Tips and pitfalls in treating epilepsy:

Lessons from small to large-scale hospitals

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Common misconceptions about epilepsy surgery

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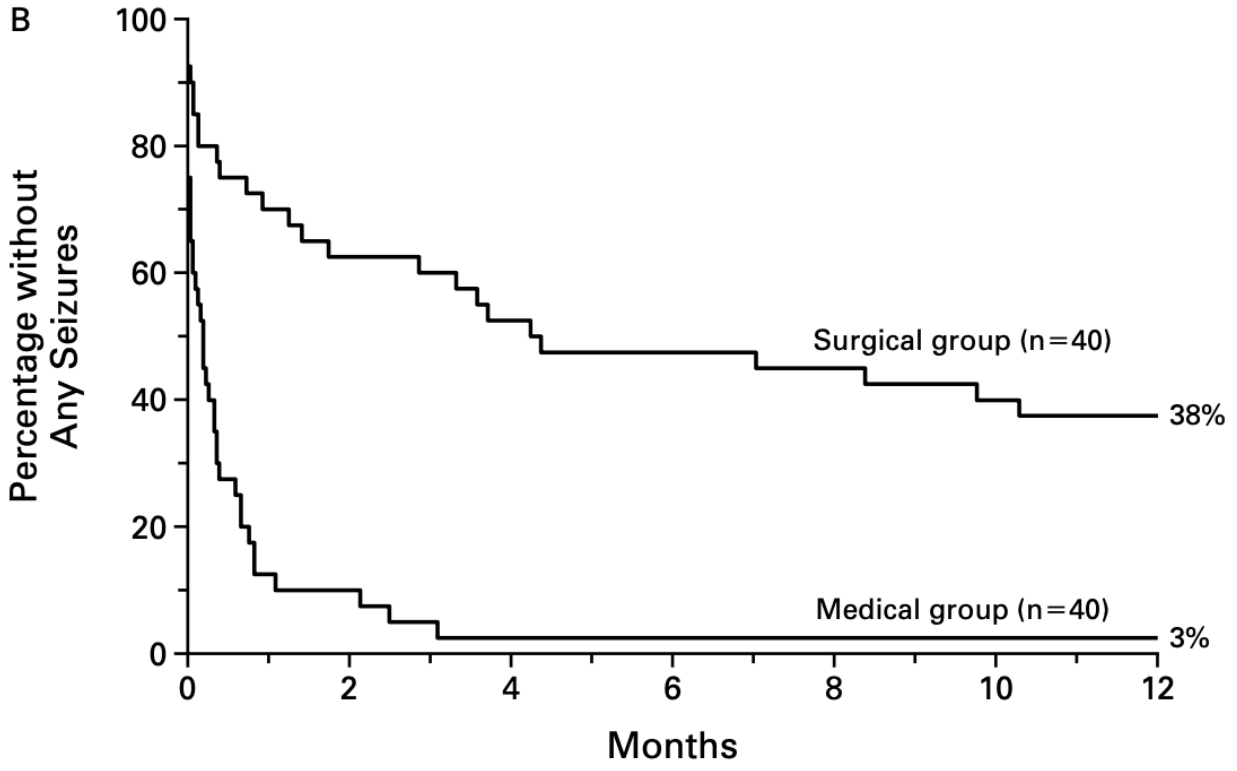
Benefits of Epilepsy Surgery

- Avoid seizure-related death
  -Drowning, accident, fatal SE, SUDEPS
- Avoid burden of AEDs
- Stop/ reverse cognitive decline
- Improve comorbidity (ADHD, mood disoder, etc.)
- Improve QOL

RCT for Surgery of TLE

- 80 TLE patients randomly
- assigned to surgery
- (n=40) versus AED
- treatment for one year
- (n=40)
- • At one year 38% in the
- surgical group vs 3% in the
- medical group were
- seizure free: Engel 1A,
- (p<0.001)



Wiebe et al 2001

RCT of Pediatric Epilepsy Surgery

- 57 patients underwent surgery
- At 12 months 44 (77%) were seizure-free,
- 59 patients stayed for one year with medical therapy
- At 12 months 4 (7%) became seizure free

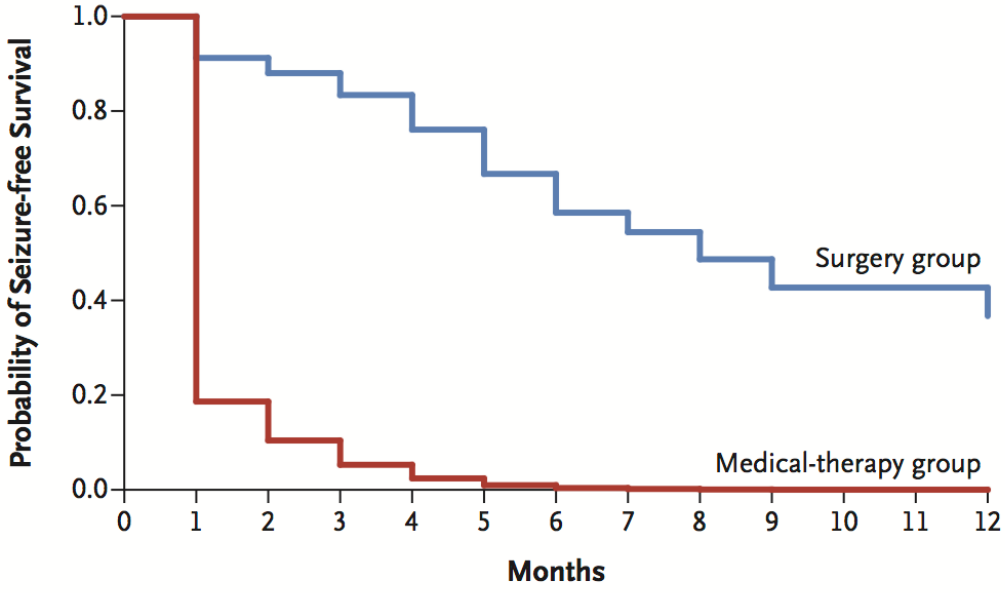


Figure 2. Probability of Seizure-free Survival at 1 Year.

Shown are Kaplan–Meier estimates of the probability of being seizure-free at 1 year in the two study groups. The rate of seizure-free survival was 36.7% in the surgery group and zero in the medical-therapy group (hazard ratio for freedom from seizures in the surgery group, 6.2; 95% confidence interval, 4.6 to 8.2; P<0.001).

Common misconceptions about epilepsy surgery

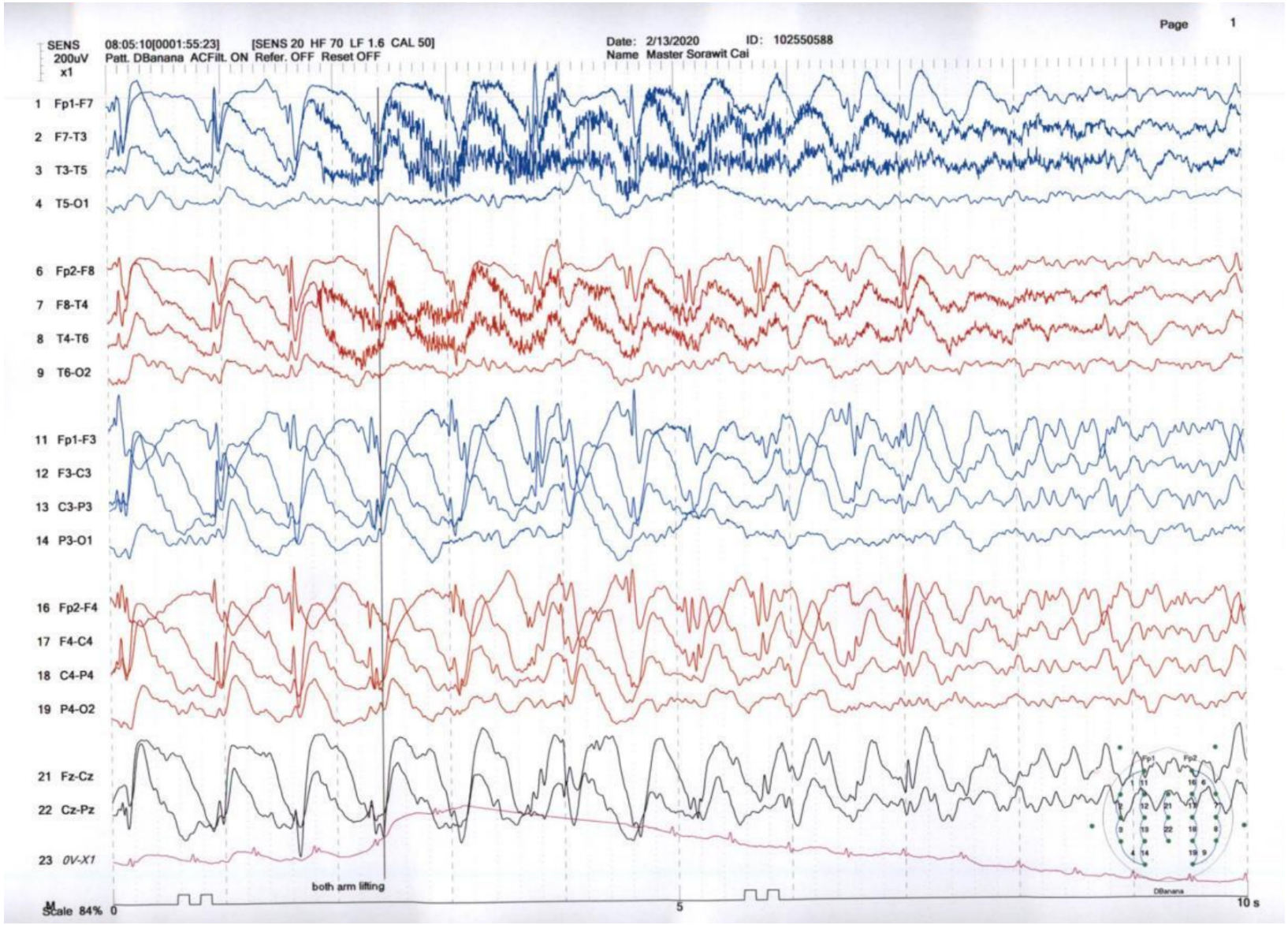
- All anti-seizure medications need to be tried
- Not a good candidate for surgery if:
  - Bilateral/ Generalized interictal epileptiform discharges
  - Very young age
  - Neuroimaging
    - normal brain MRI
    - multiple or diffuse lesions on MRI
    - lesions on the dominant cerebral hemisphere
    - Remoted double pathology
  - Genetic epilepsy

A 7-year-old boy with intractable epilepsy with heterozygous mutation of HNRNPU gene.

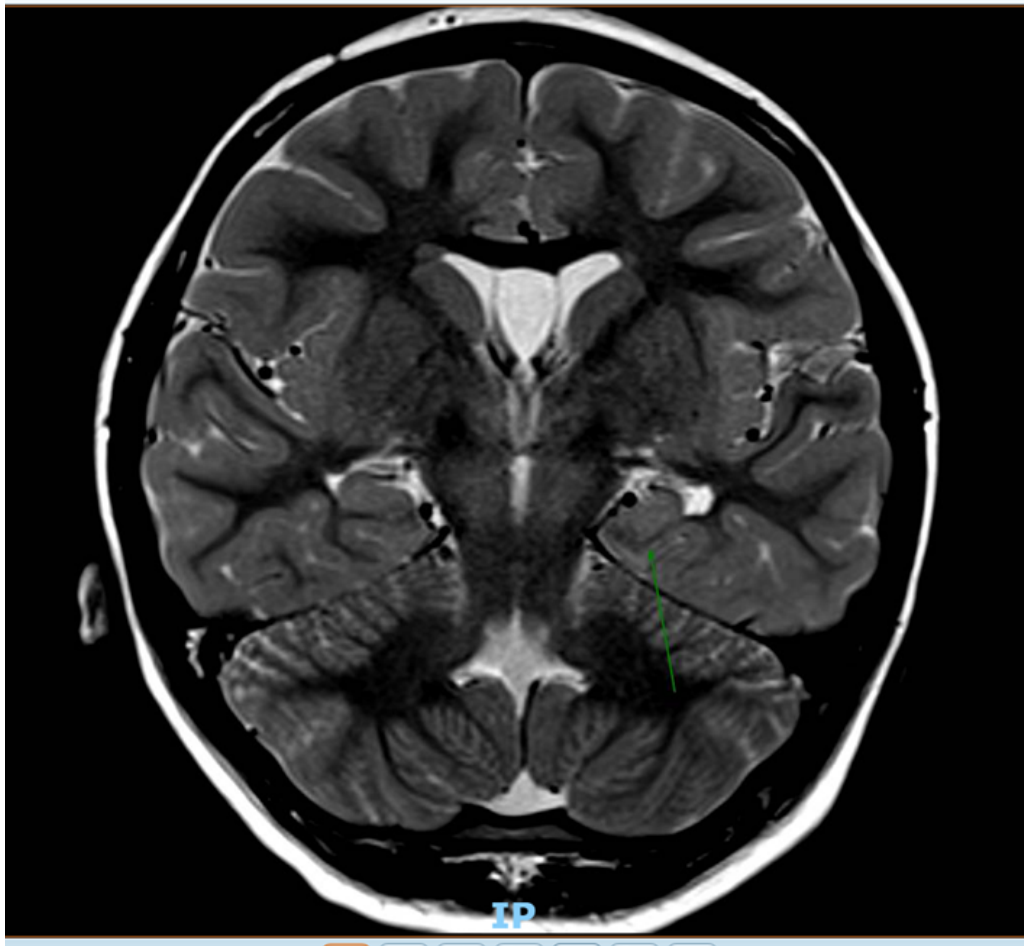
- First seizure at 9 months of age.
- Current seizures: eyes rolled up, both arms up and unresponsiveness, sometimes associated with eyes blinking and lip twitching lasted 1-5 minutes.
- Frequent seizures despite multiple AEDs trial.
- Prior to surgery, seizures became extremely frequent (> 100 sz a day)

Seizure: EEG onset

+ 10 sec

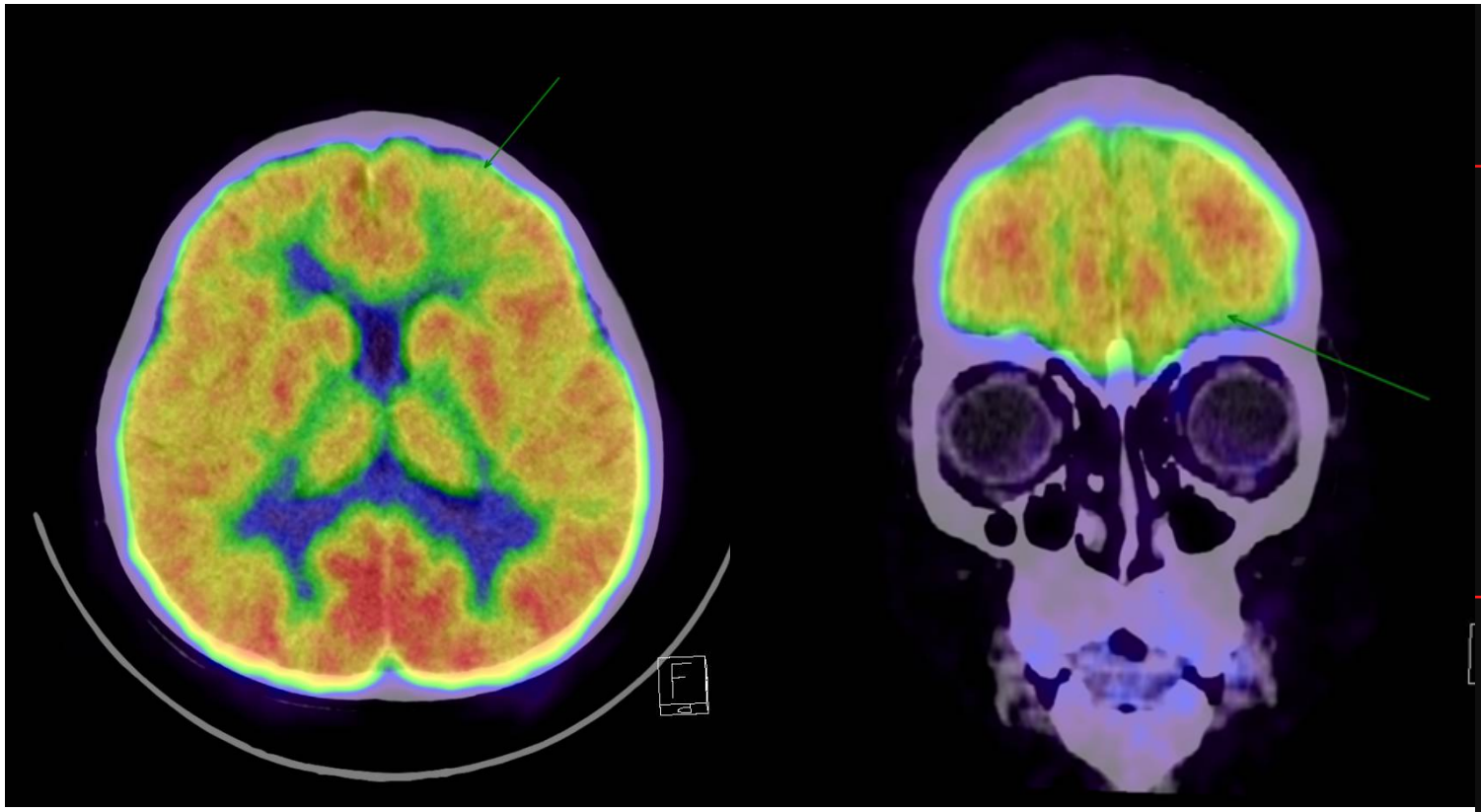

Page 1
SENS 200uV x1
08:05:10[0001:55:23] [SENS 20 HF 70 LF 1.6 CAL 50]
Patt. DBanana ACFilt. ON Refer. OFF Reset OFF
Date: 2/13/2020 ID: 102550588
Name Master Sorawit Cai
1 Fp1-F7
2 F7-T3
3 T3-T5
4 T5-O1
6 Fp2-F8
7 F8-T4
8 T4-T6
9 T6-O2
11 Fp1-F3
12 F3-C3
13 C3-P3
14 P3-O1
16 Fp2-F4
17 F4-C4
18 C4-P4
19 P4-O2
21 Fz-Cz
22 Cz-Pz
23 0V-X1
both arm lifting
Scale 84% 0
5
10 s
DBanana

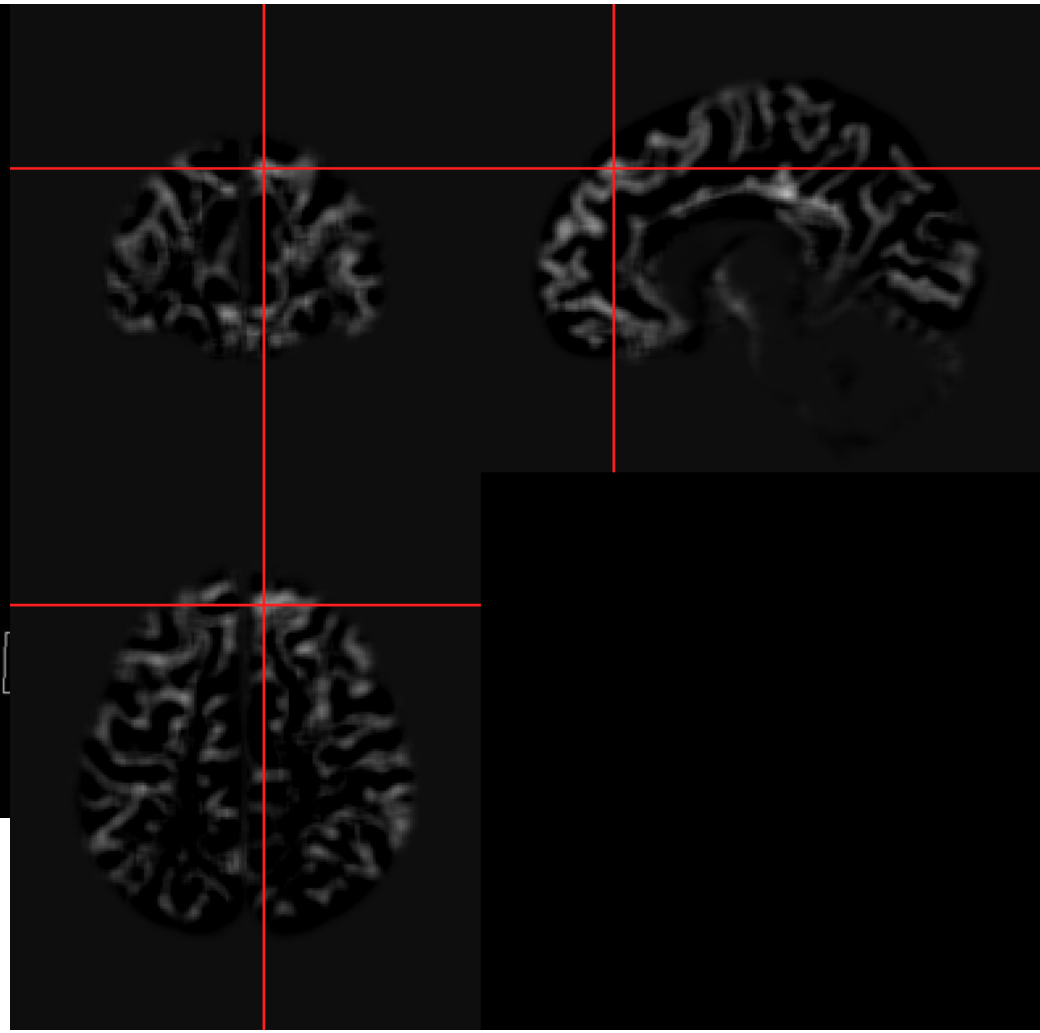
MRI brain



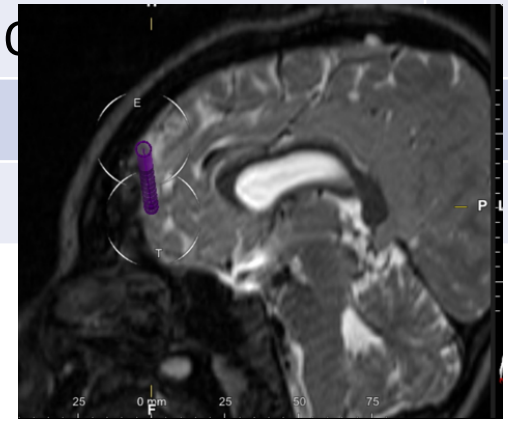
Impression: Incomplete rotation of the left hippocampus

PET/ VBM: Left Frontal

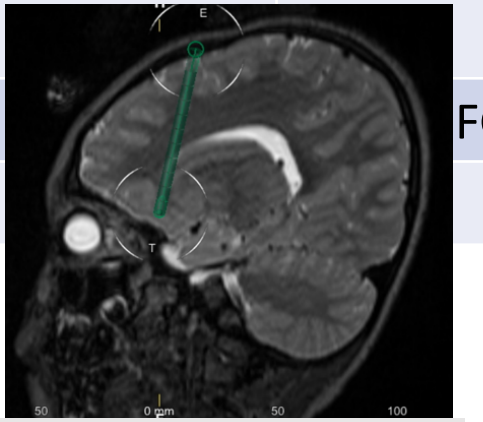




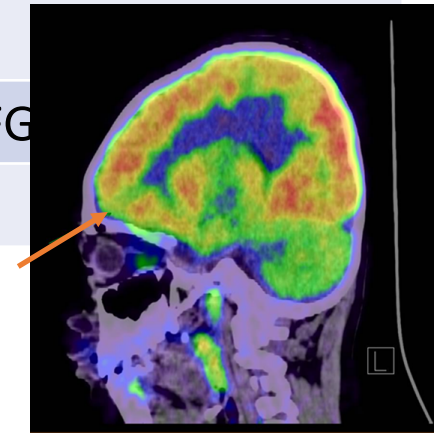
	1	2	3	4	5	6	7	8	9	10
F’	Frontomedial			WM		Frontopolar				
O’	Gyrus rectus			WM			MFG			
N’	Ant. cingulate		WM			MFG				
B’	Head of Hippo		WM		MTG					
M’	Paracentral lobule		SFG					Parietal cortex		Out
P’	Precuneus		WM		Parietal cortex					
X’	Post.cingulate		WM			Parietal cortex				Out
T’	Parahippocampus			WM		Posterior temporal gyrus				
Oc’	Lingual gyrus		WM			Occipital cortex				Out
F	Gyrus rectus		C							
N	Ant. cingulate							FG		
M	SMA									



F’6-8-Left frontopolar

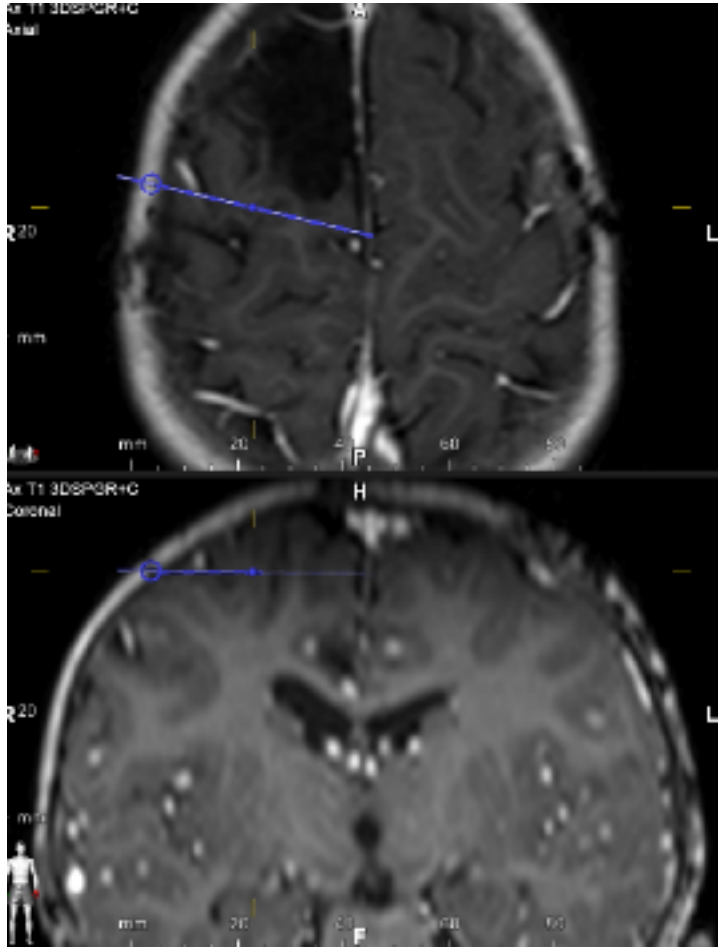


O’1-2-gyrus rectus
O’8-10-Left MFG



PET scan

A 2-Year-old girl with
SCN 8A mutation with intractable epilepsy, S/P lesionectomy

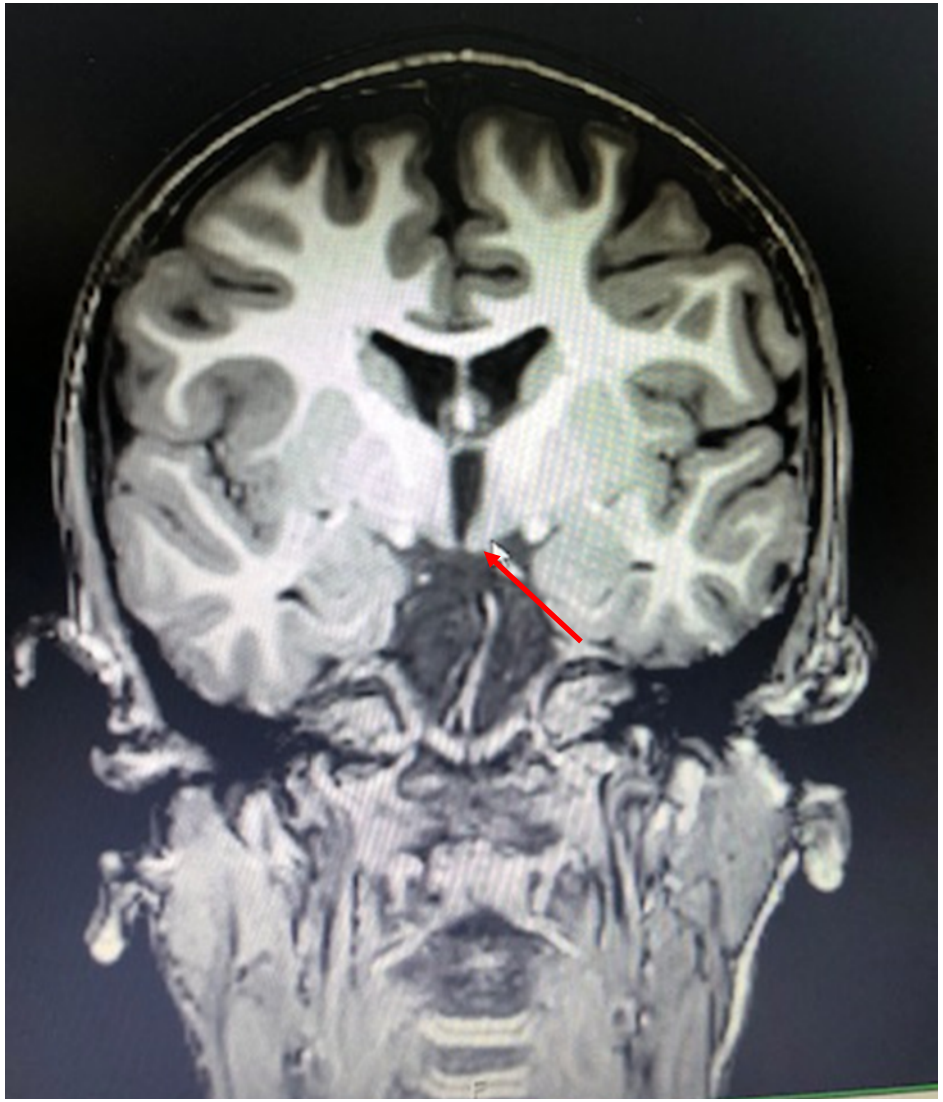


5-year-old boy with Severe Epilepsy, Normal brain

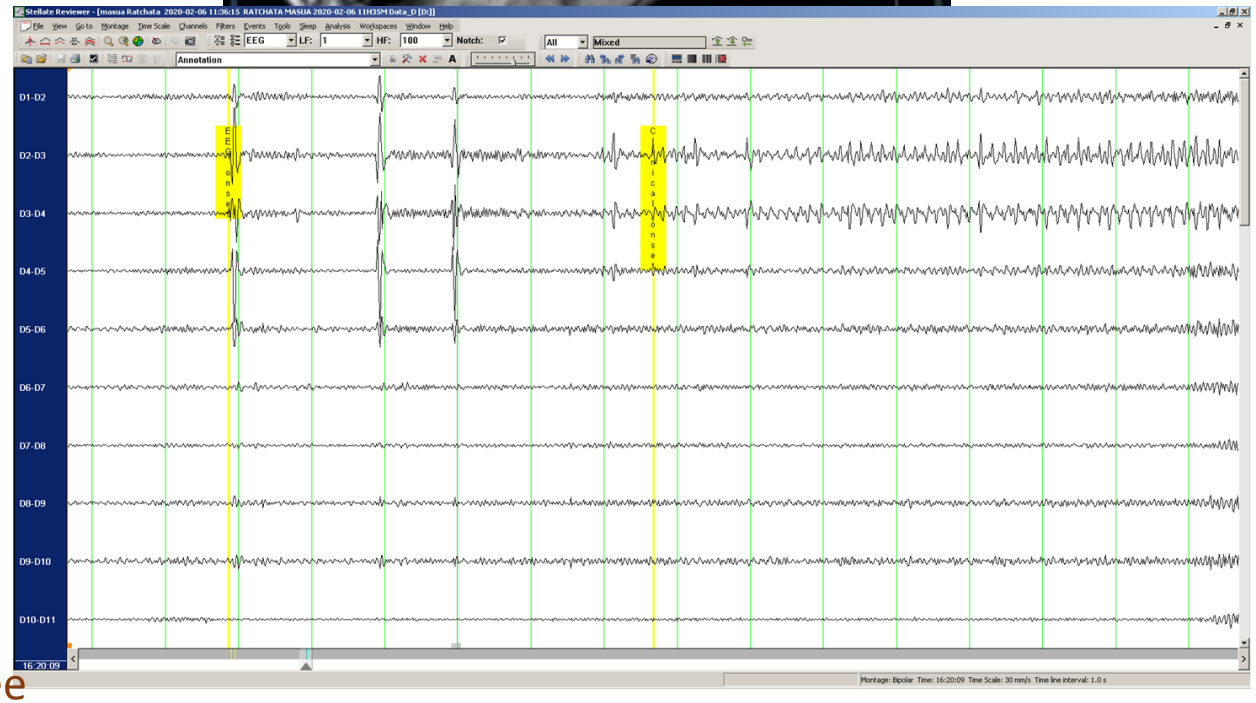
- First seizures: 1 month of age. Then recurrent episodes of generalized tonic-clonic seizures.
- Later, his mother noted outbursts of giggling, laughing without any apparent reason followed by unresponsiveness.
- Frequency 3-4 times per days. Duration less than 1 minutes.

Courtesy Dr Piradee Suwanpakdee

Repeat MRI brain

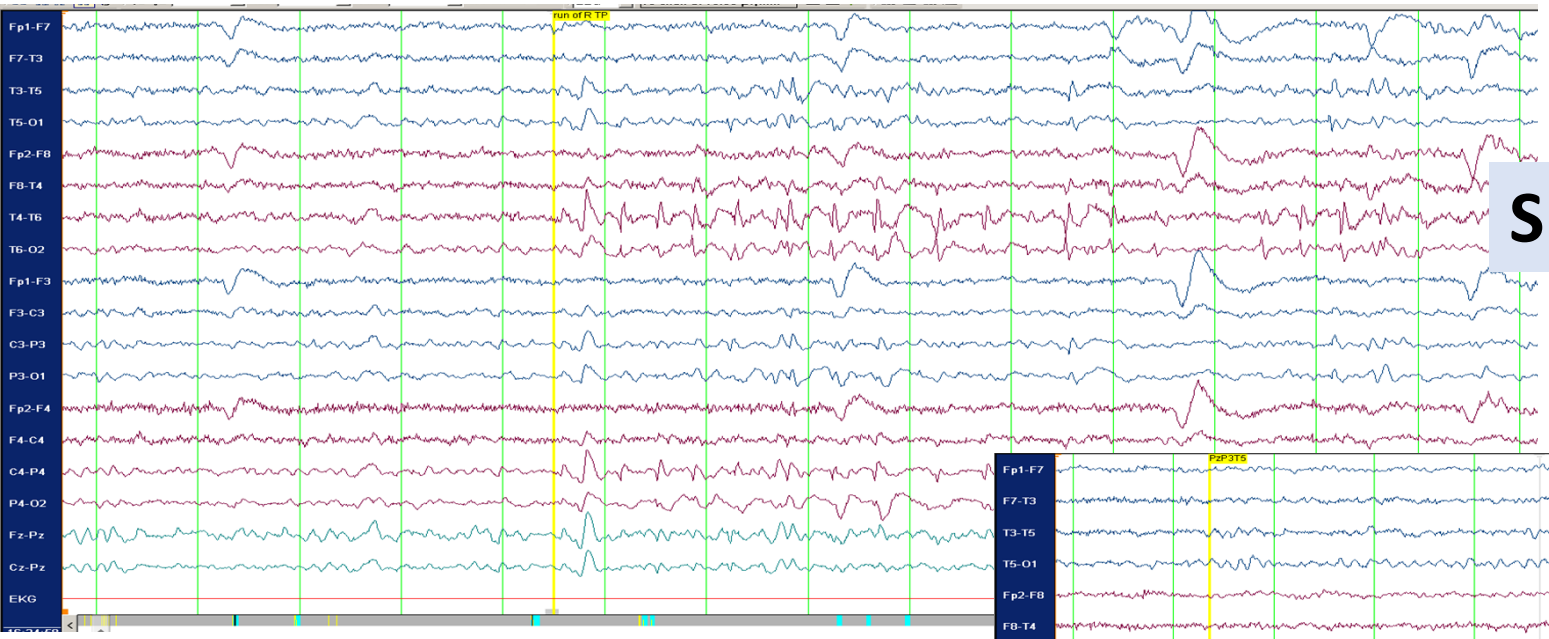


SEEG



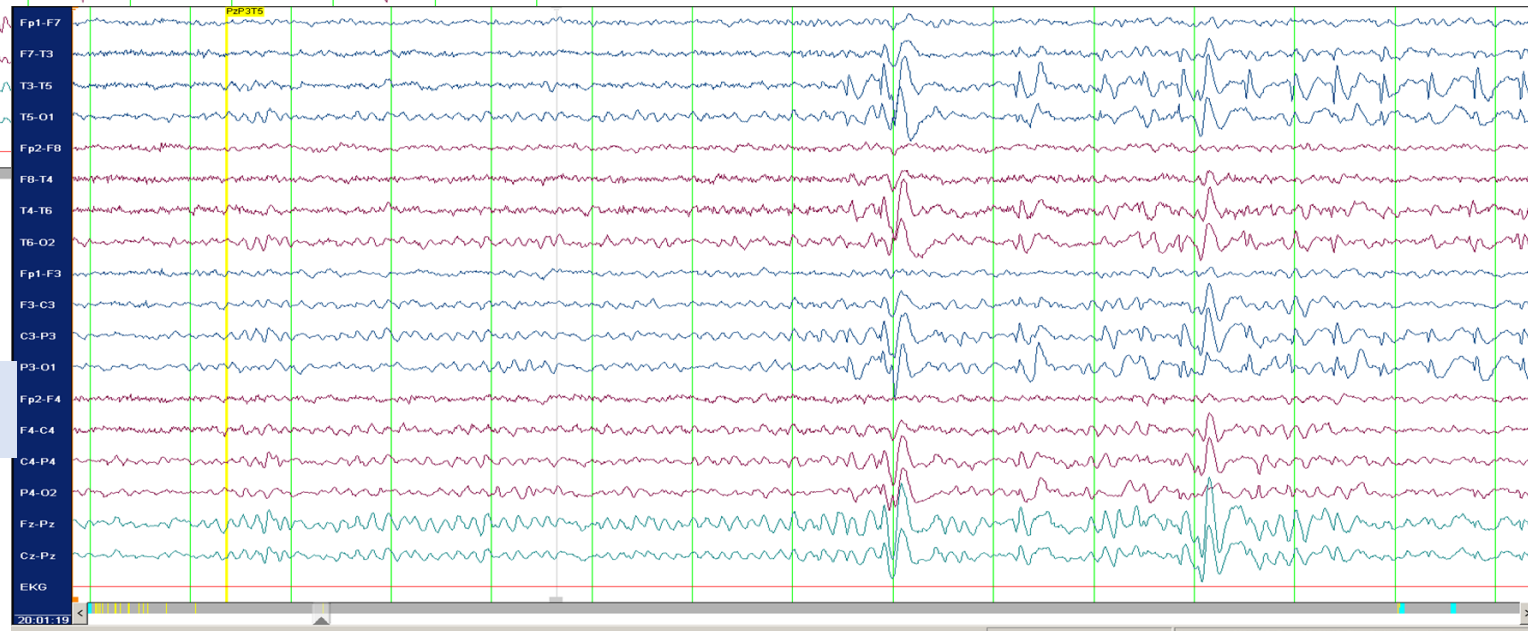
Courtesy Dr Piradee Suwanpakdee

Case a 12-year-old girl with Intractable epilepsy, Borderline IQ, ADHD

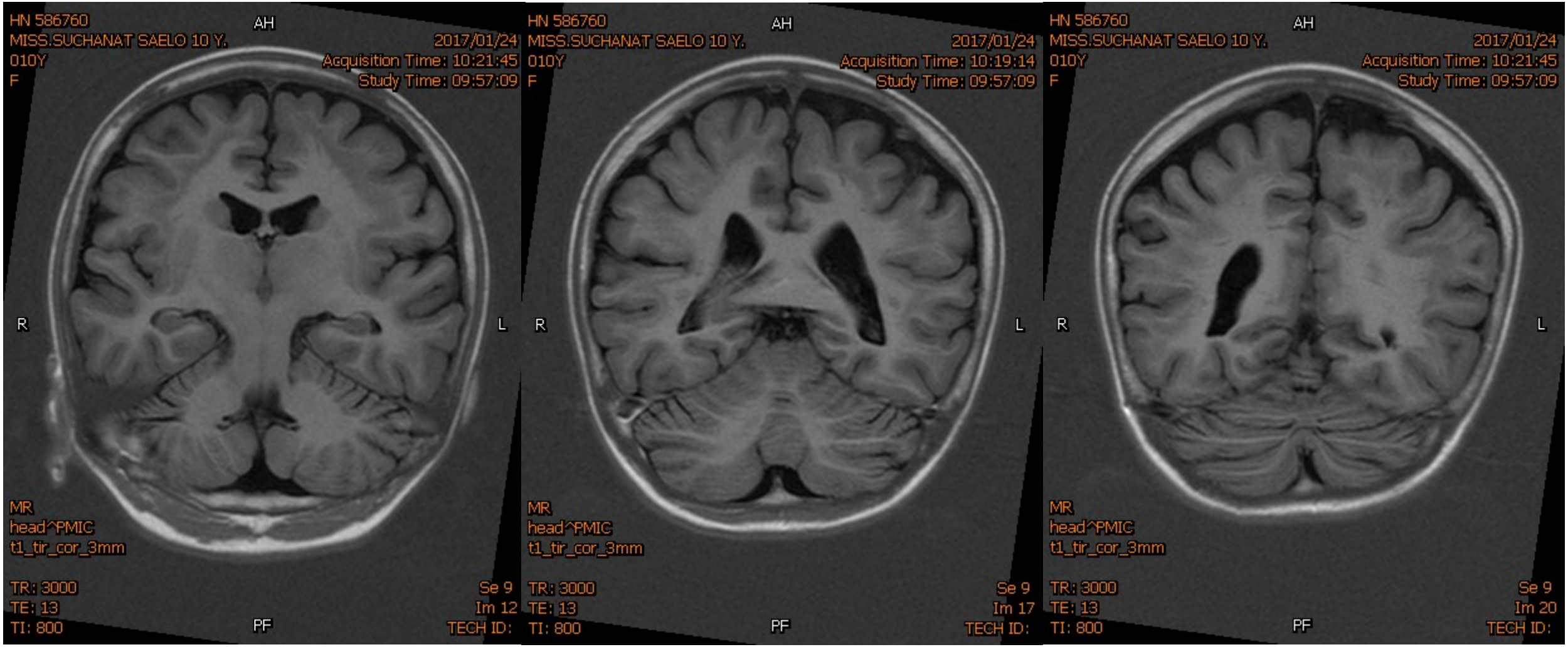


Sharp wave T4T6, frequency 70%

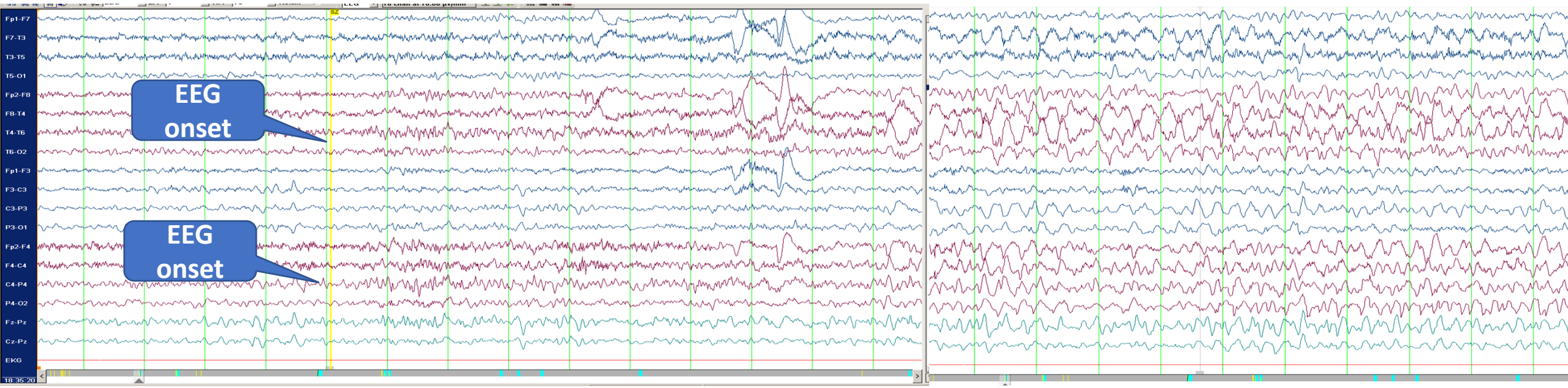
Sharp wave P3T5O1, frequency 30%

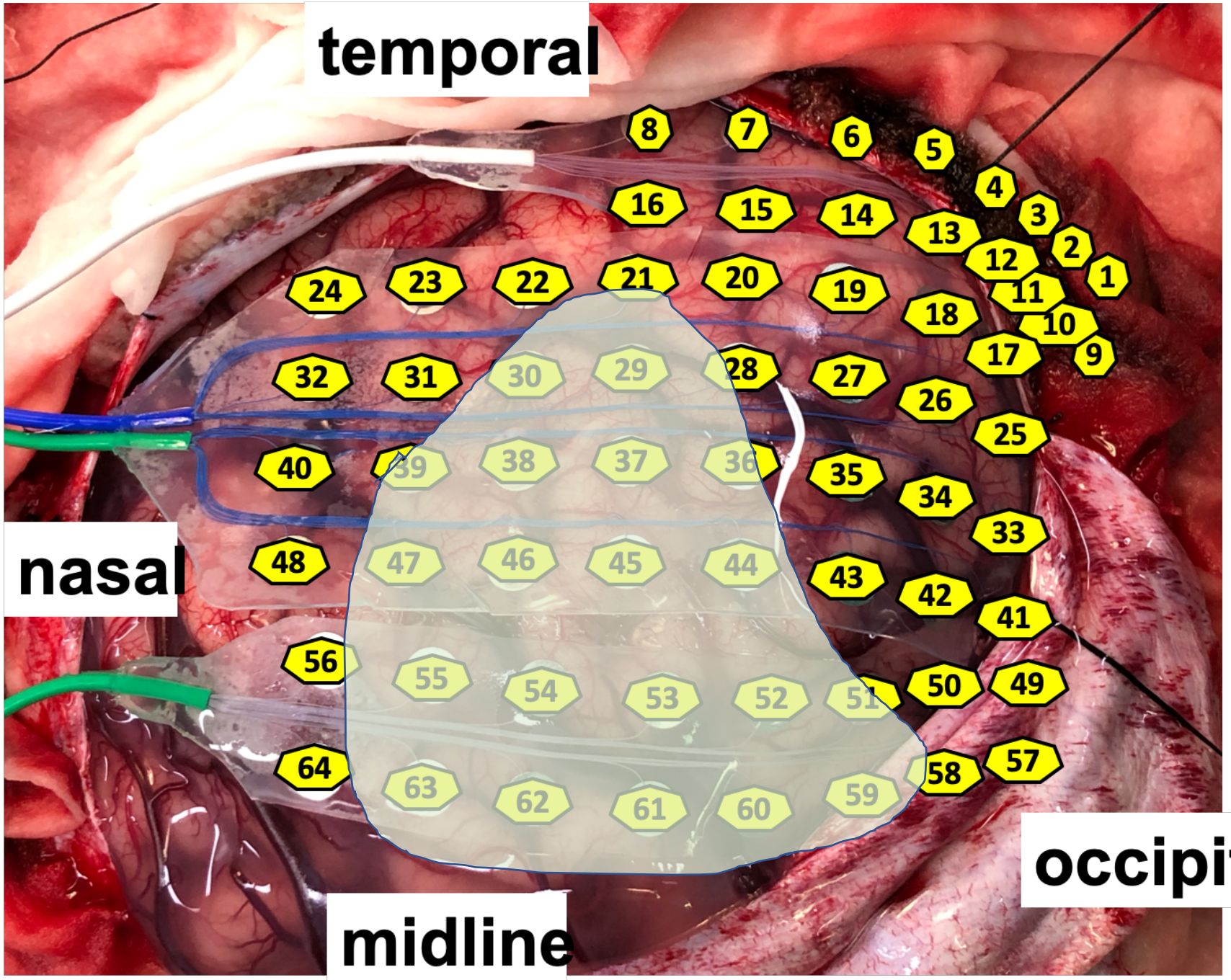


Bilateral double cortex lesions



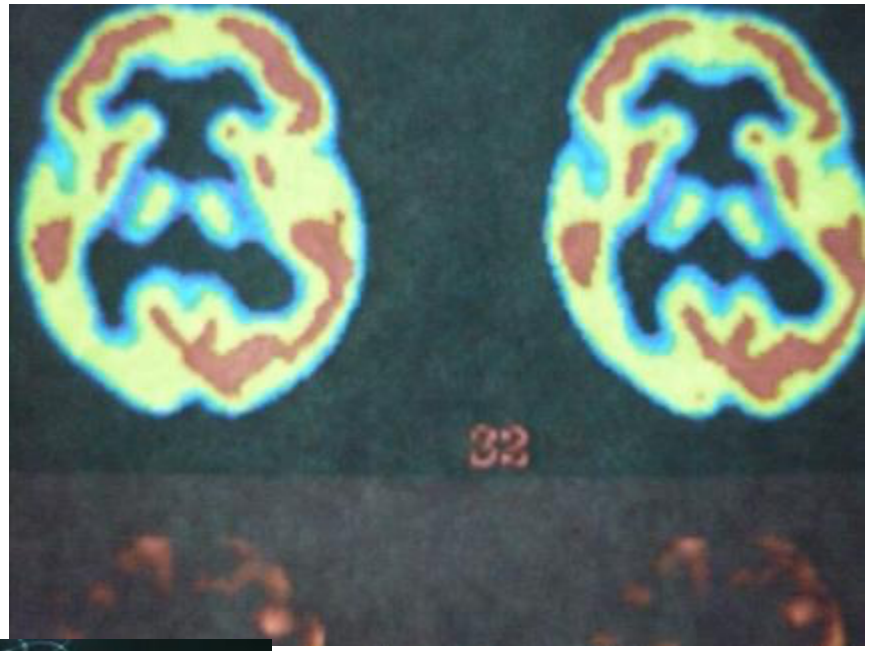
Seizure onset: Right temporo-parietal regions





Plan: Right parietal lesionectomy
Seizure outcome: Engel I

A Boy with Severe Bilateral Cortical malformation



A 6-year-old girl, RH with intractable epilepsy

- เด็กผู้หญิงอายุ 6 ปี
- เริ่มชักเมื่ออายุ 4 เดือน

ลักษณะชักเป็นGTC

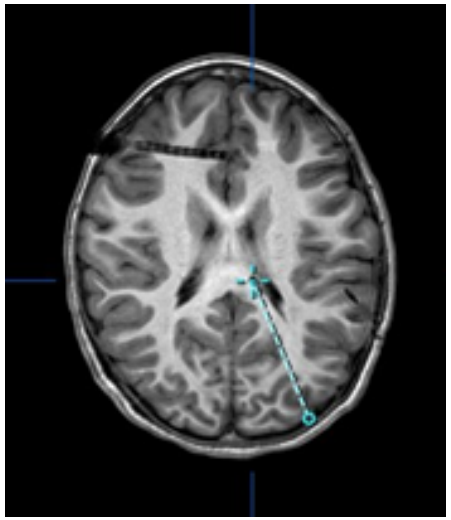
- อายุ 2 ปี ลักษณะชักเปลี่ยนเป็น

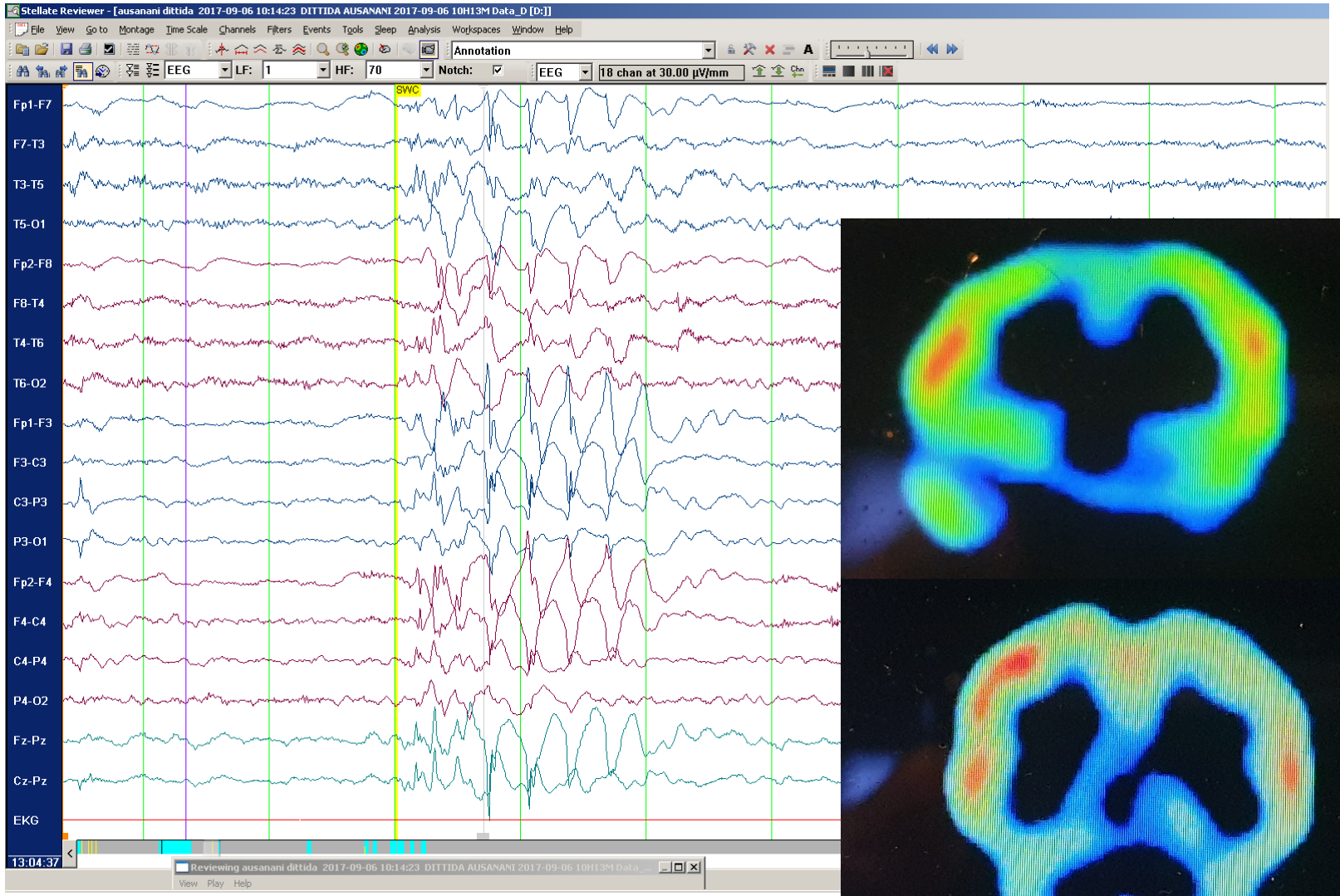
ตาลอย กระพริบตา ไม่รู้สึกตัว

นานครั้งละ 5-10 วินาที 10-20ครั้ง ต่อวัน

Courtesy Dr Piradee Suwanpakdee

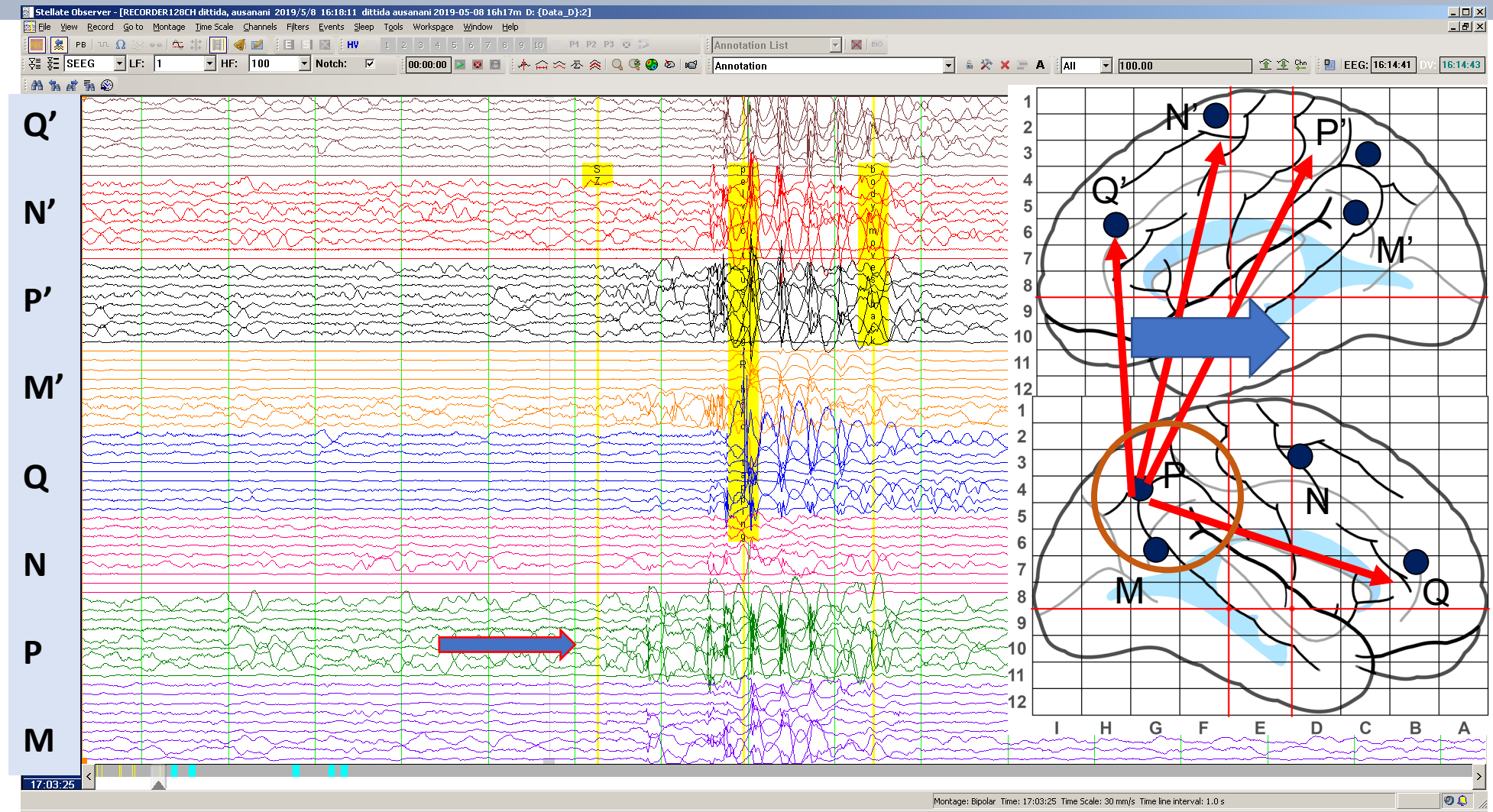
A 6-year-old girl, RH with intractable epilepsy





Courtesy Dr Piradee Suwanpakdee

A 6-year-old girl, RH with intractable epilepsy



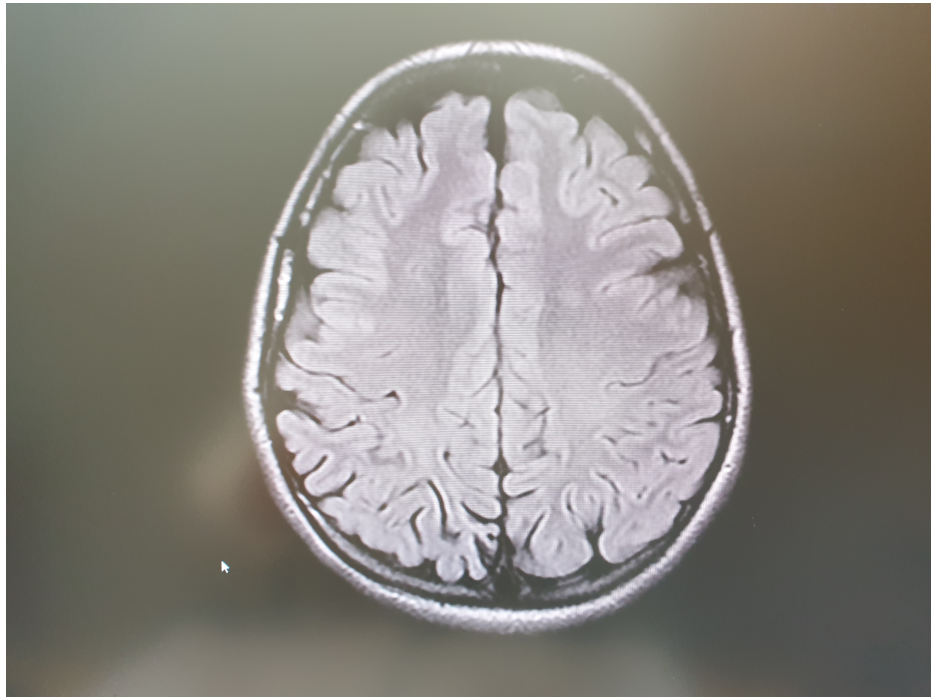
Courtesy Dr Piradee Suwanpakdee

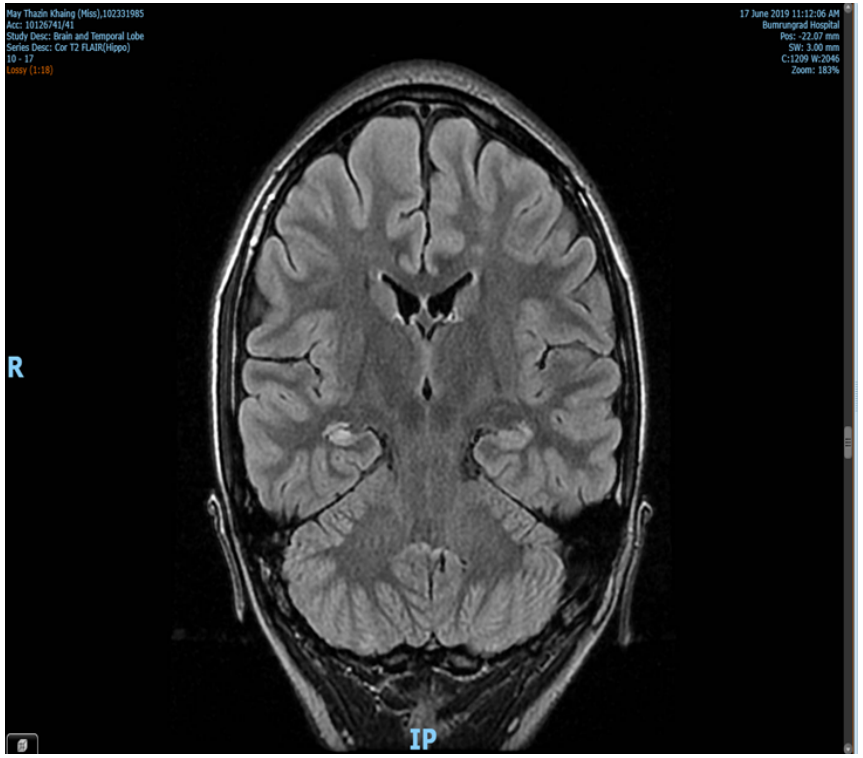
15 YO Girl with Intractable Epilepsy with Dual Pathology

MK 102331985

- First seizures at 9 years of age.
- Seizure semiology: most of seizure started with fear then left arm stiffness, then numbness/ pain that going down form shoulder toward leg, with postictal left sided weakness, some times oro-alimentary automatism at the beginning middle or end. Also some buzzing sound sometime. She can talk during the whole event.

MRI Brain (17/06/2019)



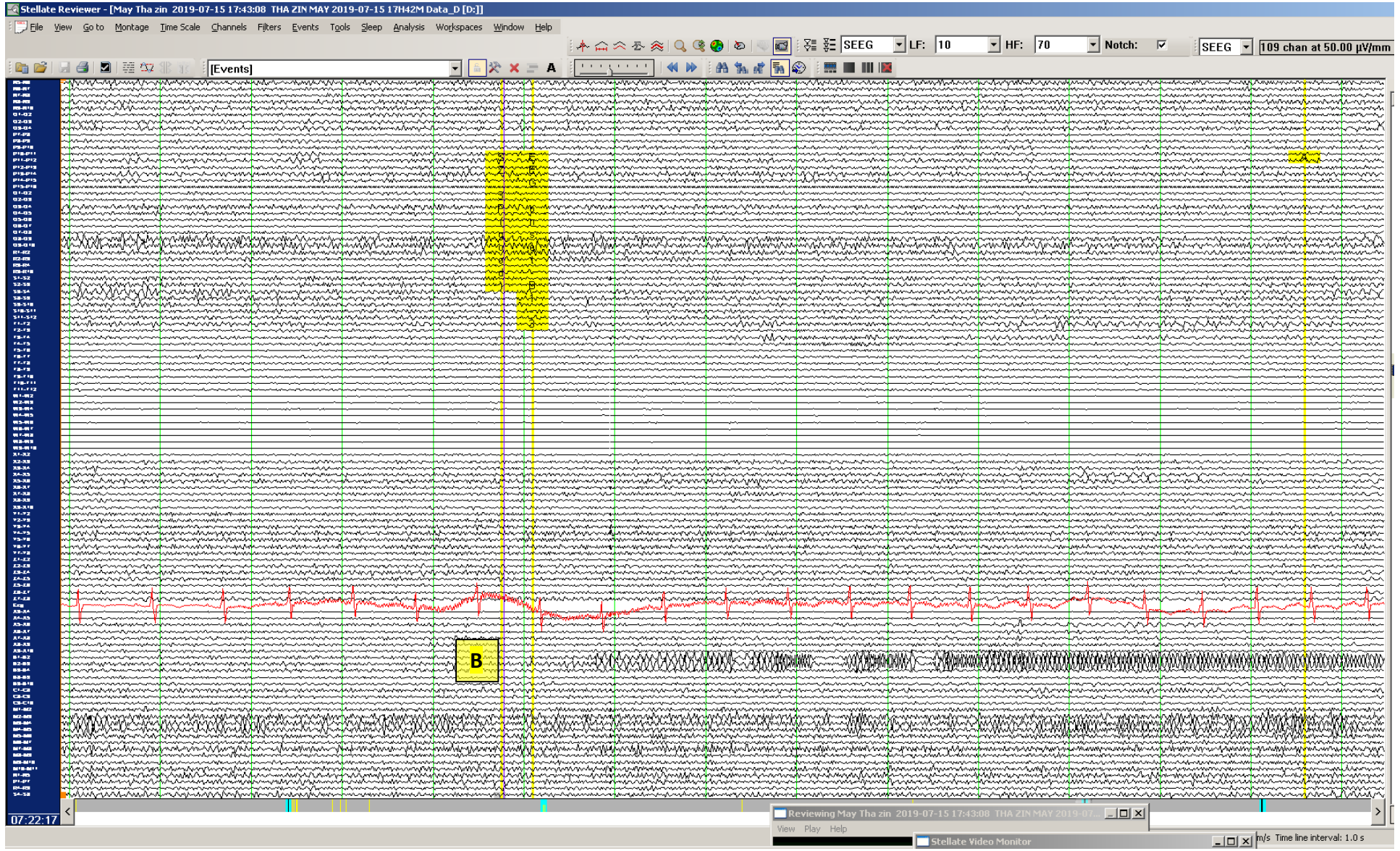


IMPRESSION

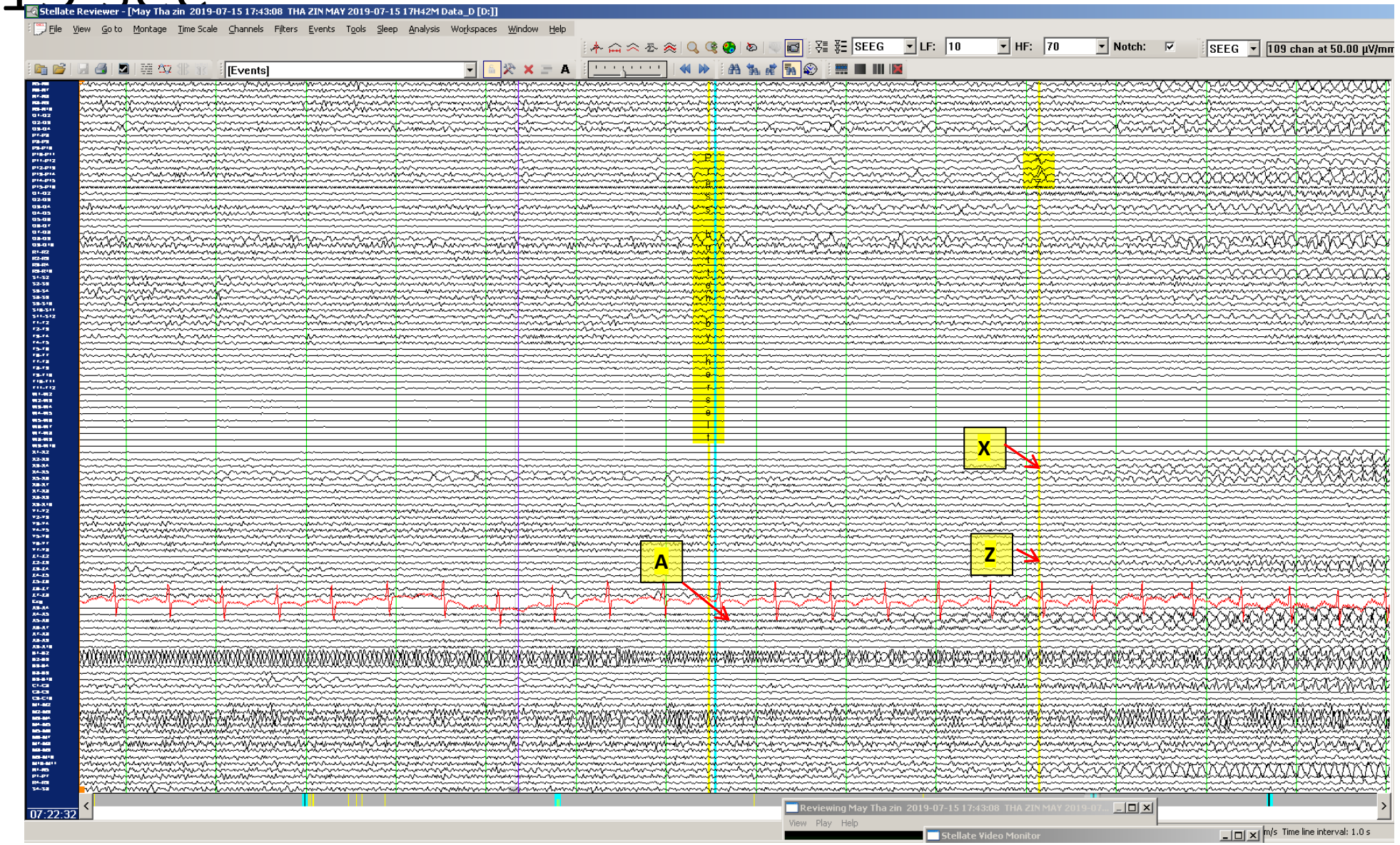
- Suggestive of right hippocampal sclerosis, unchanged.

Persistent and unchanged abnormal right precuneus,
as detailed, probably ulegyria from perinatal hypoxic-ischemic brain injury or encephalomalacic change from other insult.

SZ 3P: EEG onset



+ 15 sec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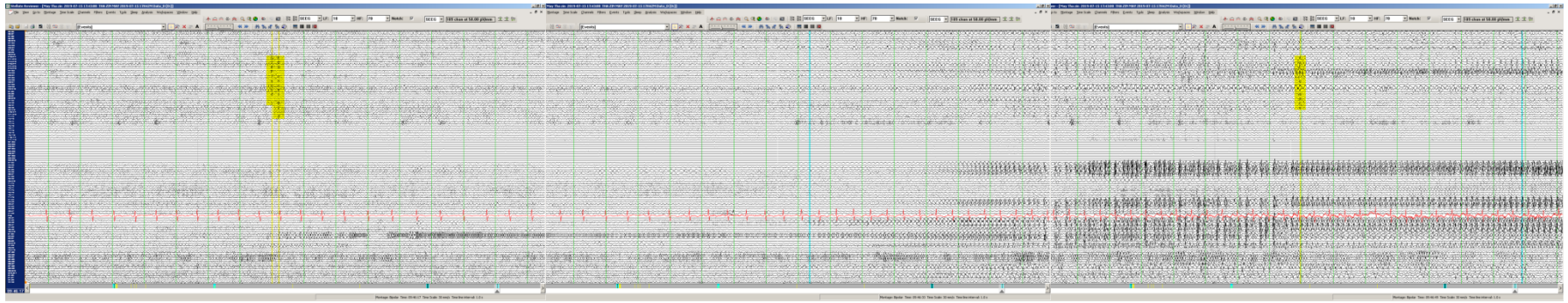
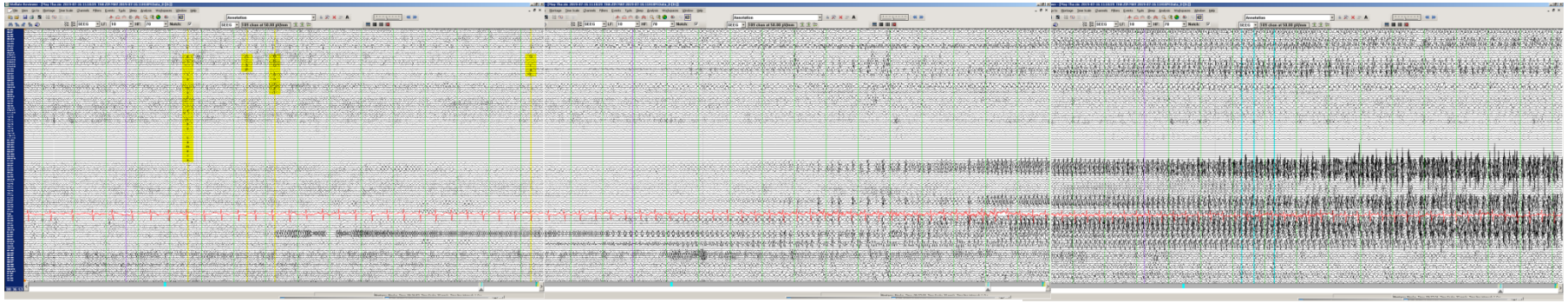
File View Go to Montage Time Scale Channels Filters Events Tools Sleep Analysis Workspaces Window Help
SEEG LF: 10 HF: 70 Notch:
SEEG 109 chan at 50.00 µV/mm
[Events]
X
Z
A
07:22:32
Reviewing May Tha zin 2019-07-15 17:43:08 THA ZIN MAY 2019-07...
View Play Help
Stellate Video Monitor
m/s Time line interval: 1.0 s

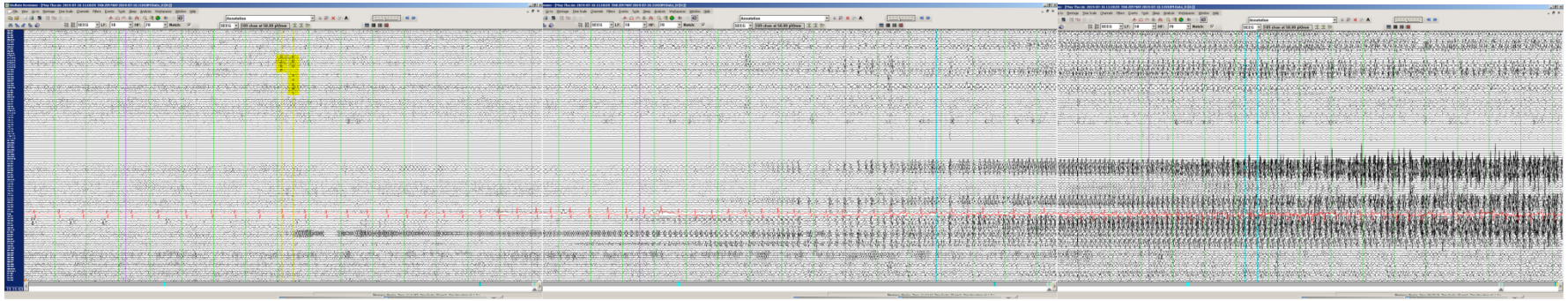
SZ 4P



SZ 5P



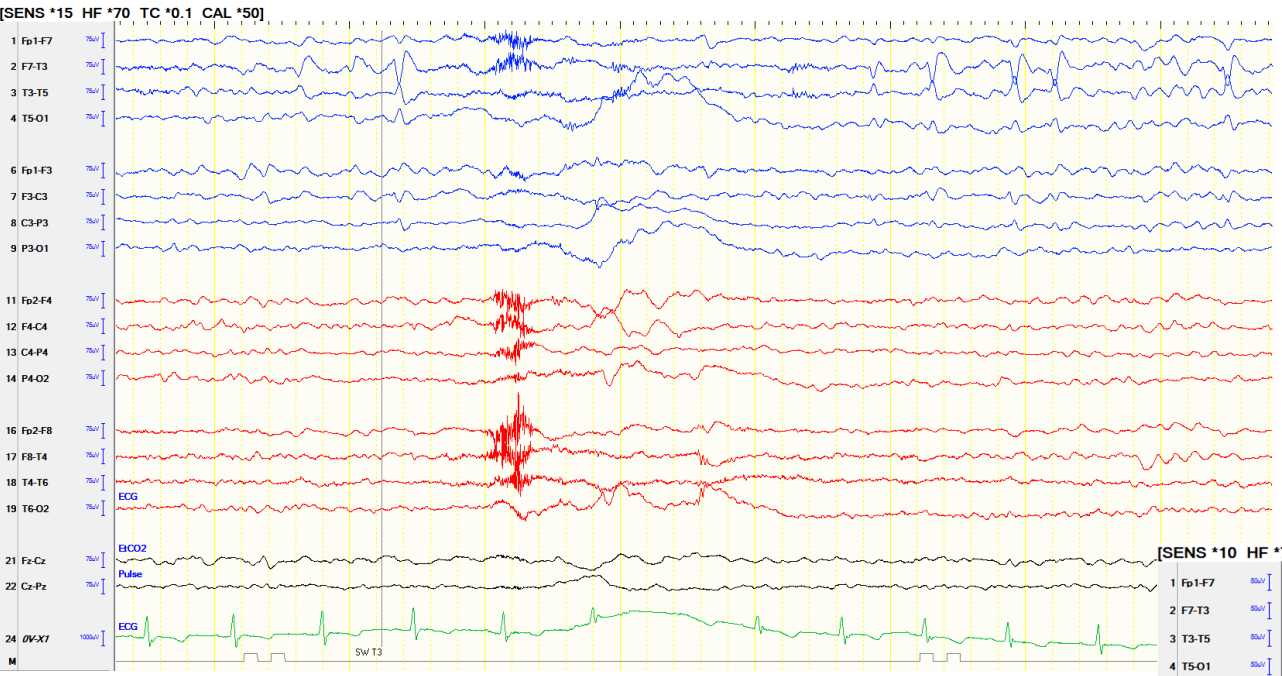
SZ 6P



Case a 9-year-old boy with intractable epilepsy

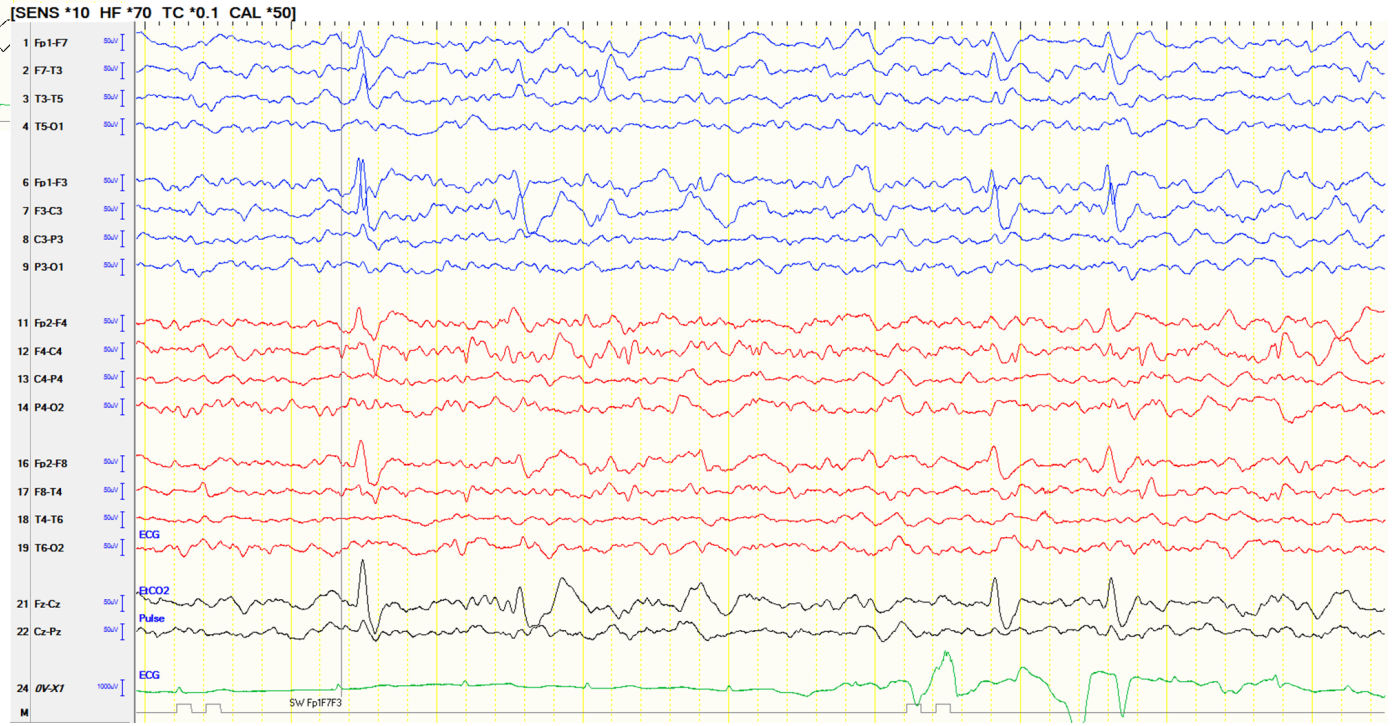
- ชักครั้งแรก อายุ 3 ปี
- ลักษณะชัก : ผู้ป่วยจะดูสับสน ขยับตัว มือขยับไปมา เรียกไม่รู้สึกตัว เป็นนาน 10-15 นาที
- MRI brain: unremarkable
- EEG:
  - Interictal: T3, F7, Fp1, Fz
  - Ictal: 1. F7, T3
    2. Fp1, F3

SW T3

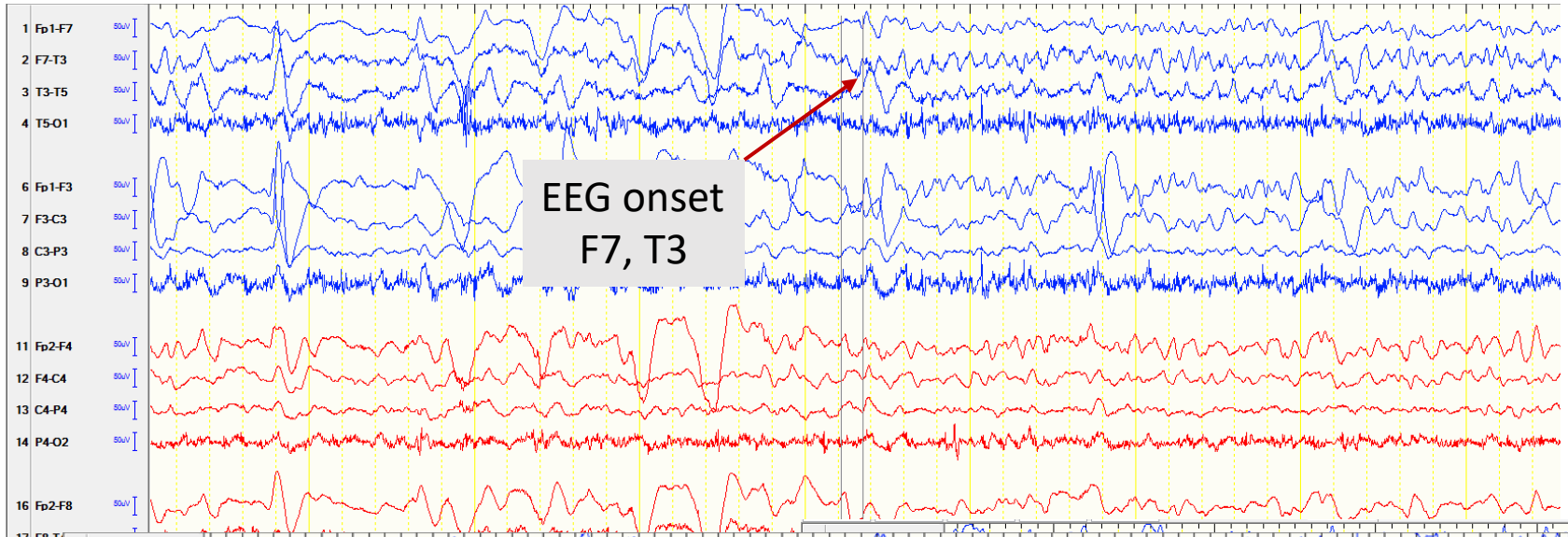


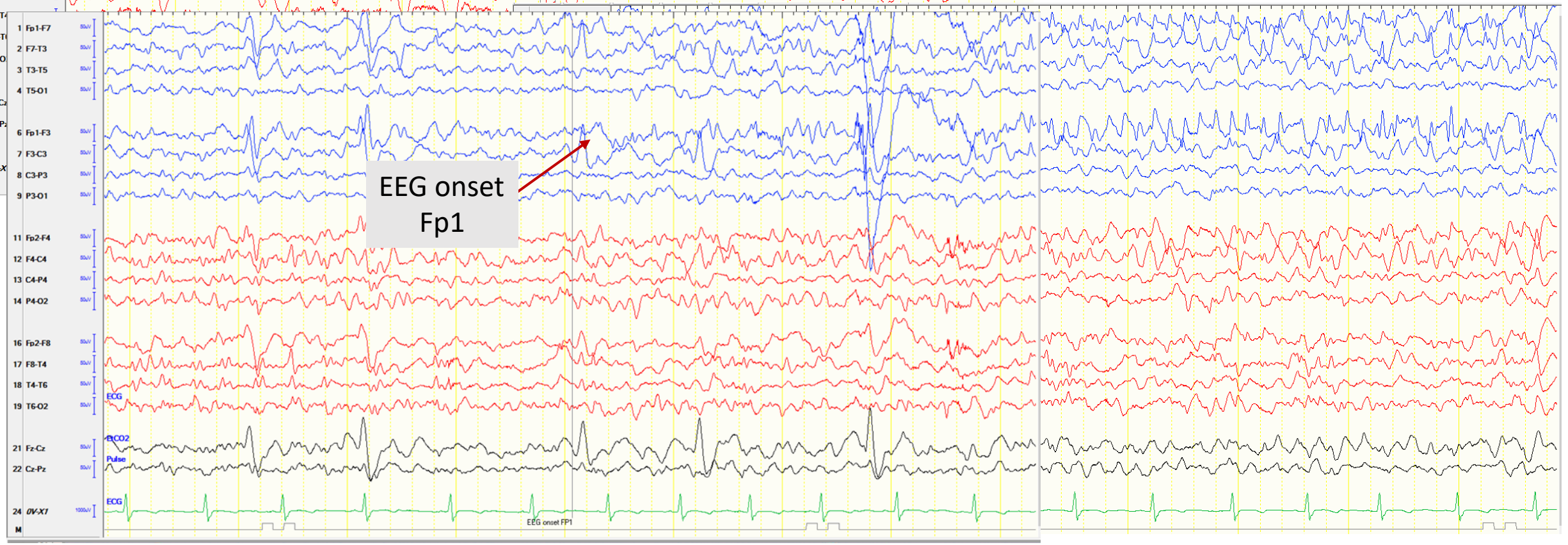
- **Interictal EEG**

SW Fp1/ Fz



• Ictal EEG


1 Fp1-F7
2 F7-T3
3 T3-T5
4 T5-O1
6 Fp1-F3
7 F3-C3
8 C3-P3
9 P3-O1
11 Fp2-F4
12 F4-C4
13 C4-P4
14 P4-O2
16 Fp2-F8
EEG onset
F7, T3

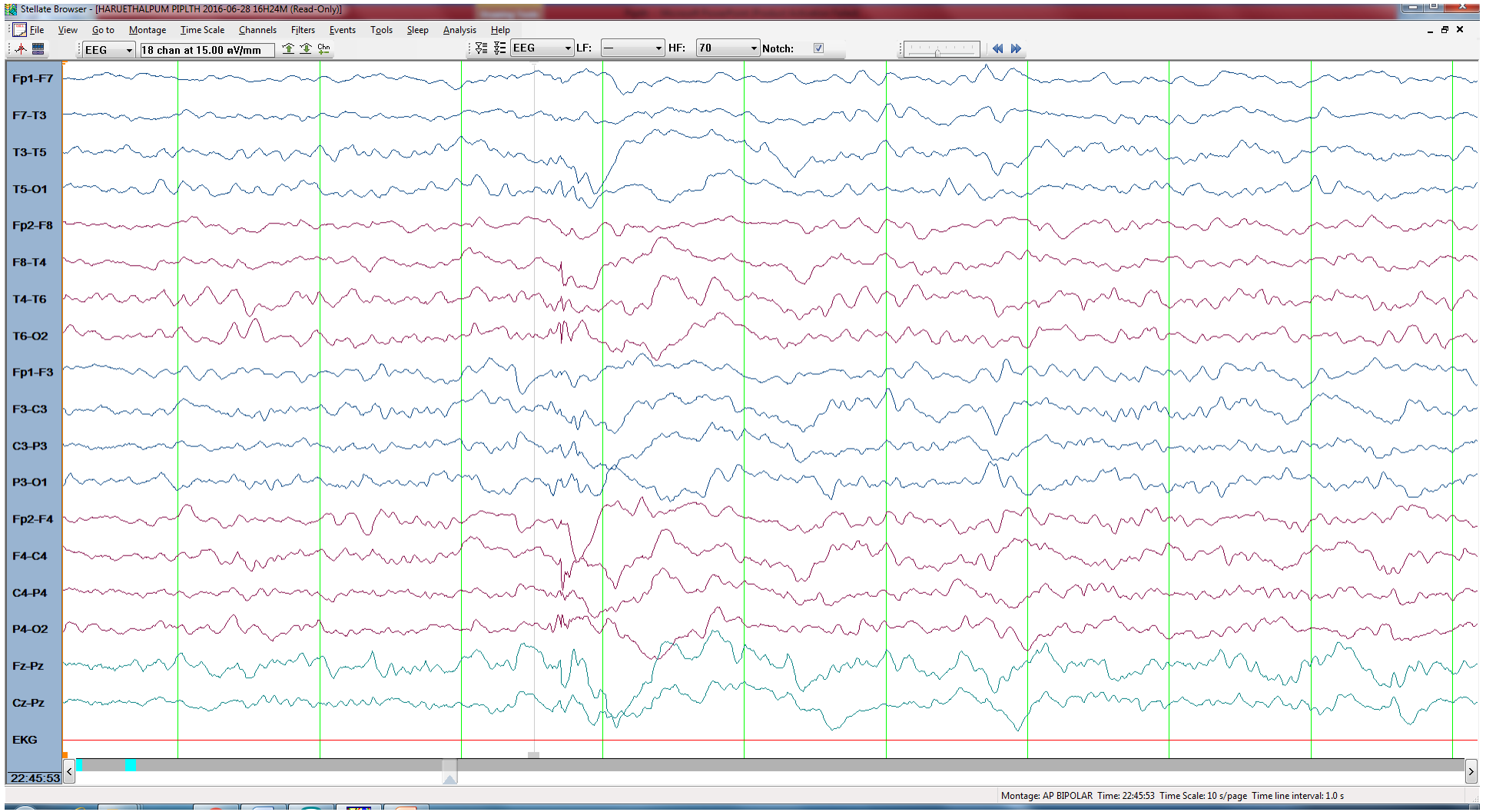

1 Fp1-F7
2 F7-T3
3 T3-T5
4 T5-O1
6 Fp1-F3
7 F3-C3
8 C3-P3
9 P3-O1
11 Fp2-F4
12 F4-C4
13 C4-P4
14 P4-O2
16 Fp2-F8
17 F8-T4
18 T4-T6
19 T6-O2
ECG
21 Fz-Cz
EtCO2
22 Cz-Pz
Pulse
24 0V-X1
ECG
EEG onset
Fp1
EEG onset FP1

9-year-old girl with Intractable Temporal Lobe Epilepsy with Dual Pathology

- Age of Seizure onset: 3 years
- Seizure types:

  L or R arm/leg tonic?-> dialeptic-> GTC
- Current seizure type:
  - เกร็งบิดมือและขาขวา หน้ากระตุกขวา จากนั้น ไม่รู้สึกตัว ประมาณ 1 นาที
  - Postictal – ชี้บอกได้แต่ไม่พูด (postictal aphasia)
- Frequency – 4 times/month

SW O2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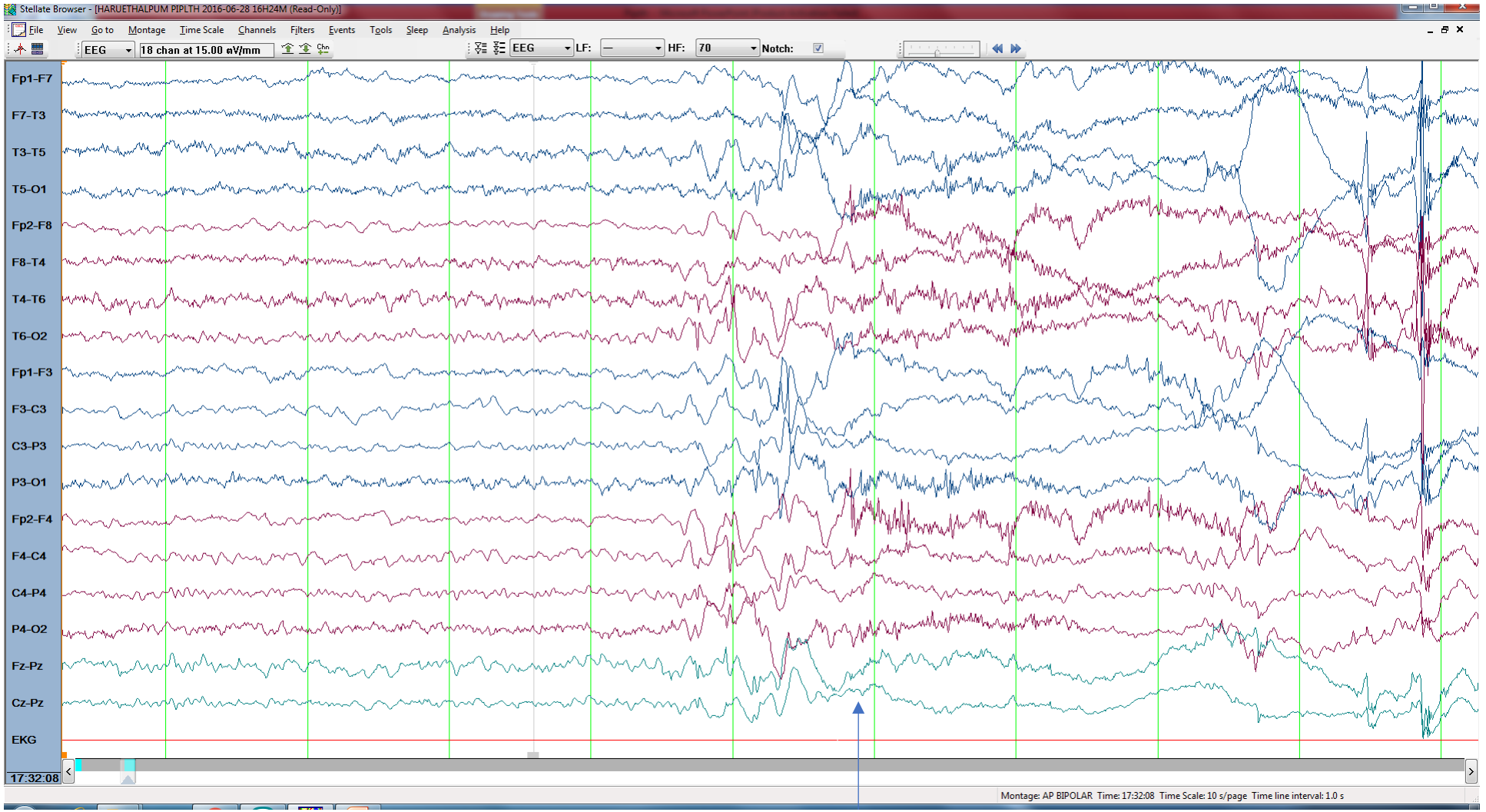
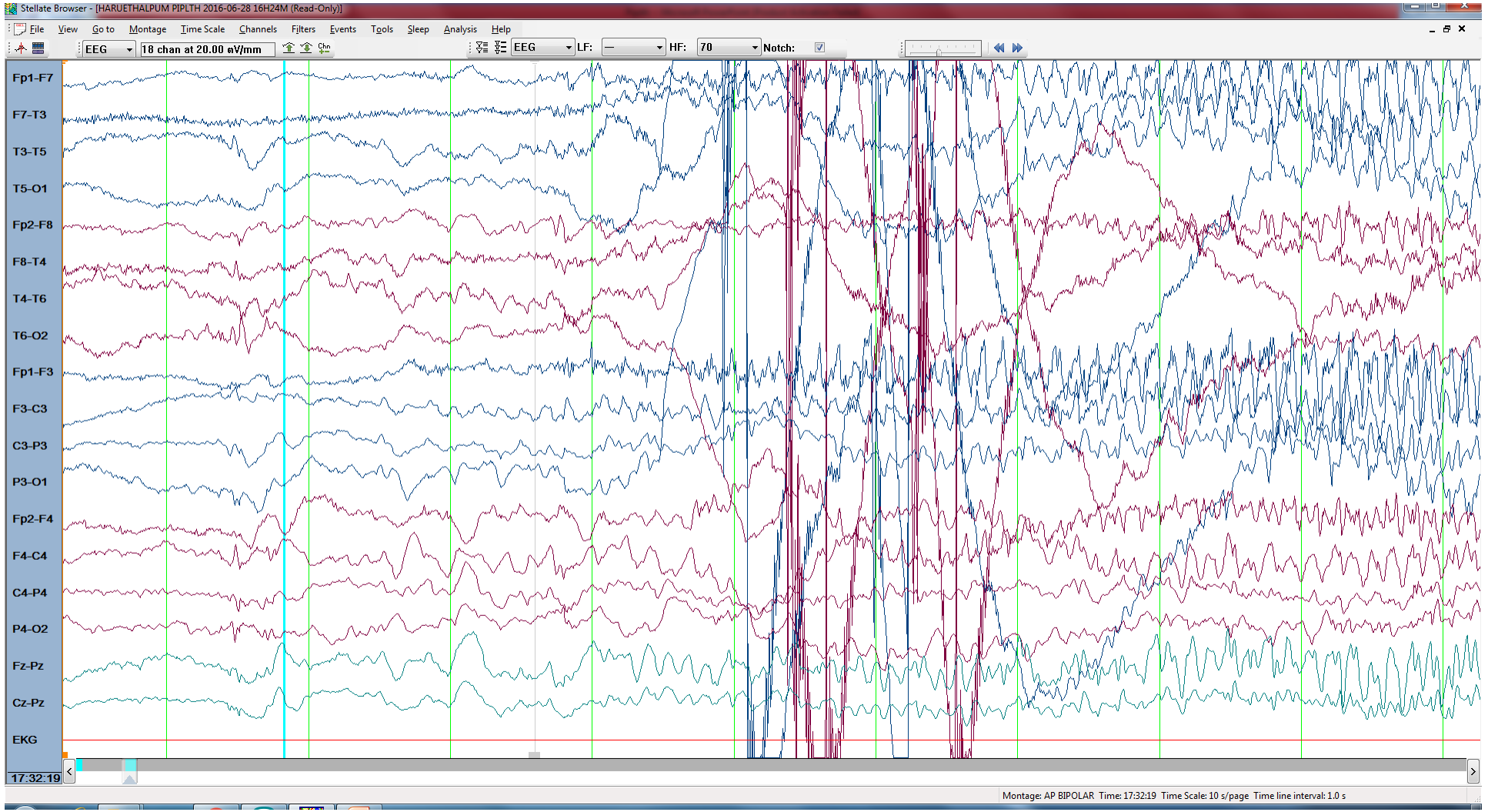
File View Go to Montage Time Scale Channels Filters Events Tools Sleep Analysis Help
EEG
18 chan at 15.00 uV/mm
EEG
LF:
HF:
70
Notch:
Fp1-F7
F7-T3
T3-T5
T5-O1
Fp2-F8
F8-T4
T4-T6
T6-O2
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp2-F4
F4-C4
C4-P4
P4-O2
Fz-Pz
Cz-Pz
EKG
22:45:53
Montage: AP BIPOLAR Time: 22:45:53 Time Scale: 10 s/page Time line interval: 1.0 s

Ictal onset



Clinical onset

+ 10 sec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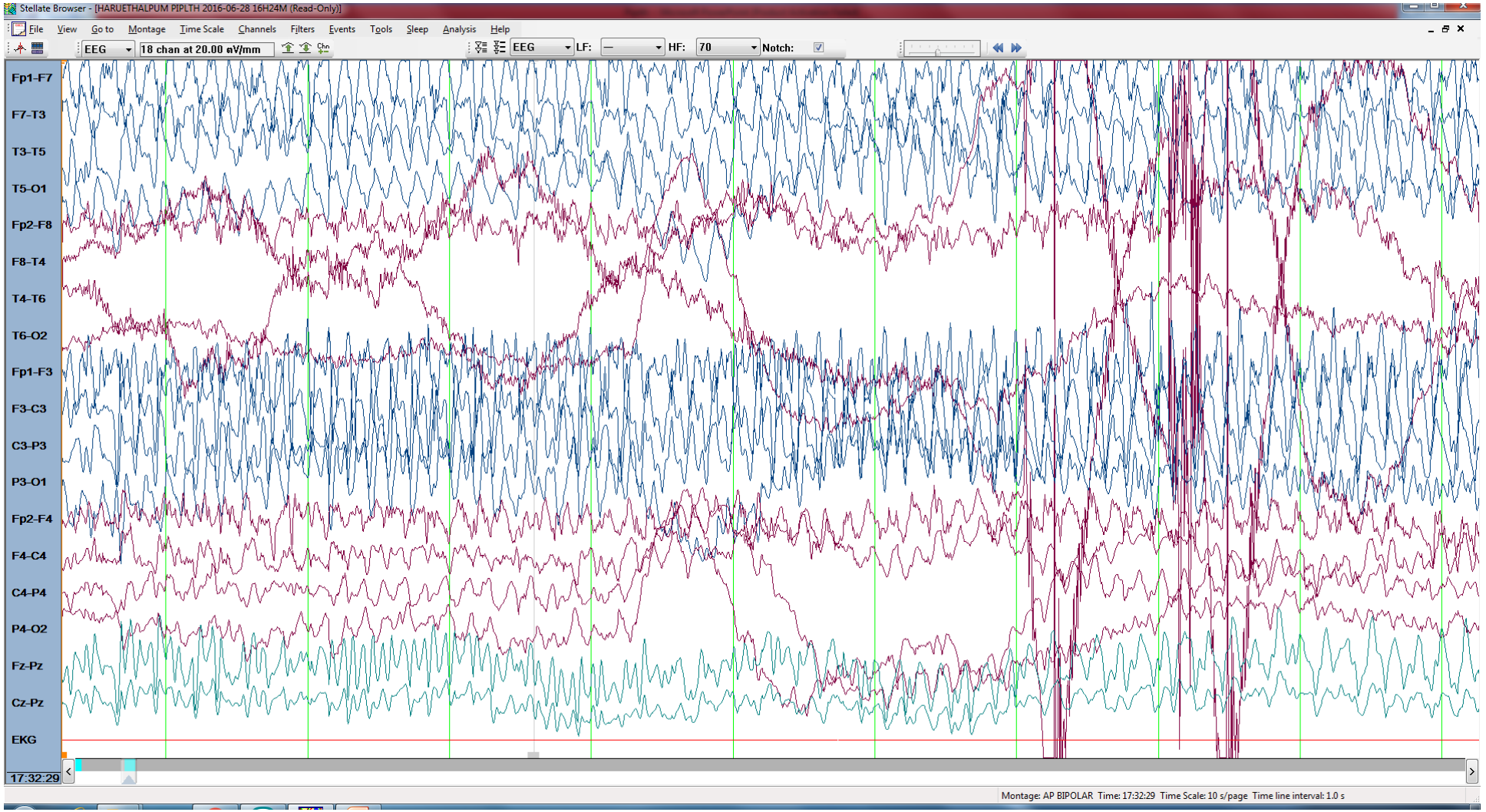
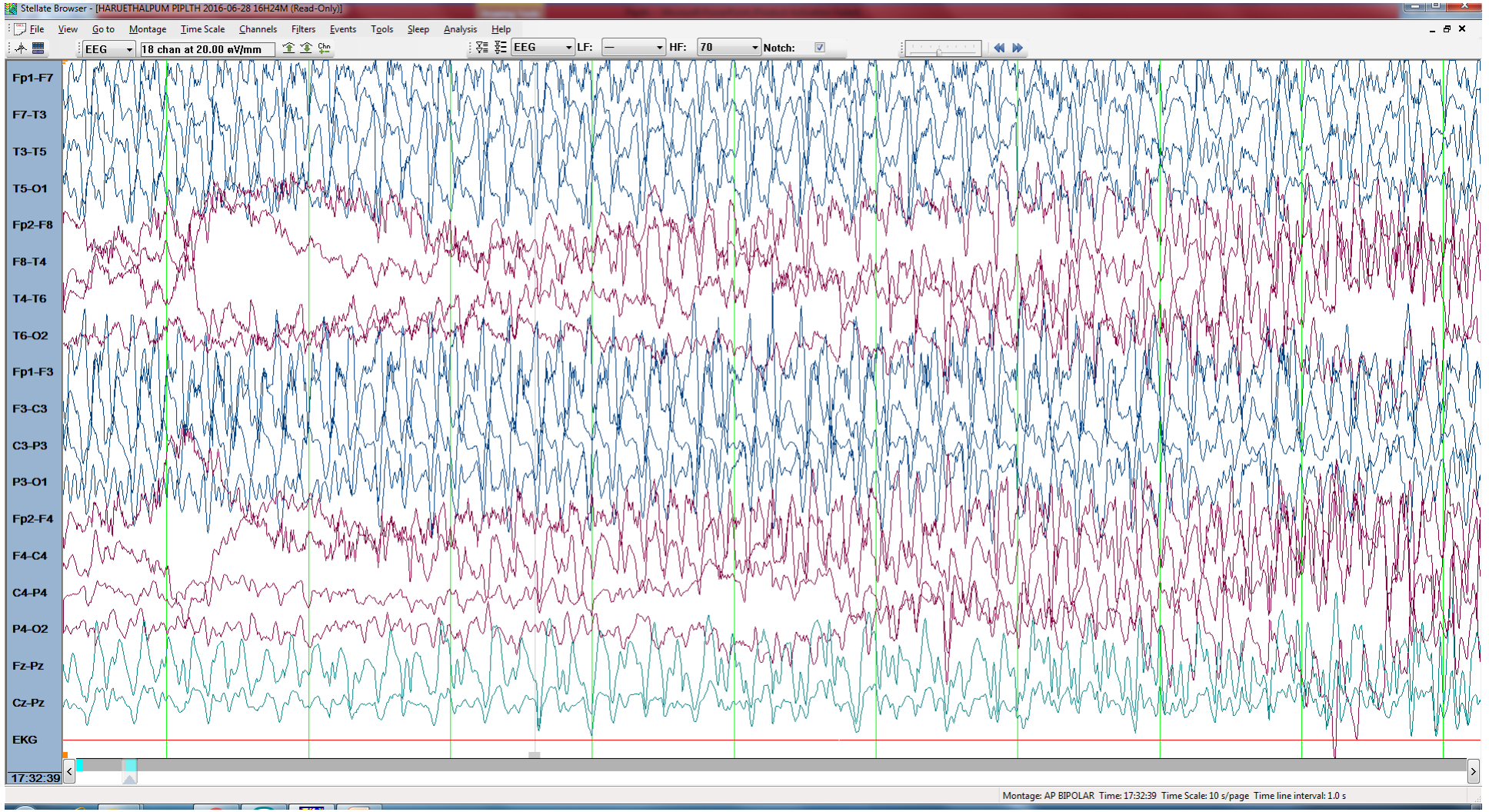
File View Go to Montage Time Scale Channels Filters Events Tools Sleep Analysis Help
EEG
18 chan at 20.00 uV/mm
EEG
LF:
HF:
70
Notch:
Fp1-F7
F7-T3
T3-T5
T5-O1
Fp2-F8
F8-T4
T4-T6
T6-O2
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp2-F4
F4-C4
C4-P4
P4-O2
Fz-Pz
Cz-Pz
EKG
17:32:19
Montage: AP BIPOLAR Time: 17:32:19 Time Scale: 10 s/page Time line interval: 1.0 s

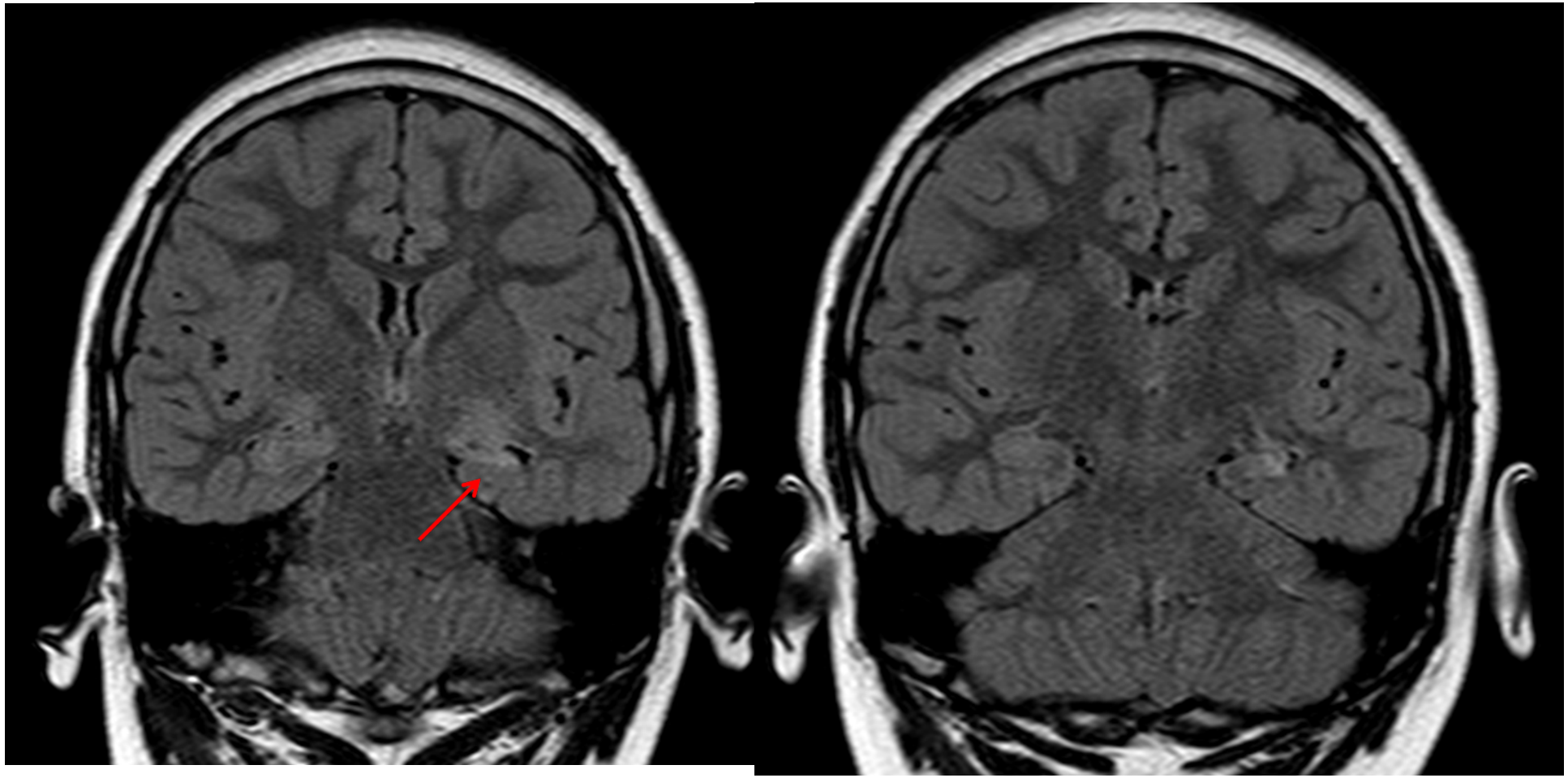
+ 20 sec


Stellate Browser - [HARUETHALPUM PIPLTH 2016-06-28 16H24M (Read-Only)]
File View Go to Montage Time Scale Channels Filters Events Tools Sleep Analysis Help
EEG
18 chan at 20.00 uV/mm
EEG
LF:
HF:
70
Notch:
Fp1-F7
F7-T3
T3-T5
T5-O1
Fp2-F8
F8-T4
T4-T6
T6-O2
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp2-F4
F4-C4
C4-P4
P4-O2
Fz-Pz
Cz-Pz
EKG
17:32:29
Montage: AP BIPOLAR Time: 17:32:29 Time Scale: 10 s/page Time line interval: 1.0 s

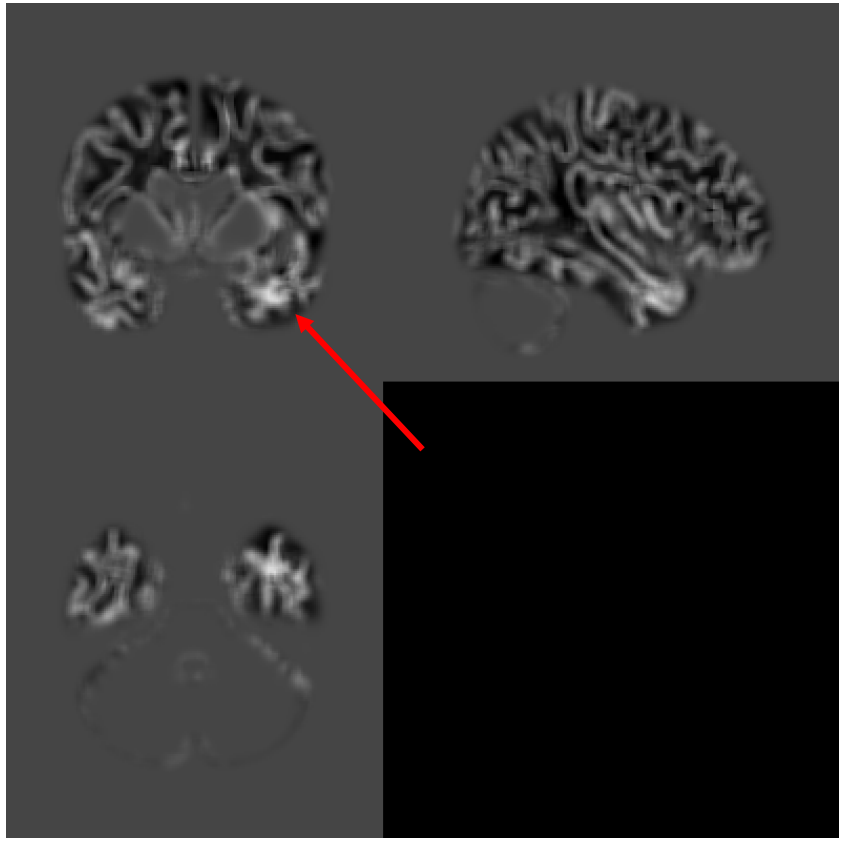
+ 30 sec


Stellate Browser - [HARUETHALPUM PIPLTH 2016-06-28 16H24M (Read-Only)]
File View Go to Montage Time Scale Channels Filters Events Tools Sleep Analysis Help
EEG
18 chan at 20.00 uV/mm
EEG
LF:
HF:
70
Notch:
Fp1-F7
F7-T3
T3-T5
T5-O1
Fp2-F8
F8-T4
T4-T6
T6-O2
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp2-F4
F4-C4
C4-P4
P4-O2
Fz-Pz
Cz-Pz
EKG
17:32:39
Montage: AP BIPOLAR Time: 17:32:39 Time Scale: 10 s/page Time line interval: 1.0 s

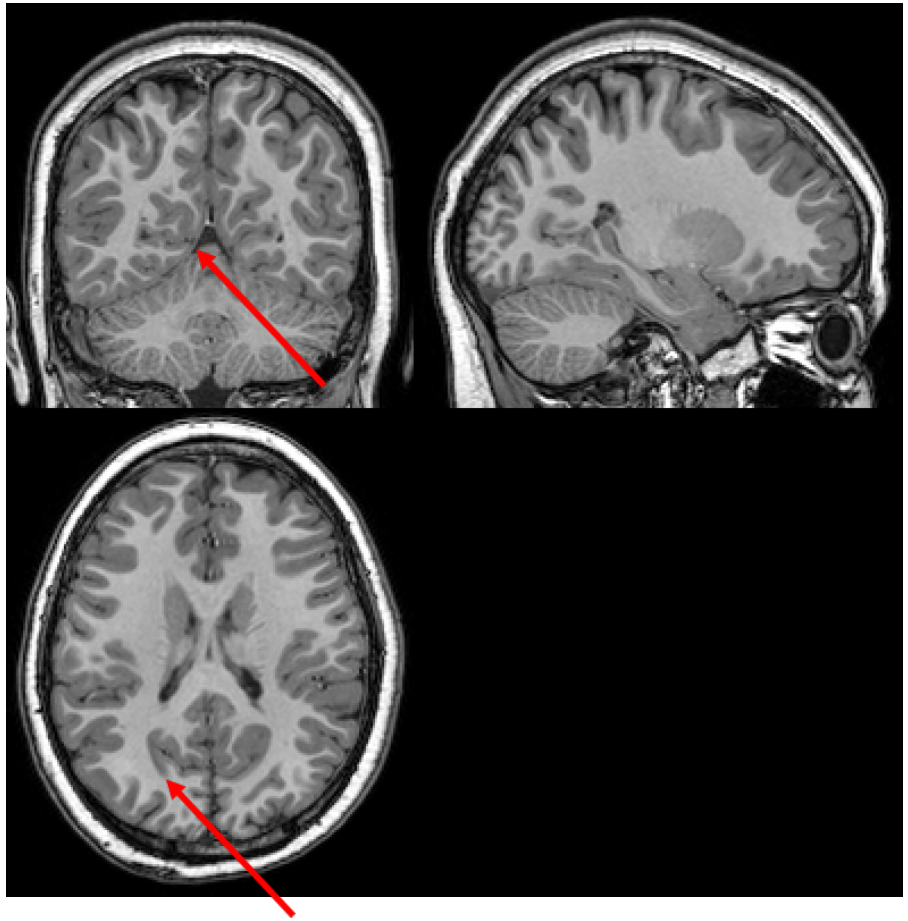
MRI

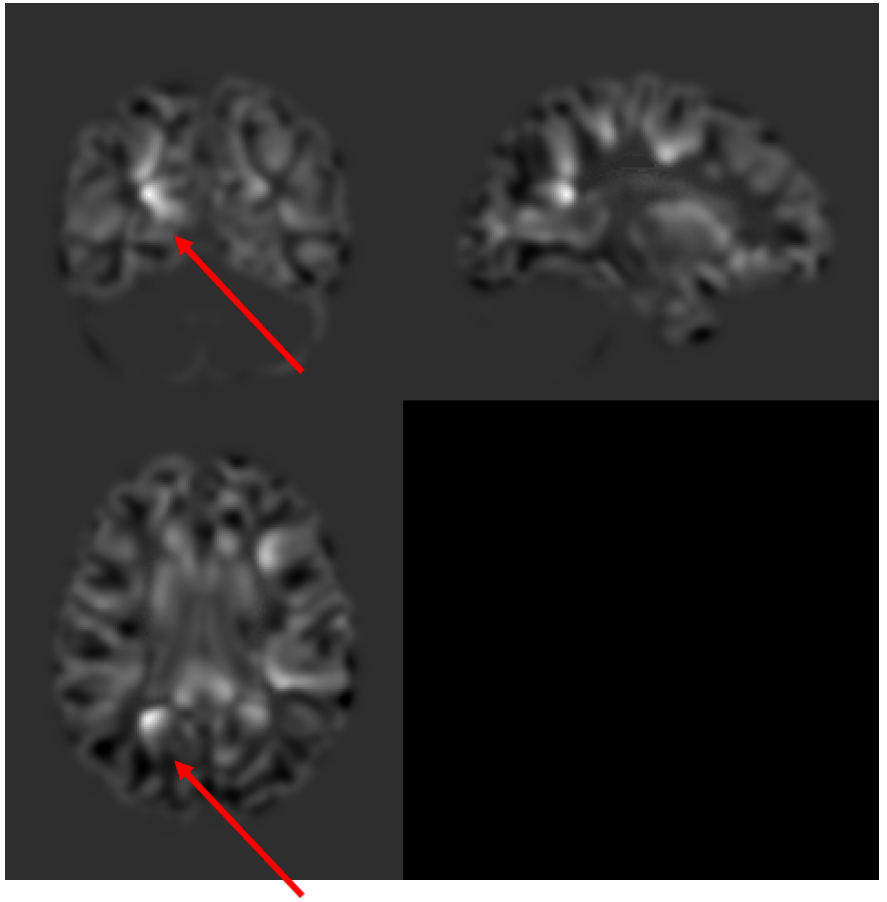


VBM #1 Left temporal pole

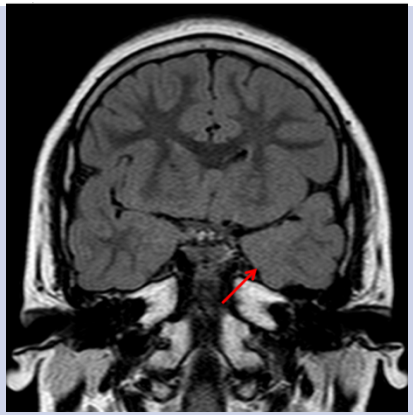
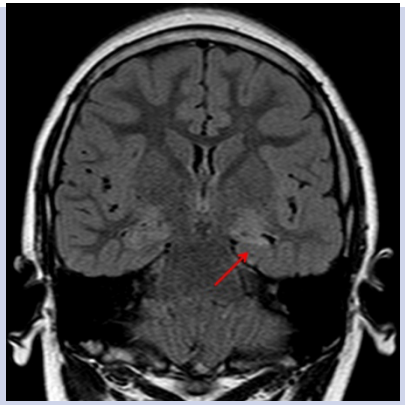
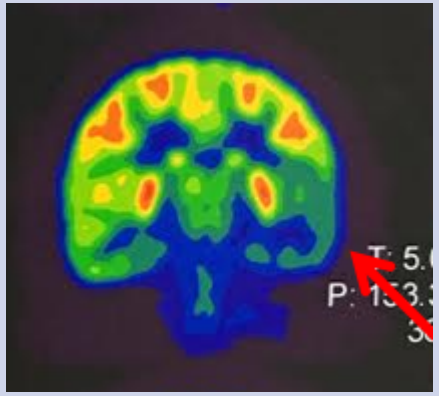
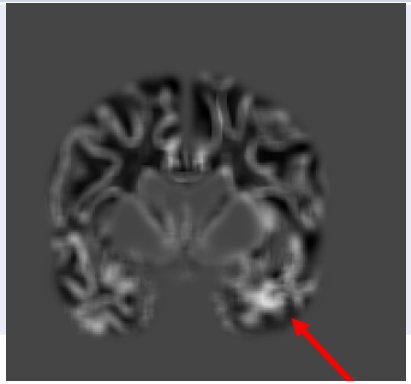
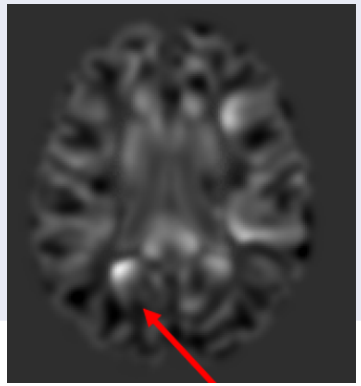
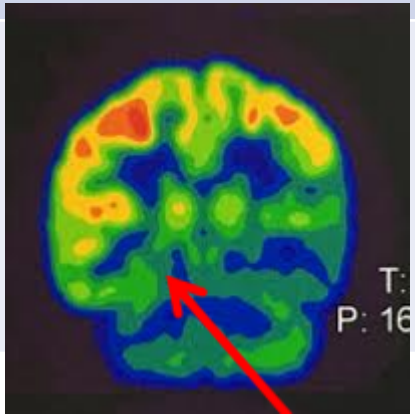


VBM #2 Right anterior calcarine sulcus

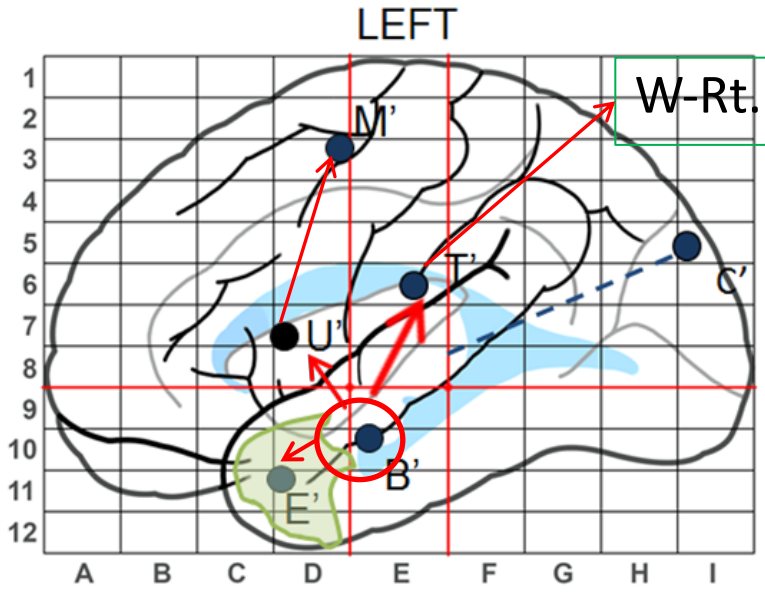




Summary

Semiology: R arm tonic-> R face clonic->GTC	EEG:Interictal Multifocal SW L TP (40%), R post (40%)	Ictal - Right Post. - Left TP
MRI 		PET 
VBM 		

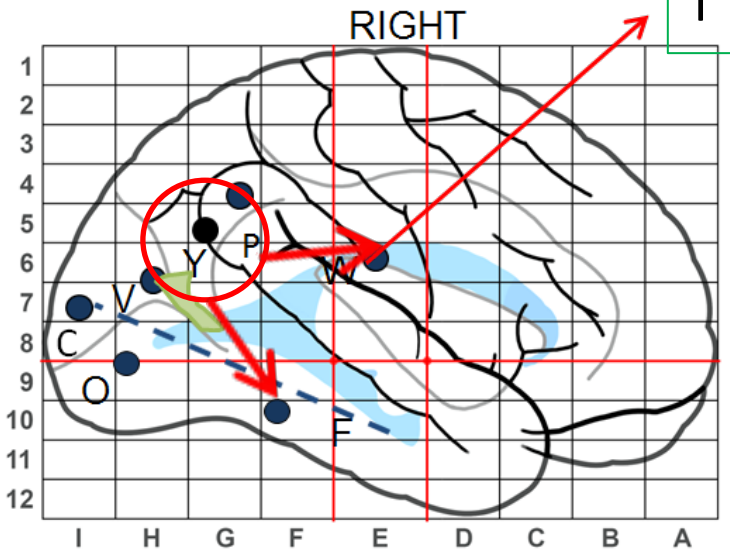
Ictal Map



W-Rt. Post.insula

80%- EEG seizure→ B' mesial
(left hippocampus)

Ictal Map



T'-Lt. Post.insula

20%- EEG seizure→ Right post. mesial
(near Y-post. cingulate)

PMC(1/12/2016)

- The group agreed that the patient had 2 epileptogenic zone:
  - 80%- left hippocampus
  - 20% - right area around posterior cingulate.
- We recommended left anterior temporal resection due to most of the seizures arising from this region. Regarding to another EZ, the group think it should be controlled by medication.
- We discussed this option with her parents.

Newly Diagnosed Epilepsy
One year terminal remission

First drug monotherapy	47%
Second drug monotherapy	13%
Third drug monotherapy	1%
Duotherapy	3%
Total seizure free	64%

Kwan P and Brodie MJ. N Engl J Med 2000;342:314-9

Common misconceptions about epilepsy surgery
Conclusion

- All anti-seizure medications **not** need to be tried
- **Can be** a good candidate for surgery **in**:
  - Bilateral/ Generalized interictal epileptiform discharges
  - Very young age
  - Neuroimaging
    - normal brain MRI
    - multiple or diffuse lesions on MRI
    - lesions on the dominant cerebral hemisphere
    - Remoted double pathology
  - Genetic epilepsy

Thank You Very Much for Your Attention