: tonic–clonic SE)**
  - Generalized convulsive
  - Focal onset evolving into bilateral convulsive SE
  - Unknown whether focal or generalized
- **Myoclonic SE (prominent epileptic myoclonic jerks)**
  - With coma
  - Without coma
- **Focal motor**
  - Repeated focal motor seizures (Jacksonian)
  - Epilepsia partialis continua (EPC)
  - Ictal paresis (i.e., focal inhibitory SE)

Without prominent motor symptoms (NCSE)

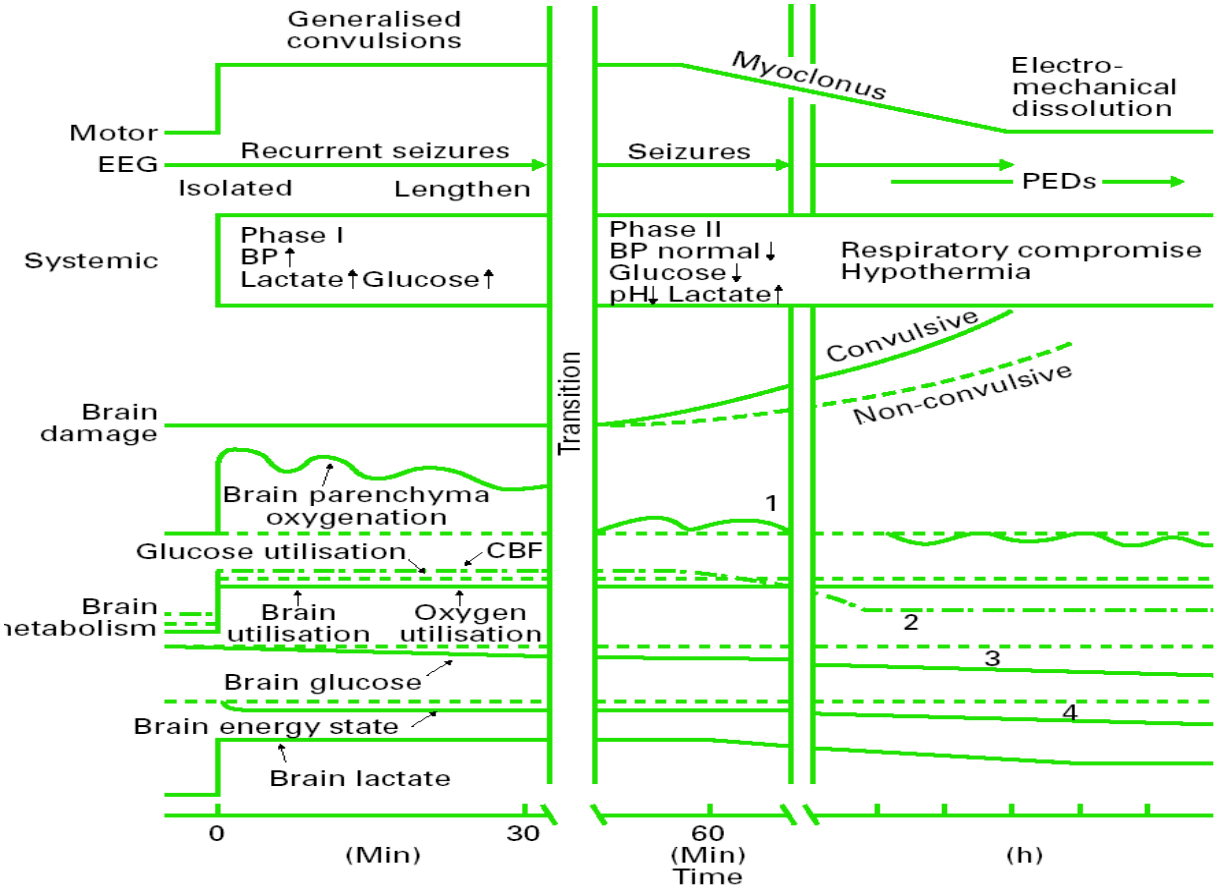
- **NCSE with coma (including "subtle" SE)**
- **NCSE without coma**
  - Generalized e.g. absence status
  - Focal
    - Without impairment of consciousness (aura continua, with autonomic, sensory, visual, olfactory, gustatory, emotional/psychic/experiential, or auditory symptoms)
    - Aphasic status
    - With impaired consciousness

Consider in any encephalopathic patients with epilepsy, structural brain lesions and learning difficulties.

May present as a confusional state in the elderly

Trinka E et al ILAE Task Force on Classification of Status Epilepticus, Epilepsia 56 (2015) 1515–1523

Convulsive status epilepticus



As seizure progresses:

- Motor activity becomes less pronounced
- Compensatory mechanisms maintaining cerebral oxygenation fail
- Brain damage occurs

Convulsive seizure activity >5 minutes

Airway, Breathing, Circulation
Start high flow O2
IV access, Urgent bloods*
BM, SaO2, ECG, BP

Consider in all patients:
Hypoglycaemia

***Urgent bloods**
FBC, U&E, LFTs, Ca, Mg. PO_4.
ESR, CRP, Coag. screen
AED levels, Toxicology

REVIEW DIAGNOSIS

Epileptic seizure

Psychogenic non-epileptic attack

5- 30 min Early SE

Lorazepam 4 mg IV bolus

Continuing seizure at 5 minutes

Repeat Lorazepam 4 mg iv

Continuing seizure at 5 minutes

SEIZURE TERMINATED

Observe
Monitor SaO2, pulse, resps
Avoid parenteral drugs
Check notes

Still doubt?

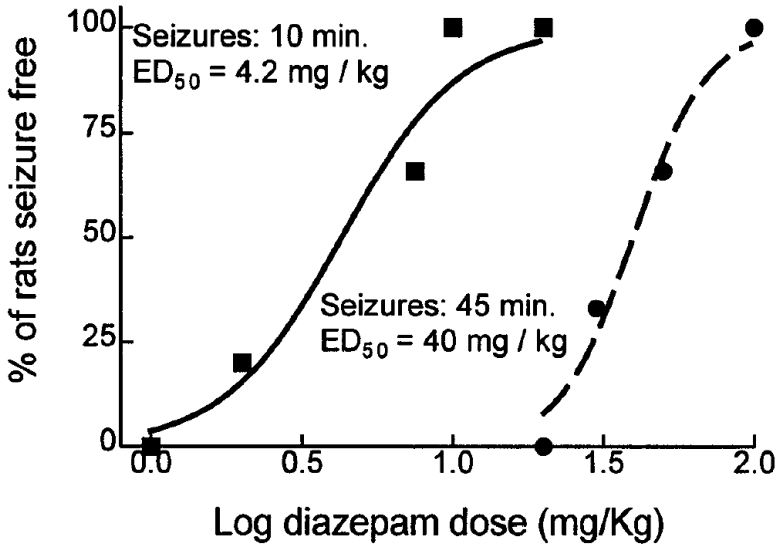
Consider urgent EEG

30-60 min Established SE

Start second line therapy
Valproate / Levetiracetam
Phenytoin
Request ITU review
Check ABG

Continuing seizure after second line drug

REFRACTORY STATUS



FURTHER MANAGEMENT

GCS <10, need urgent ITU review
r airway management
rgent EEG to exclude non-
onvulsive SE

phenytoin used, send levels 2hrs
ost loading

scuss with Neurology registrar on
ll re optimisation of AEDs

	Valproate	Keppra (levetiracetam)	Phenytoin
Relative effectiveness	75.7% (95% CI: 63.7-84.8%)	68.5% (95% CI: 56.2-78.7%)	50.2% (95% CI: 34.2-66.1%)
Caution/ CI	Reduced use in females since MHRA warning in 2015	Can cause irritability and mood disturbance.	Cardiovascular problems. Frailty Hyponatremia Hemodynamic instability or sepsis. Poor IV access Burning, bradycardia or hypotension? – slow infusion. If persistent – stop infusion.
Dose	800 mg IV bolus, 1600 mg over 24 hours	Loading dose 20 mg/kg (1500 – 2000 mg) followed by 1000 – 1500 mg BD	20 mg/kg IV over a minimum of 20 minutes
Other considerations	Traditionally the favoured AED in neurosurgery	Faster elimination in neuro-ICU setting (maintenance of 1000 mg TDS) Bioavailability reduces by 30% on switching from IV to oral preparation in ICU patients Least likely to cause drug interactions	Monitor levels

The relative effectiveness of five antiepileptic drugs in treatment of benzodiazepine-resistant convulsive status epilepticus: A meta-analysis of published studies Yasiry & Shorvon Seizure 2014; 23: 167-174

Management of refractory SE on ICU

Maintain burst suppression with no breakthrough seizures for 24 - 48 hours

Convulsive seizure activity for 40 – 60 minutes, not terminated by IV lorazepam x 2 and second line agent (eg: IV valproate)

General anaesthesia with
Propofol 1-2 mg/kg bolus, repeated as necessary and then continuous infusion
Midazolam 0.1–0.2 mg/kg bolus, repeated as necessary then continuous infusion

Intubate, ventilate
Admit to ITU
Observe for subtle convulsive activity
If ongoing motor activity,
Thiopentone 3-5 mg/ kg bolus, and continuous infusion with CFAM monitoring

Obtain urgent EEG to ensure electrographic seizures abolished and burst suppression achieved

Continuous EEG monitoring, or regular EEG recordings
Correct any metabolic derangement
Ensure on adequate antiepileptic medication
If on phenytoin, check level – consider further IV loading dose
Neurology review

Daily Bloods
FBC, U&E, LFT, CRP, CK, Coagulation screen, Phenytoin levels
Daily EEG (if continuous monitoring not available)