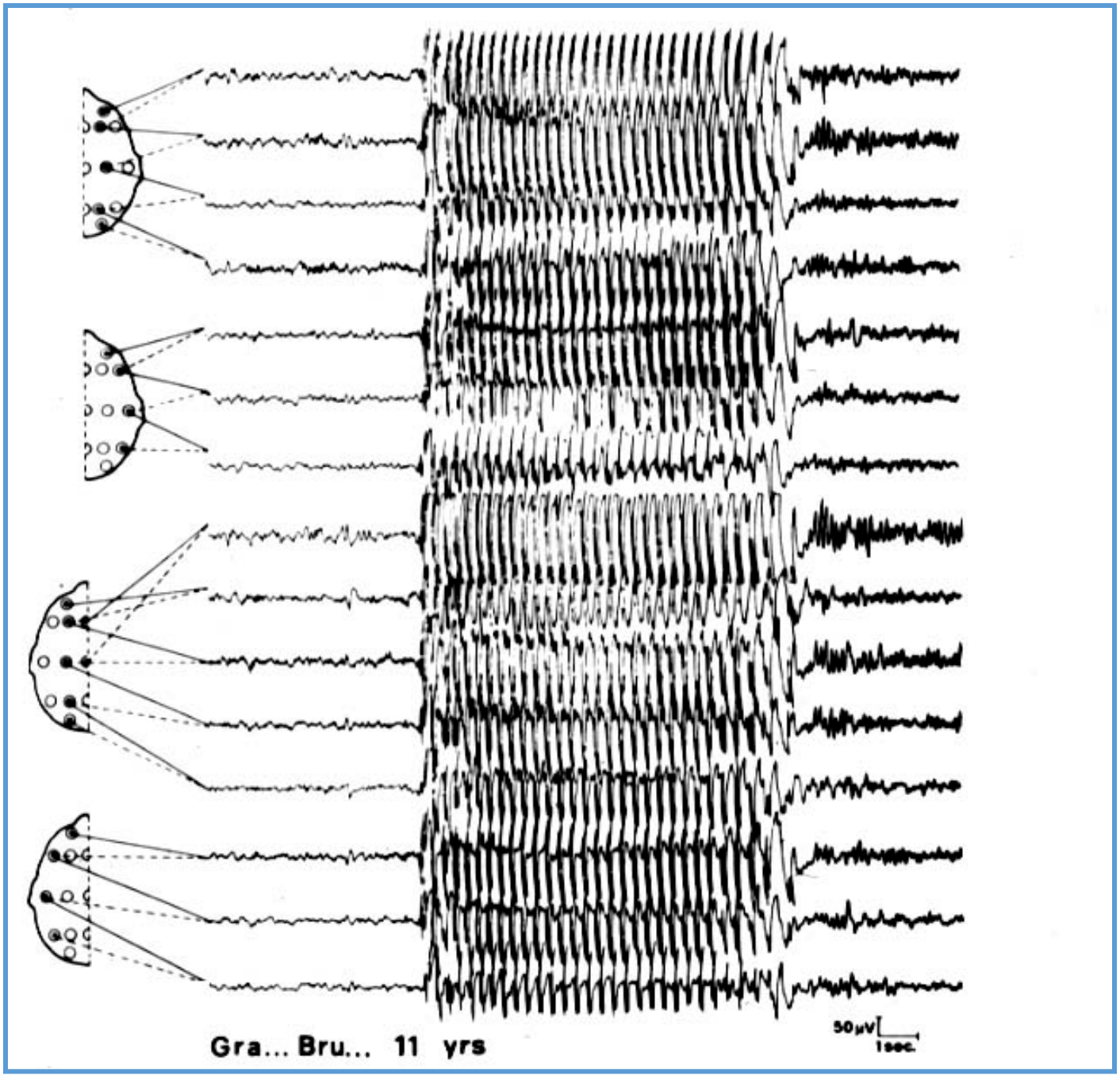
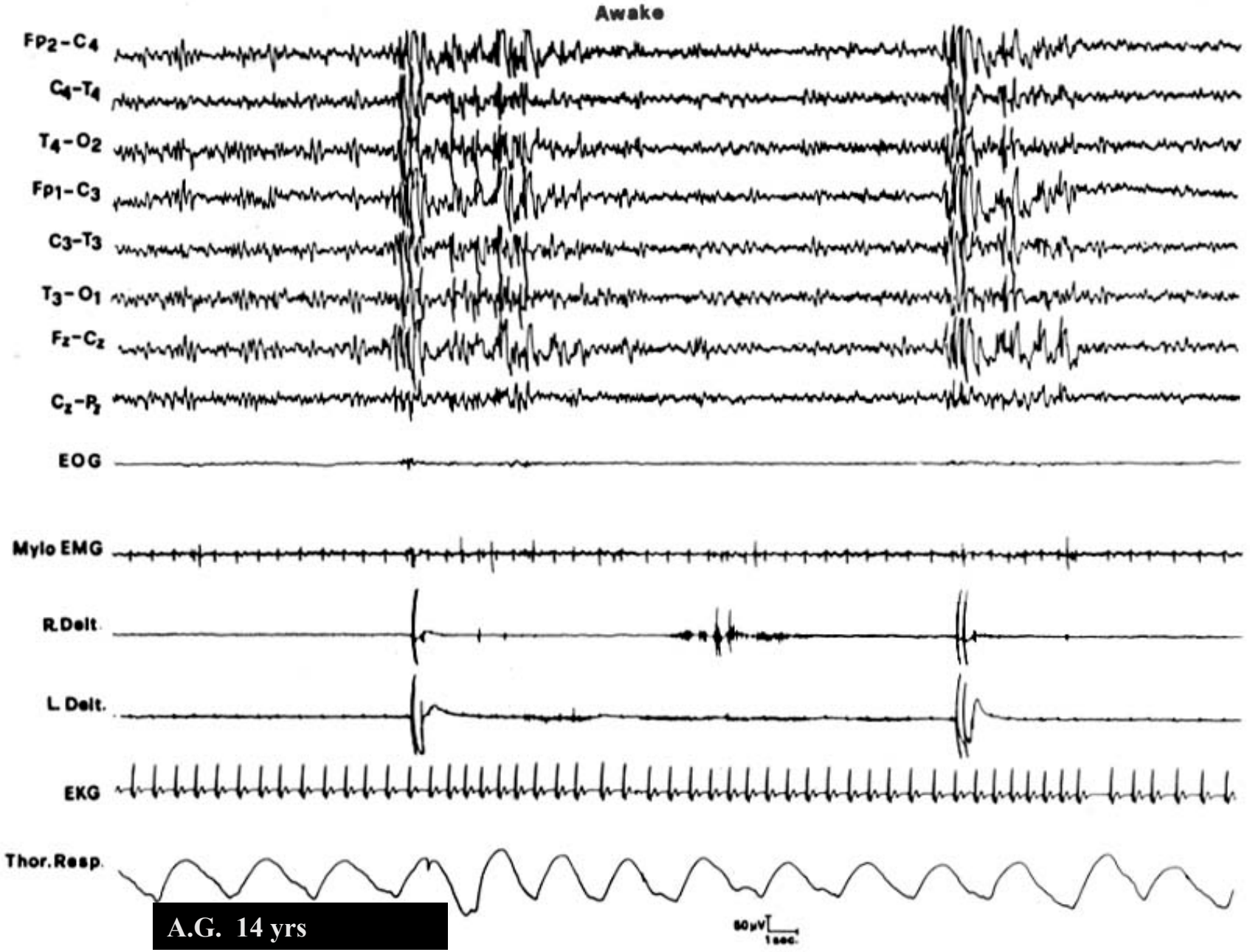
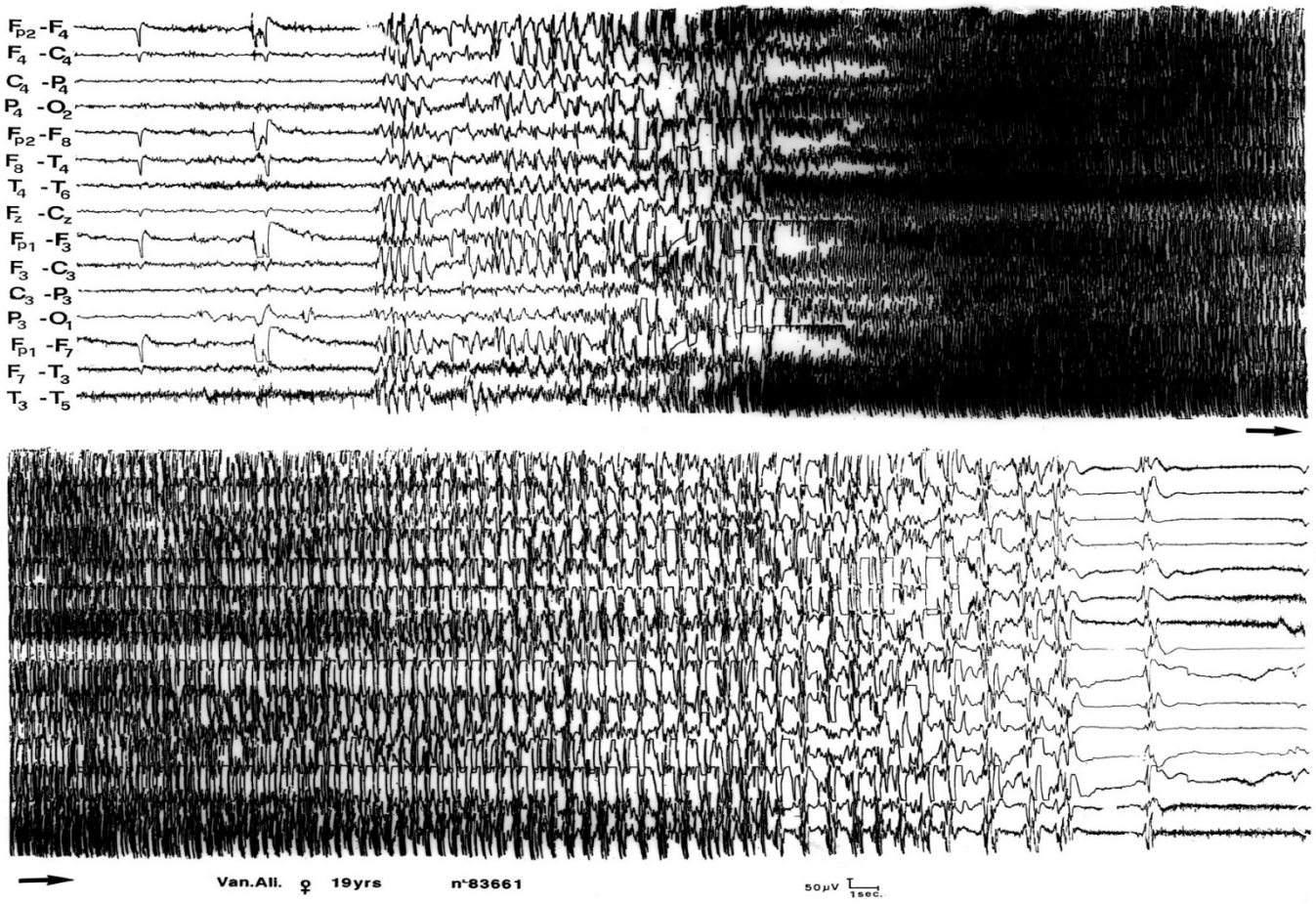
L'EEG nelle epilessie generalizzate

Paolo Tinuper

IRCCS Istituto delle Scienze Neurologiche di Bologna.
Dipartimento di Scienze Biomediche e Neuromotorie. Università di Bologna


Gra... Bru... 11 yrs
50 µV
1sec.


Awake
Fp2-C4
C4-T4
T4-O2
Fp1-C3
C3-T3
T3-O1
Fz-Cz
Cz-Pz
EOG
Mylo EMG
R.Delt.
L.Delt.
EKG
Thor.Resp.
A.G. 14 yrs
50μV
1 sec.


Fp2 -F4
F4 -C4
C4 -P4
P4 -O2
Fp2 -F8
F8 -T4
T4 -T6
Fz -Cz
Fp1 -F3
F3 -C3
C3 -P3
P3 -O1
Fp1 -F7
F7 -T3
T3 -T5
Van.All. ♀ 19yrs n°83661
50µV
1sec.

ILAE Classification Task Force 2013-7

Torbjörn Tomson, Emilio Perucca, Ingrid Scheffer, Jackie French, Yue-Hua Zhang
Satish Jain, Gary Mathern, Sam Wiebe, Edouard Hirsch, Sameer Zuberi, Nico Moshe

ILAE POSITION PAPER

Operational classification of seizure types by the International League Against Epilepsy: Position Paper of the ILAE Commission for Classification and Terminology

*Robert S. Fisher, †J. Helen Cross, ‡Jacqueline A. French, §Norimichi Higurashi, ¶Edouard Hirsch, #Floor E. Jansen, **Lieven Lagae, ††Solomon L. Moshé, ‡‡Jukka Peltola, §§Eliane Roulet Perez, ¶¶Ingrid E. Scheffer, and ##***Sameer M. Zuberi

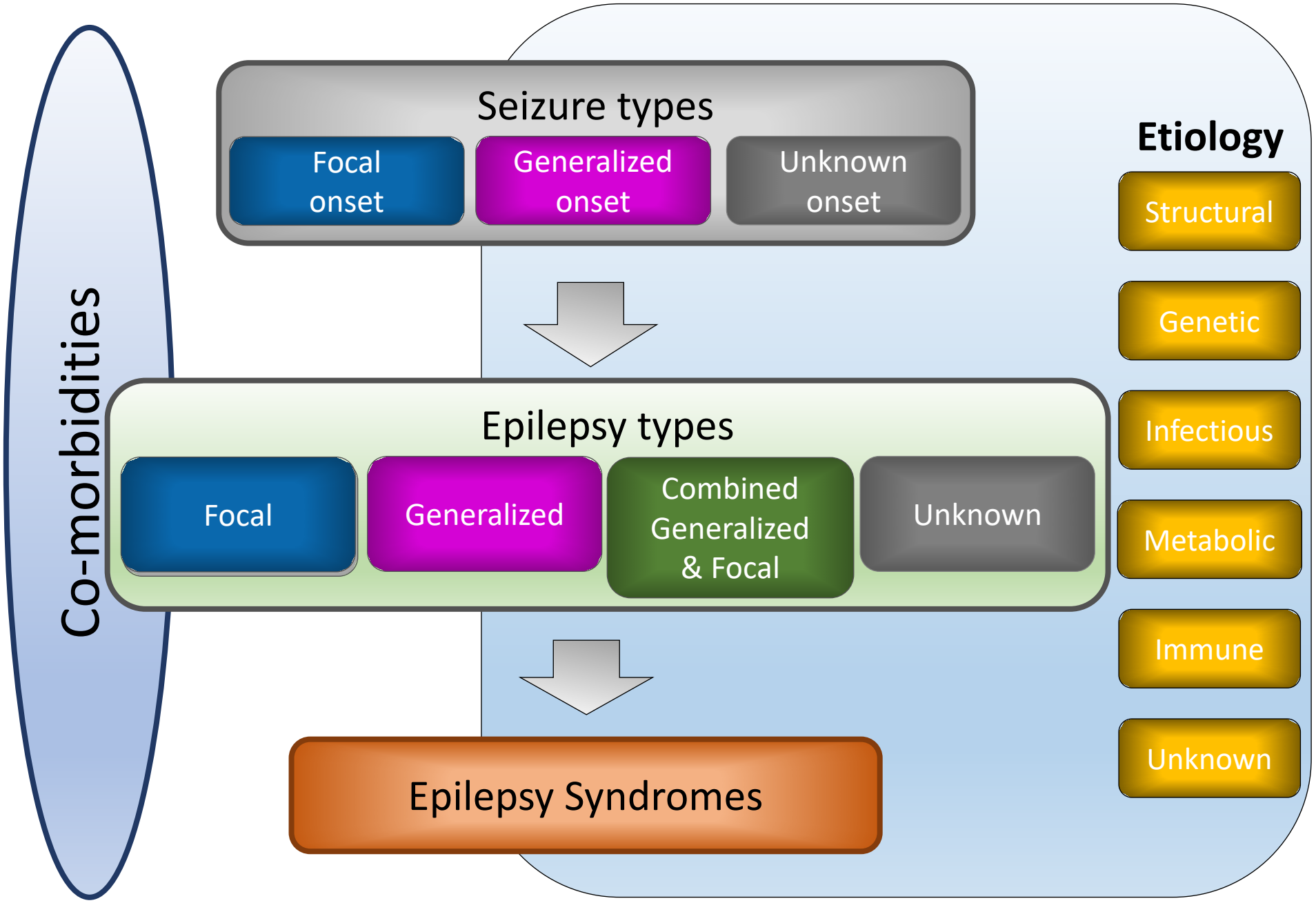
Epilepsia, **(*):1–9, 2017
doi: 10.1111/epi.13670

ILAE POSITION PAPER

ILAE classification of the epilepsies: Position paper of the ILAE Commission for Classification and Terminology

[1,2,3]Ingrid E. Scheffer, [1]Samuel Berkovic, [4]Giuseppe Capovilla, [5]Mary B. Connolly, [6]Jacqueline French, [7]Laura Guilhoto, [8,9]Edouard Hirsch, [10]Satish Jain, [11]Gary W. Mathern, [12]Solomon L. Moshé, [13]Douglas R. Nordli, [14]Emilio Perucca, [15]Torbjörn Tomson, [16]Samuel Wiebe, [17]Yue-Hua Zhang, and [18,19]Sameer M. Zuberi

Epilepsia, **(*):1–10, 2017
doi: 10.1111/epi.13709


Co-morbidities
Seizure types
Focal onset
Generalized onset
Unknown onset
Etiology
Structural
Genetic
Infectious
Metabolic
Immune
Unknown
Epilepsy types
Focal
Generalized
Combined Generalized & Focal
Unknown
Epilepsy Syndromes

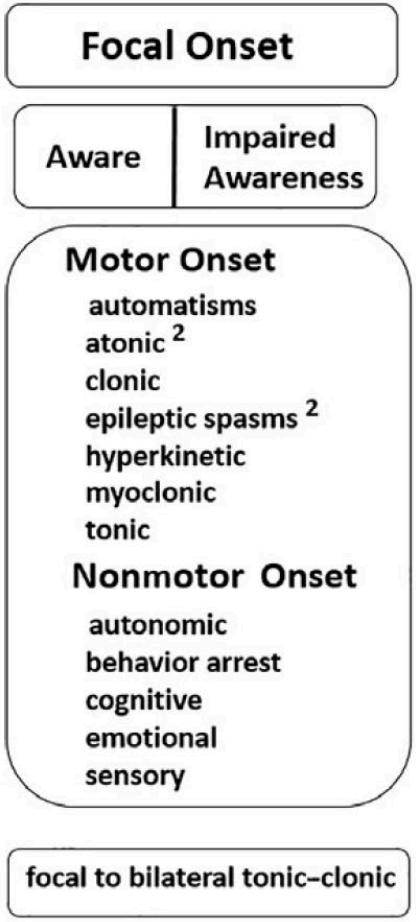
Focal seizures:

- originating within networks limited to one hemisphere. These may be discretely localised or more widely distributed….

Generalised seizures

- originating at some point within, and rapidly engaging, bilaterally distributed networks. …can include cortical and subcortical structures, but not necessarily include the entire cortex.

ILAE 2017 Classification of Seizure Types Expanded Version [1]



ILAE 2017 Classification of Seizure Types Expanded Version [1]

Focal Onset

Aware	Impaired Awareness

Motor Onset

- automatisms
- atonic [2]
- clonic
- epileptic spasms [2]
- hyperkinetic
- myoclonic
- tonic

Nonmotor Onset

- autonomic
- behavior arrest
- cognitive
- emotional
- sensory

focal to bilateral tonic–clonic

Generalized Onset

Motor

- tonic–clonic
- clonic
- tonic
- myoclonic
- myoclonic–tonic–clonic
- myoclonic–atonic
- atonic
- epileptic spasms

Nonmotor (absence)

- typical
- atypical
- myoclonic
- eyelid myoclonia

ILAE 2017 Classification of Seizure Types Expanded Version [1]

Focal Onset

Aware	Impaired Awareness

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- myoclonic–atonic
- atonic
- epileptic spasms

Nonmotor (absence)
- typical
- atypical
- myoclonic
- eyelid myoclonia

Unknown Onset

Motor
- tonic–clonic
- epileptic spasms

Nonmotor
- behavior arrest

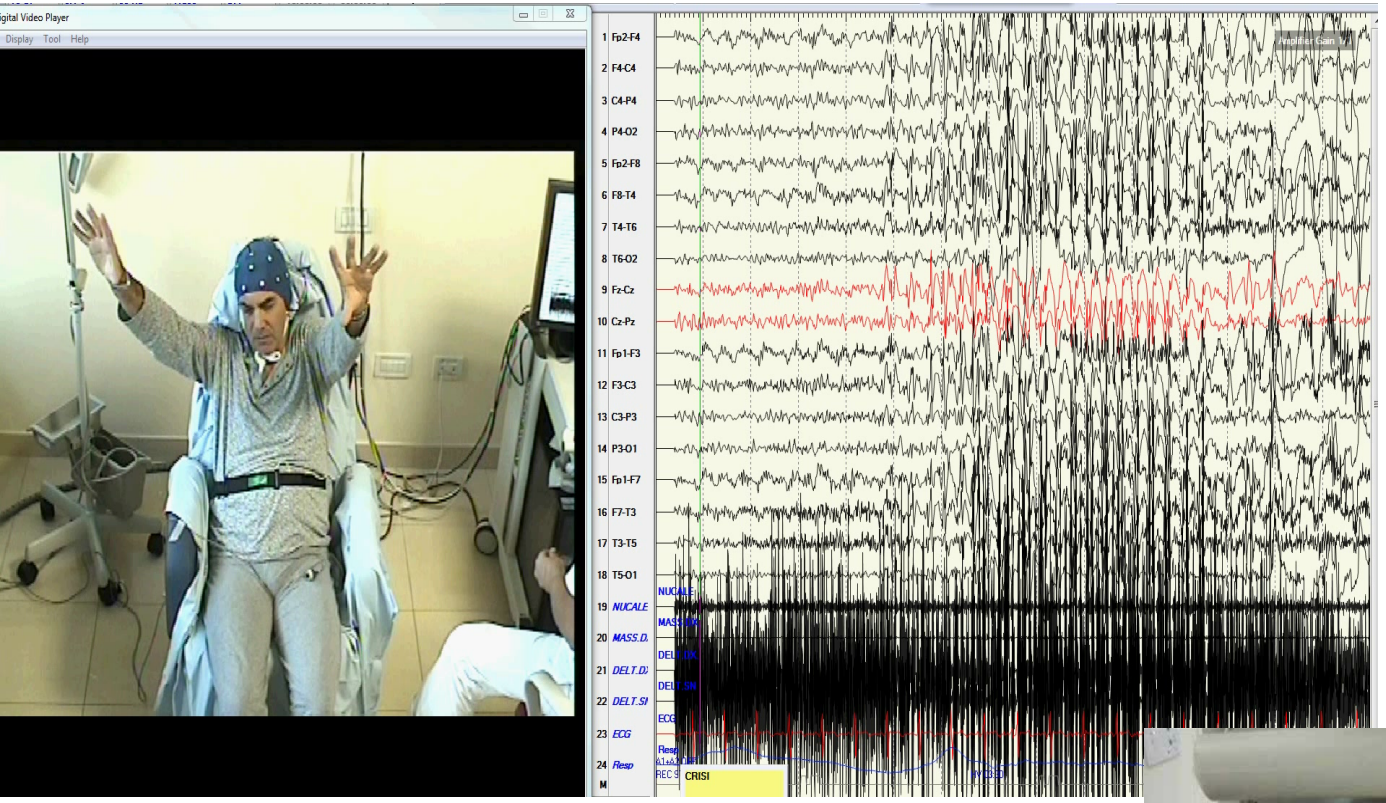
Unclassified [3]

Some seizures could be either focal or generalized onset

- Clonic
- Myoclonic
- Tonic
- Atonic
- Spasms
- Tonic-clonic
- Absences ???

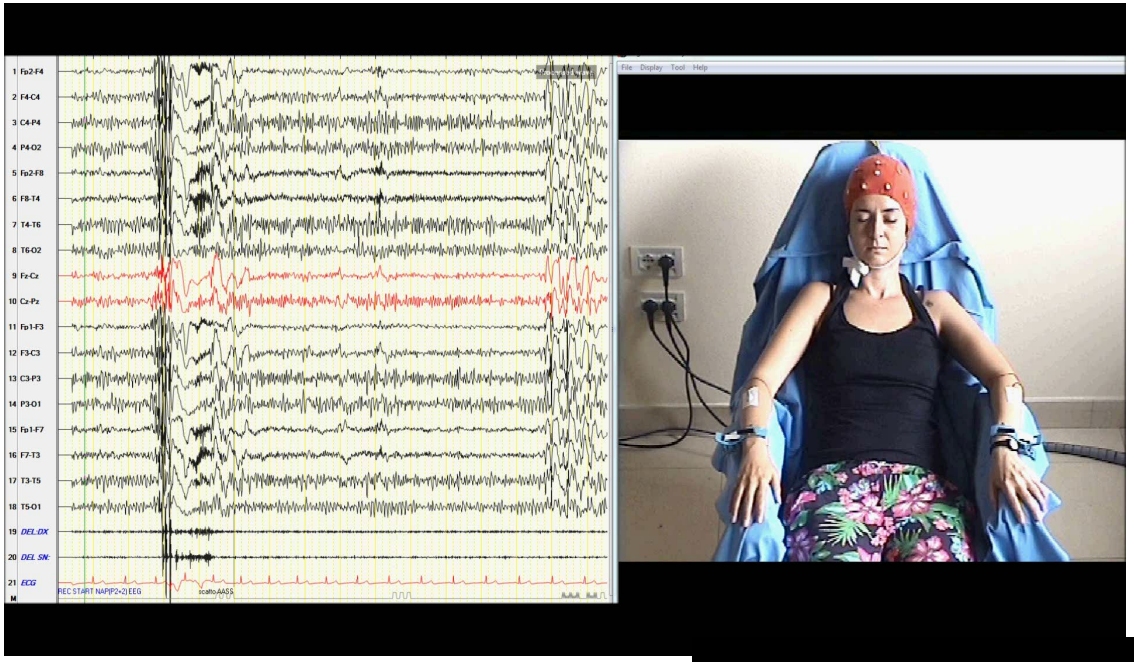
Clonic seizure

Generalized onset



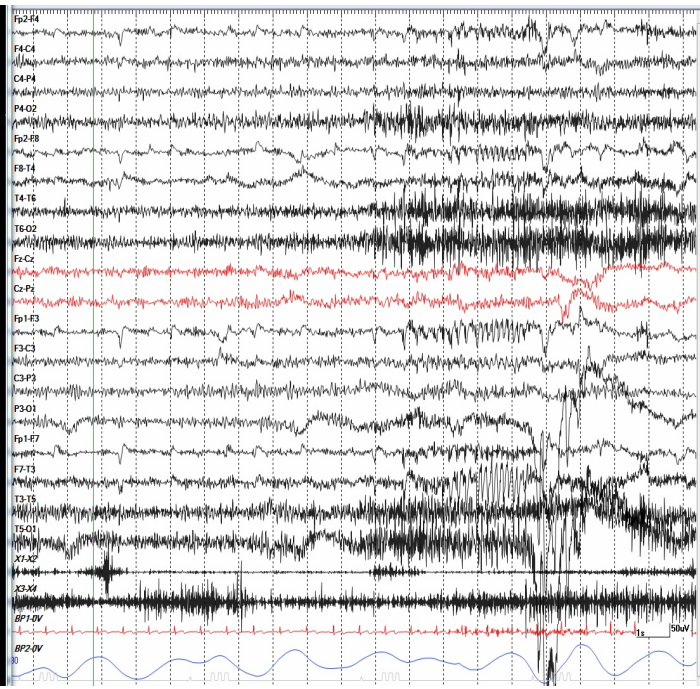
Focal onset

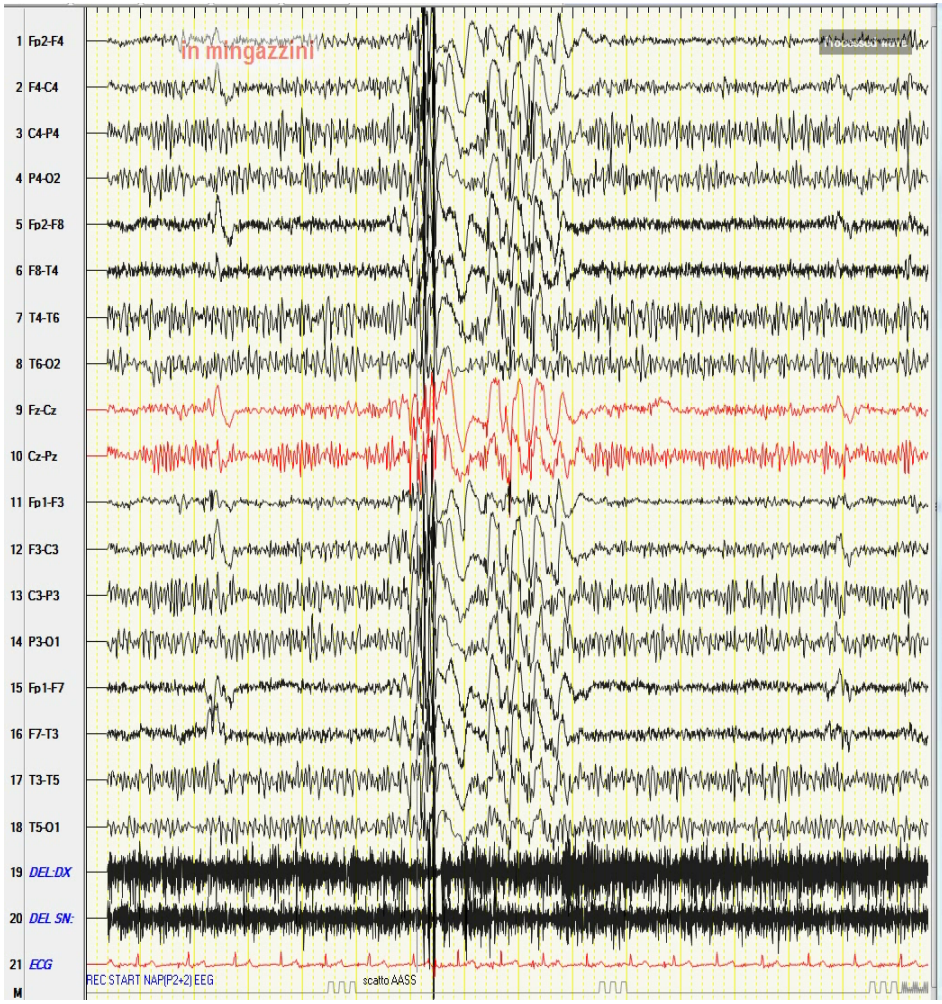
Generalized onset

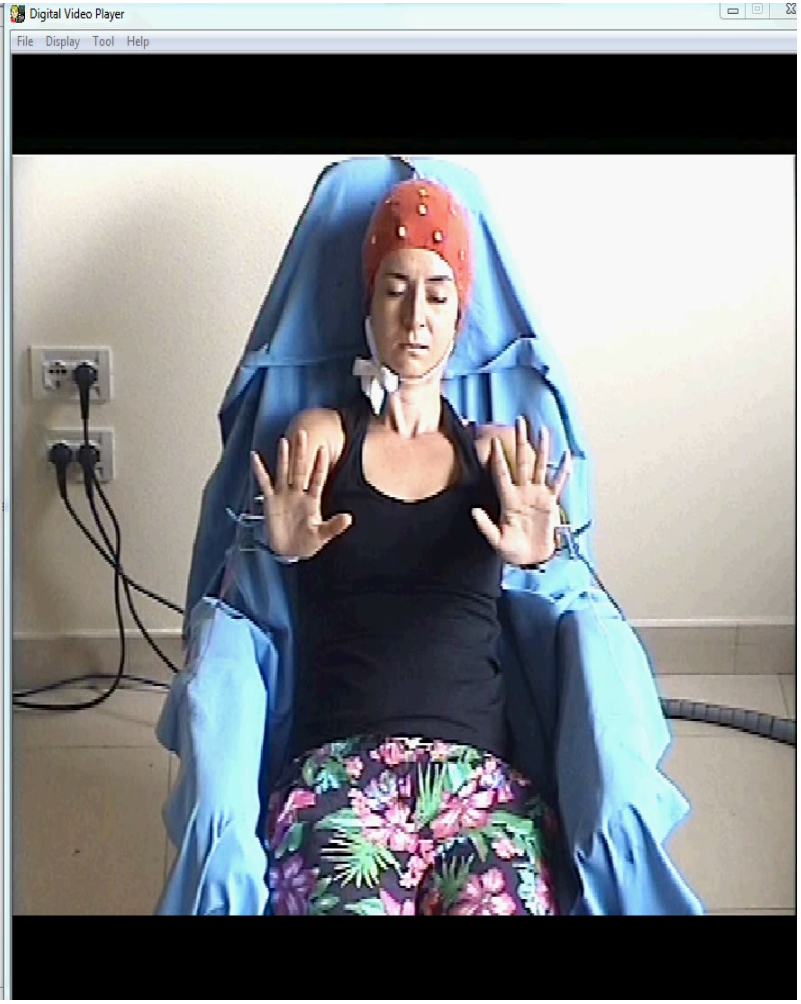


Myoclonic seizure

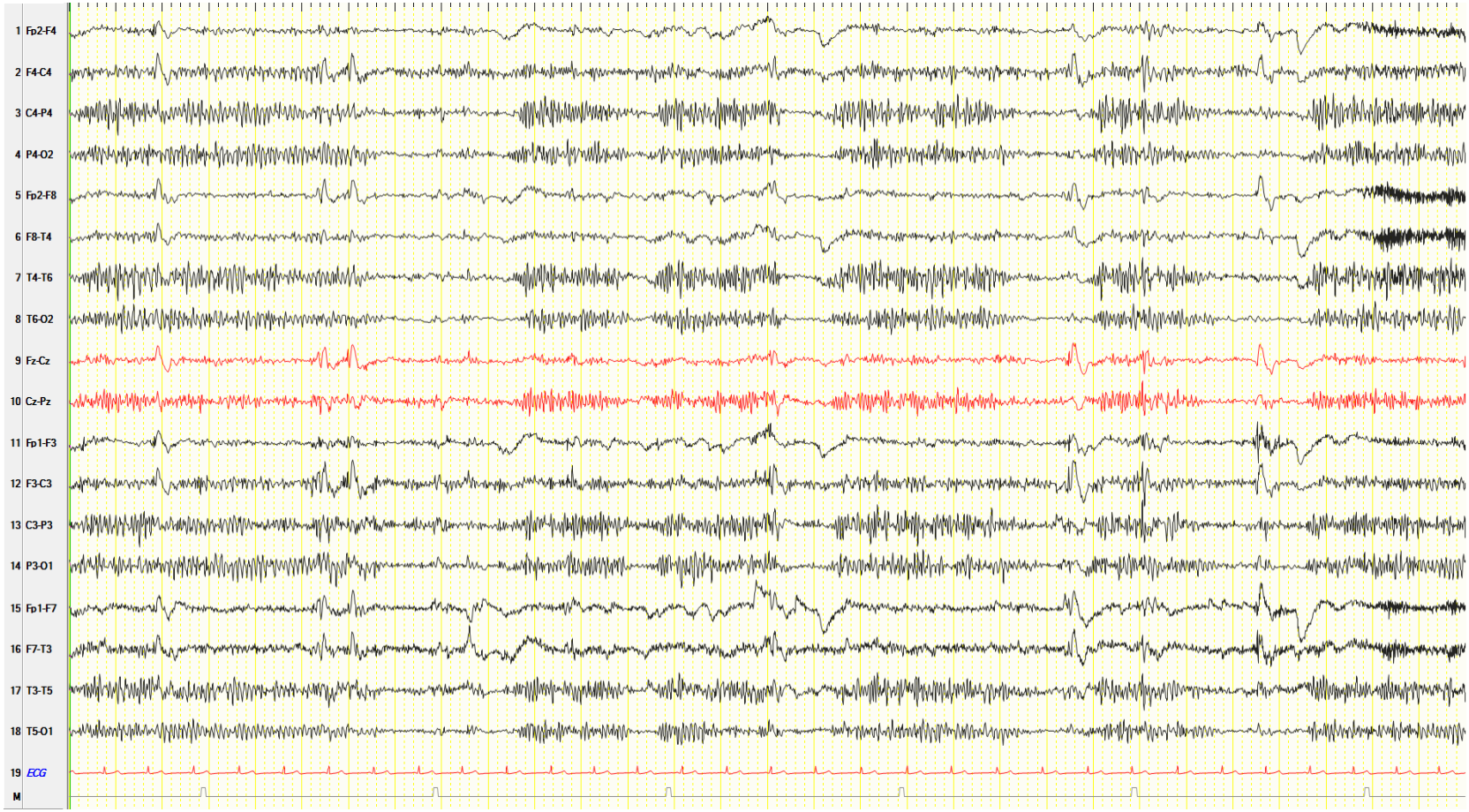
Focal onset

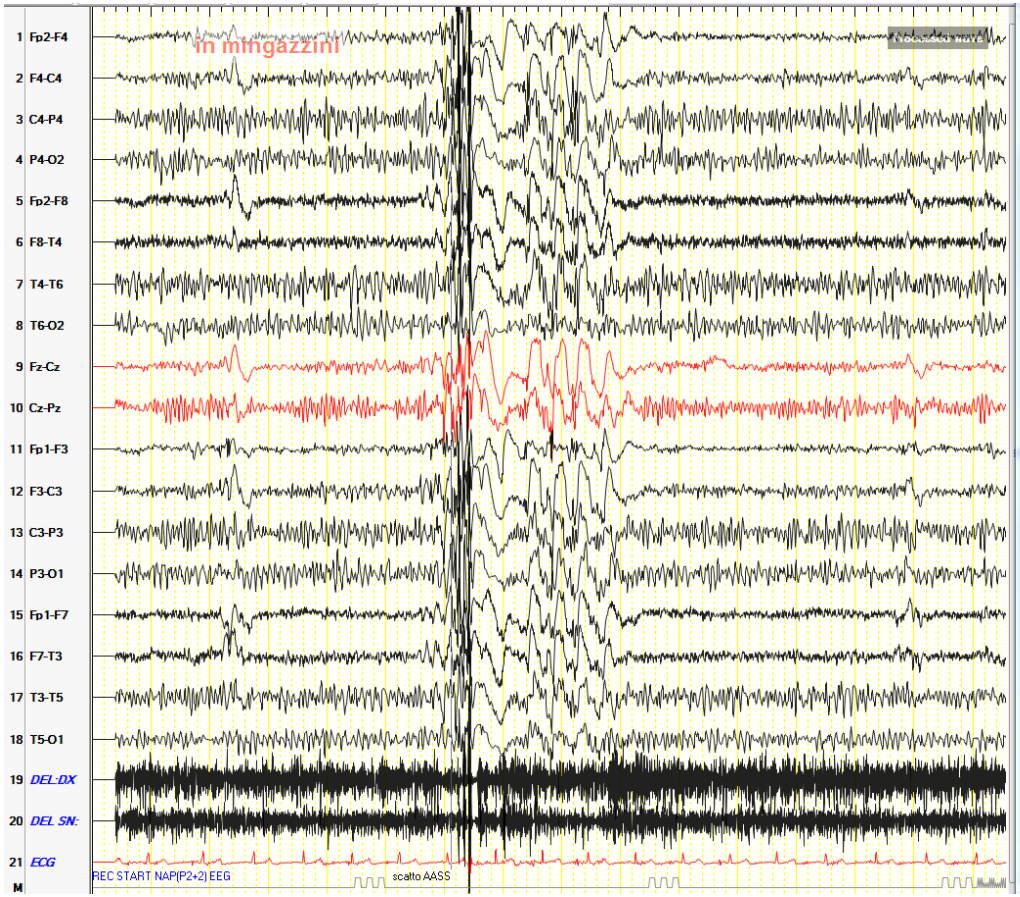


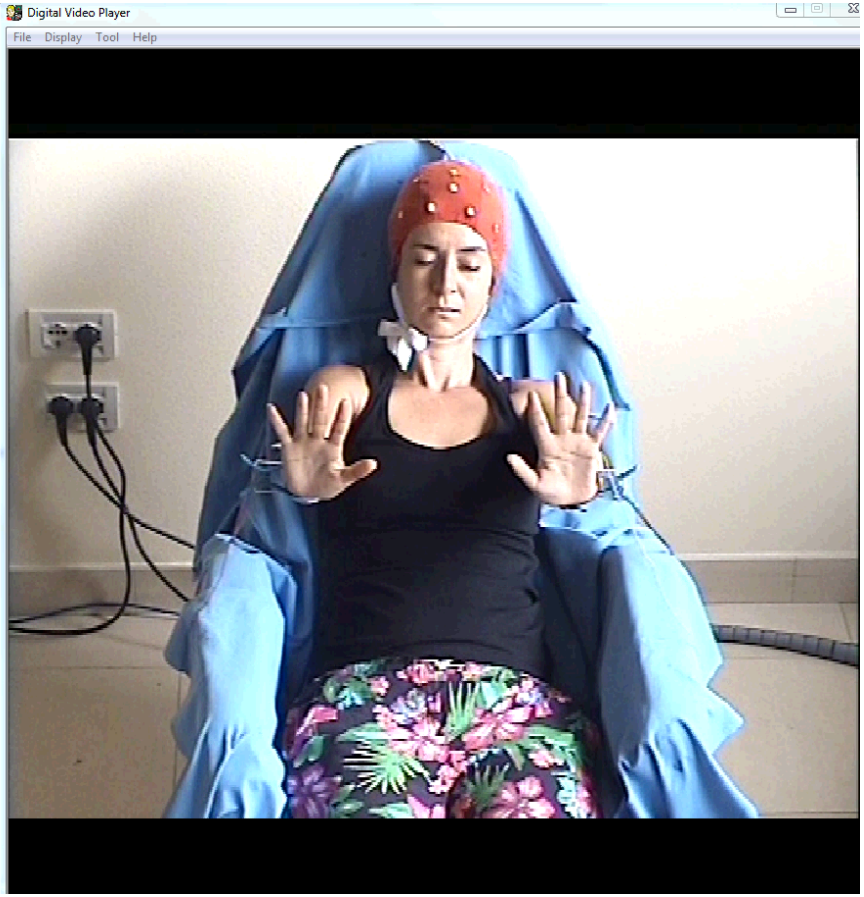

1 Fp2-F4
2 F4-C4
3 C4-P4
4 P4-O2
5 Fp2-F8
6 F8-T4
7 T4-T6
8 T6-O2
9 Fz-Cz
10 Cz-Pz
11 Fp1-F3
12 F3-C3
13 C3-P3
14 P3-O1
15 Fp1-F7
16 F7-T3
17 T3-T5
18 T5-O1
19 DEL:DX
20 DEL SN:
21 ECG
M
in magazzini
REC START NAP(P2+2) EEG
scatto AASS

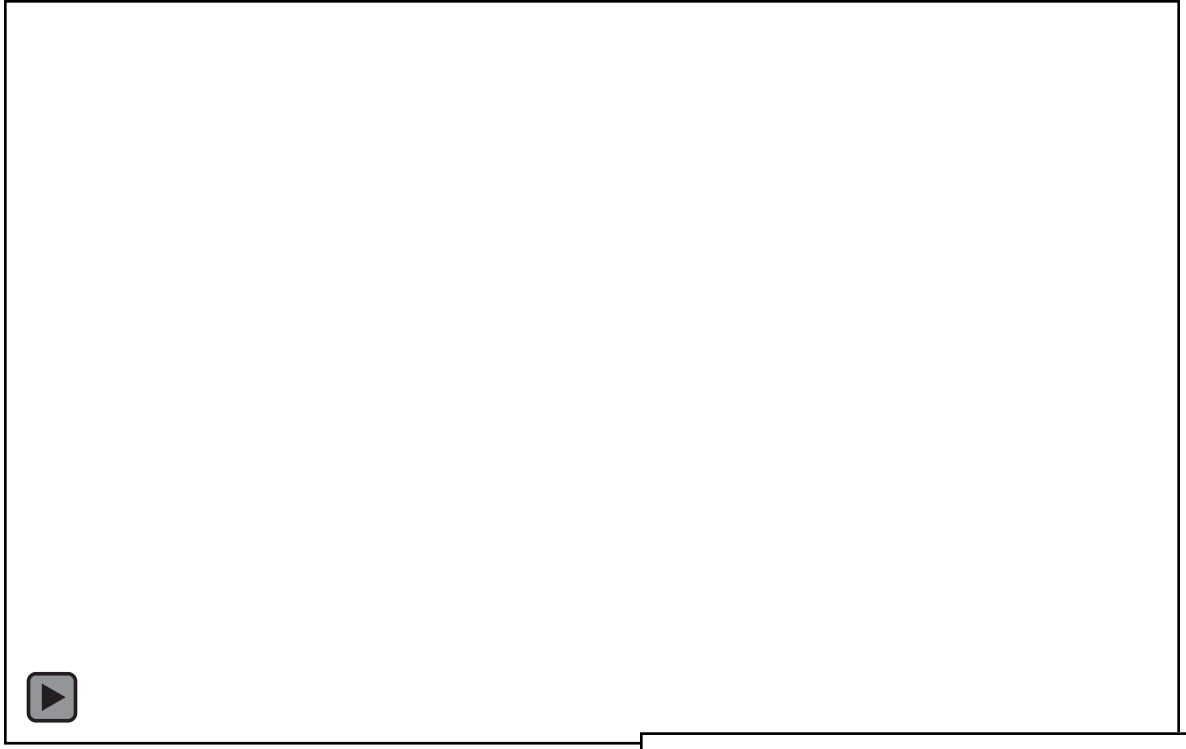

Digital Video Player
File Display Tool Help

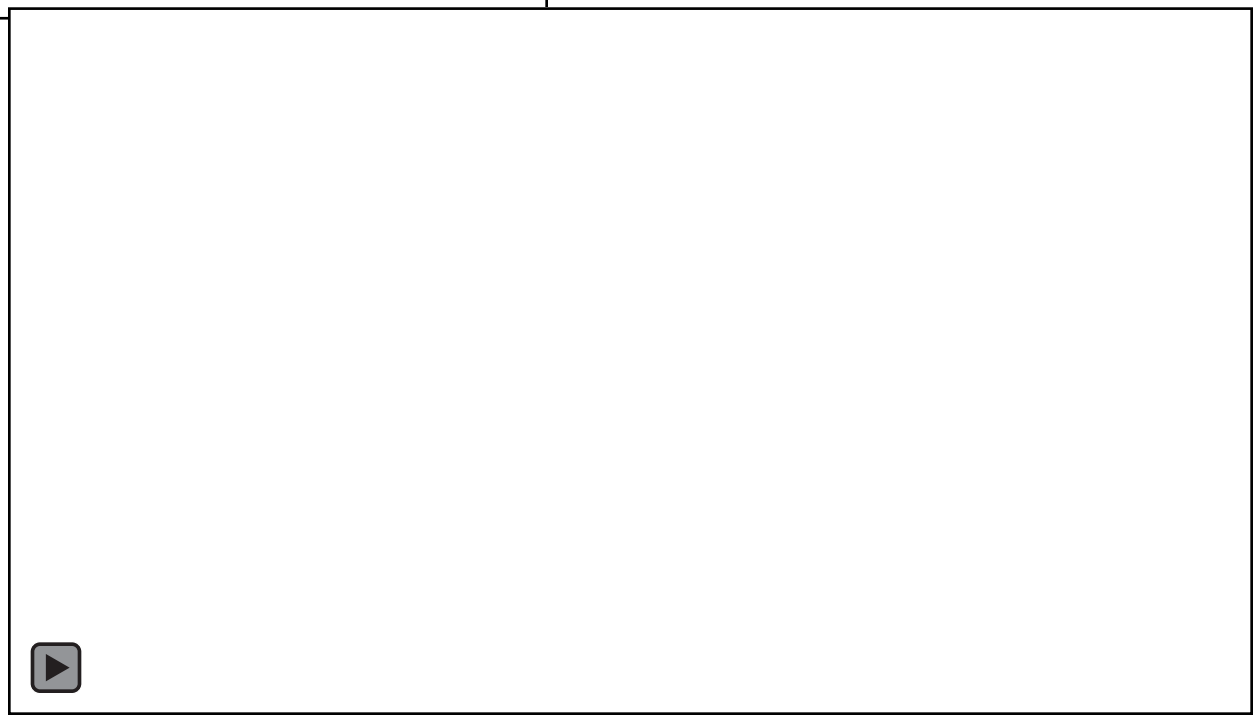
Le anomalie possono essere focali !!!!

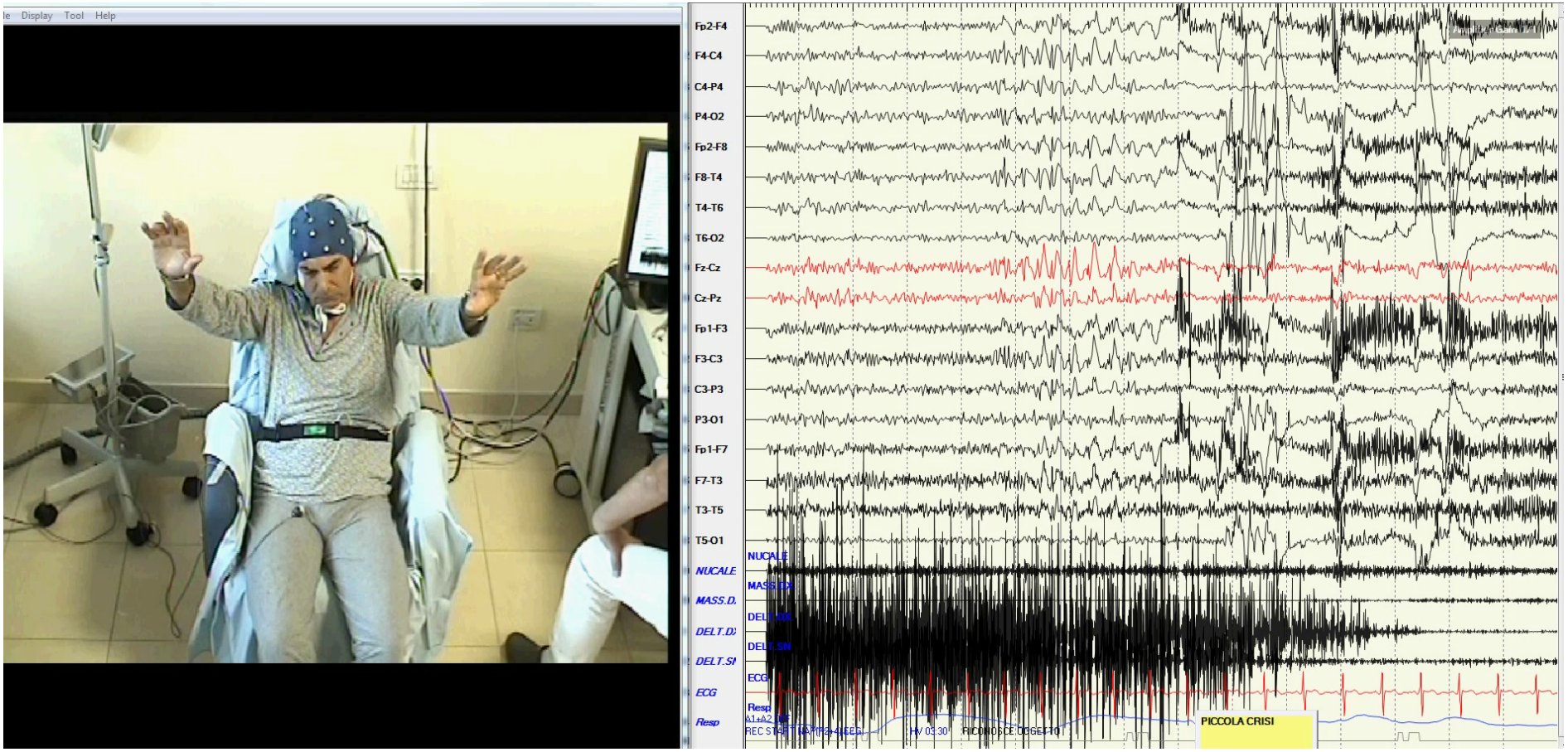


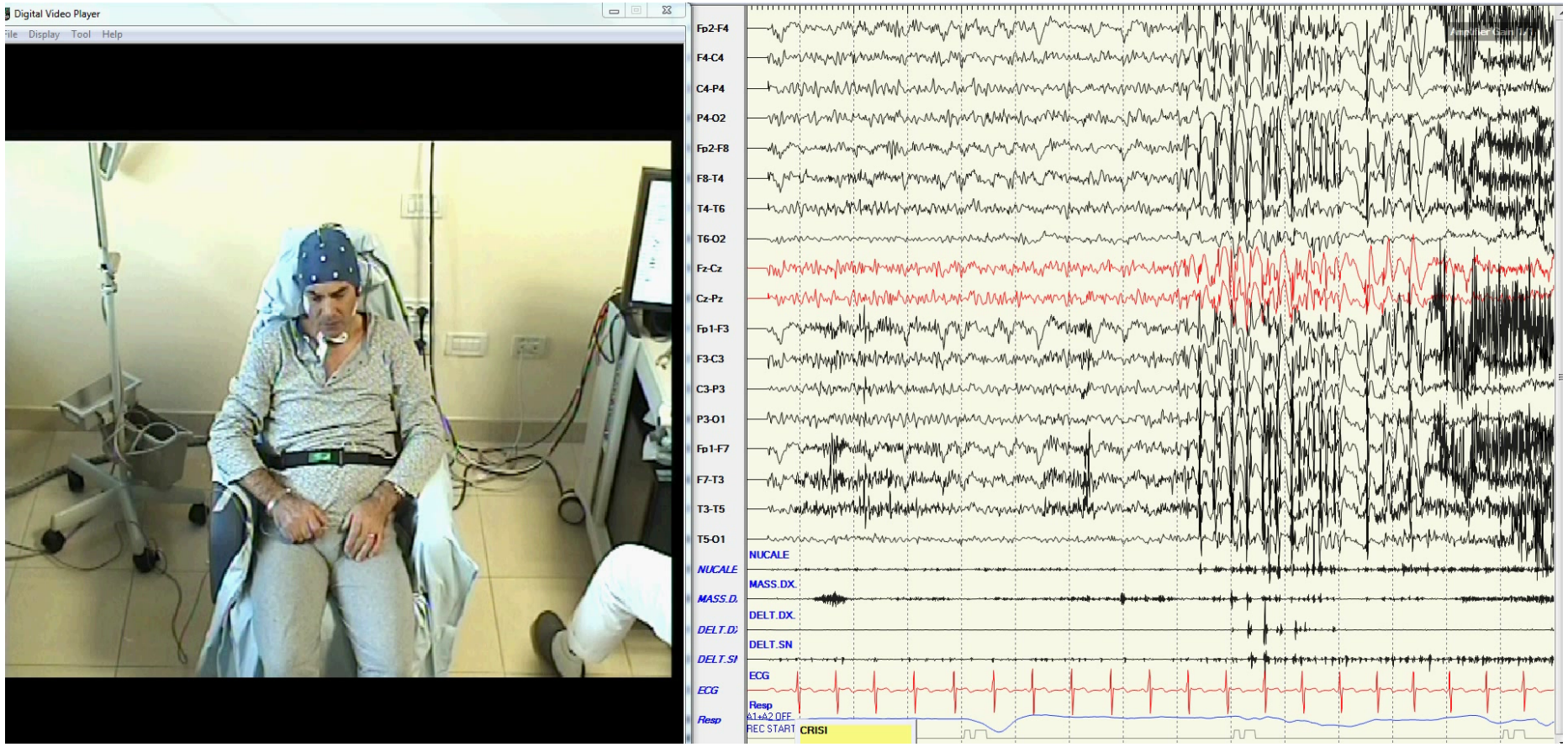

in mingazzini
1 Fp2-F4
2 F4-C4
3 C4-P4
4 P4-O2
5 Fp2-F8
6 F8-T4
7 T4-T6
8 T6-O2
9 Fz-Cz
10 Cz-Pz
11 Fp1-F3
12 F3-C3
13 C3-P3
14 P3-O1
15 Fp1-F7
16 F7-T3
17 T3-T5
18 T5-O1
19 DEL:DX
20 DEL SN:
21 ECG
M
REC START NAP(P2+2) EEG
scatto AASS


Digital Video Player
File Display Tool Help

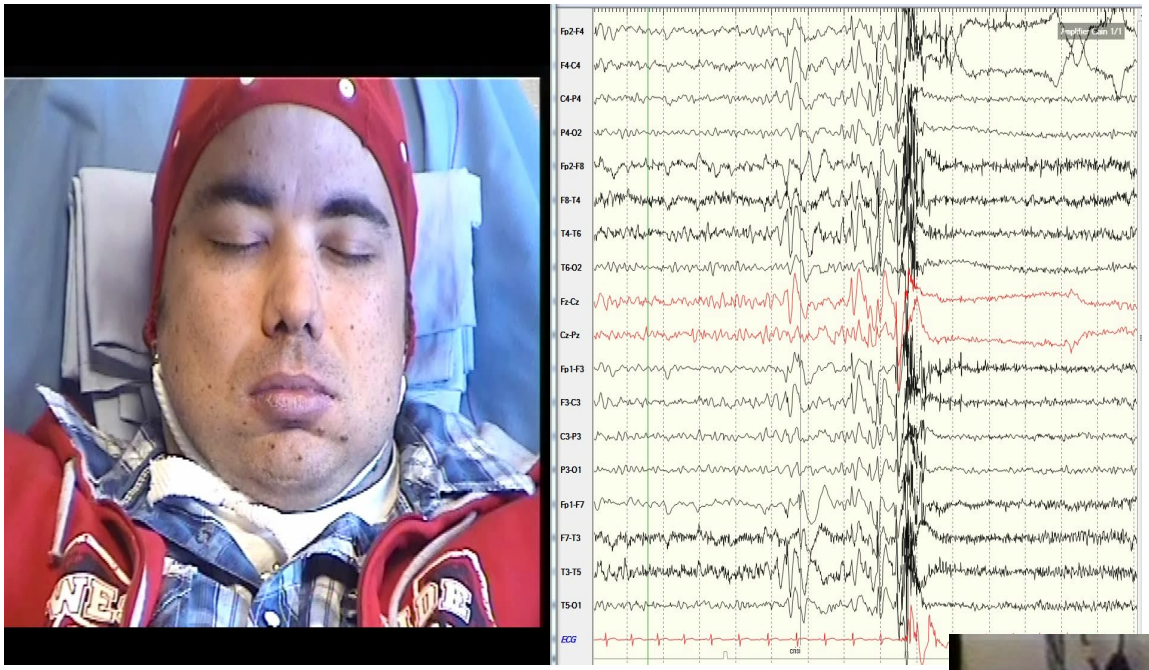





Display
Tool
Help
Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz-Cz
Cz-Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
NUCALE
MASS.D.
DELT.DX
DELT.SN
ECG
Resp
PICCOLA CRISI

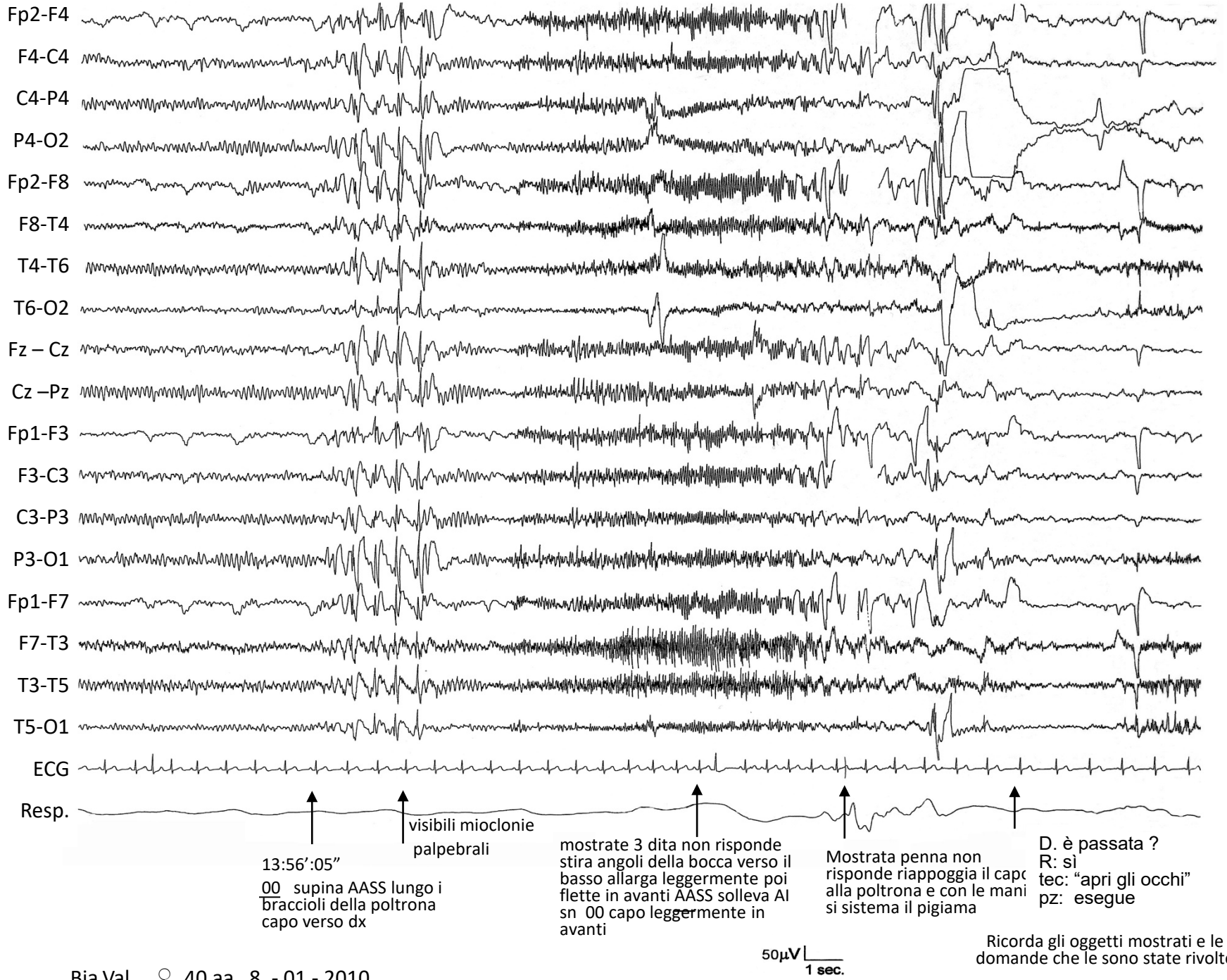

Digital Video Player
File Display Tool Help
Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz-Cz
Cz-Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
NUCALE
NUCALE
MASS.DX
MASS.D
DELT.DX
DELT.D
DELT.SN
DELT.SI
ECG
ECG
Resp
Resp
A1+A2 OFF
REC START
CRISI

Generalized onset

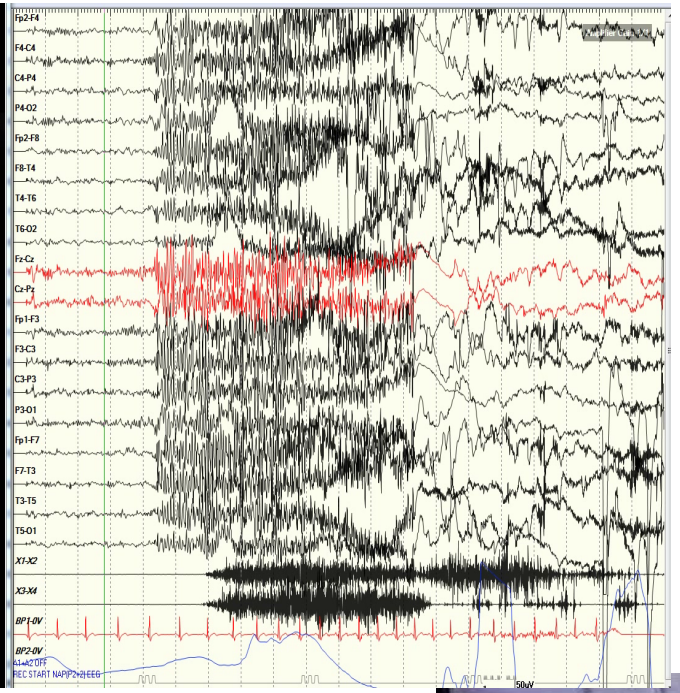


Tonic seizure

Focal onset


Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz – Cz
Cz –Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
ECG
Resp.
13:56':05"
00 supina AASS lungo i braccioli della poltrona capo verso dx
visibili mioclonie palpebrali
mostrate 3 dita non risponde stira angoli della bocca verso il basso allarga leggermente poi flette in avanti AASS solleva AI sn 00 capo leggermente in avanti
Mostrata penna non risponde riappoggia il capo alla poltrona e con le mani si sistema il pigiama
D. è passata ?
R: sì
tec: "apri gli occhi"
pz: esegue
50μV
1 sec.
Ricorda gli oggetti mostrati e le domande che le sono state rivolte
Bia.Val. ♀ 40 aa 8 .- 01 - 2010

Generalized onset

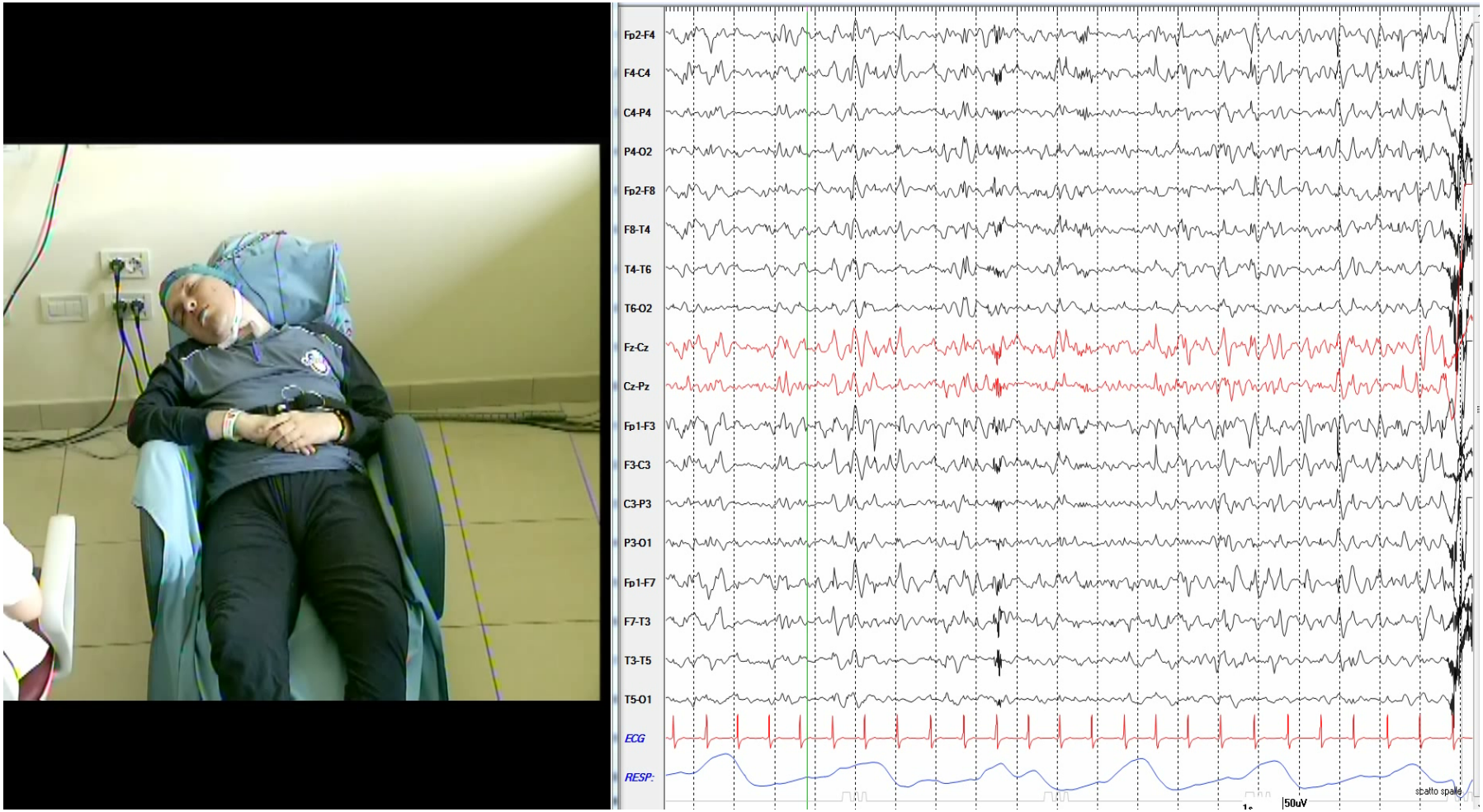


Tonic seizure

Focal onset

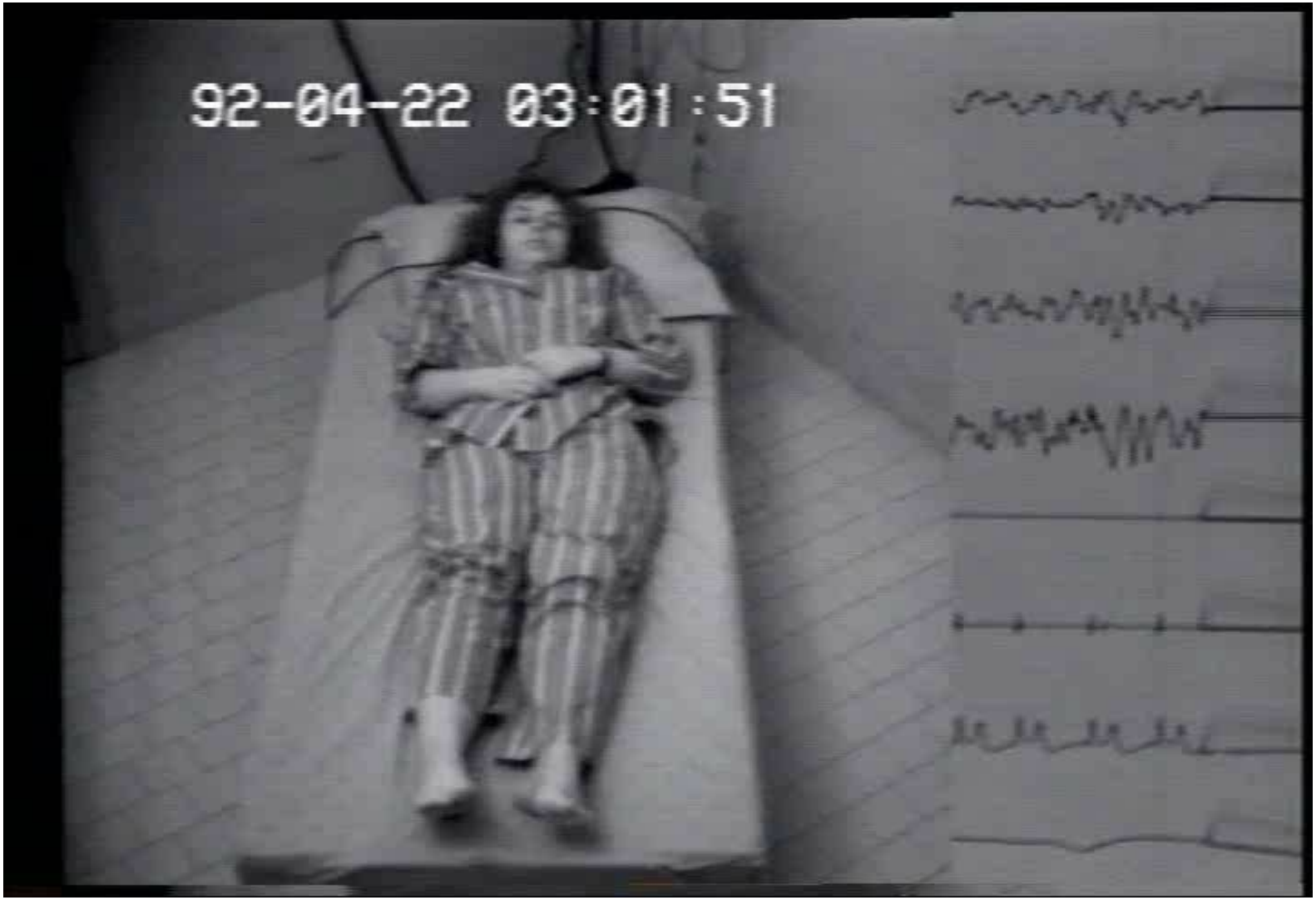
Tonic seizure

Generalized onset



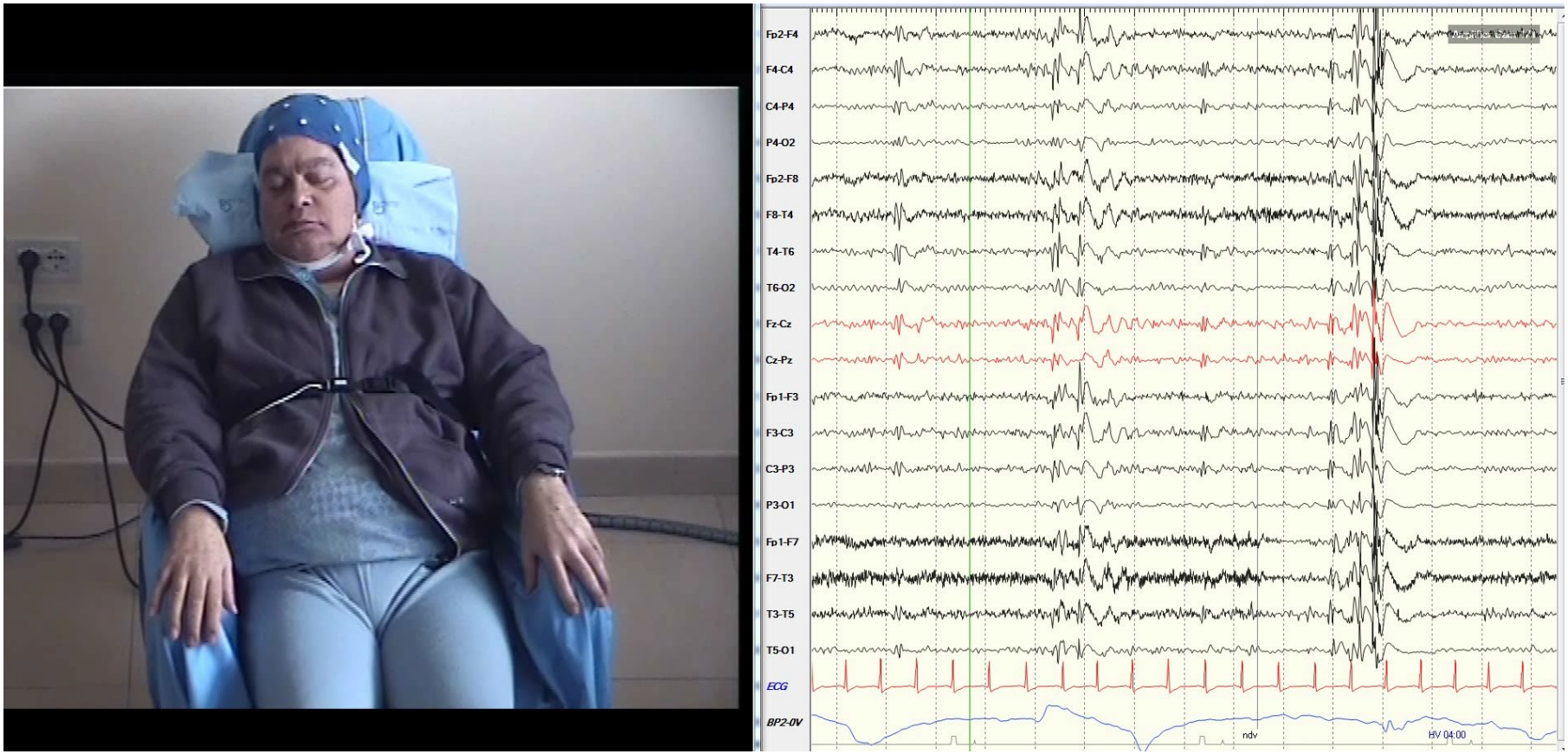
Tonic seizure

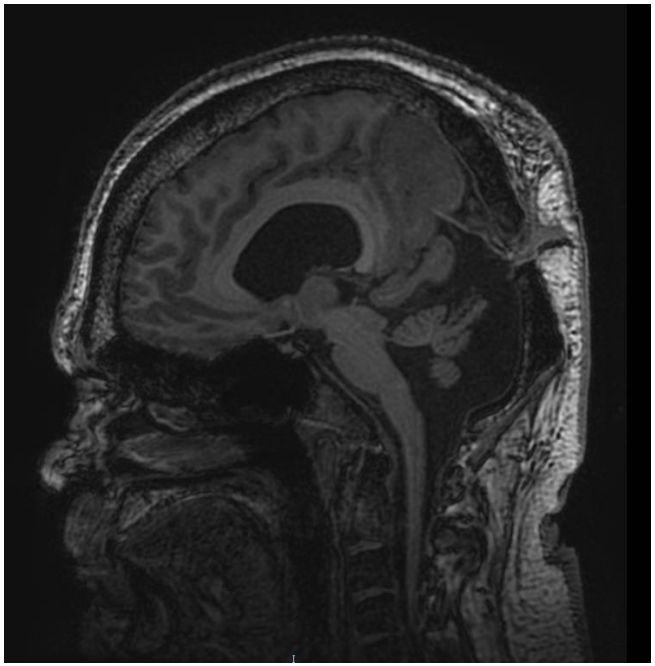
Focal onset

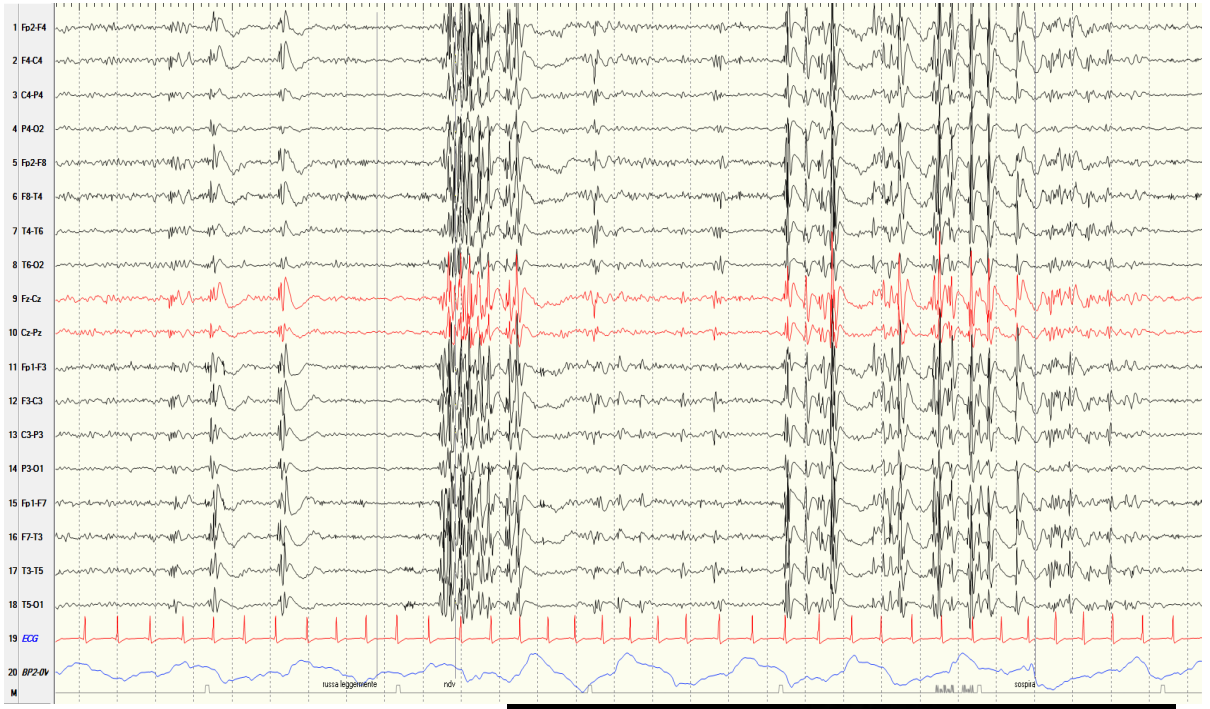


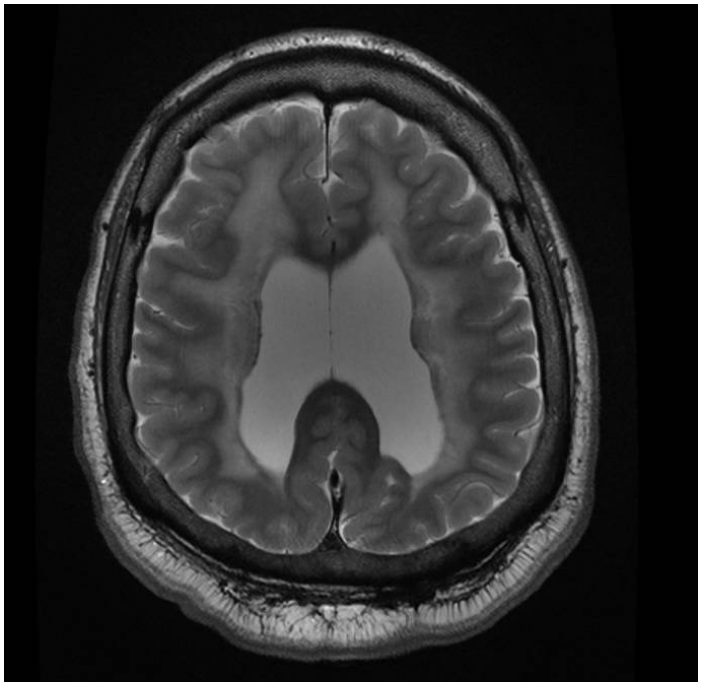
Epileptic spasm

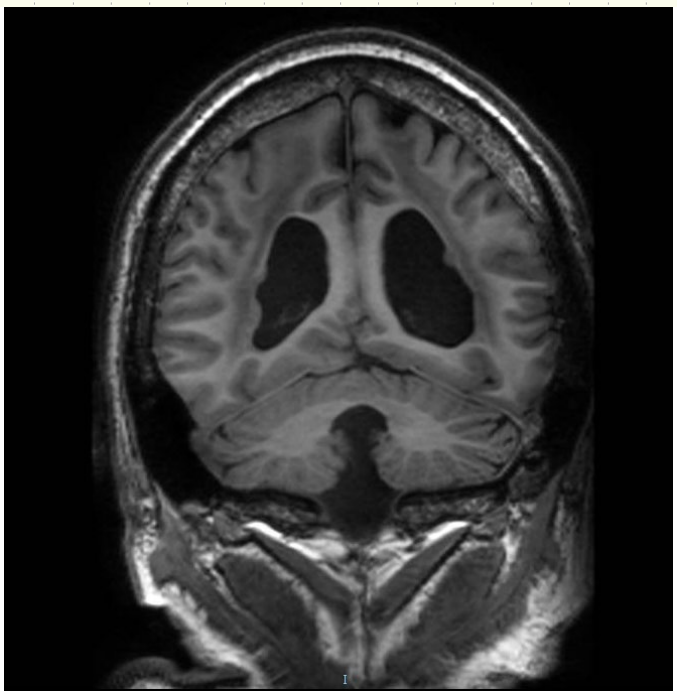
Generalized onset





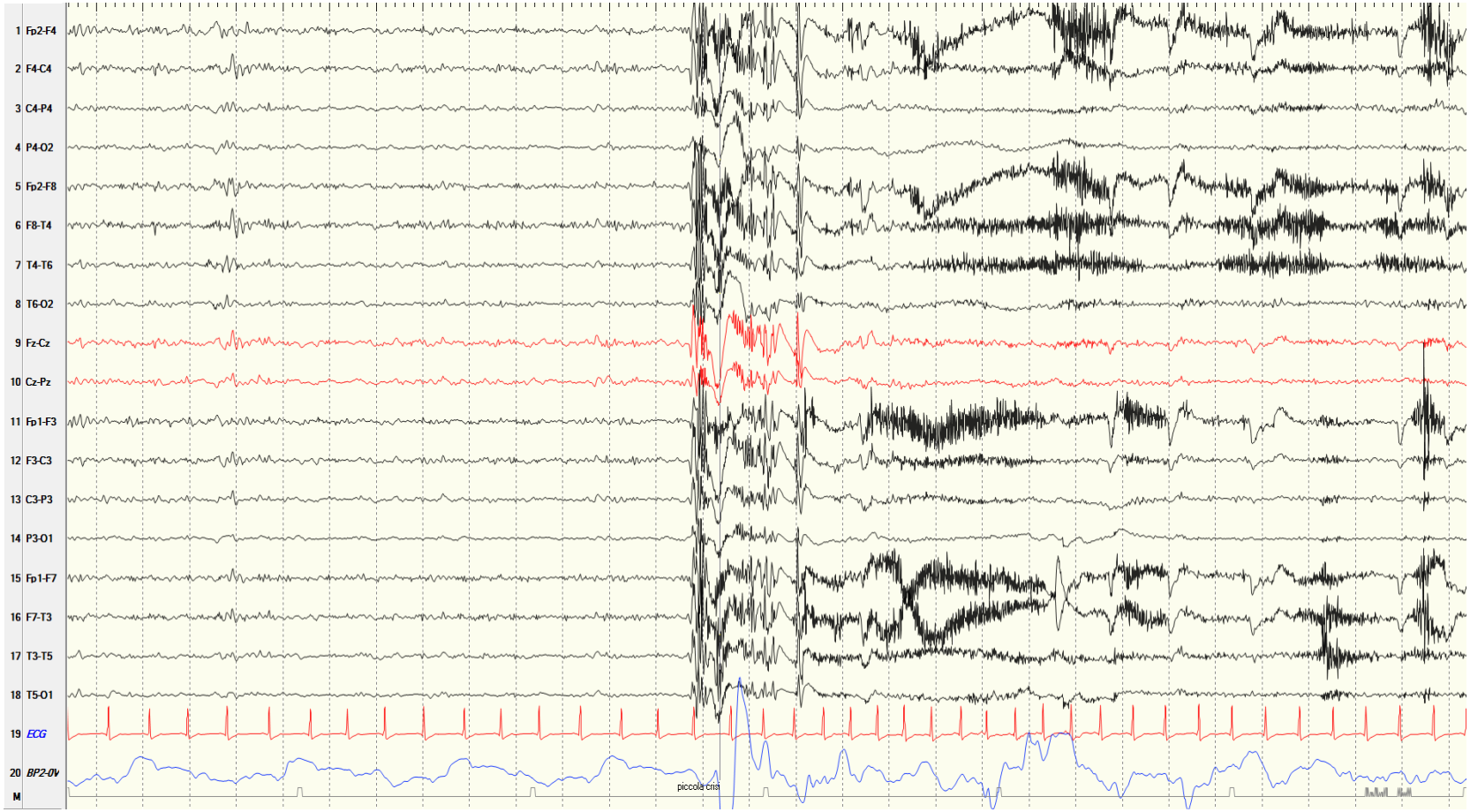

1 Fp2-F4
2 F4-C4
3 C4-P4
4 P4-O2
5 Fp2-F8
6 F8-T4
7 T4-T6
8 T6-O2
9 Fz-Cz
10 Cz-Pz
11 Fp1-F3
12 F3-C3
13 C3-P3
14 P3-O1
15 Fp1-F7
16 F7-T3
17 T3-T5
18 T5-O1
19 ECG
20 BP2-0v
M
tussa leggermente
nòv
sospira





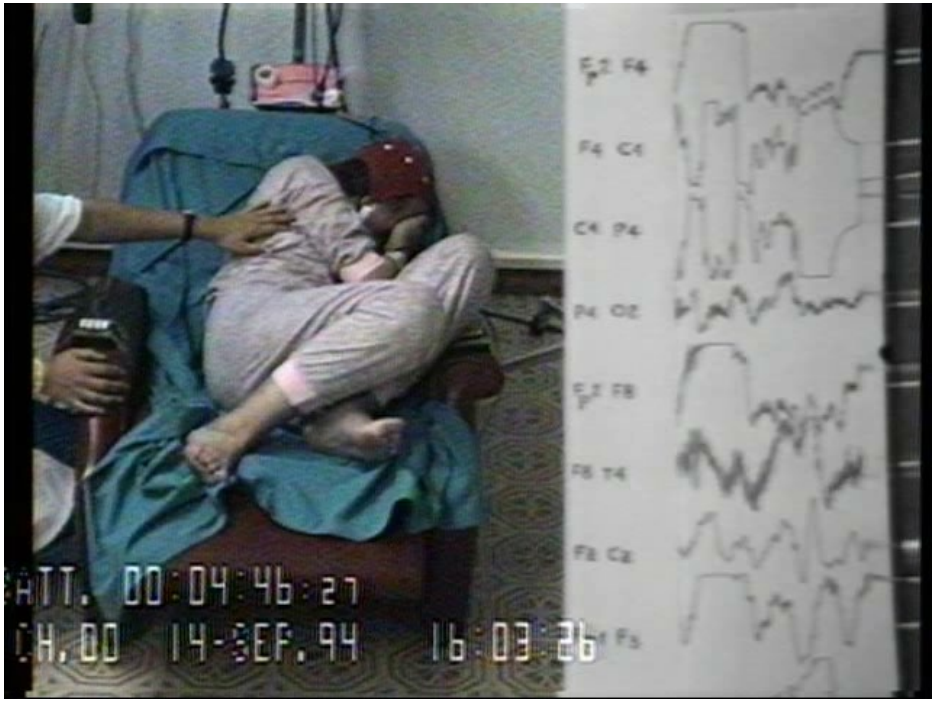
Picc. Gianni

Pic Gianni 2013

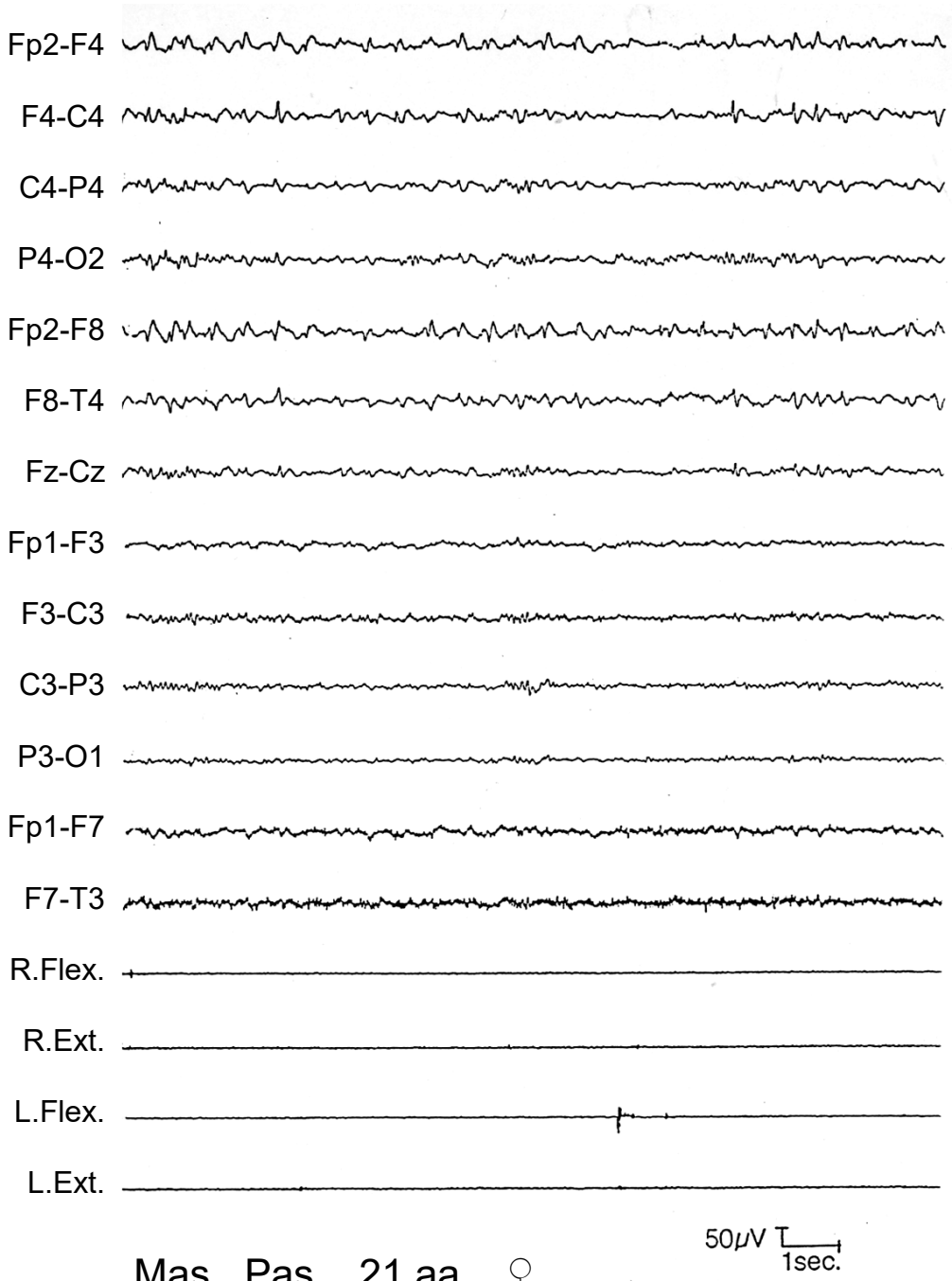


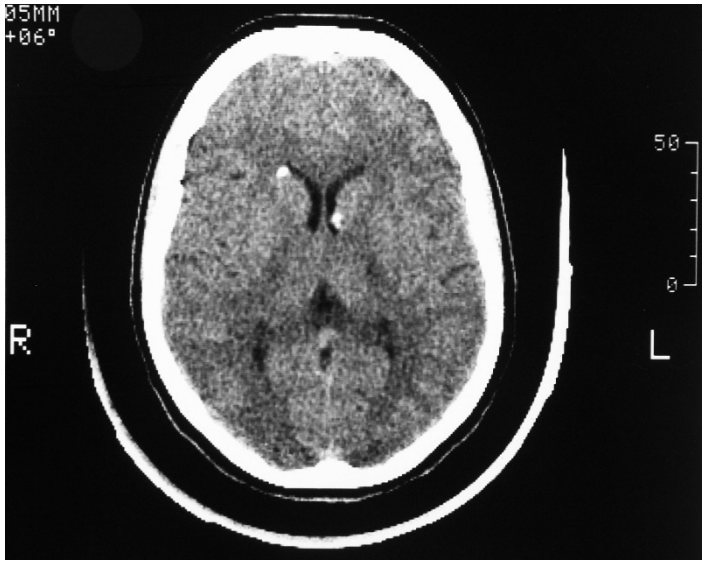
Epileptic spasm

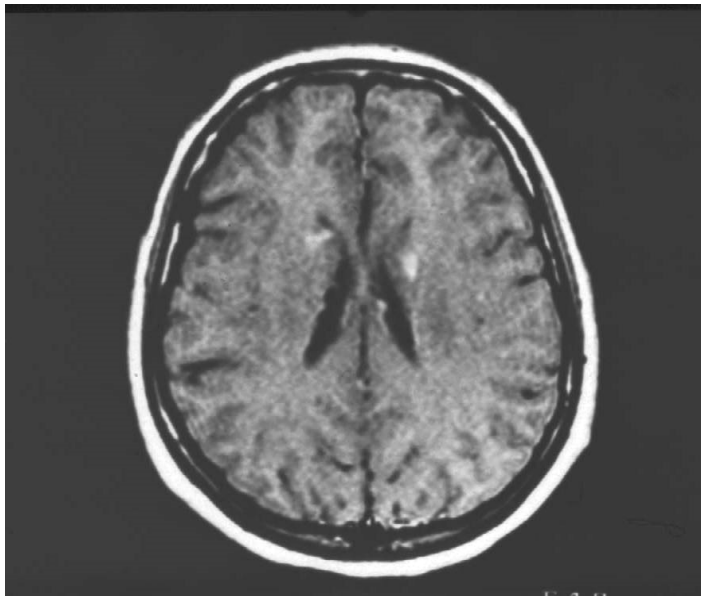
Focal onset

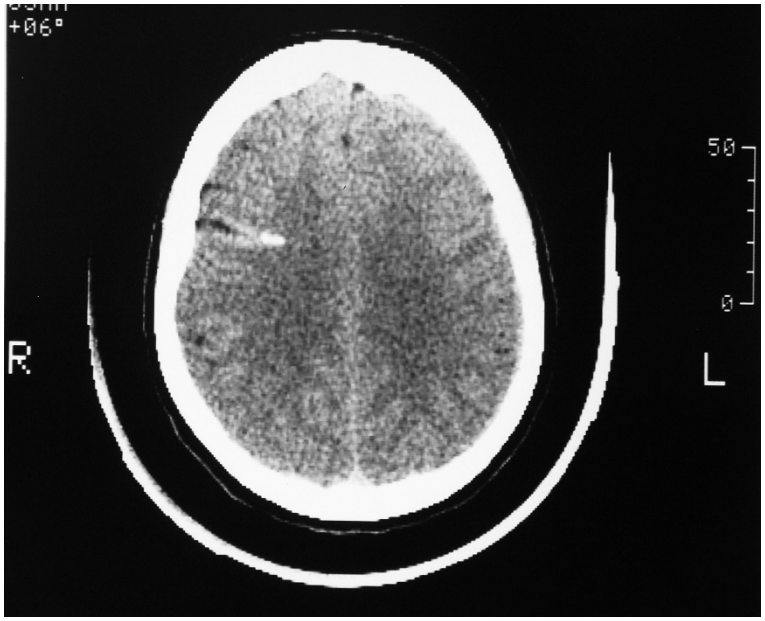


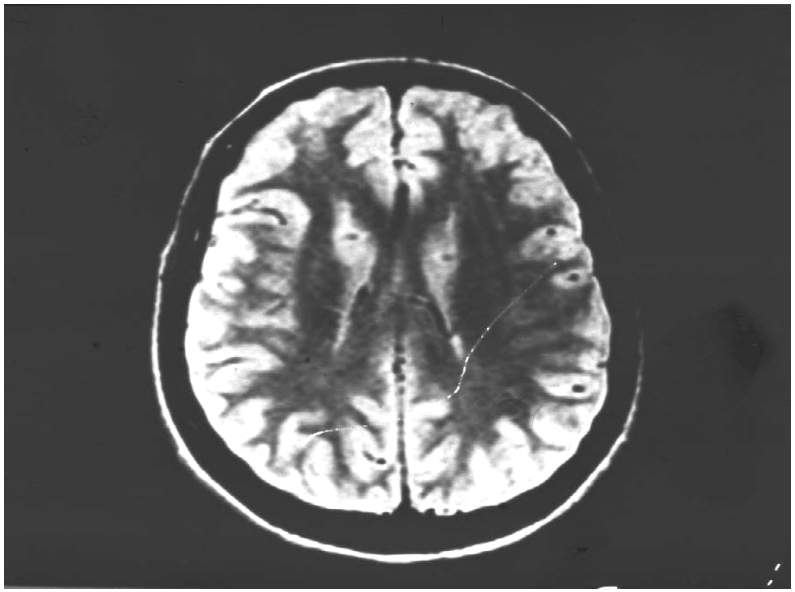
M.P. 21 yrs


Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
Fz-Cz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
R.Flex.
R.Ext.
L.Flex.
L.Ext.
50μV
1sec.
Mas . Pas. 21 aa ♀









NMR: Cortical nodular formation in posterior R frontal, L cerebellar and sub ependymal regions. Focal R fronto-parietal eterotopia.

(M.P) female 21 yrs TUBEROUS SCLEROSIS (Bourneville' s disease)

Since 1 months of life: upward deviation of eyes and "jerks" of the left limbs (ES?).

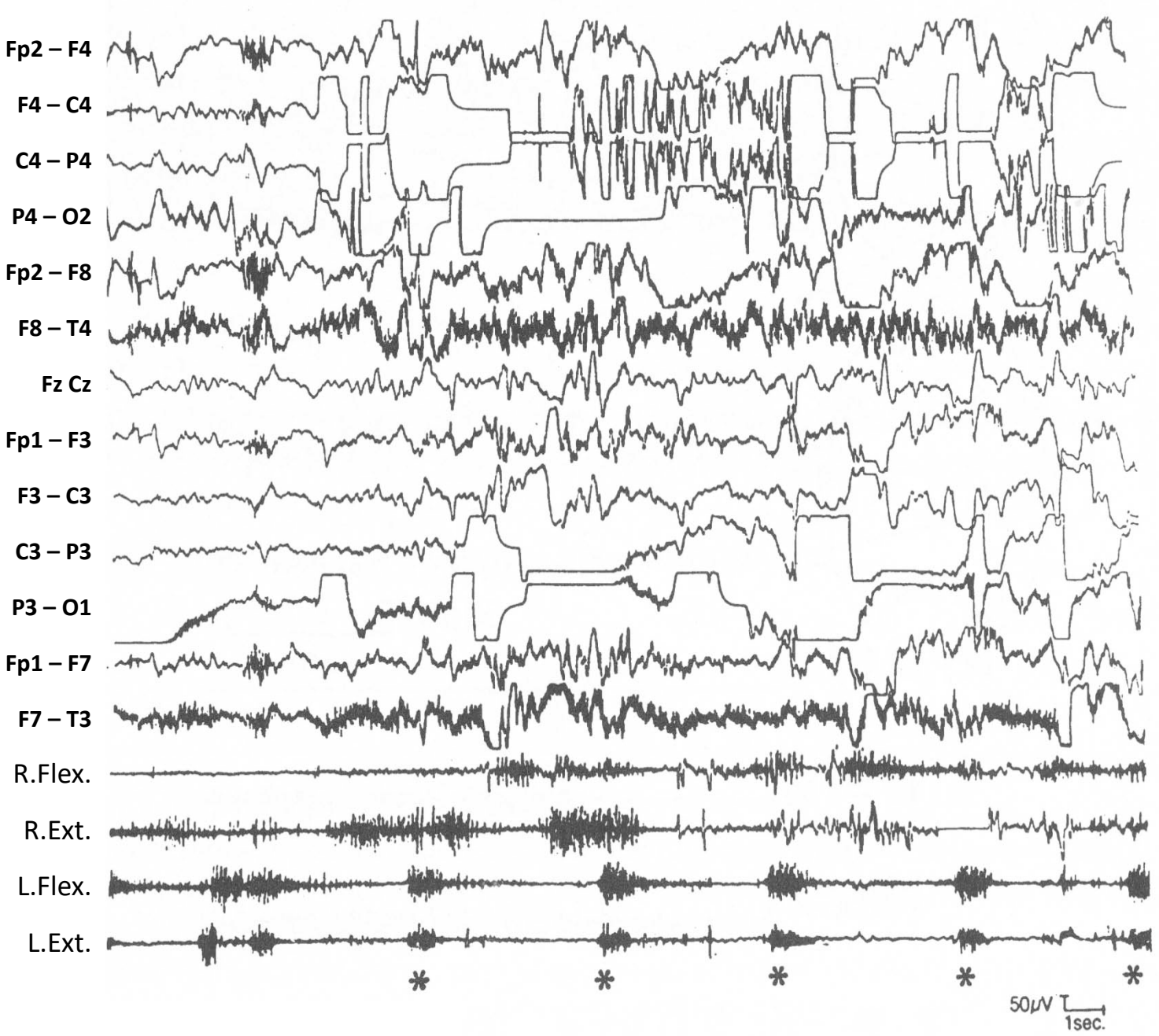
Since 14 yrs: asymmetrical spasms involving upper limbs, flexion of the head, facial grimace and LOC

Prolonged clusters every day, drug - resistant.

Severe mental deficit, left harm hypoplasia,

facial angiofibromas, shagreen patches,

cardiac rhabdomyoma, renal angiomyolipoma



Mas . Pas. 21 yrs ♀

Tonic-clonic

Generalized onset

Focal onset

> Generalized seizure

CONVULSIVE

Clinical Overview | Videos | EEG | Differential diagnoses | Related syndromes

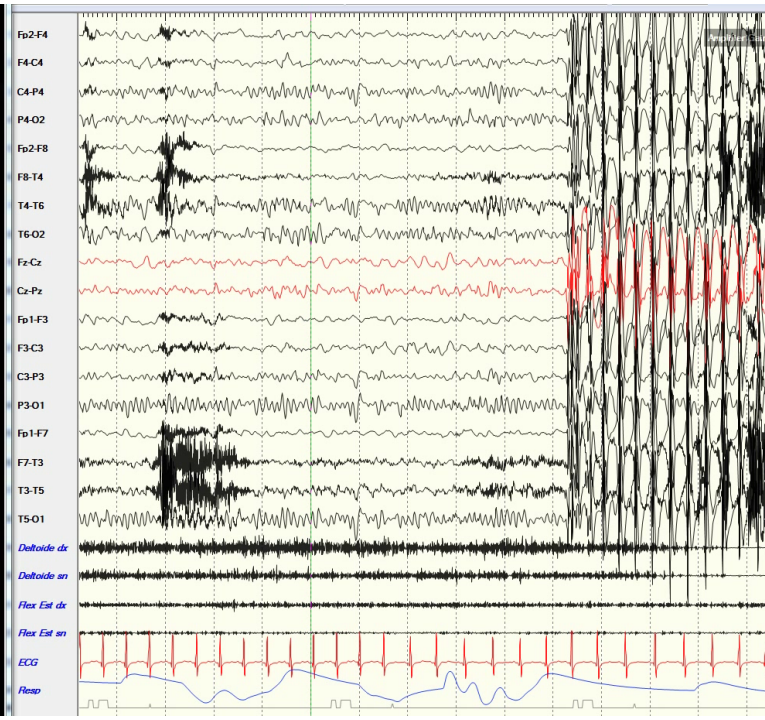
Generalized convulsive seizures are typically bilateral and symmetric although variants with asymmetry including head and eye deviation can be seen. A **tonic clonic** seizure is a seizure consisting of a tonic and a clonic phase, typically in this order, however variations such as **clonic-tonic-clonic** are also seen. A **clonic** seizure is a seizure involving bilaterally rhythmic jerking and may occur alone or in combination with **tonic** activity where there is bilaterally increased tone of the limbs typically lasting seconds to a minute. The jerking in a clonic seizure is more sustained and rhythmic than seen in a myoclonic seizure.

www.epilepsydiagnosis.org

Focal to bilateral tonic-clonic

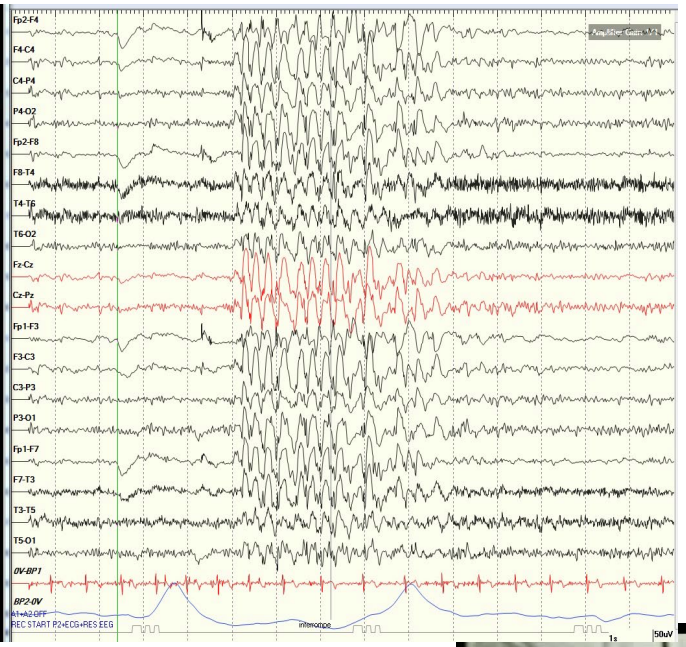
- GENERALIZED
- FOCAL

- Clonic
- Myoclonic
- Tonic
- Atonic
- Spasms
- Tonic-clonic
- Absences ???

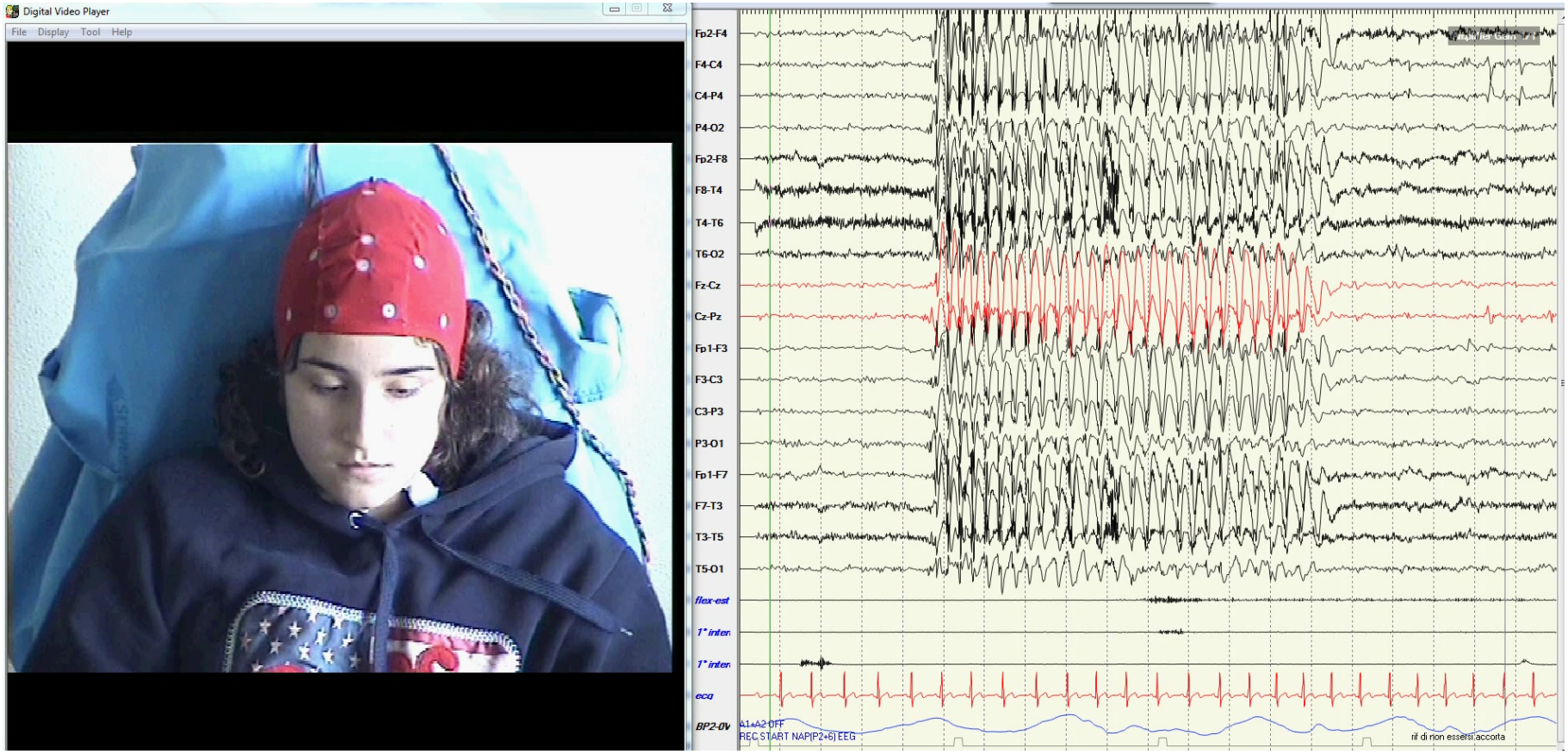


«Absence» seizure

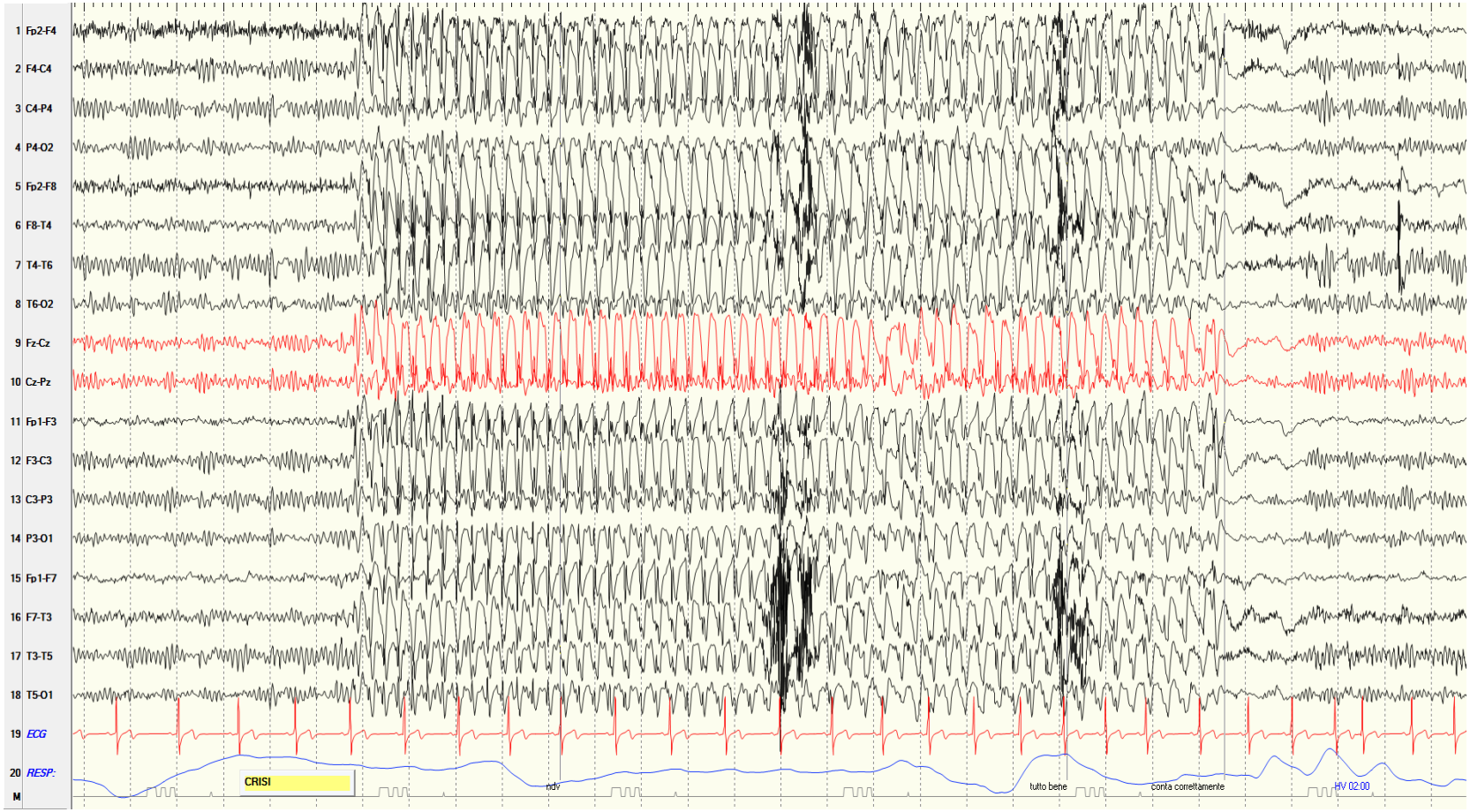
Generalized onset



Focal onset


Digital Video Player
File Display Tool Help
Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz-Cz
Cz-Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
flex-est
1° inter
1° inter
ecg
BP2-0v
A1+A2 OFF
REC START NAP[P2+6] EEG

Spag. HP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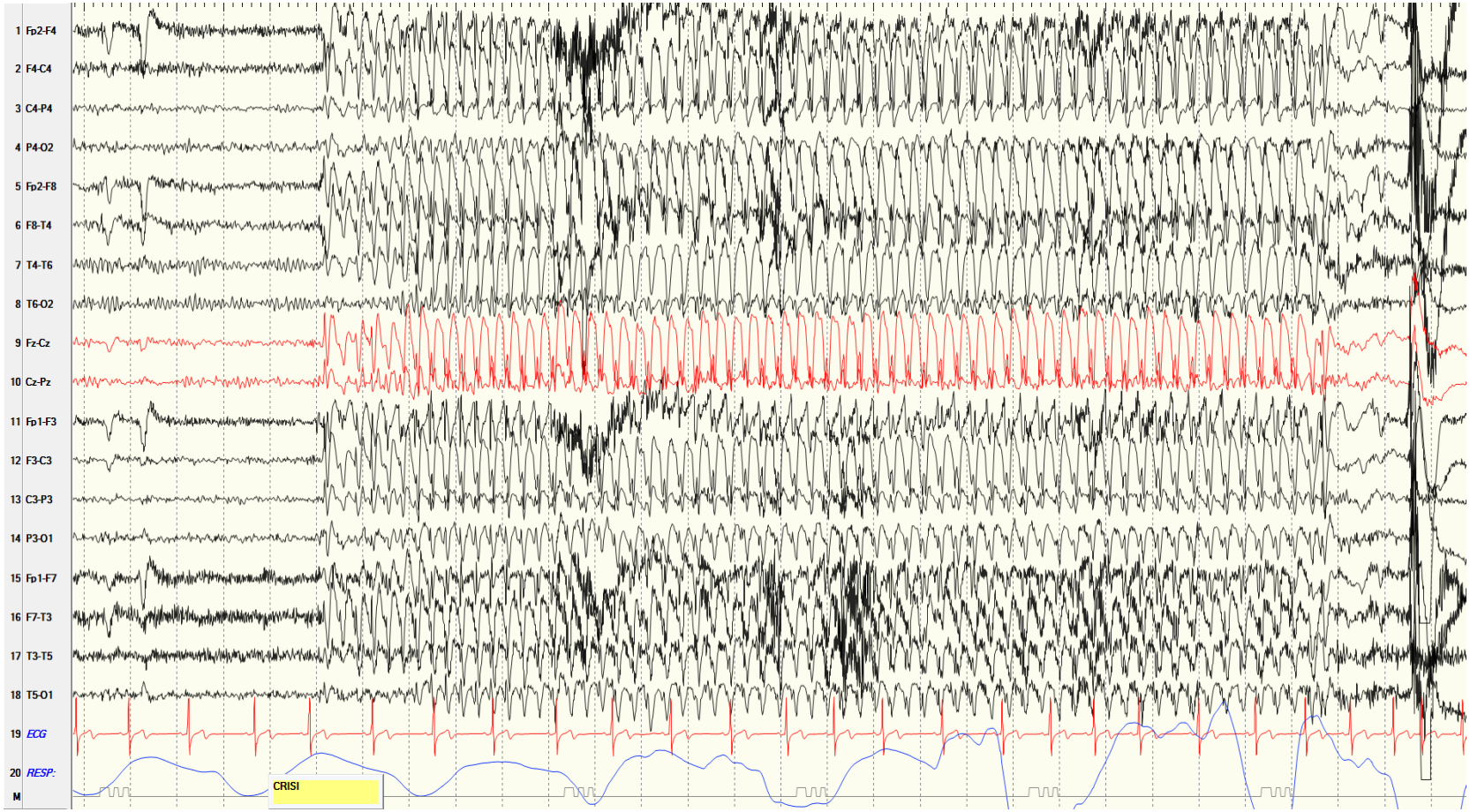
2 F4-C4
3 C4-P4
4 P4-O2
5 Fp2-F8
6 F8-T4
7 T4-T6
8 T6-O2
9 Fz-Cz
10 Cz-Pz
11 Fp1-F3
12 F3-C3
13 C3-P3
14 P3-O1
15 Fp1-F7
16 F7-T3
17 T3-T5
18 T5-O1
19 ECG
20 RESP-
M
CRISI
tutto bene
conta correttamente
HV 02:00

Spag.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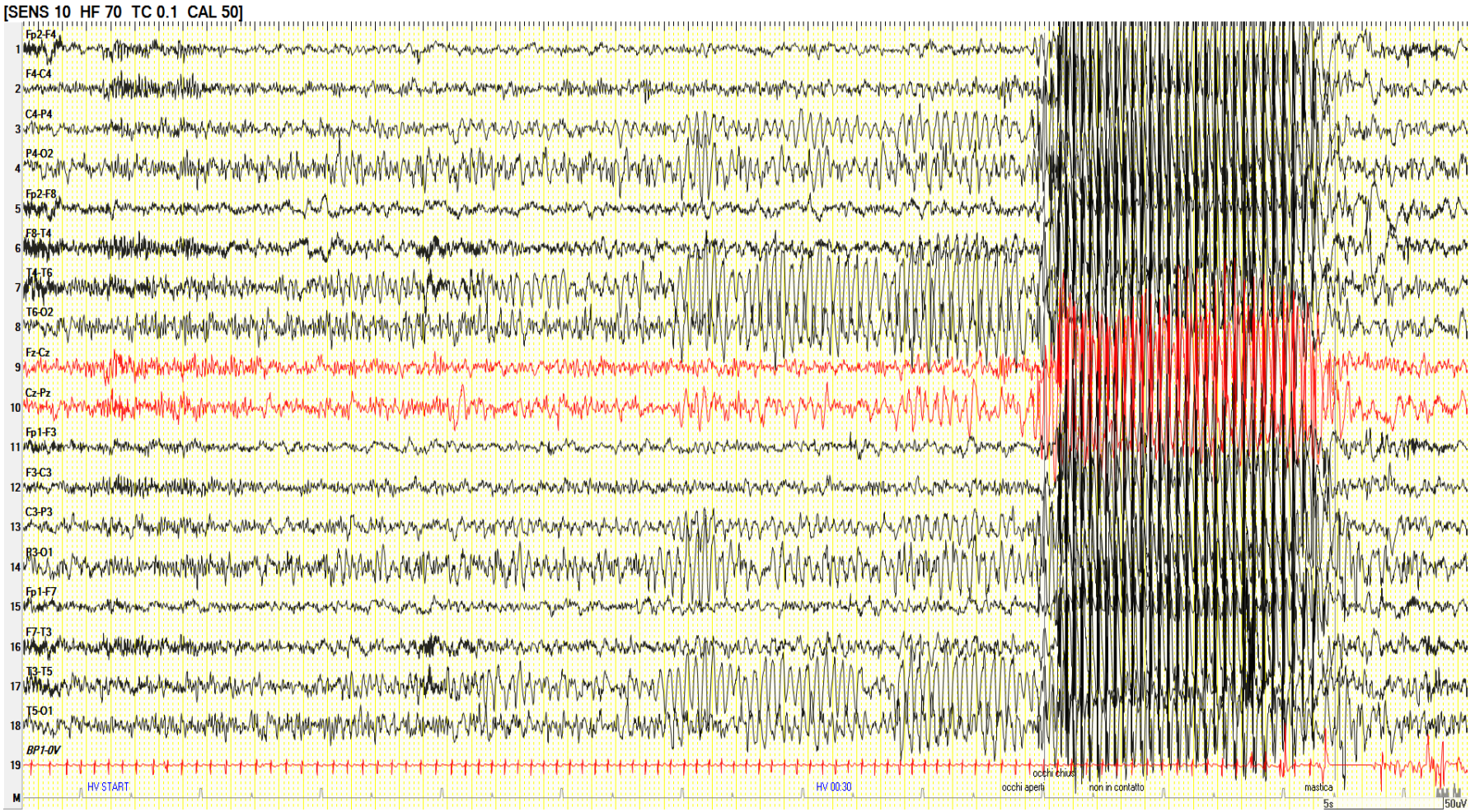
2 F4-C4
3 C4-P4
4 P4-O2
5 Fp2-F8
6 F8-T4
7 T4-T6
8 T6-O2
9 Fz-Cz
10 Cz-Pz
11 Fp1-F3
12 F3-C3
13 C3-P3
14 P3-O1
15 Fp1-F7
16 F7-T3
17 T3-T5
18 T5-O1
19 ECG
20 RESP:
M
CRISI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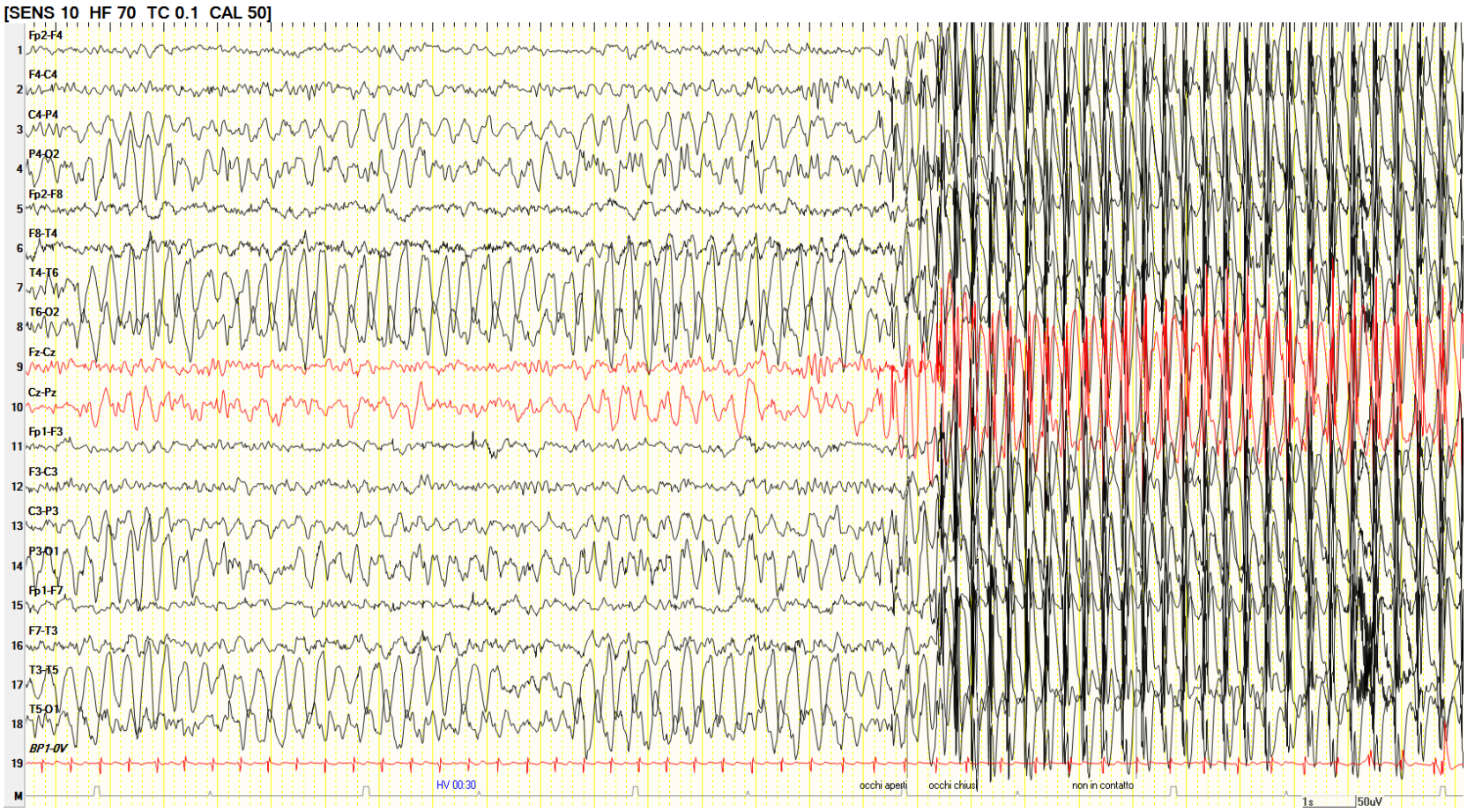
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz-Cz
Cz-Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
BP1-0V
HV START
HV 00.30
occhi chiusi
occhi aperti
non in contatto
mastica
5s
50uV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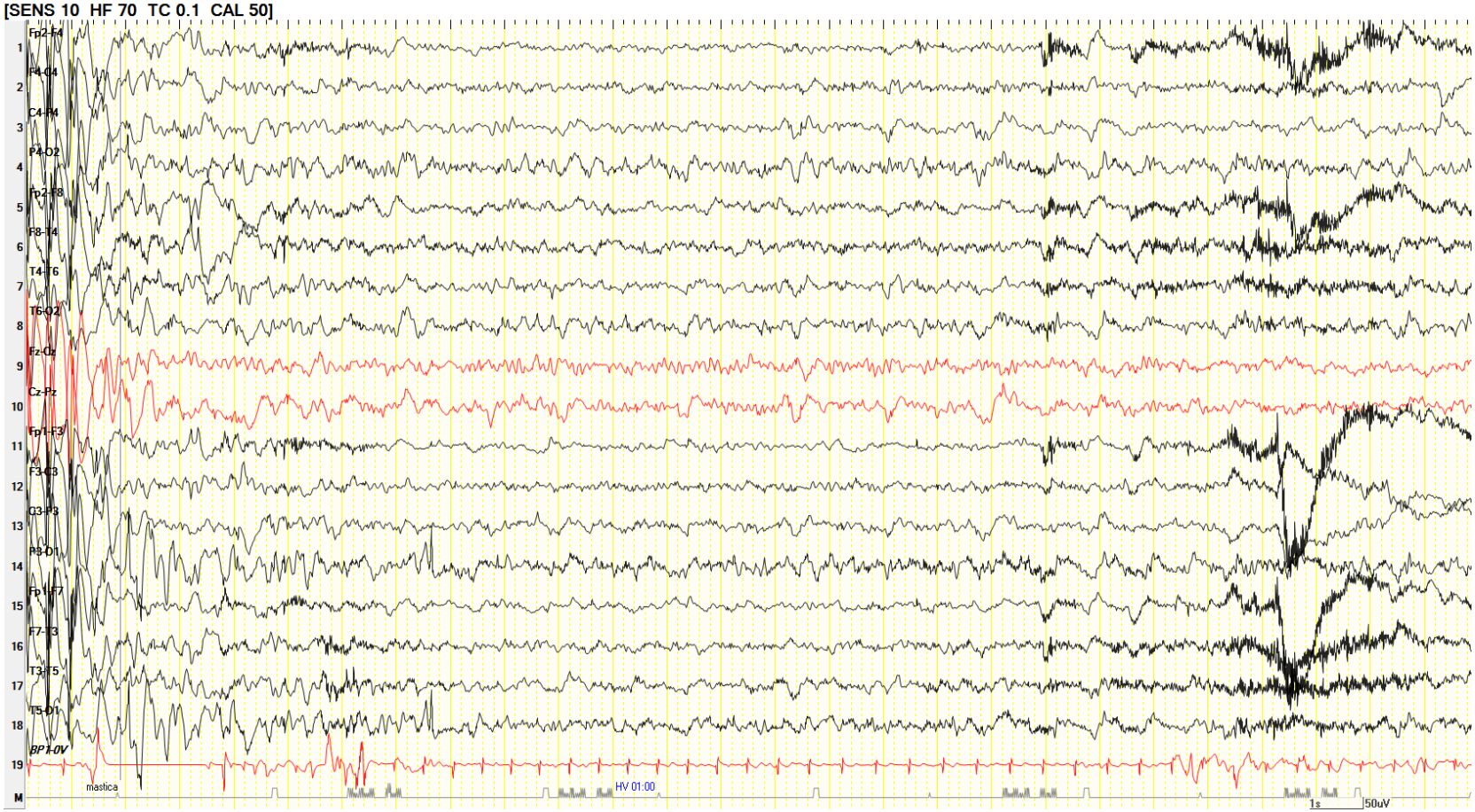
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz-Cz
Cz-Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
BP1-0V
HV 00:30
occhi aperti
occhi chiusi
non in contatto
1s
50uV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C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz-Cz
Cz-Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
BP1-0V
1
2
3
4
5
6
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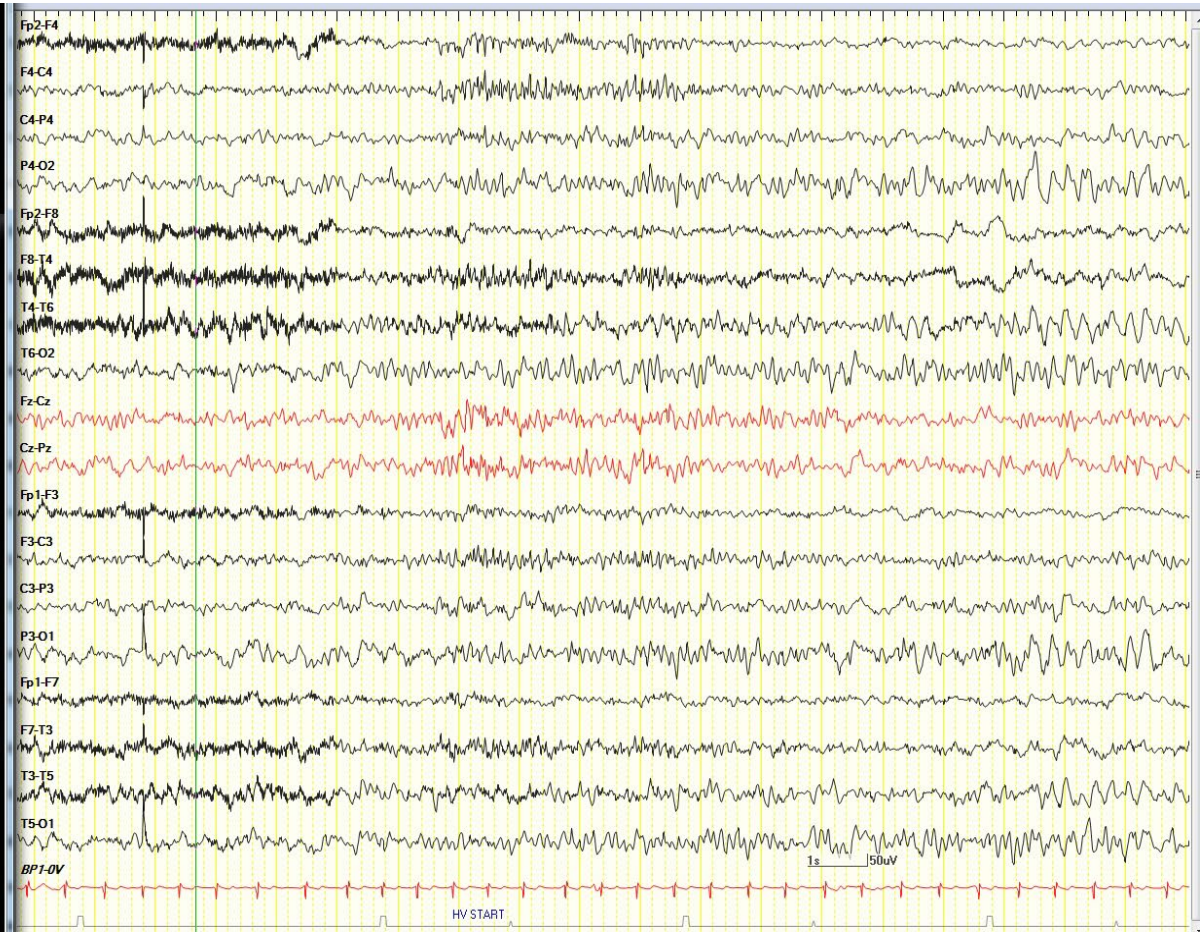
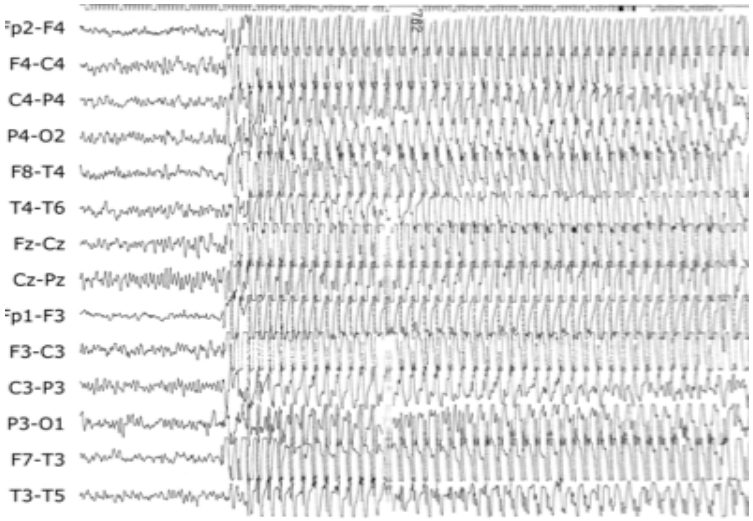
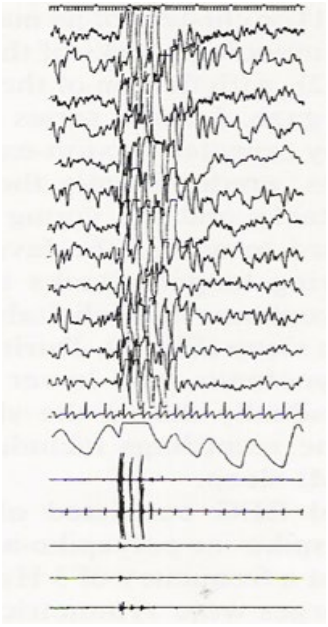
9
10
11
12
13
14
15
16
17
18
19
M
mastica
HV 01:00
1s
50uV

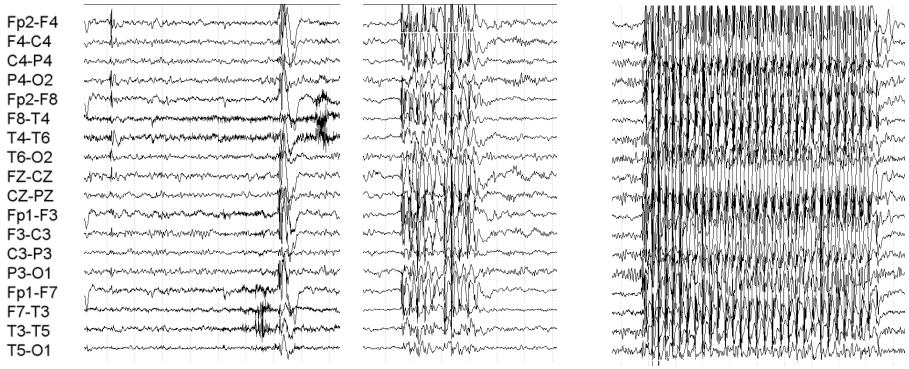

Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz-Cz
Cz-Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
BP1-0V
1s
50uV
HV START

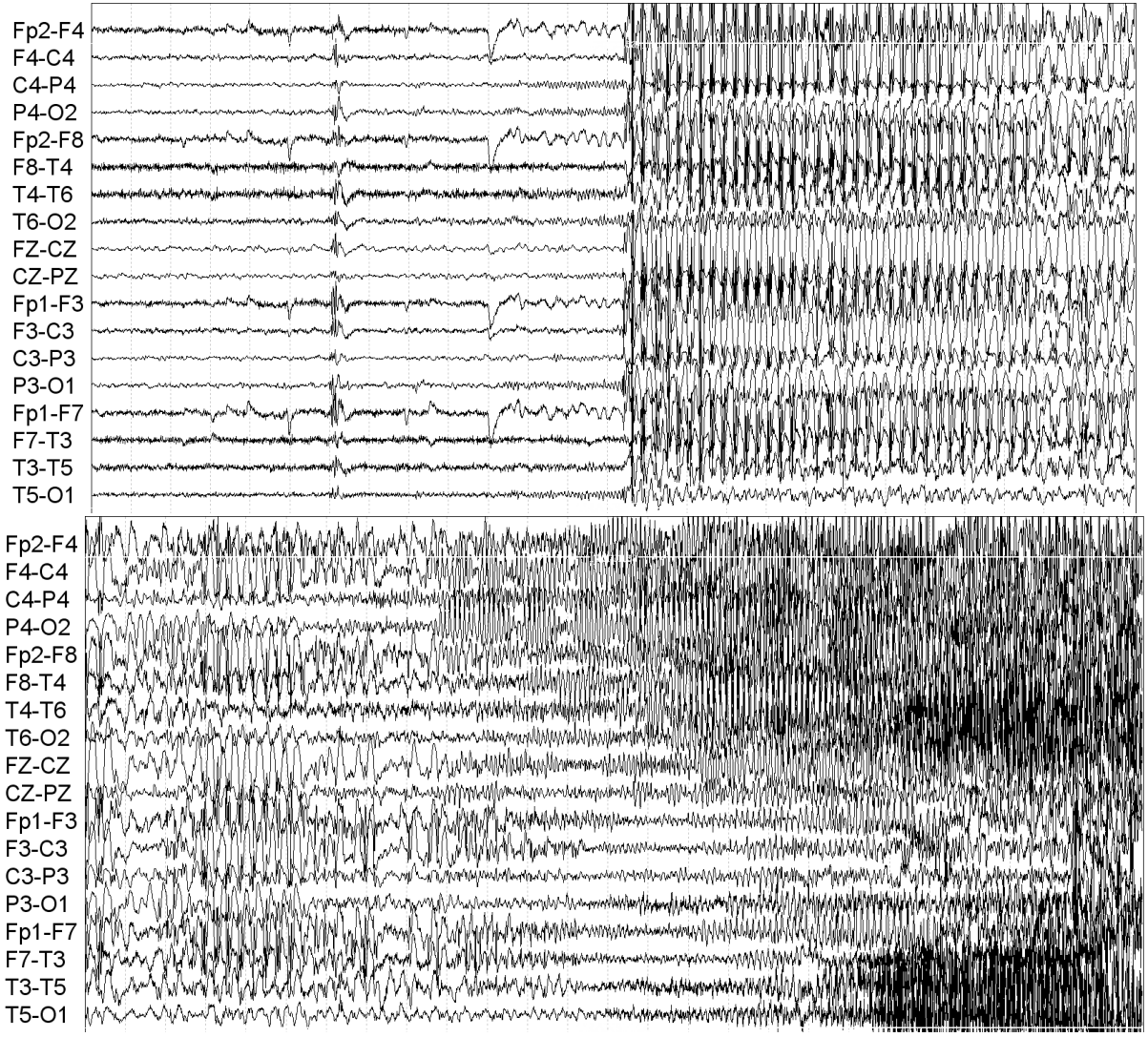
“Generalized Seizures”

- Myoclonic jerks
- Absence seizures Typical, Atypical:
- absence with eyelid myoclonia;
- myoclonic absence.
- Generalized Tonic-Clonic; Tonic,
- Clonic, Atonic, Myoclonic
- Myolonic-Tonic-Clonic
- Epileptic spasms






Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
FZ-CZ
CZ-PZ
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1


Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
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T4-T6
T6-O2
FZ-CZ
CZ-PZ
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
FZ-CZ
CZ-PZ
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1

Epilepsia, 50(7):1827–1832, 2009
doi: 10.1111/j.1528-1167.2009.02045.x

BRIEF COMMUNICATION

Generalized-onset seizures with secondary focal evolution

Randy Williamson, Samrina Hanif, Gregory C. Mathews, Andre H. Lagrange, and Bassel Abou-Khalil

Department of Neurology, Vanderbilt University, Nashville, Tennessee, U.S.A.

Epilepsy & Behavior 54 (2016) 20–29

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journal homepage: www.elsevier.com/locate/yebeh

Generalized onset seizures with focal evolution (GOFE) — A unique seizure type in the setting of generalized epilepsy

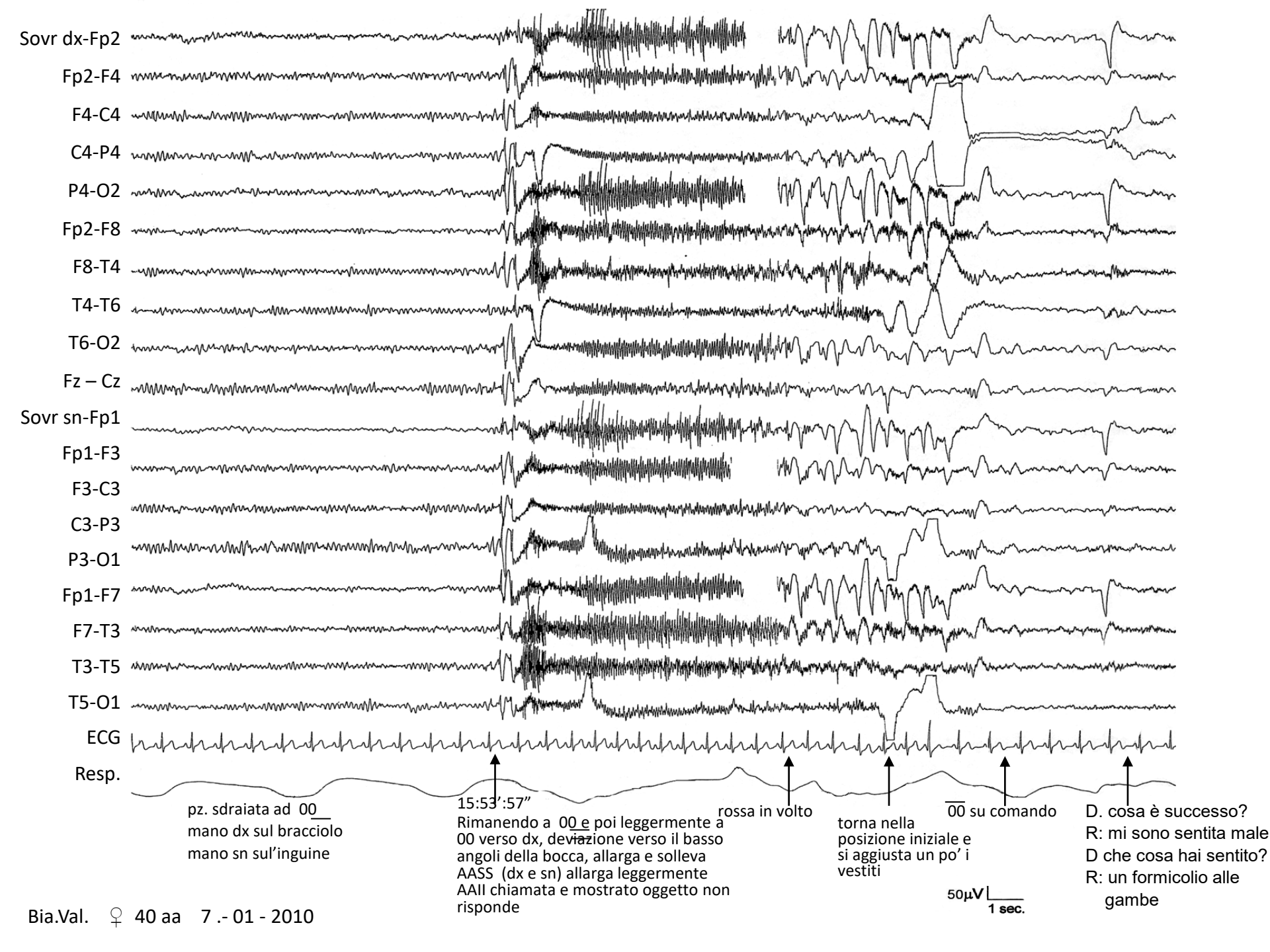
Avriel Linane, Andre H. Lagrange, Cary Fu, Bassel Abou-Khalil *

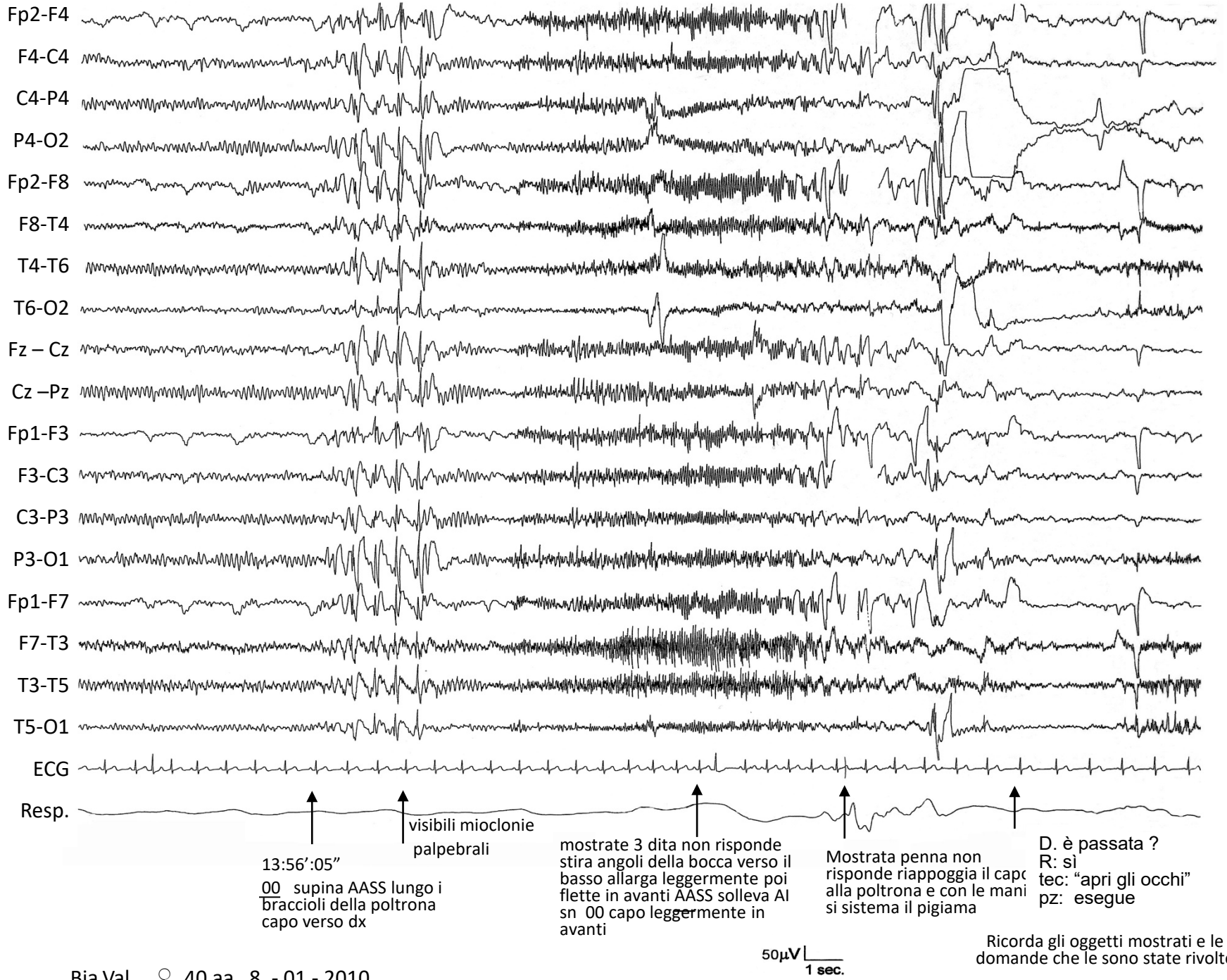
Department of Neurology, Vanderbilt University, Nashville, TN, USA

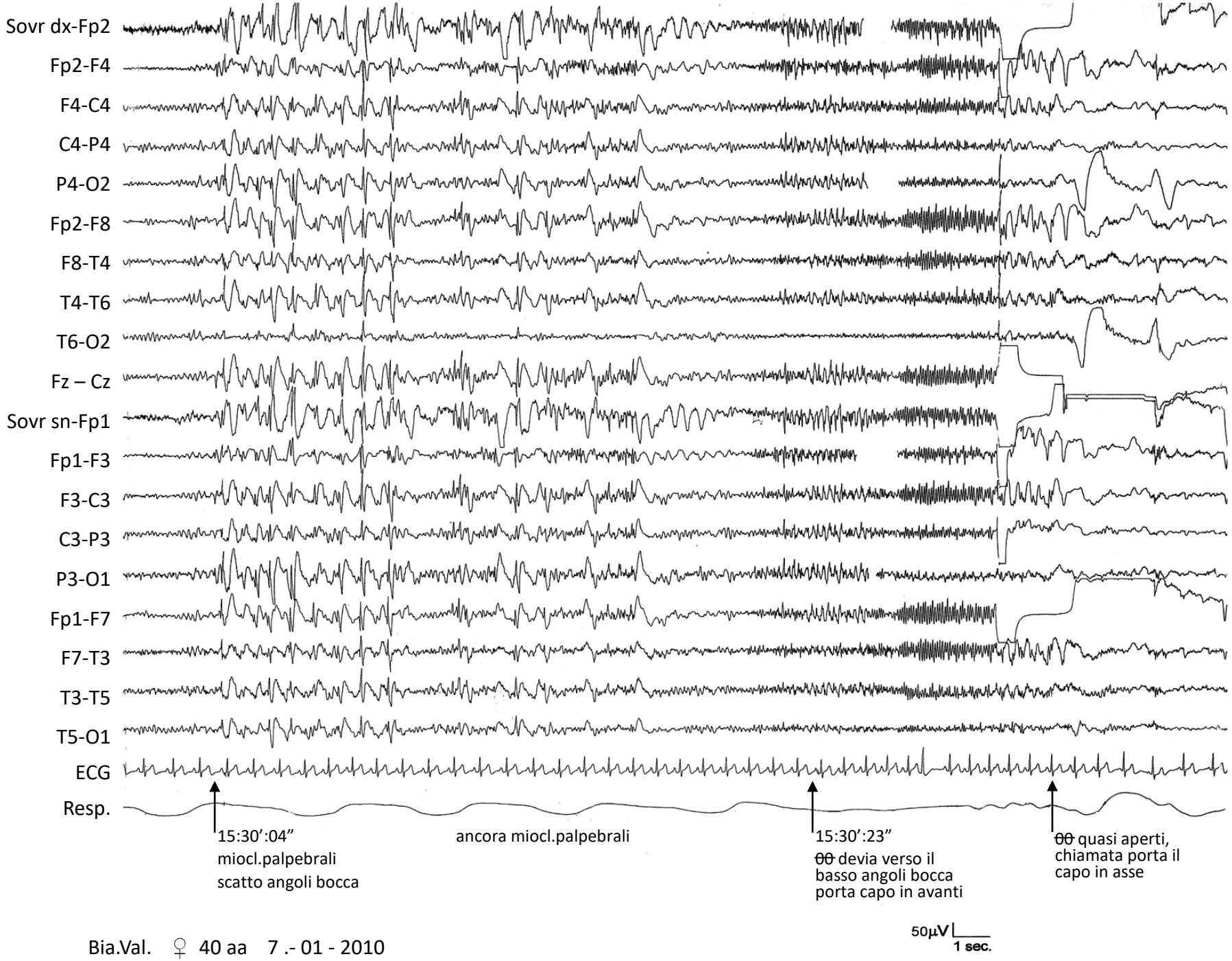

13:53:52


14:58:19

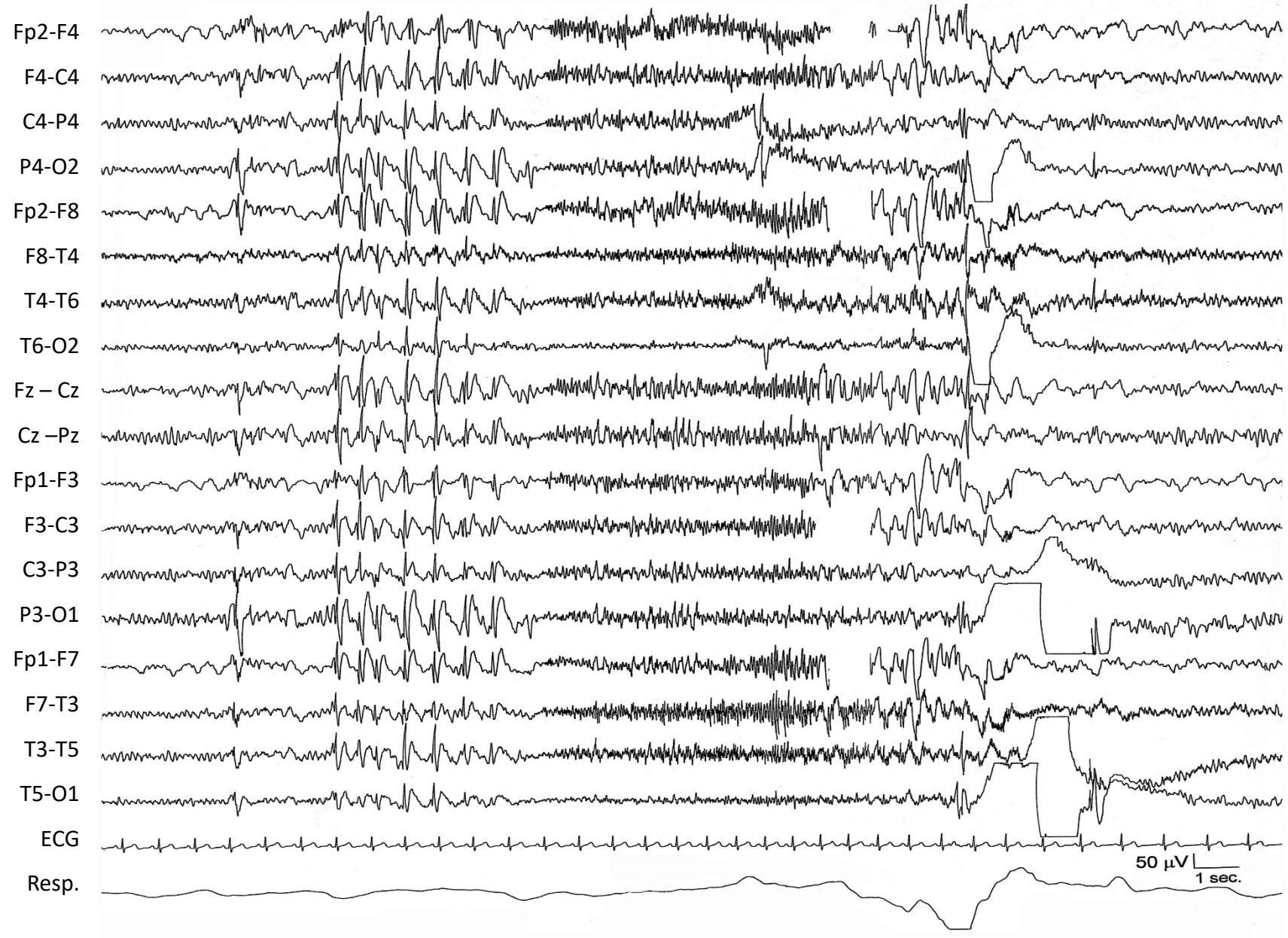

15:30:00


Sovr dx-Fp2
Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz – Cz
Sovr sn-Fp1
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
ECG
Resp.
pz. sdraiata ad 00
mano dx sul bracciolo
mano sn sull'inguine
15:53':57"
Rimanendo a 00 e poi leggermente a
00 verso dx, deviazione verso il basso
angoli della bocca, allarga e solleva
AASS (dx e sn) allarga leggermente
AAII chiamata e mostrato oggetto non
risponde
rossa in volto
torna nella
posizione iniziale e
si aggiusta un po' i
vestiti
00 su comando
D. cosa è successo?
R: mi sono sentita male
D che cosa hai sentito?
R: un formicolio alle
gambe
50µV
1 sec.
Bia.Val. ♀ 40 aa 7 .- 01 - 2010


Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz – Cz
Cz –Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
ECG
Resp.
13:56':05"
00 supina AASS lungo i braccioli della poltrona capo verso dx
visibili mioclonie palpebrali
mostrate 3 dita non risponde stira angoli della bocca verso il basso allarga leggermente poi flette in avanti AASS solleva AI sn 00 capo leggermente in avanti
Mostrata penna non risponde riappoggia il capo alla poltrona e con le mani si sistema il pigiama
D. è passata ?
R: sì
tec: "apri gli occhi"
pz: esegue
50μV
1 sec.
Ricorda gli oggetti mostrati e le domande che le sono state rivolte
Bia.Val. ♀ 40 aa 8 .- 01 - 2010



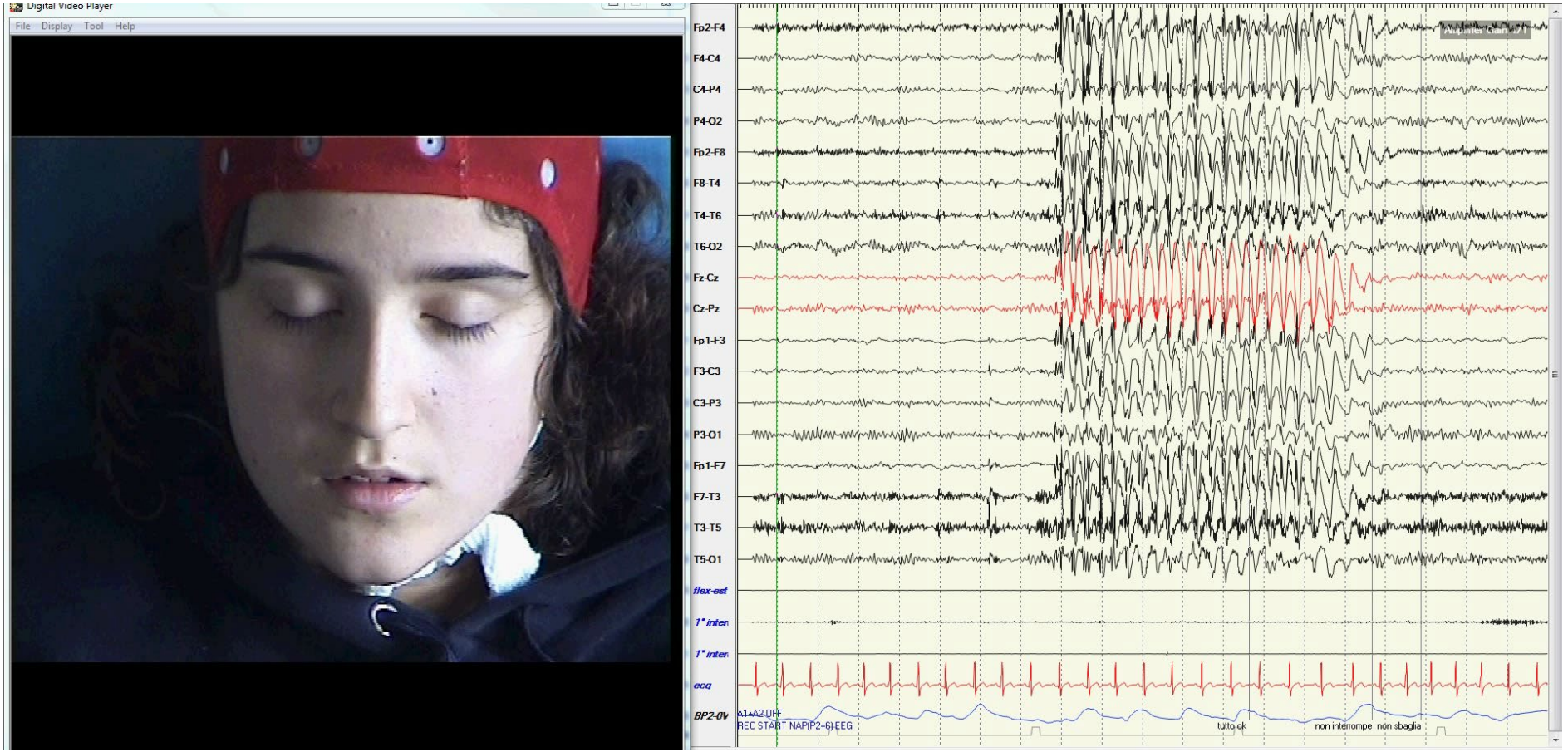
Bia.Val. ♀ 40 aa 7 .- 01 - 2010

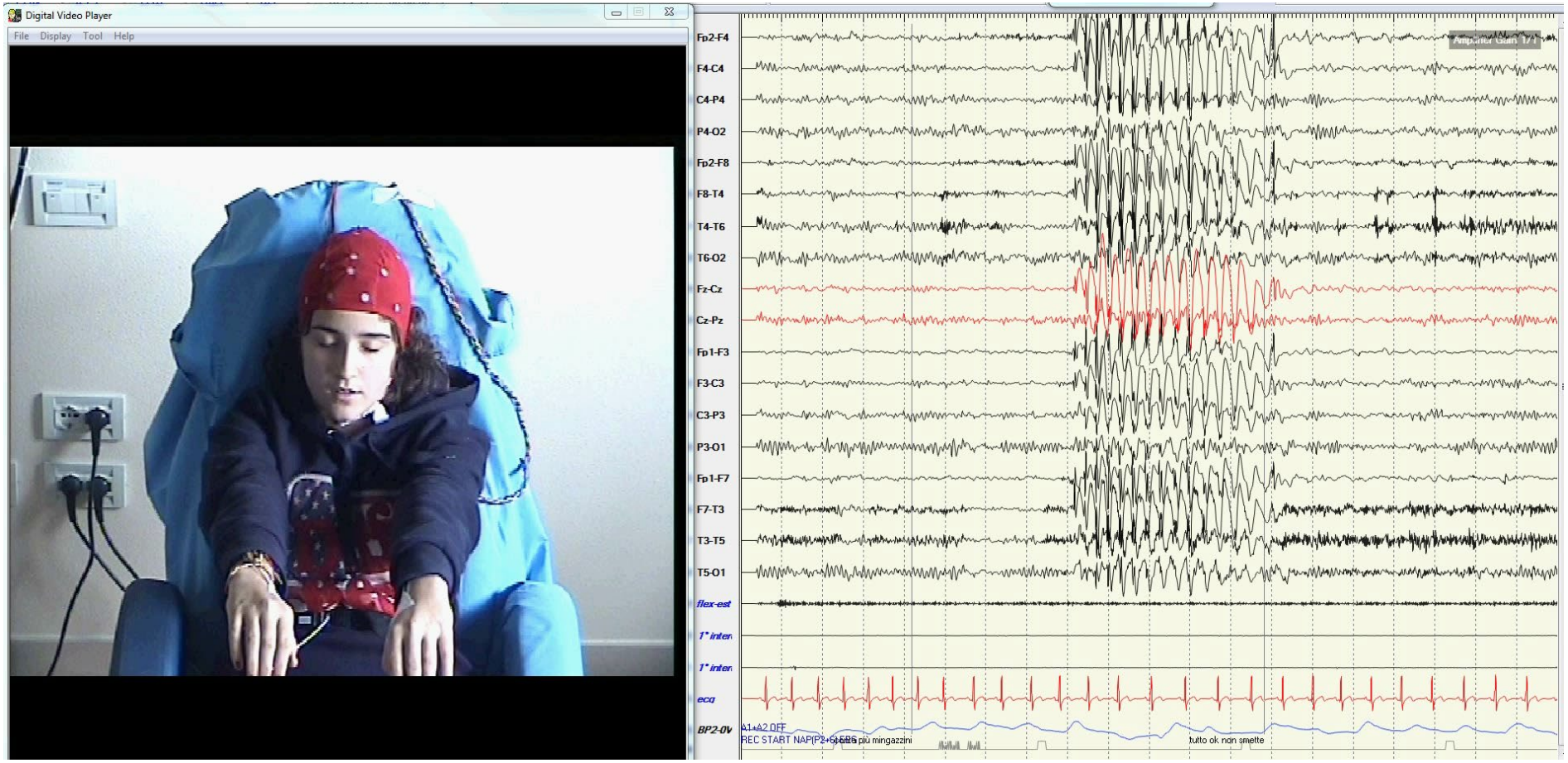


Stessa semeiologia della precedente
visibile rossore al volto

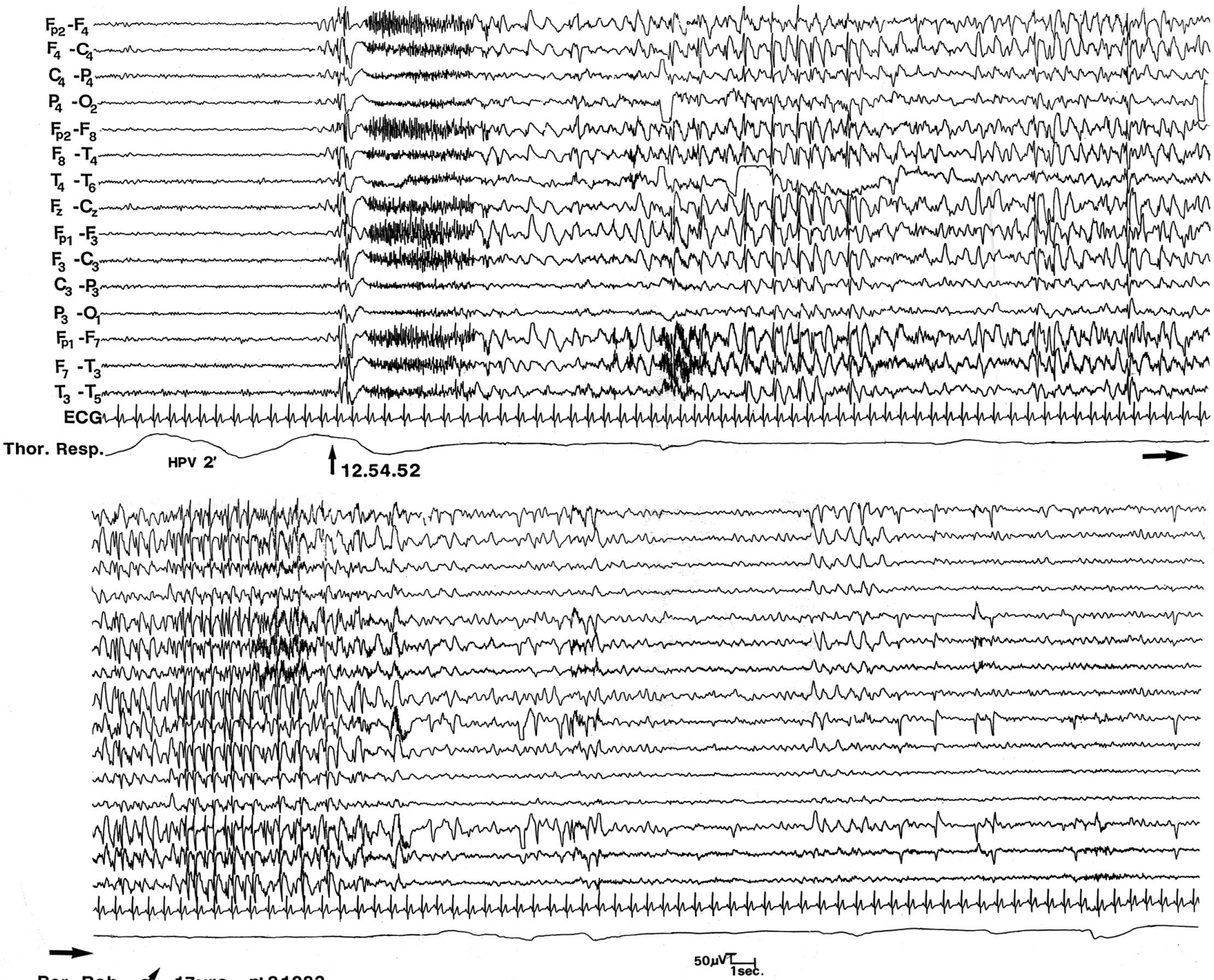
13:58’:05”

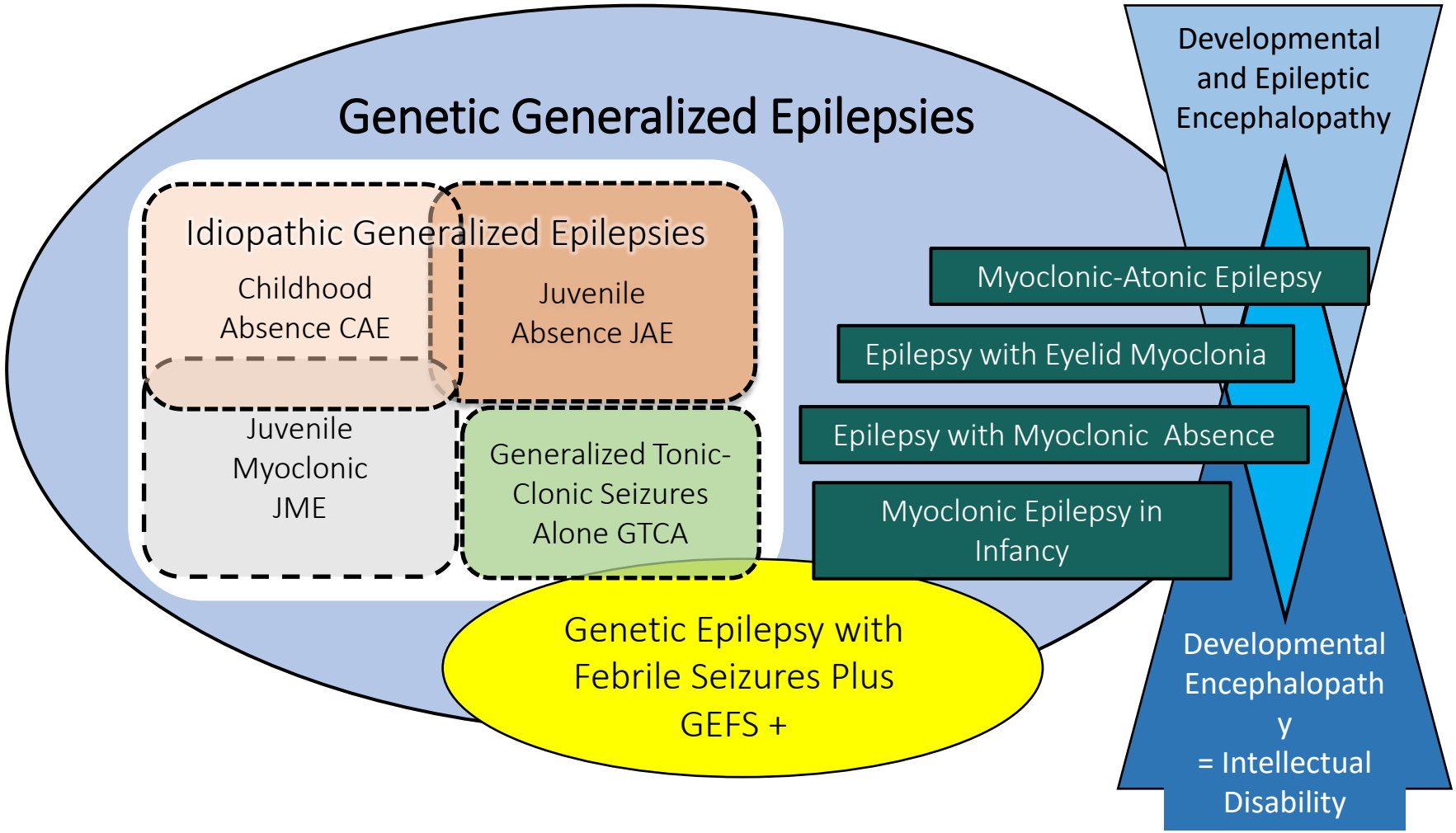
Bia.Val. ♀ 40 aa 8 .- 01 - 2010


Digital Video Player
File Display Tool Help
Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz-Cz
Cz-Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
flex-est
1° inter
1° inter
ecg
BP2-0v
A1+A2 OFF
REC START NAP(P2+6)-EEG
tutto ok
non interrompe non sbaglia


Digital Video Player
File Display Tool Help
Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz-Cz
Cz-Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
flex-est
1° inten
1° inten
ecg
BP2-0v
A1+A2 OFF
REC START NAP(P2+6 SBS più mingazzini
tutto ok non smette


Fp2 F8
F4 C4
C4 P4
P4 O2
Fp2 F8
F8 T4
T4 T6
F4 C2


Fp2-F4
F4 -C4
C4 -P4
P4 -O2
Fp2-F8
F8 -T4
T4 -T6
Fz -Cz
Fp1-F3
F3 -C3
C3 -P3
P3 -O1
Fp1-F7
F7 -T3
T3 -T5
ECG
Thor. Resp.
HPV 2'
12.54.52
50μV
1sec.
Ber. Rob. ♂ 17yrs n° 81283


Genetic Generalized Epilepsies
Idiopathic Generalized Epilepsies
Childhood Absence CAE
Juvenile Absence JAE
Juvenile Myoclonic JME
Generalized Tonic-Clonic Seizures Alone GTCA
Genetic Epilepsy with Febrile Seizures Plus GEFS +
Developmental and Epileptic Encephalopathy
Myoclonic-Atonic Epilepsy
Epilepsy with Eyelid Myoclonia
Epilepsy with Myoclonic Absence
Myoclonic Epilepsy in Infancy
Developmental Encephalopathy = Intellectual Disability

ILAE Task Force on Nosology and Definitions 2017-2021

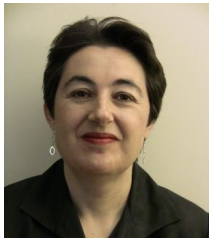


















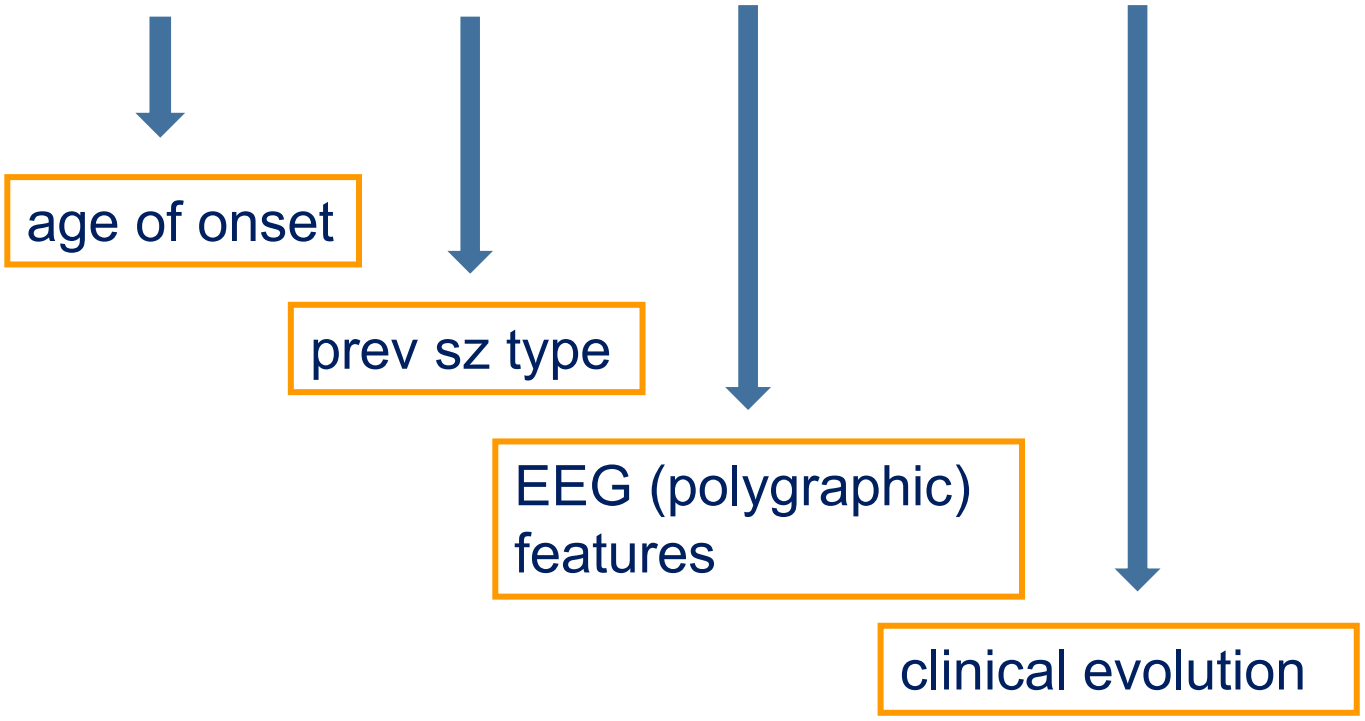

EC Wirrell, P Tinuper (Co-Chair), E Trinka, S Wiebe, JH Cross, E Hirsch, SM Zuberi, A Bogacz, E Somerville, K Riney, JA French, IE Scheffer, R Nabbout, N Specchio, S Kaneko, S Jain, P Samia, T Alsaadi, OC Snead, S Balestrini

IGE: common features

- **Onset** : around infancy
- **Types of seiz** : absences
  myoclonic seizures
  tonic-clonic seizures
- **EEG** : bss S-W and PP-SW complexes
  normal BG activity
- **Clin ctx** : normal neurological ex and intell
- **MRI find** : normal
- **Outcome** : usually good

not all IGEs are equal

specific syndromes are defined according to:



IGE syndromes

- Benign myoclonic epilepsy of infancy (BMEI)
- Childhood absence epilepsy (CAE)
- Juvenile absence epilepsy (JAE)
- Juvenile myoclonic epilepsy (JME)
- IGE with tonic-clonic seizures alone (IGE-TCS)

- Epilepsy with myoclonic-astatic seizures (EMAS)
- Epilepsy with myoclonic absences (EMA)

Different IGE sub-types seem to present as distinctive entities with different age of onset, electroclinical patterns, duration of illness and response to therapy.

CAE

Onset 4-10 yrs

Typical absence S

Rare TCS

Remission at puberty

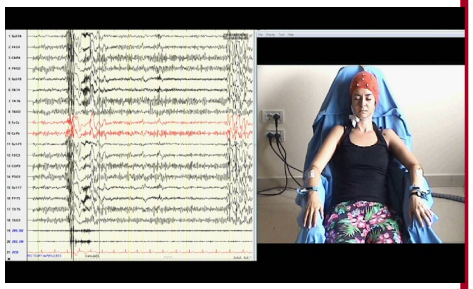
JME

Onset 10-18 yrs

Myocl S, photosensit

Freq TCS

Late remission



IGE-TCS

Onset chil to ad

TCS, Myocl S,

Normal intellect

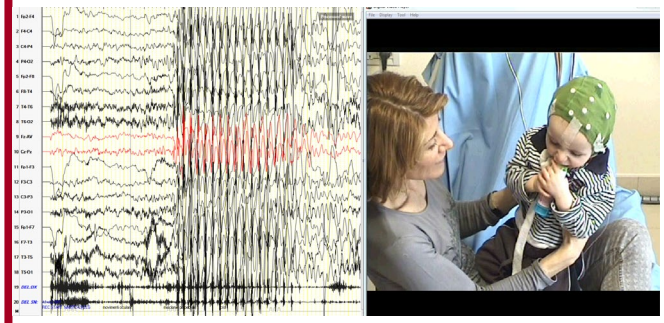
Good outcome

EMA

Onset 5-10 yrs

Myocl abs, intellect impairm

Variable outcome



MAE

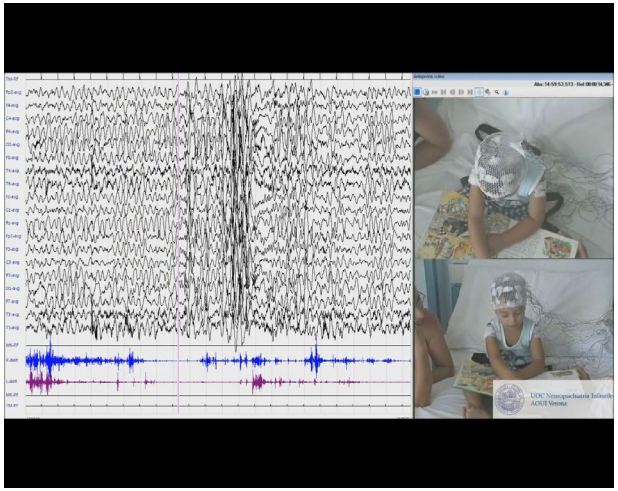
Onset 2-6 yrs

Myocl ,atonic, GTCS, NCSE

long lasting intellect impairm

Variable outcome

Possible intractability

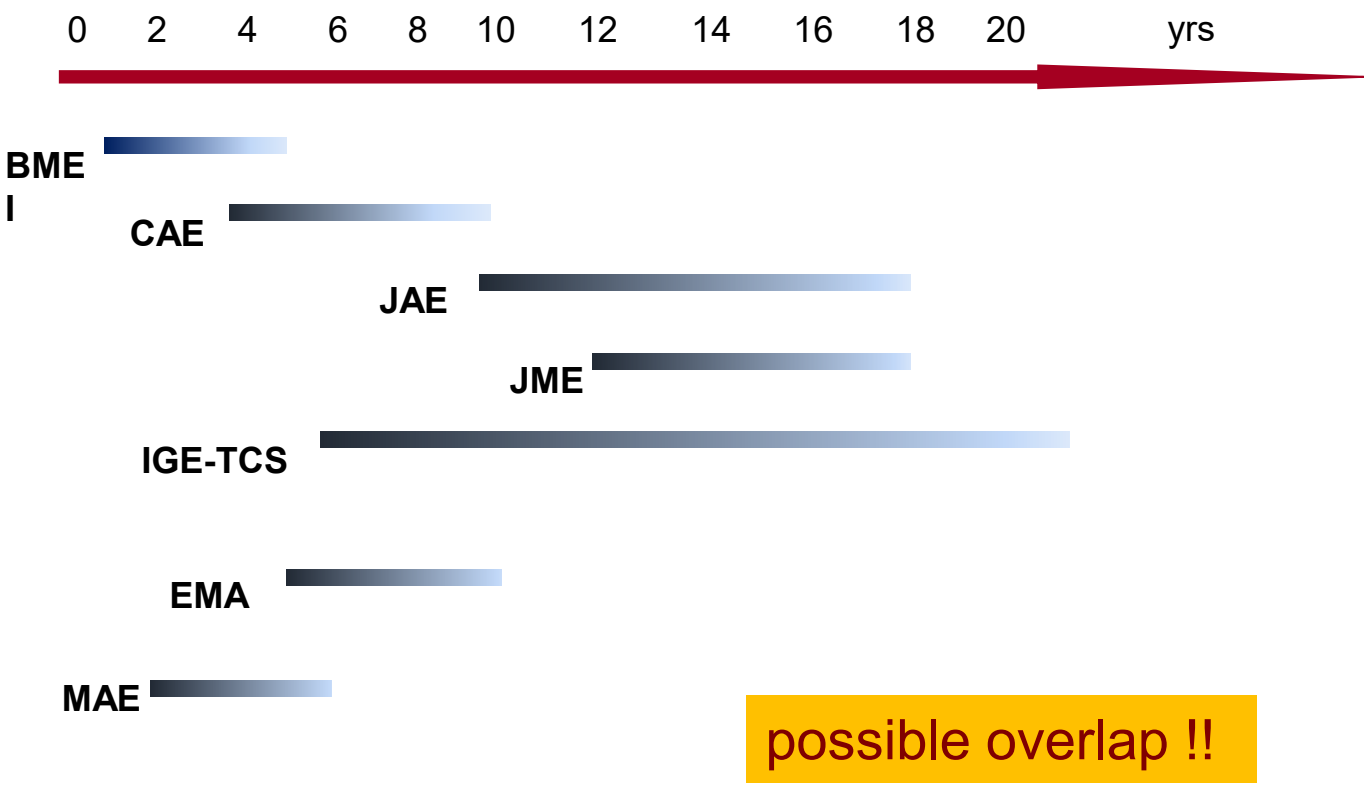


Summary of the clinical features of the IGE syndromes

IGE subtype	Age of onset	1st seizure type	Other seizure types	EEG	Photosesitivity
Included in ILAE classification					
BMEI	0.4-5 yrs	My	FS	GSW	Rare
CAE	4-10 yrs	Ab	TCS, My	3-Hz GSW	Rare
JAE	10-18 yrs	Ab	TCS, My	3-4Hz GSW	Rare
JME	12-18 yrs	My	TCS, Ab	4-6Hz GSW	Frequent
IGE-TCS	Childhood to early adulthood	TCS	My, Ab	GSW	Rare
EMA	5-10 yrs	MA	TCS	3-Hz GSW	Rare
MAE	2-6 yrs	My-ast	Ab, TCS,non convulsive SE	GSW	Rare

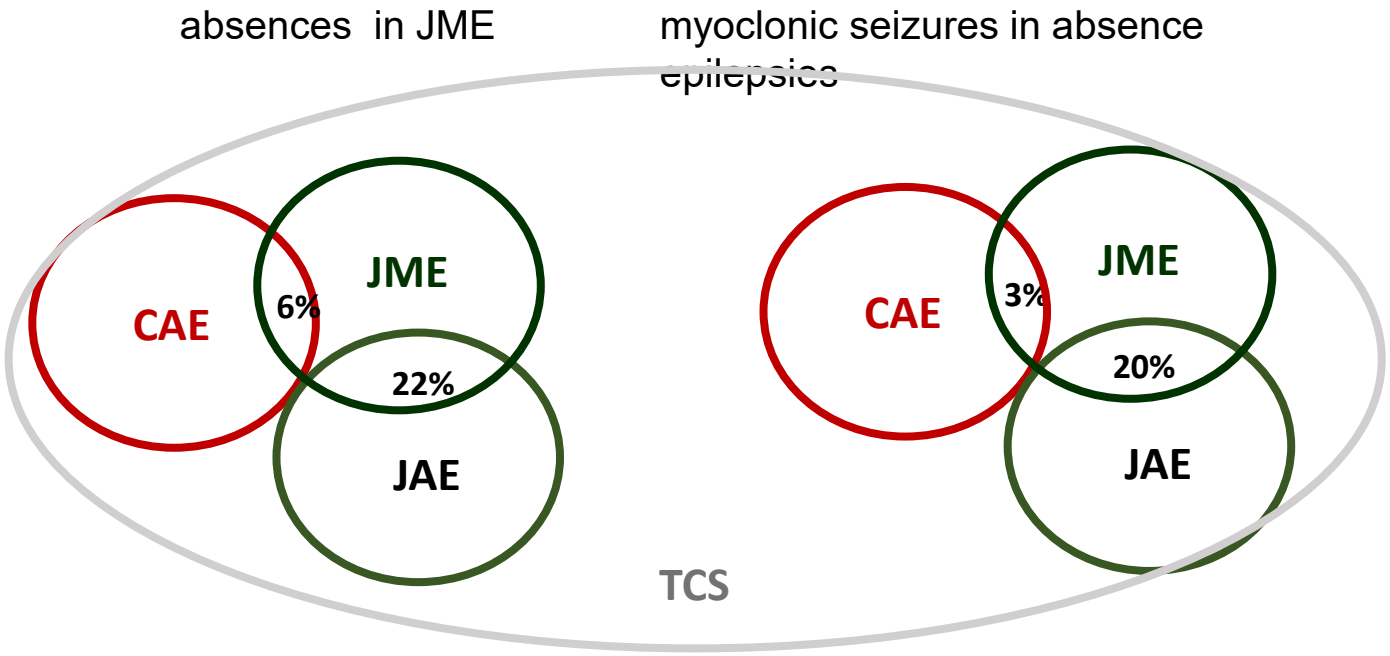
mod. from Guerrini and Marini, 2011

age of onset of IGE syndromes



possible overlap !!

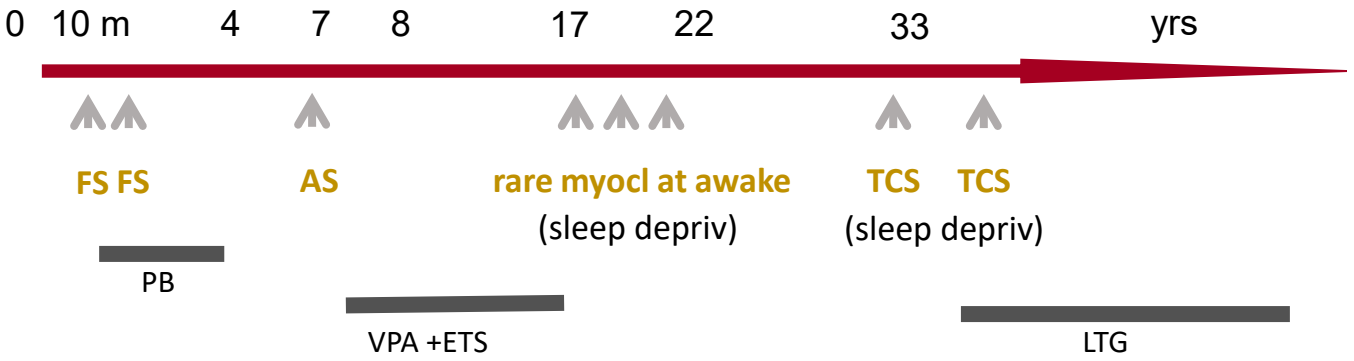
from Janz, 1990



frequent clinical overlap !!

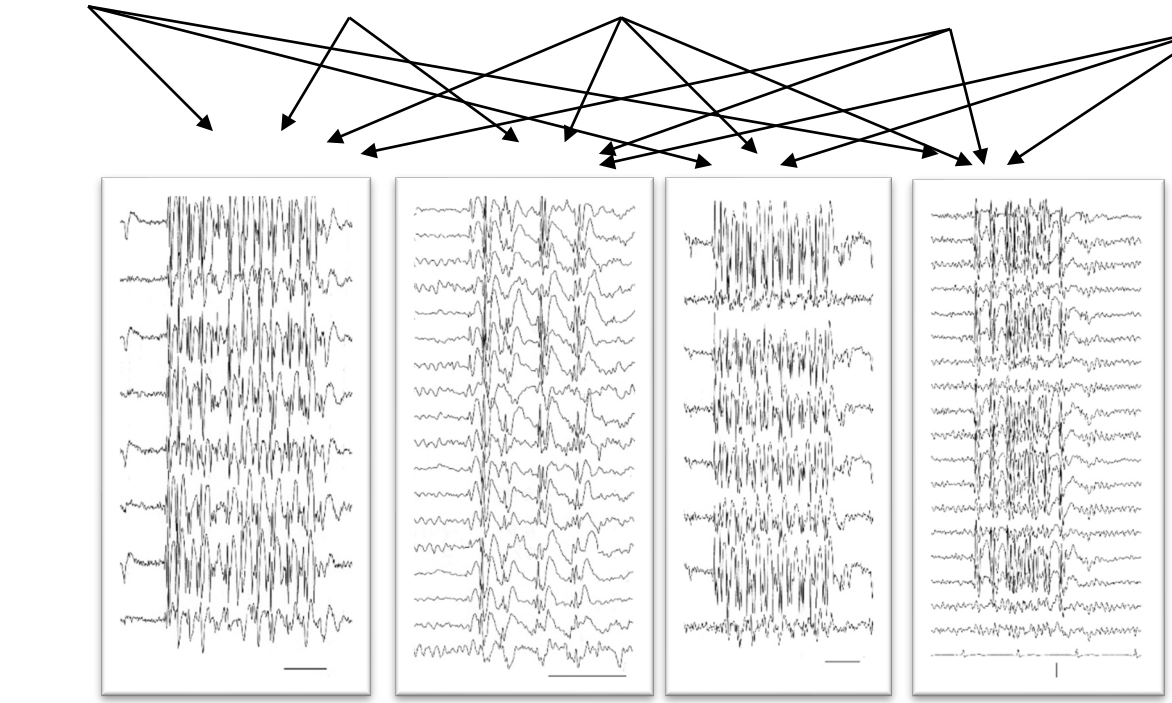
possible intraindividual overlap !!

A.A. 35 yrs lady's hairdresser
Fam + for FS (the son of a daughter)

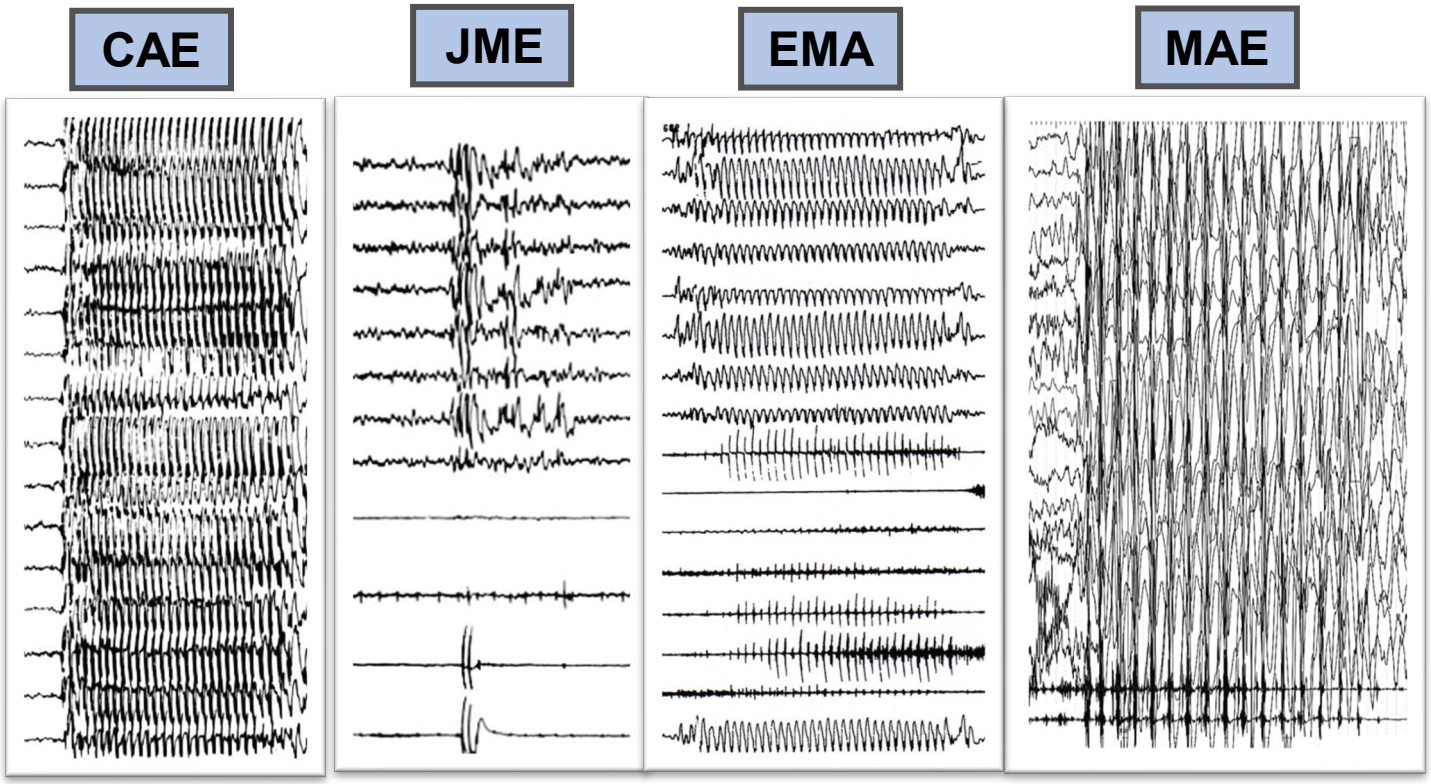


neurophysiological overlap !!

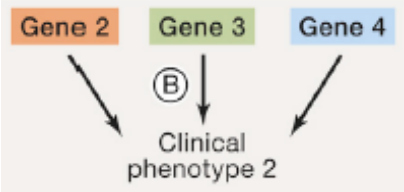
CAE JME IGE-TCS EMA MAE

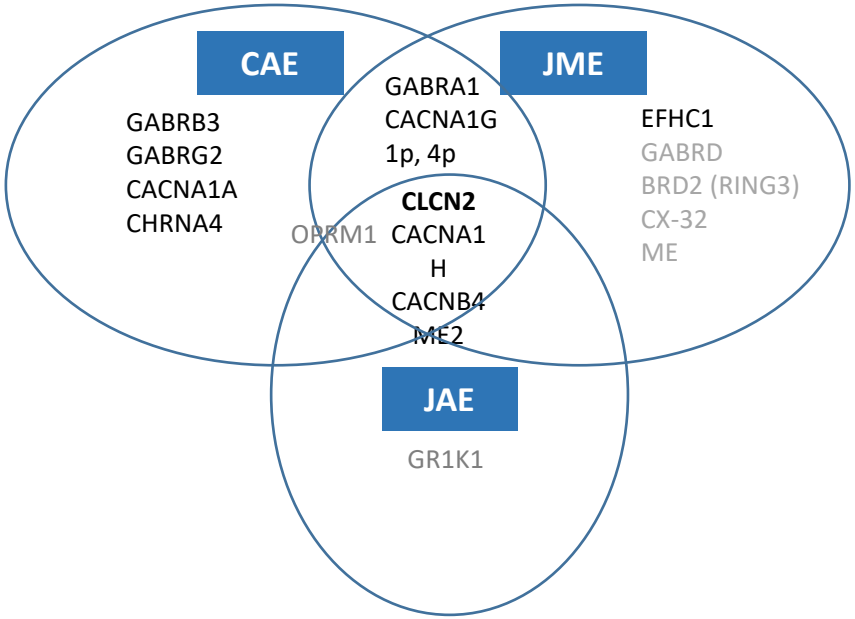


It is very important to describe EEG- polygraphic features to differentiate seizures and syndromes



genetic overlap !!





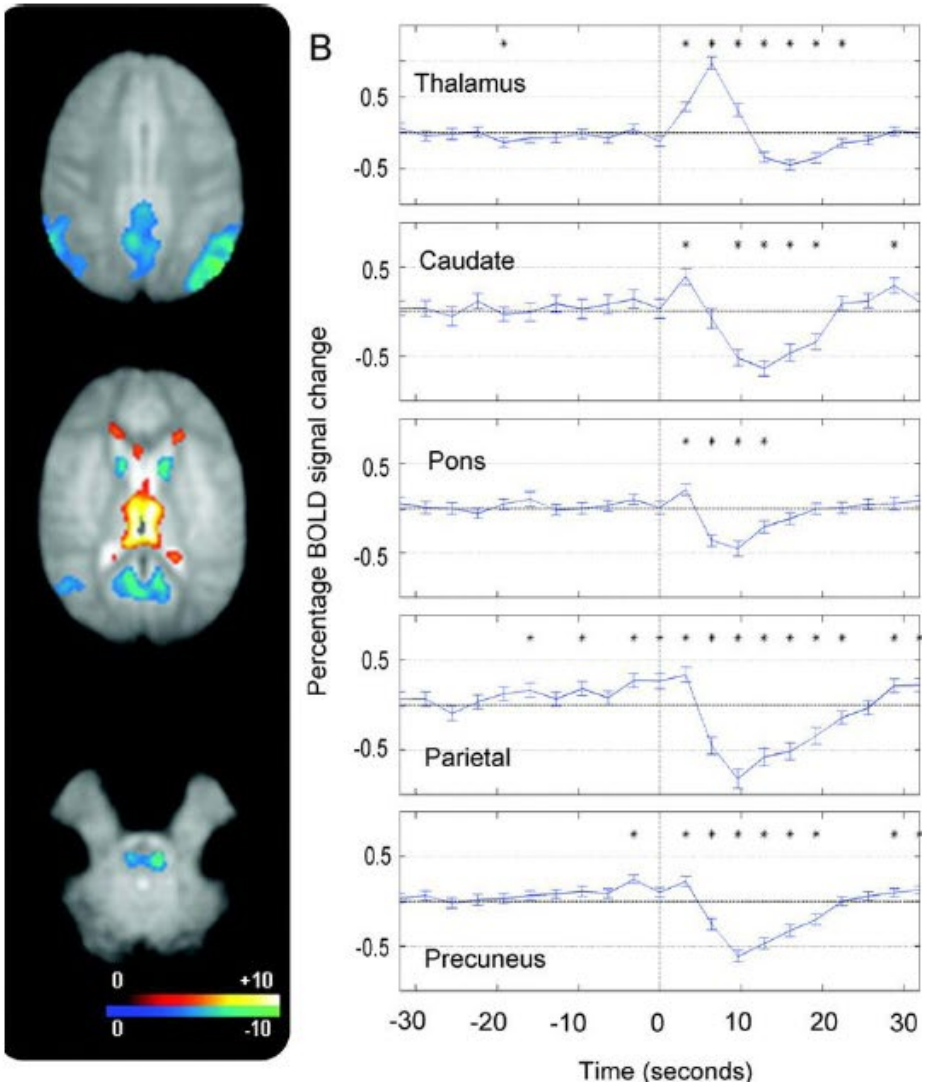
The core network in absence epilepsy

Differences in cortical and thalamic BOLD response

P.W. Carney, FRACP
R.A.J. Masterton, PhD
A.S. Harvey, MD, FRACP
I.E. Scheffer, PhD, MBBS, FRACP
S.F. Berkovic, MD, FRACP
G.D. Jackson, MD, FRACP

Neurology® 2010;75:904-911

11 children with typical AS, untreated

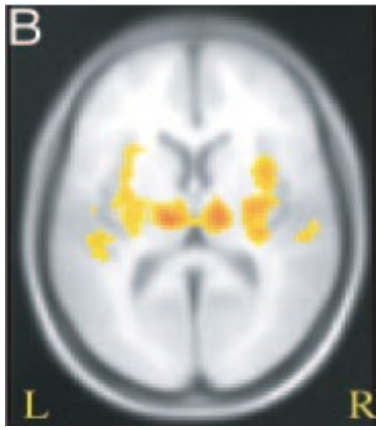


pathophysiological overlap !!

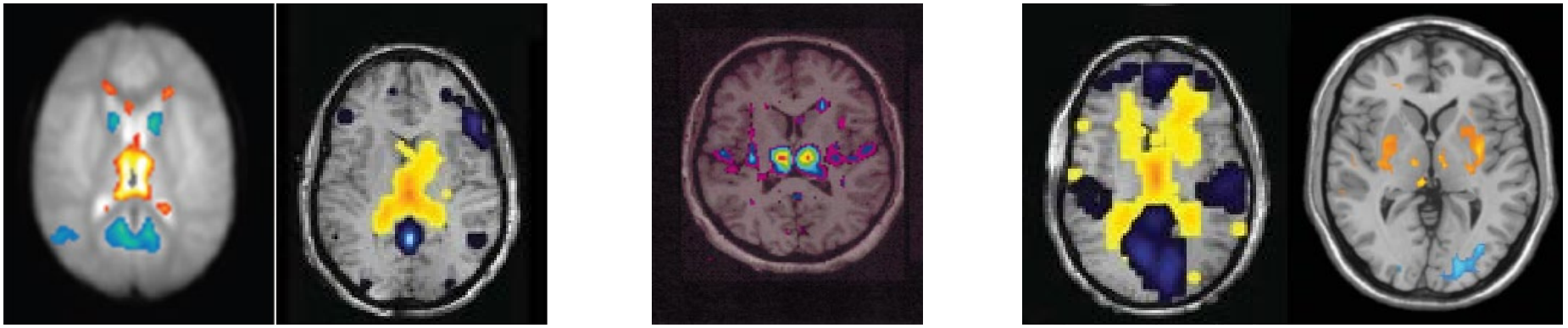
IGE

critical neuronal network

- neocortical pyramidal neurons
- thalamic relay neurons
- reticular thalamic neurons



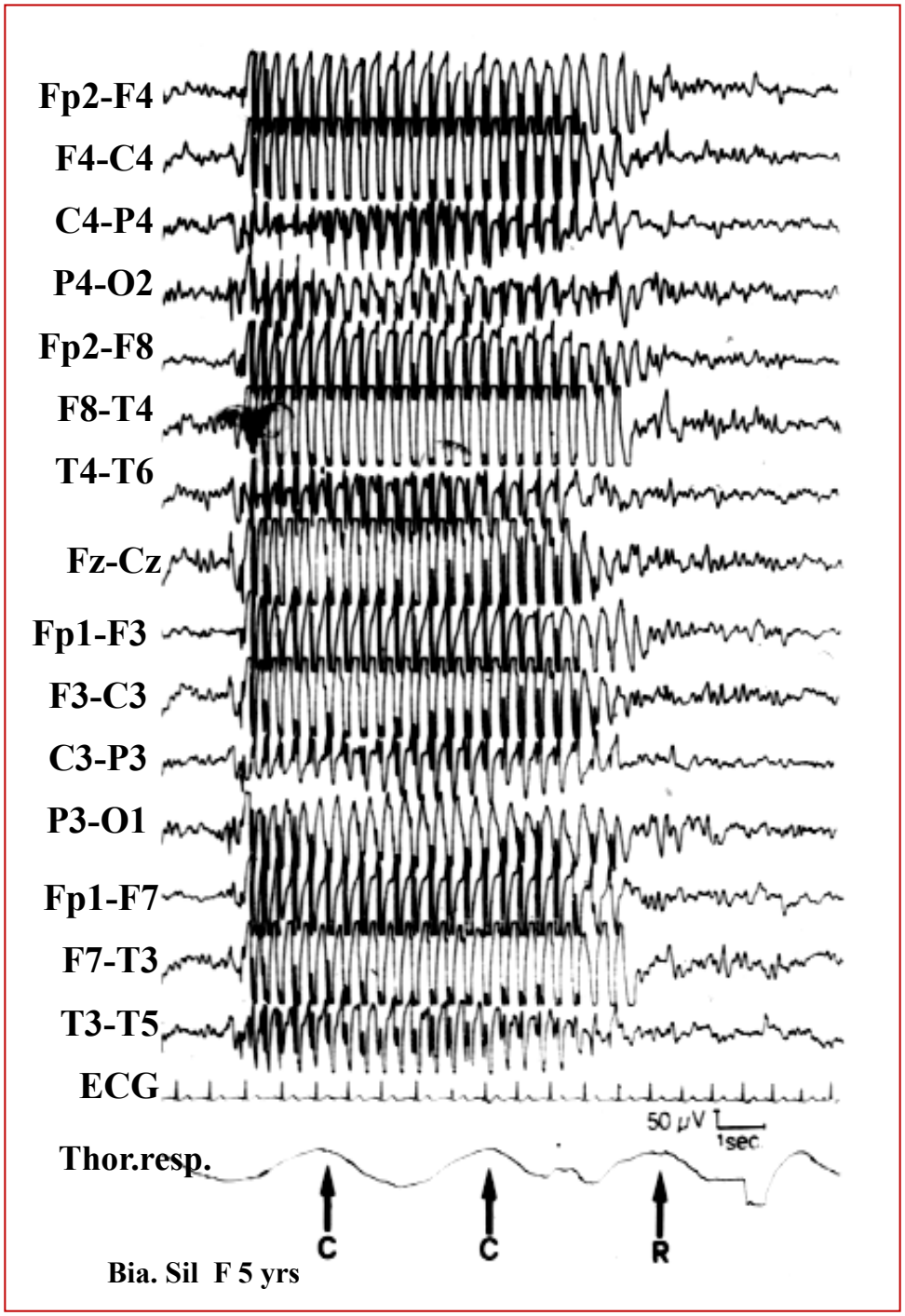
CAE **JAE** **IGE-TCS** **JME** **MAE**



Aghakhani 2004; Gotman,2005 Carney 2010; Moeller 2010 Muller et al. 2014

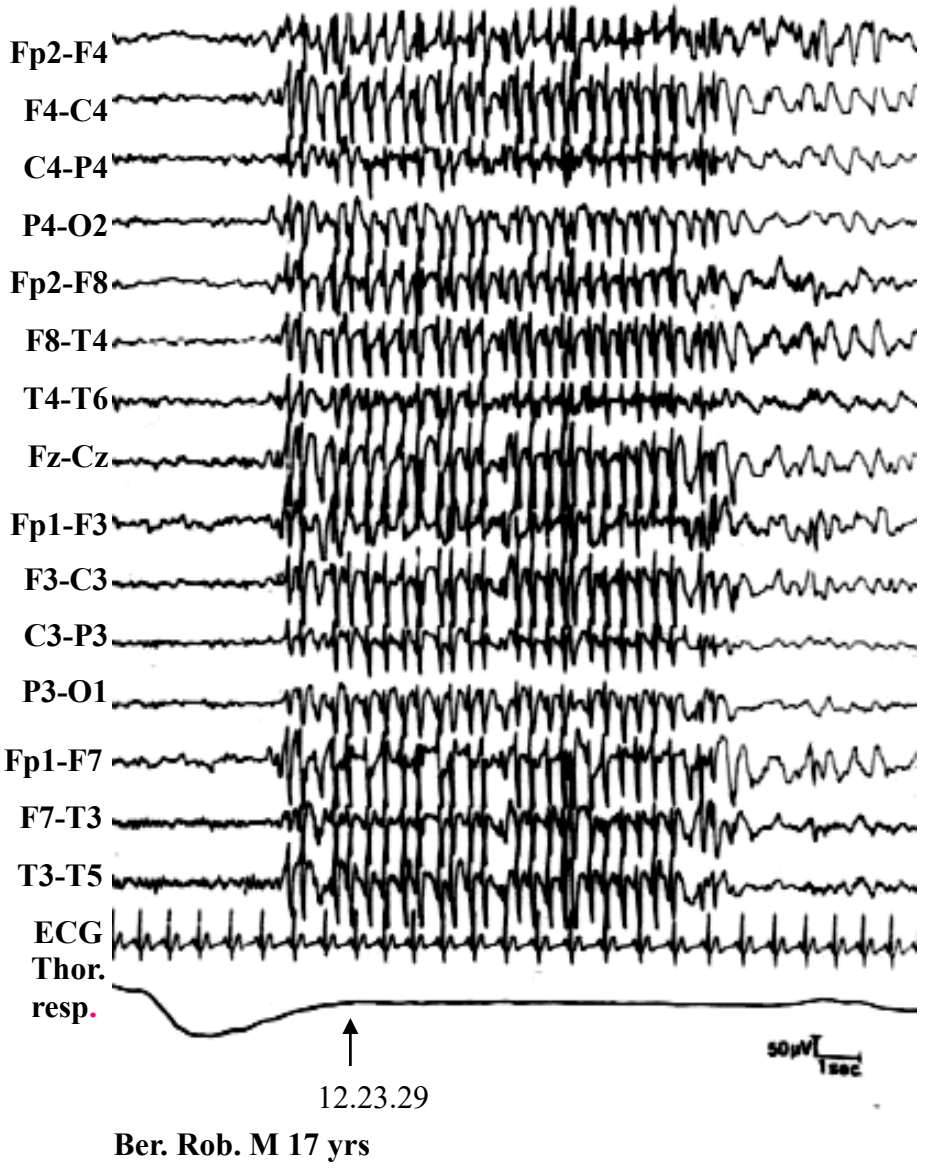
ASSENZA “PURA” (3 c/s)

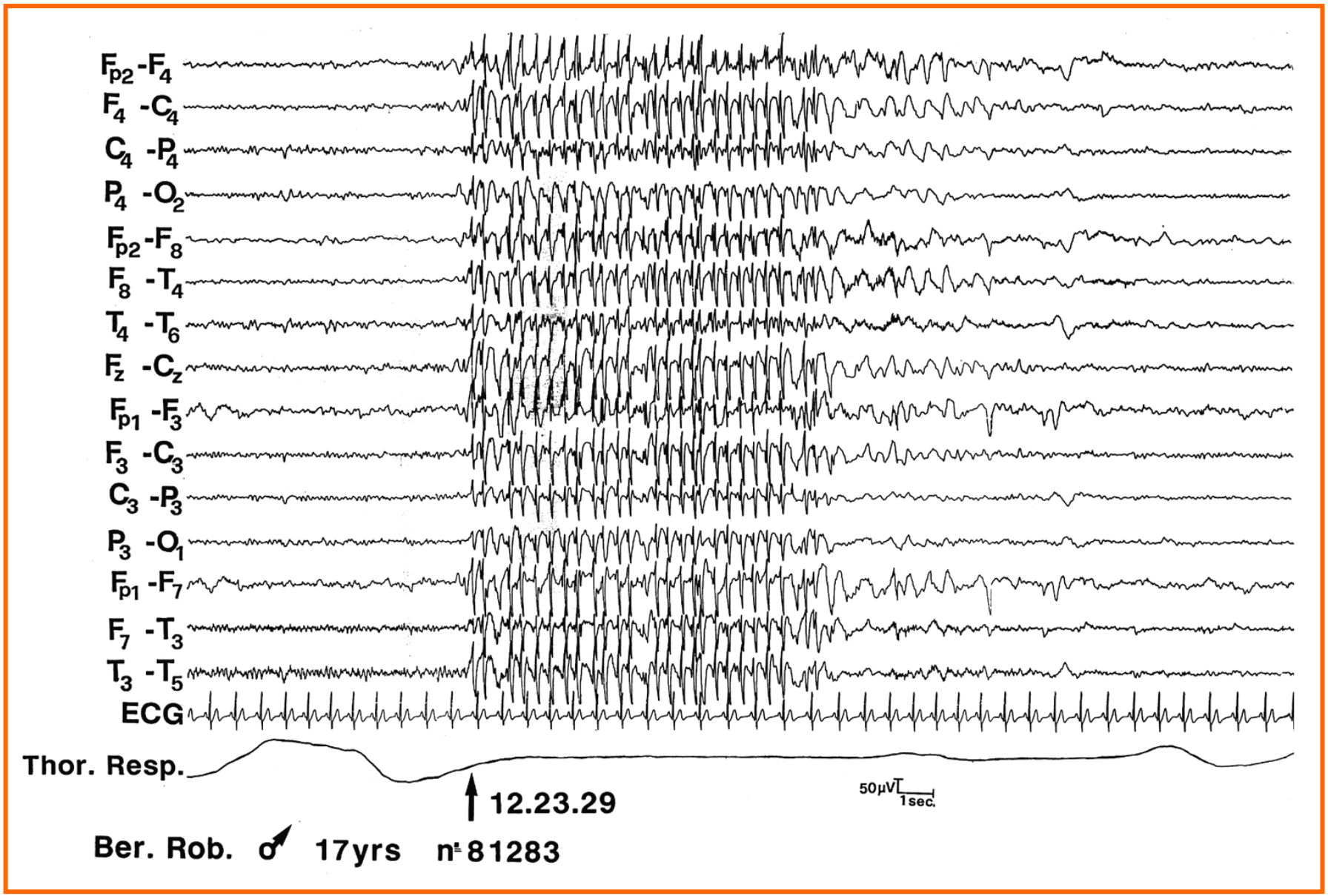
Breve sospensione della working memory



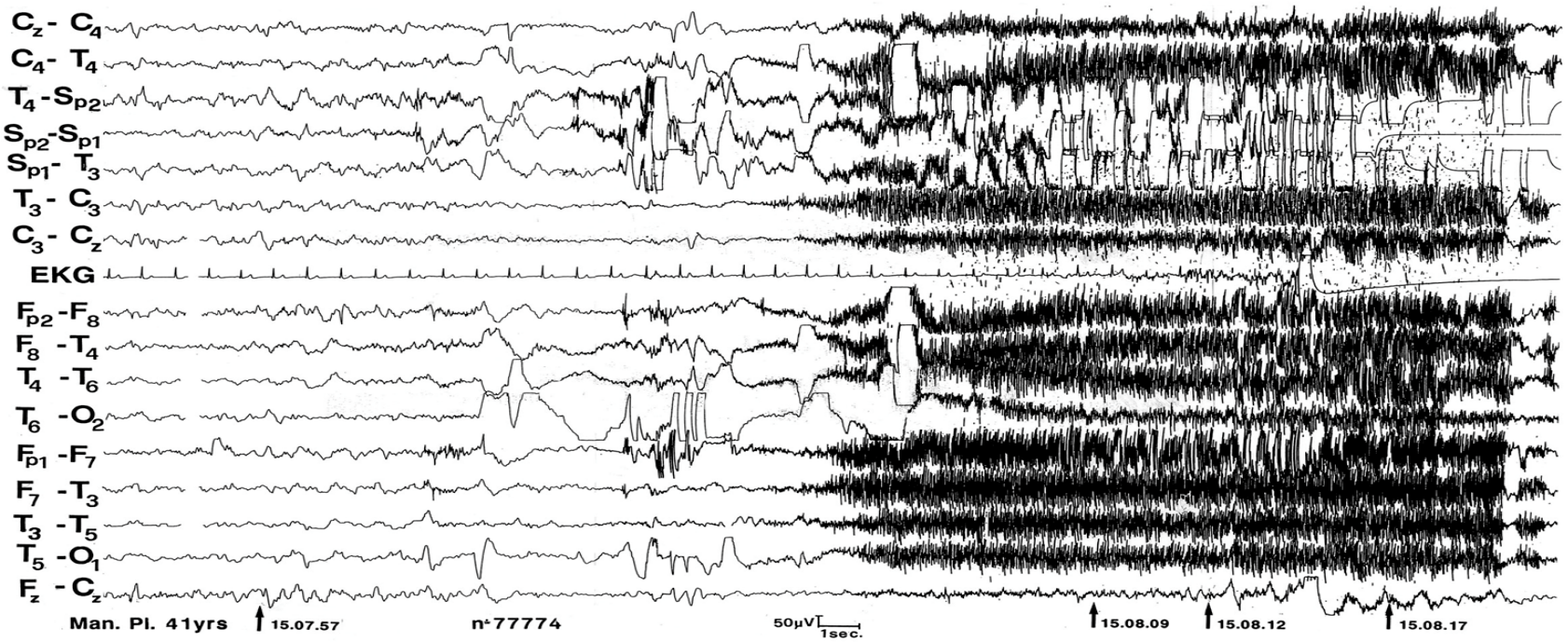
ASSENZA “NON PURA” (3c/s)

Disturbo dell’iniziativa e dell’intenzione




Fp2-F4
F4 -C4
C4 -P4
P4 -O2
Fp2-F8
F8 -T4
T4 -T6
Fz -Cz
Fp1-F3
F3 -C3
C3 -P3
P3 -O1
Fp1-F7
F7 -T3
T3 -T5
ECG
Thor. Resp.
50µV
1sec.
12.23.29
Ber. Rob. ♂ 17yrs n= 81283

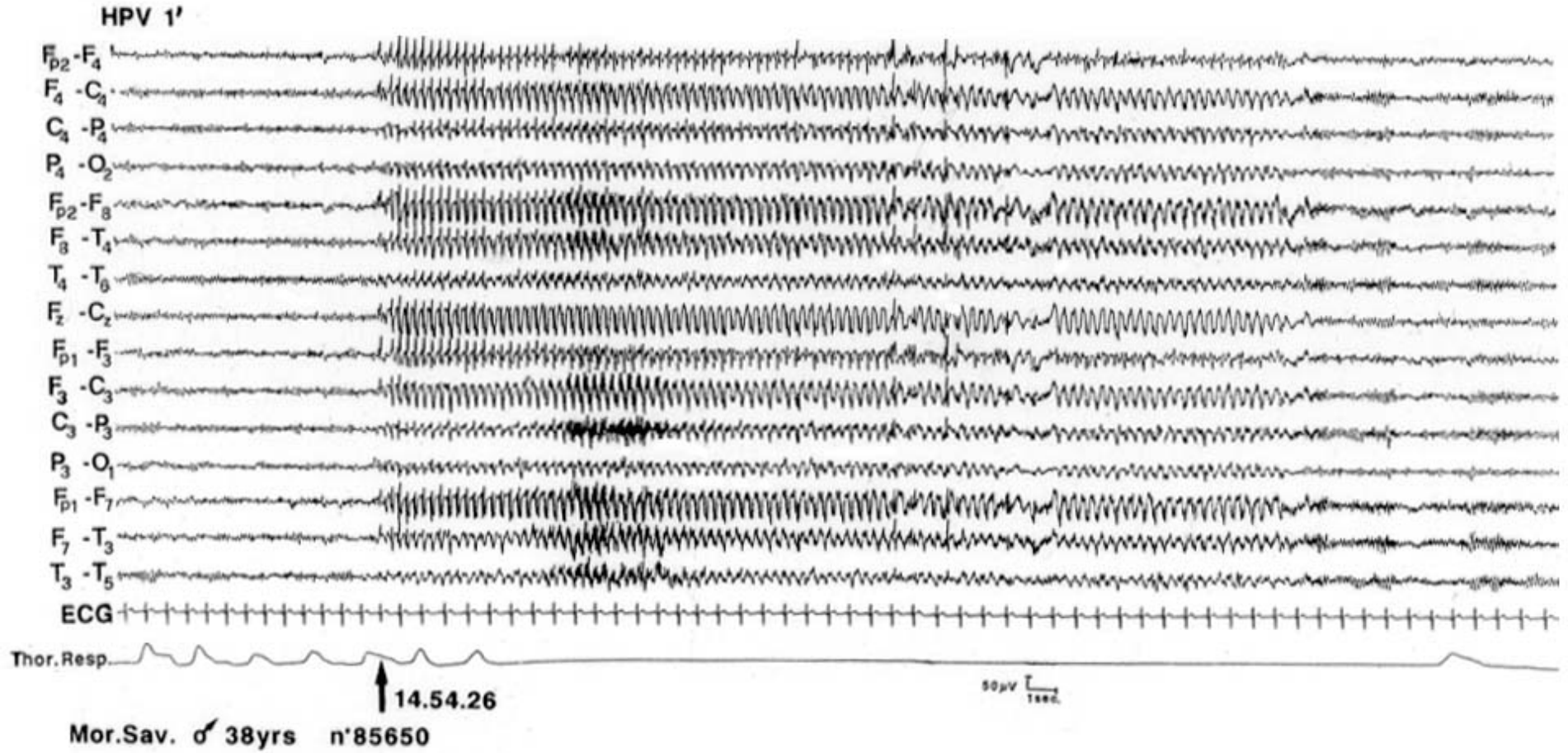
Il problema dell'EEG nelle **crisi** frontali



"... interictal and ictal scalp electroencephalograms are often not helpful and sometimes misleading." P.D. Williamson, *1985*

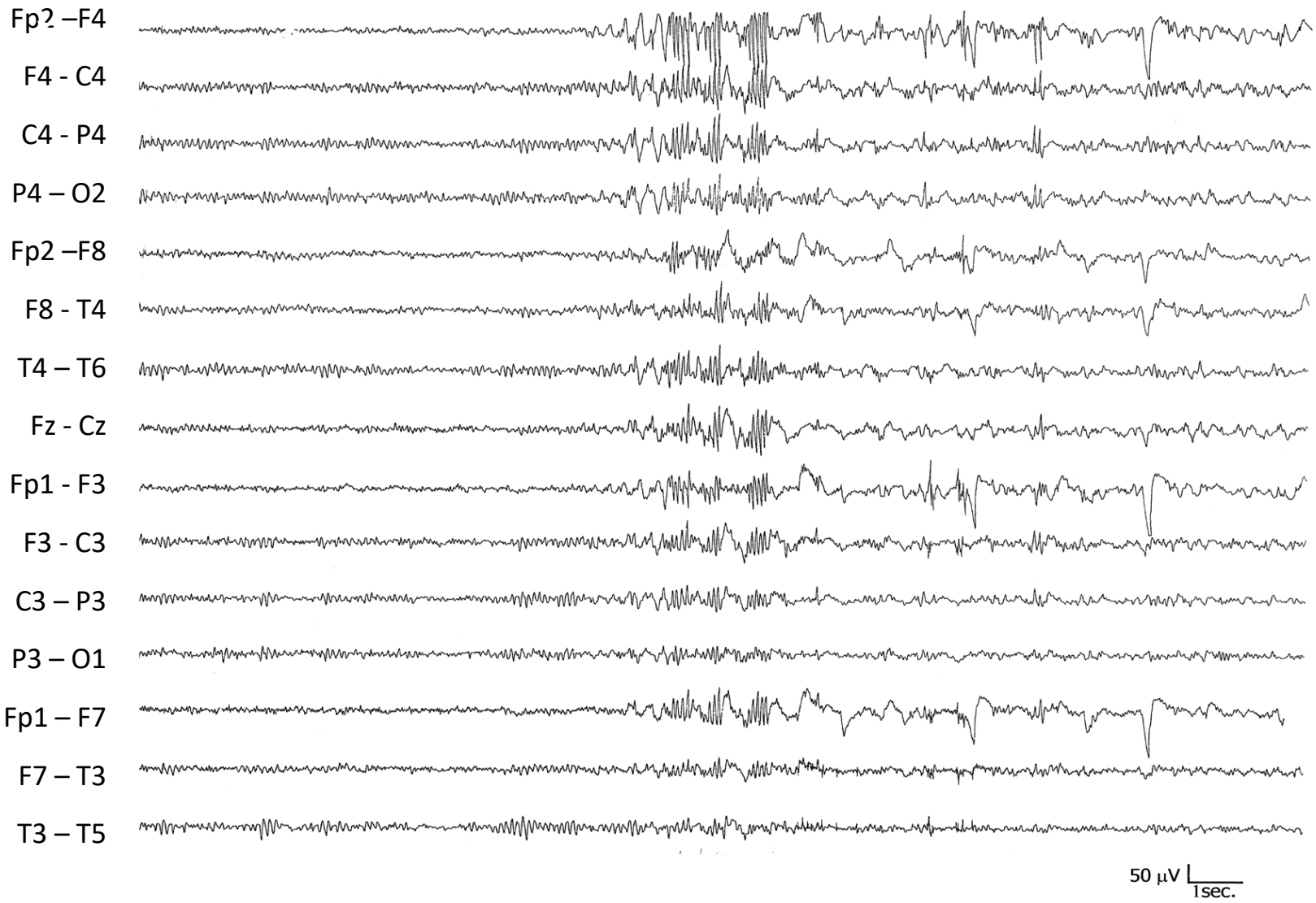
the electrographic diagnosis of orbital seizures depends exclusively on the findings from chronically implanted electrodes. *C. Ajmone – Marsan, 1988*

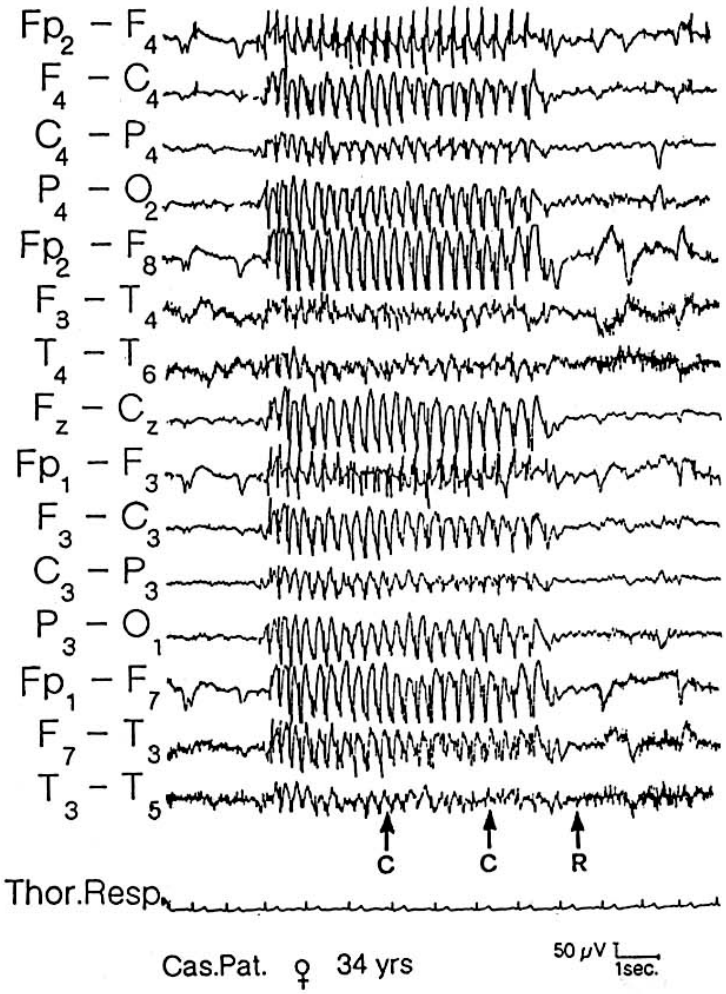
Tukel and Jasper. **The electroencephalogram in parasagittal lesions**
Electroenceph Clin Neurophysiol ,1952

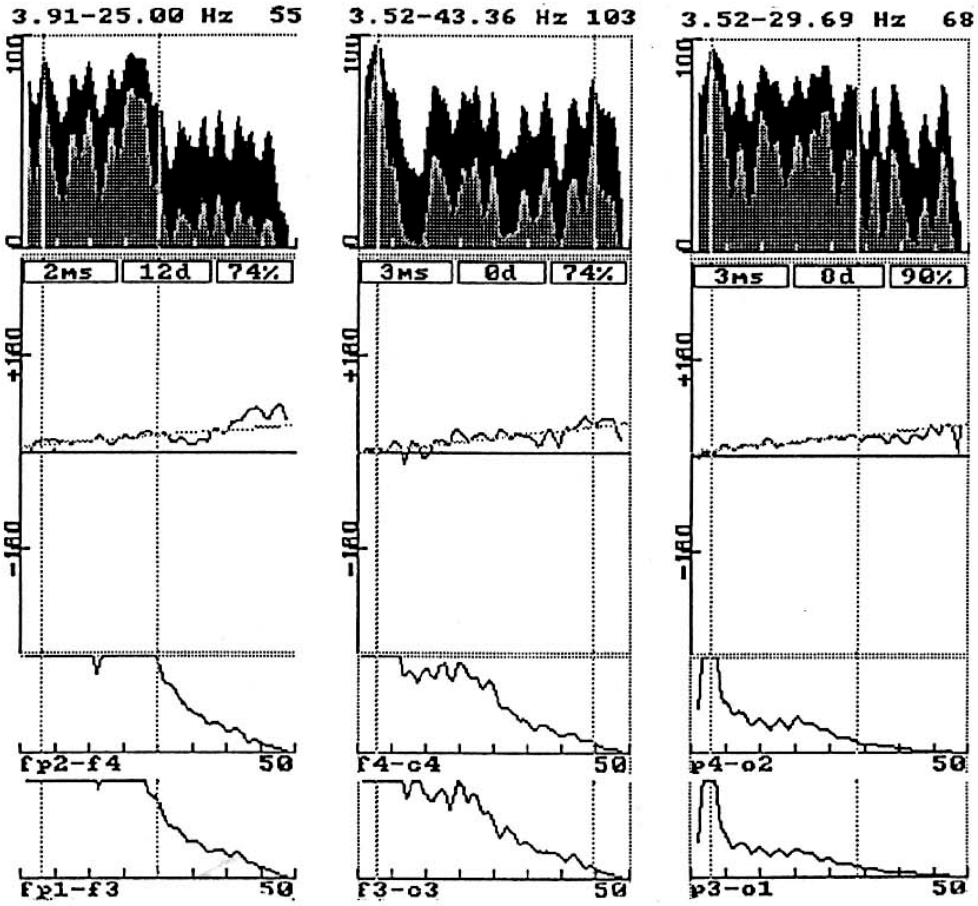


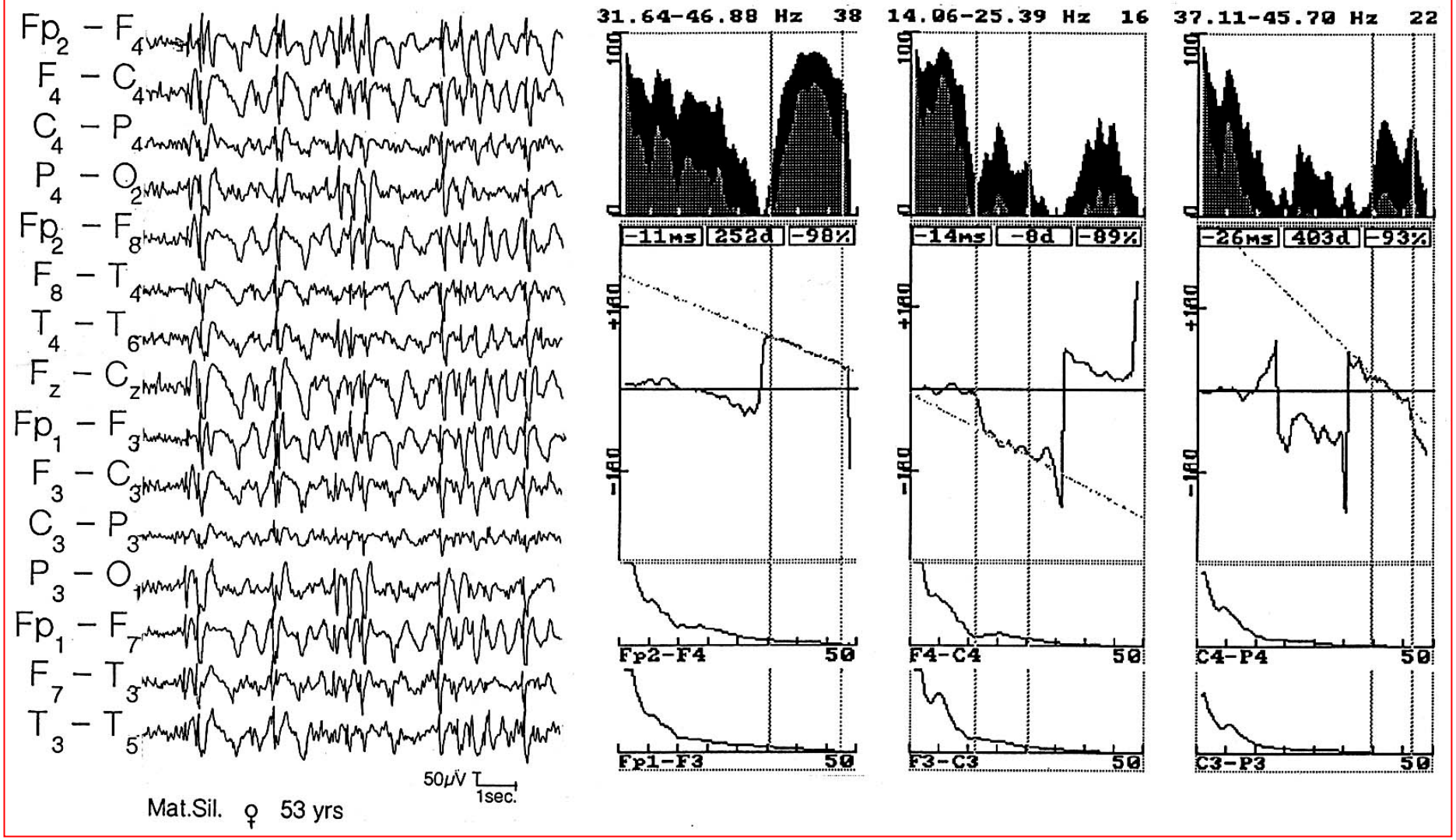
….these eegs may resemble closely those of petit mal . . .epilepsy"

La bisincronia secondaria (SBS)

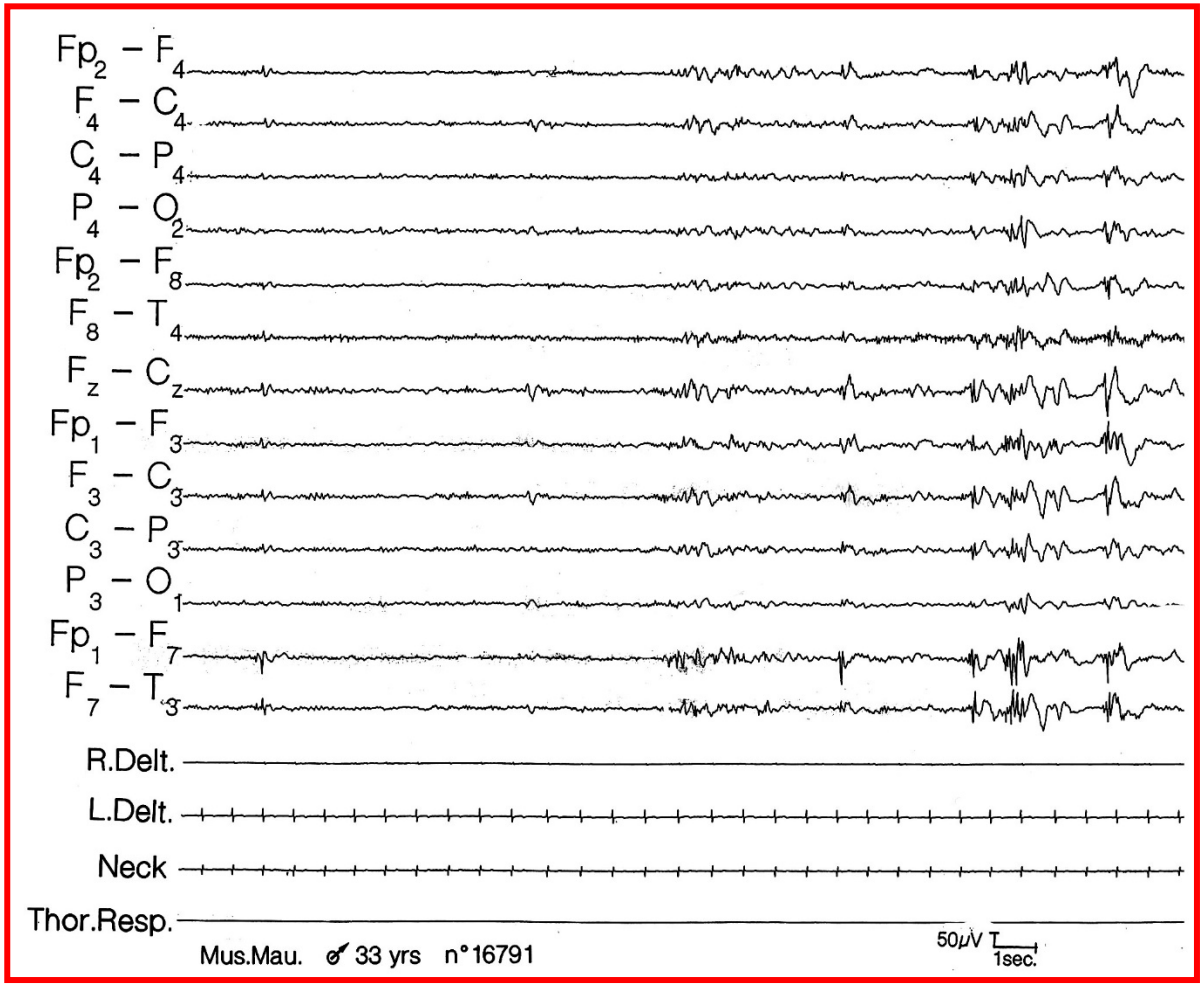


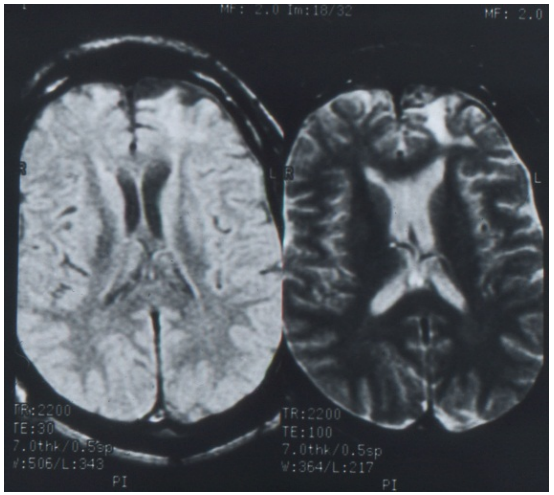

Fp2 – F4
F4 – C4
C4 – P4
P4 – O2
Fp2 – F8
F3 – T4
T4 – T6
Fz – Cz
Fp1 – F3
F3 – C3
C3 – P3
P3 – O1
Fp1 – F7
F7 – T3
T3 – T5
C
C
R
Thor.Resp
Cas.Pat. ♀ 34 yrs
50 μV
1sec.

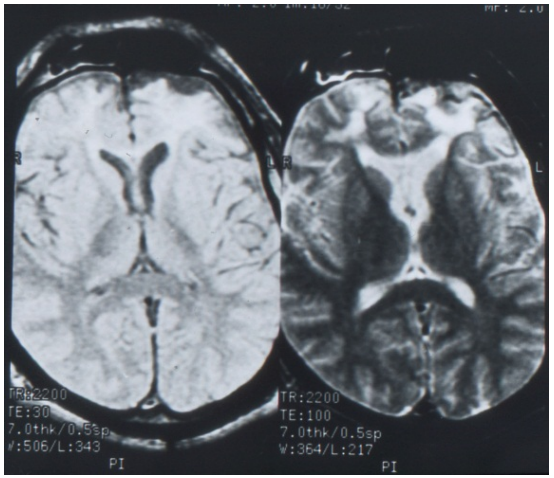

3.91-25.00 Hz 55
2ms 12d 74%
+100
-100
fp2-f4 50
fp1-f3 50
3.52-43.36 Hz 103
3ms 0d 74%
+100
-100
f4-c4 50
f3-c3 50
3.52-29.69 Hz 68
3ms 0d 90%
+100
-100
p4-o2 50
p3-o1 50


Fp2 – F4
F4 – C4
C4 – P4
P4 – O2
Fp2 – F8
F8 – T4
T4 – T6
Fz – Cz
Fp1 – F3
F3 – C3
C3 – P3
P3 – O1
Fp1 – F7
F7 – T3
T3 – T5
50μV
1sec.
Mat.Sil. ♀ 53 yrs
31.64-46.88 Hz 38
14.06-25.39 Hz 16
37.11-45.70 Hz 22
-11ms 252d -98%
-14ms -8d -89%
-26ms 403d -93%
+100
-100
Fp2-F4 50
F4-C4 50
C4-P4 50
Fp1-F3 50
F3-C3 50
C3-P3 50

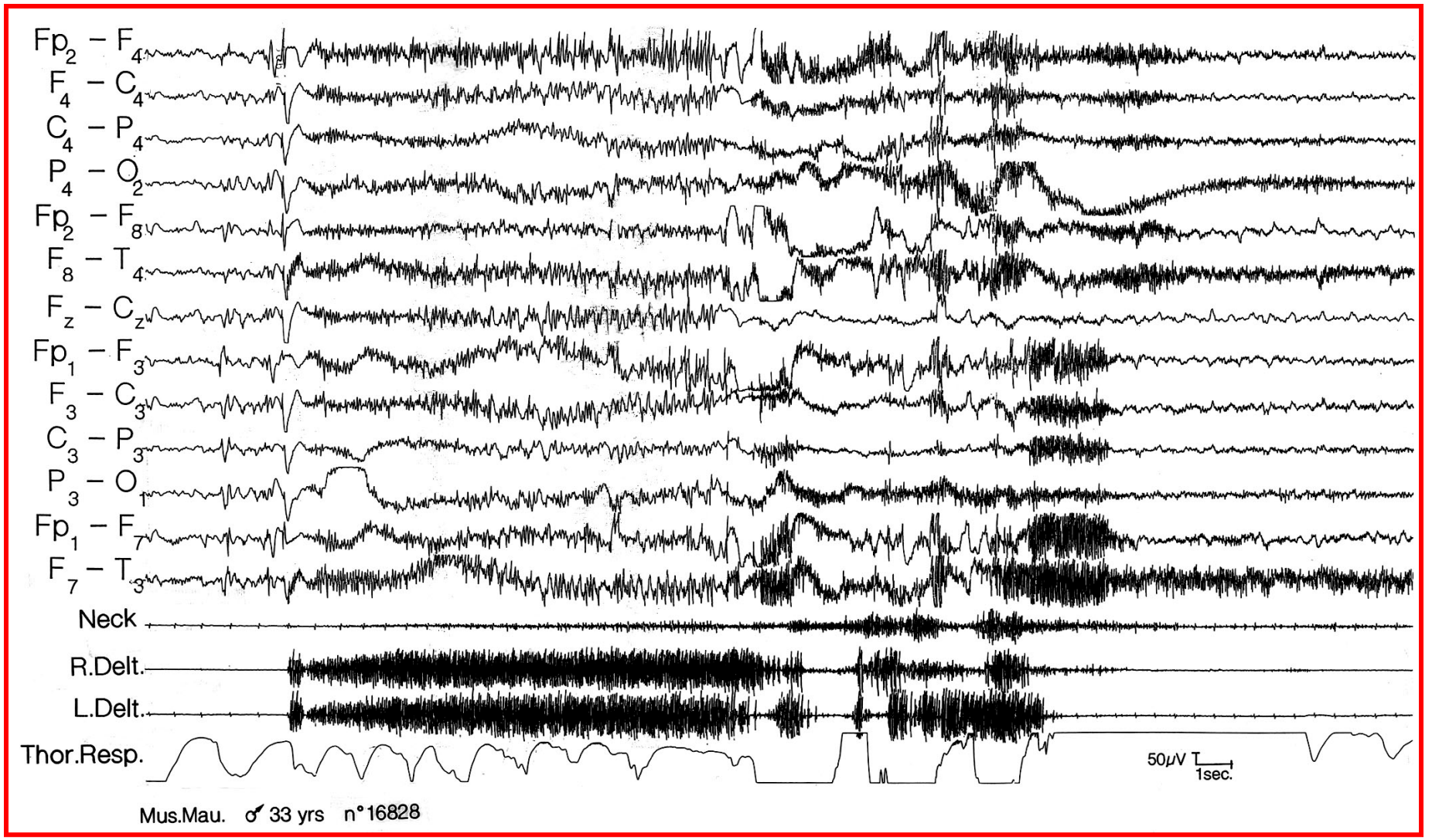
SBS è un indice di prognosi sfavorevole nelle ep. focali



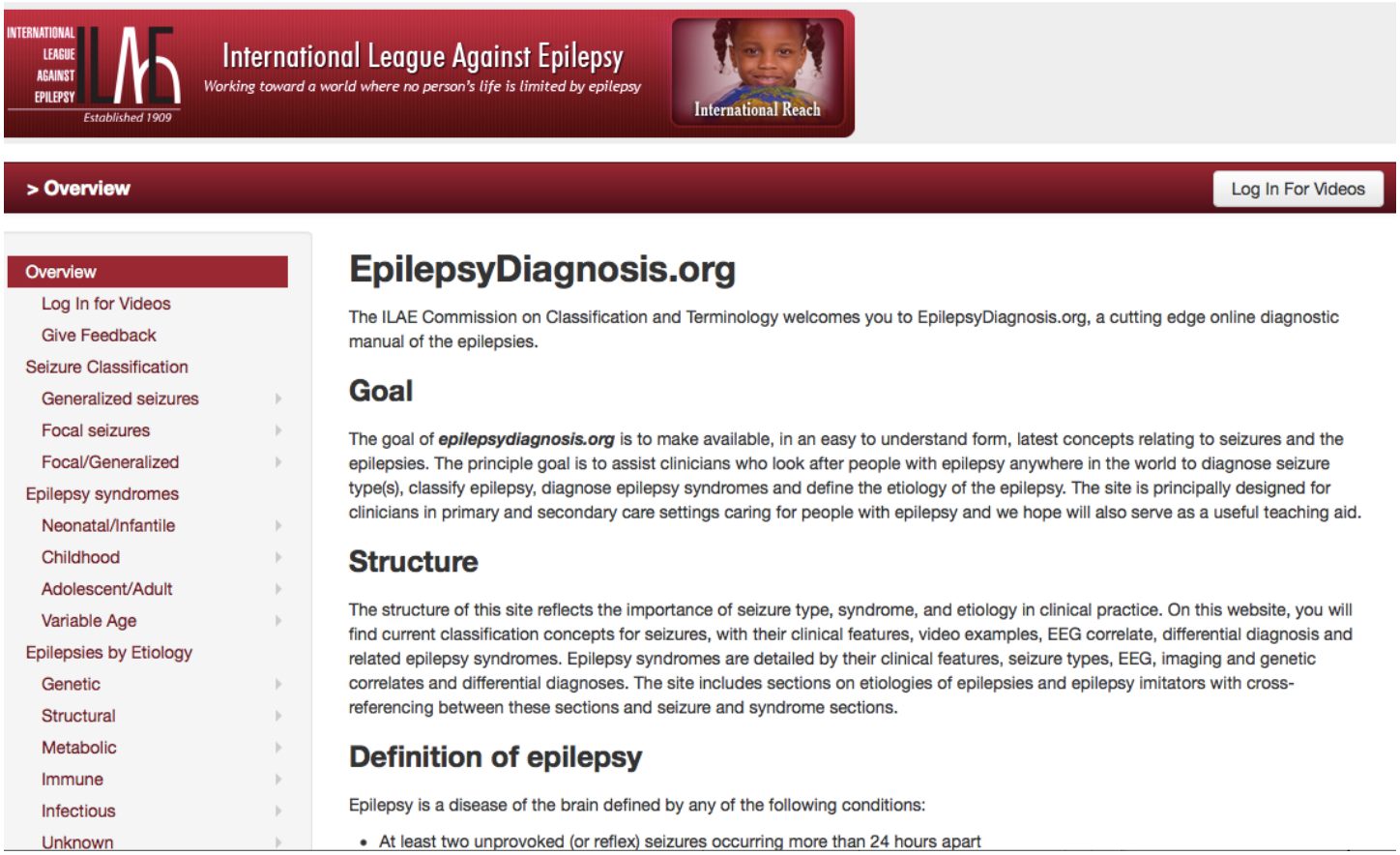




Clinical and EEG features of partial epilepsy with secondary bilateral synchrony. P.Tinuper 1995


Fp2 – F4
F4 – C4
C4 – P4
P4 – O2
Fp2 – F8
F8 – T4
Fz – Cz
Fp1 – F3
F3 – C3
C3 – P3
P3 – O1
Fp1 – F7
F7 – T3
Neck
R.Delt.
L.Delt.
Thor.Resp.
50μV
1sec.
Mus.Mau. ♂ 33 yrs n°16828

https://www.epilepsydiagnosis.org



Francesca Bisulli

Barbara Mostacci

Laura Licchetta

Lidia Di Vito

Carlotta Stipa

Veronica Menghi

Lorenzo Ferri

Lorenzo Muccioli

Tecnici EEG

Atonic seizure

Generalized onset

Focal onset

Epileptic spasm

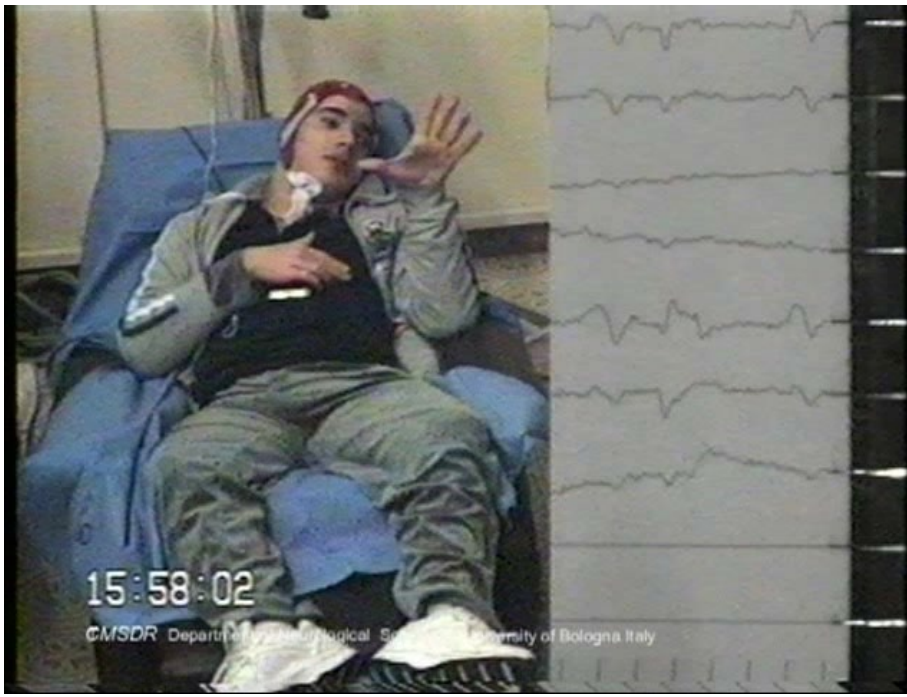
Generalized onset

Focal onset

Gat.Max. ♂ 20 aa 16-02-2011


15:48:20
©MSDR Department of Neurological Sciences University of Bologna Italy


15:53:14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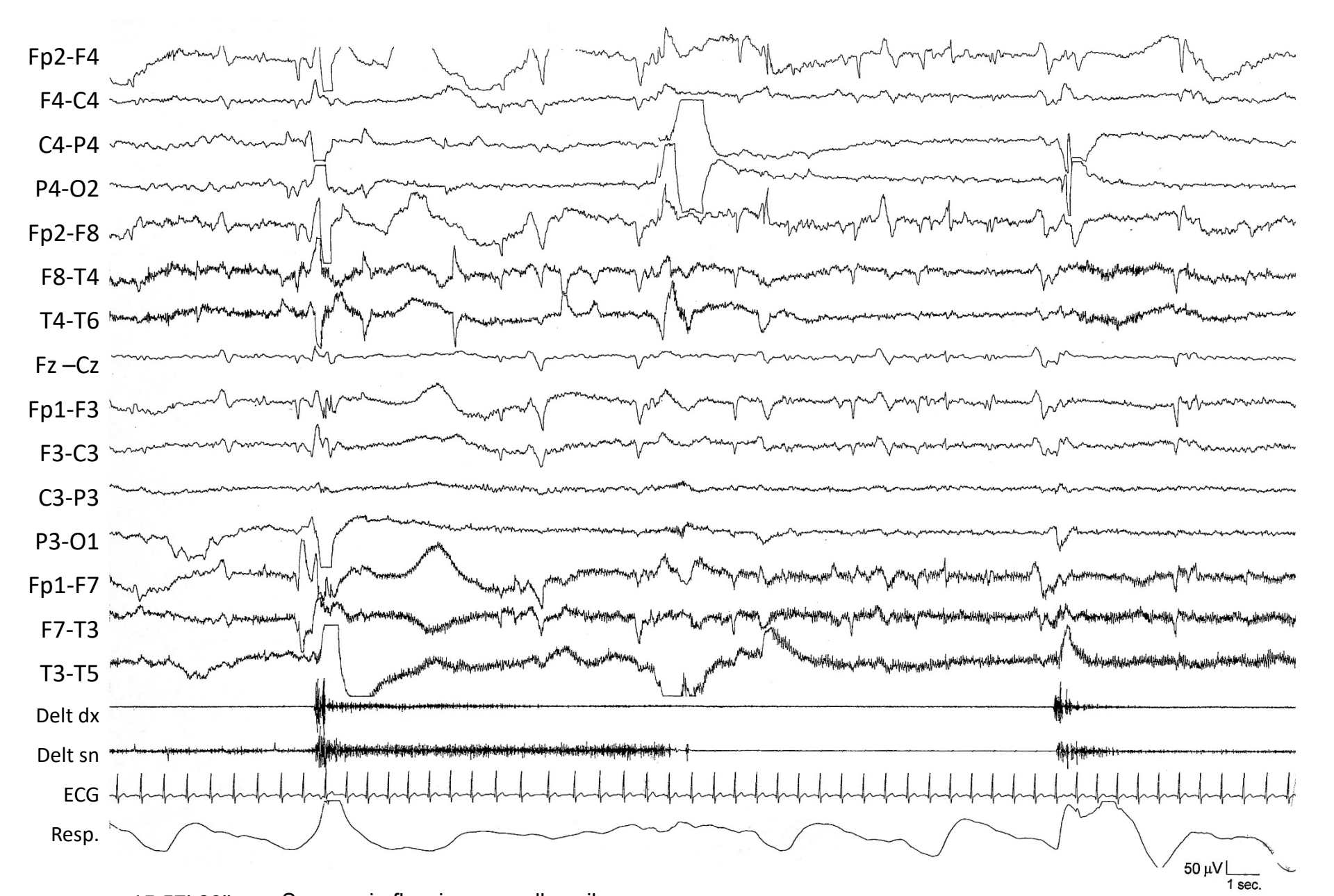
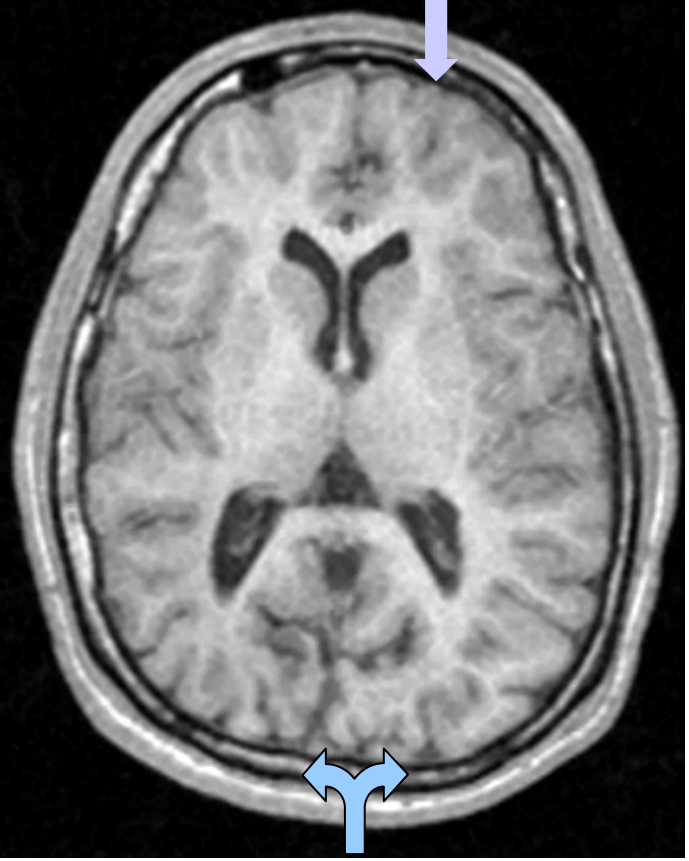
©MSDR

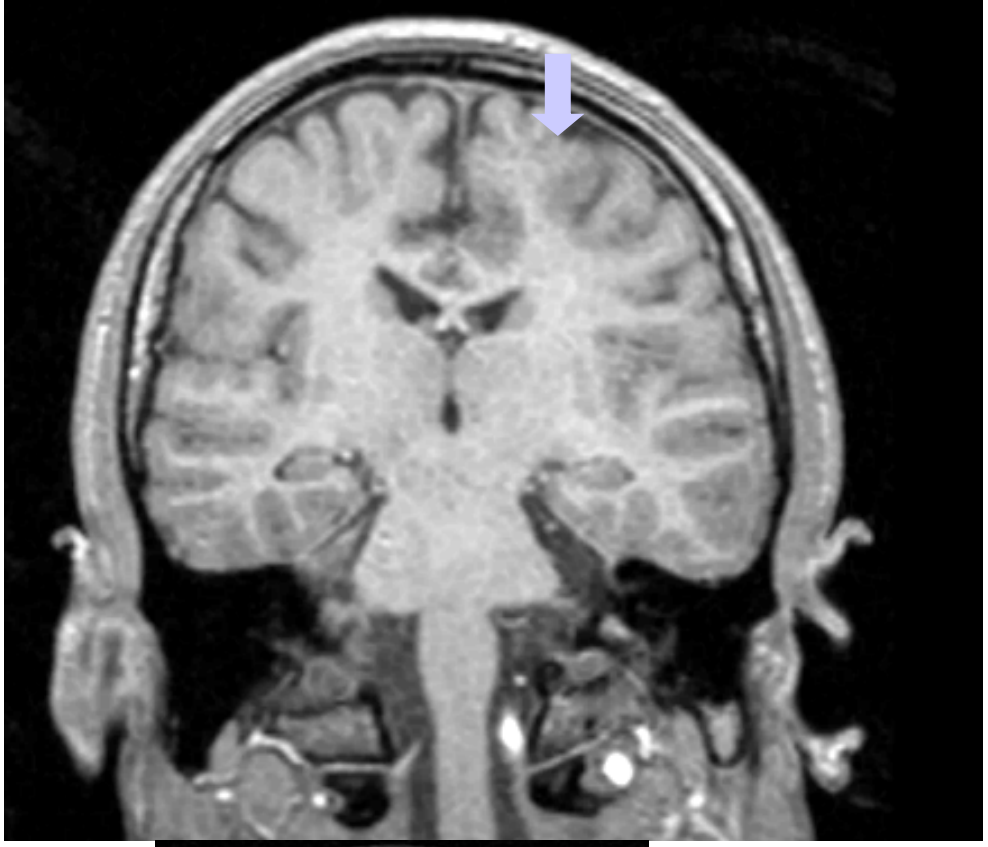


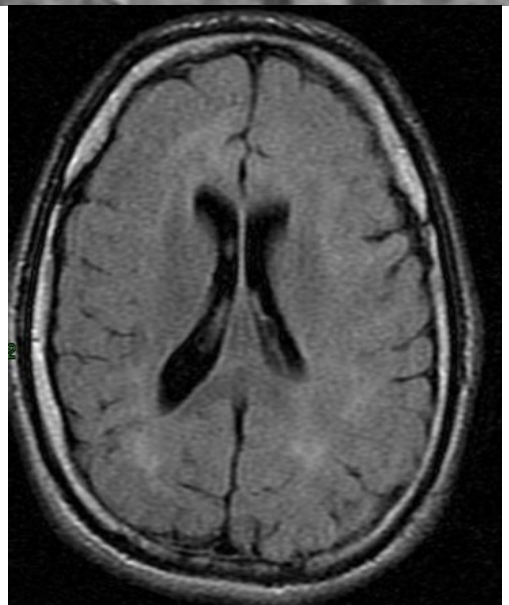
15:57':28" Spasmo in flessione + solleva il capo

Piccolo spasmo

Gat.Max. ♂ 20 aa 16-02-2011







Ulegiria bilaterale e verosimile polimicrogiria frontale sinistra


Fp2 F4
F4 C4
C4 P4
P4 O2
Fp2 F8
F8 T4
T4 T6
29-SEP-89 14:06:28
CMSDR Dip. di Scienze Neurologiche Università di Bologna

(Z.G) female 57 yrs

Age 6 to 10 yrs: rare minor seizures with staring and tonic posturing

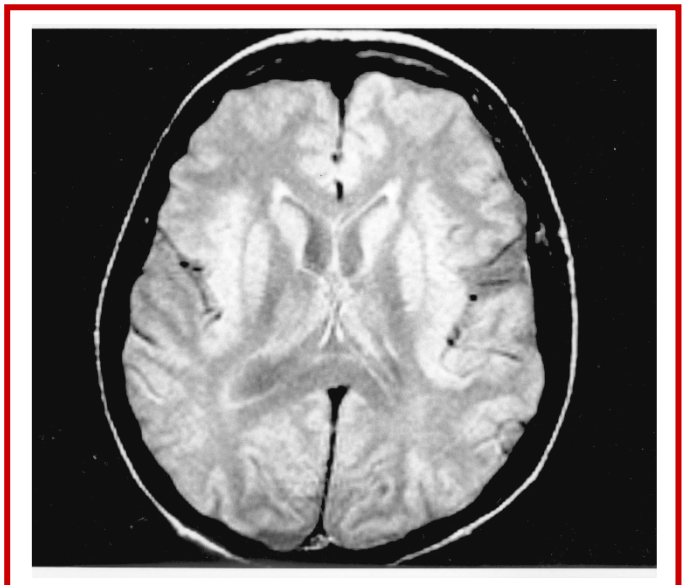
Age 11 to 27 yrs: TC s sometime preceded by L harm paresthesia

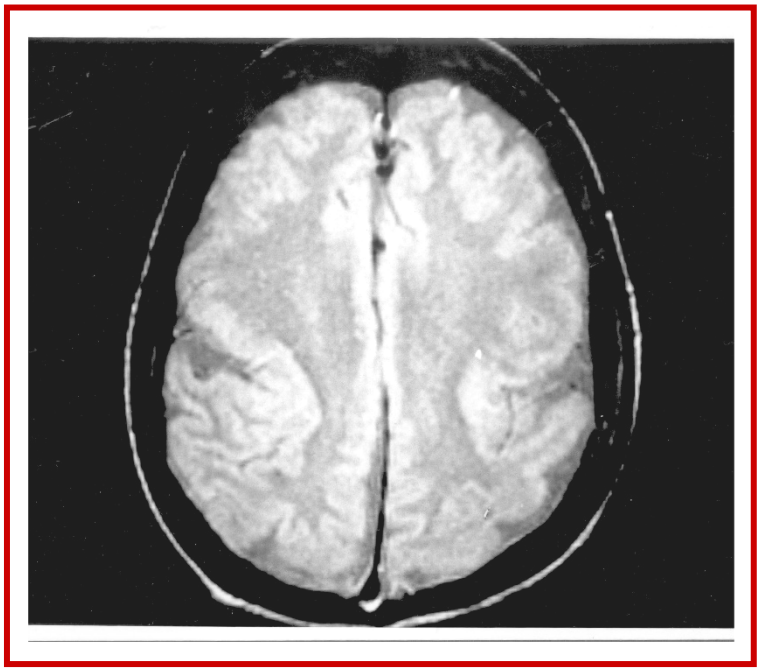
Since age 27: bilateral tonic contractions of peribuccal muscles (more on the left) with anteflexion of the head and trunk.

In cluster 3-4 / week

Partially responding to therapy (CBZ, VPA)

NMR: bilateral perisylvian polymicrogyria



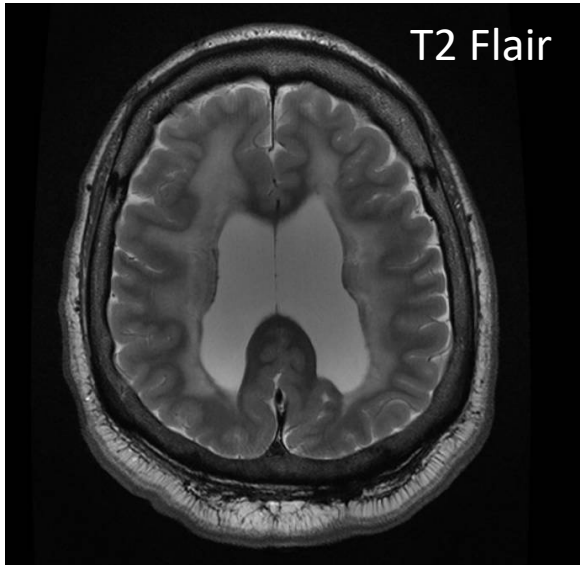


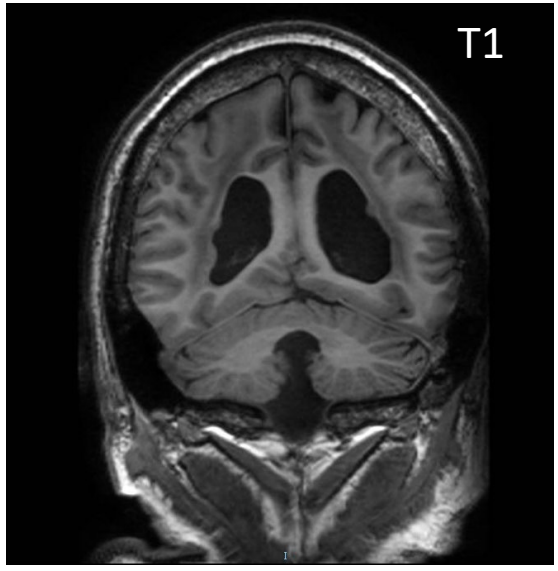
Pi. Gianni (49 aa)

Malattia di Whipple con interessamento linfonodale e surrenali

EON: strabismo divergente, ristagno rapido nello sguardo laterale verso sinistra,sindattilia del 2-3 dito del piede bilateralmente, atteggiamento distonico in estensione degli alluci bilateralmente (dx>sn), lieve ipotestenia a tricipite dx e bicipite dx, tremore postulare AS dx, marcia atassica con tendenza alla lateropulsione verso destra alla chiusura degli occhi.
CGH- Array: nn

Malformazione congenita complessa con encefalocele, complesso di Dandy- Walker, anomalie della migrazione neuronale e leucoencefalopatia.



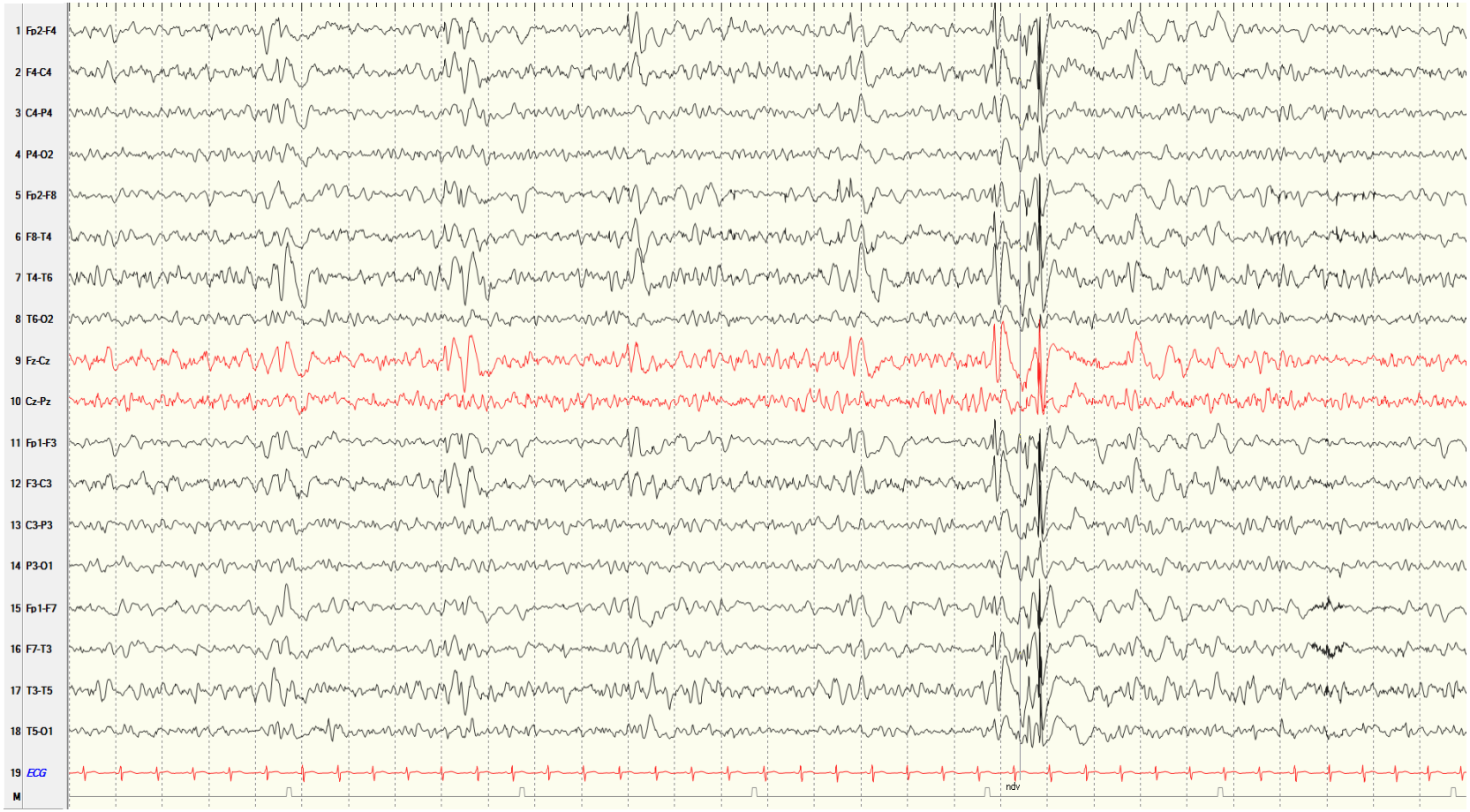


Pi. Gianni (12 aa)

Pi. Gianni (12 aa)

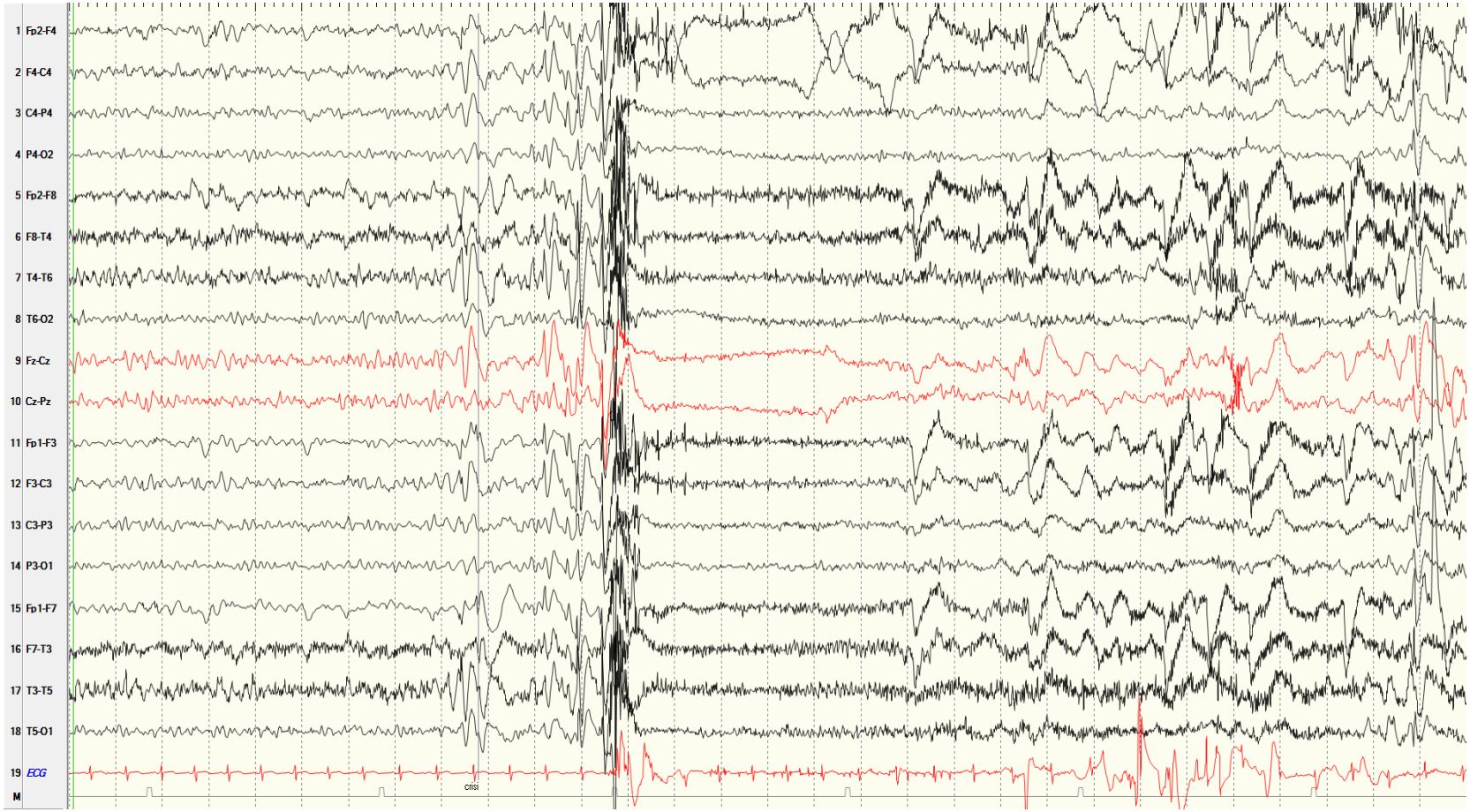
02-11-2012

Tonin luca



Tonin luca

crisi



Tonin luca


Fp2-F4
F4-C4
C4-P4
P4-O2
Fp2-F8
F8-T4
T4-T6
T6-O2
Fz-Cz
Cz-Pz
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp1-F7
F7-T3
T3-T5
T5-O1
ECG
crisi

Francesca Bisulli

Barbara Mostacci

Laura Licchetta

Patrizia Avoni

Lidia Di Vito

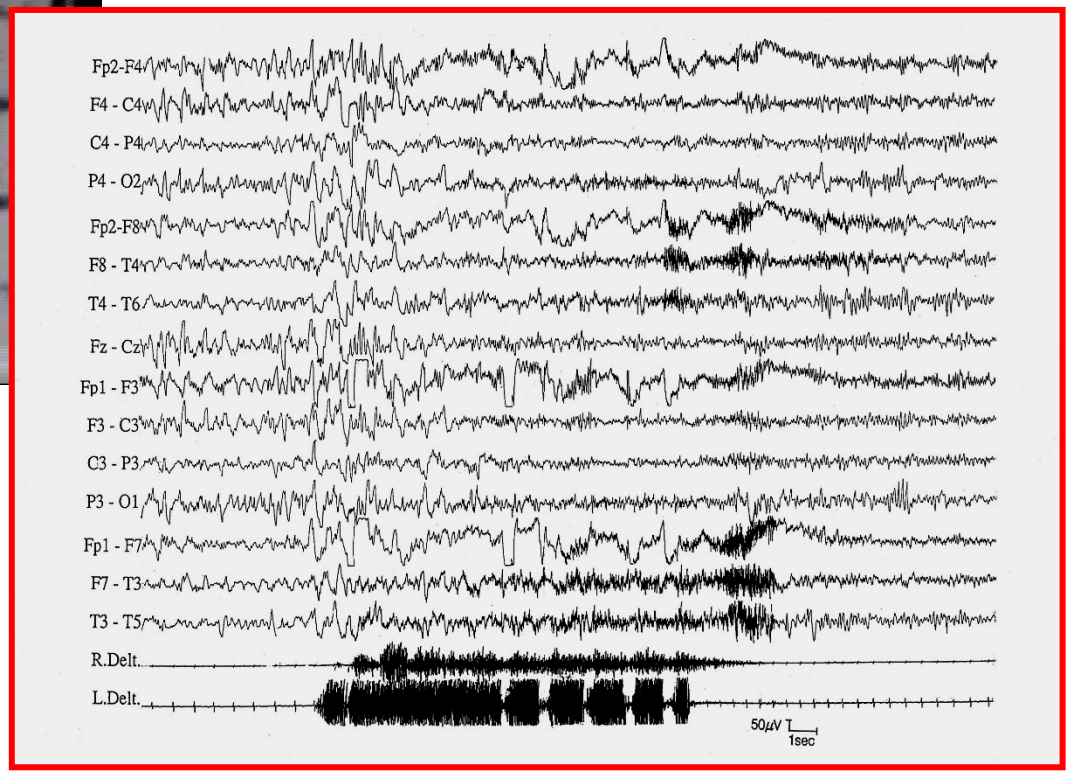
Carlotta Stipa

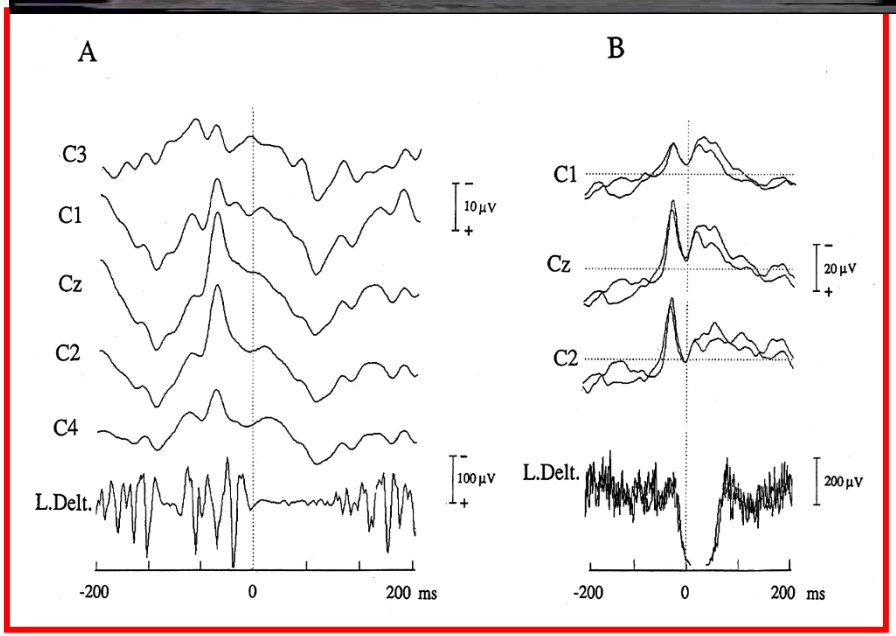
Veronica Menghi

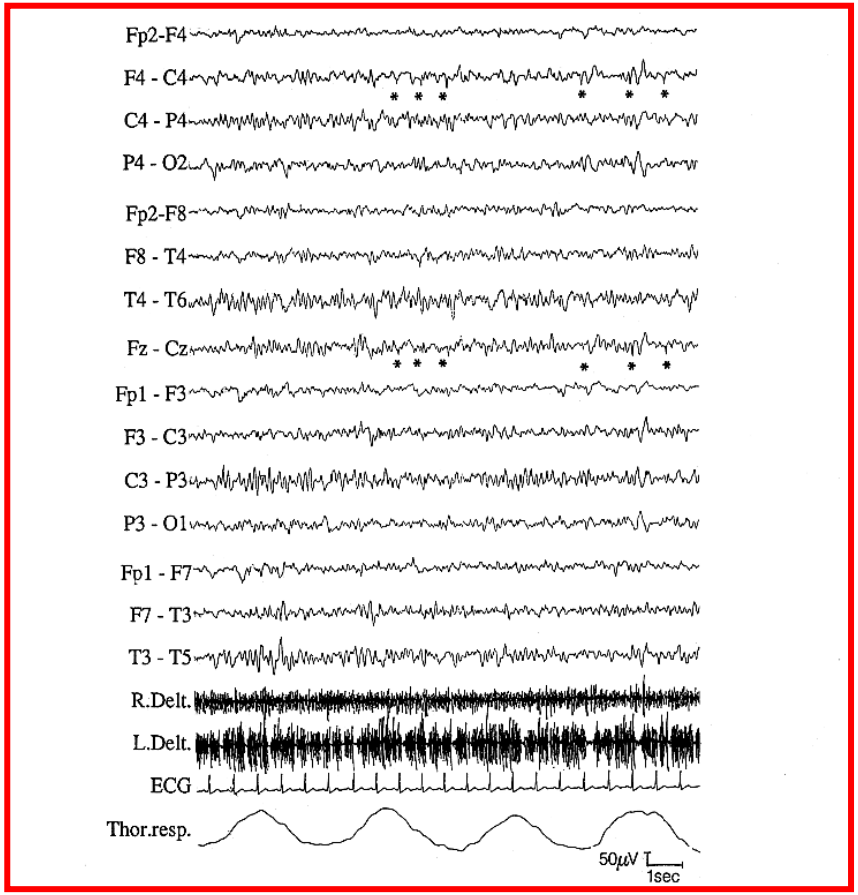
Lorenzo Ferri

Tecnici EEG

tonic and atonic seizure



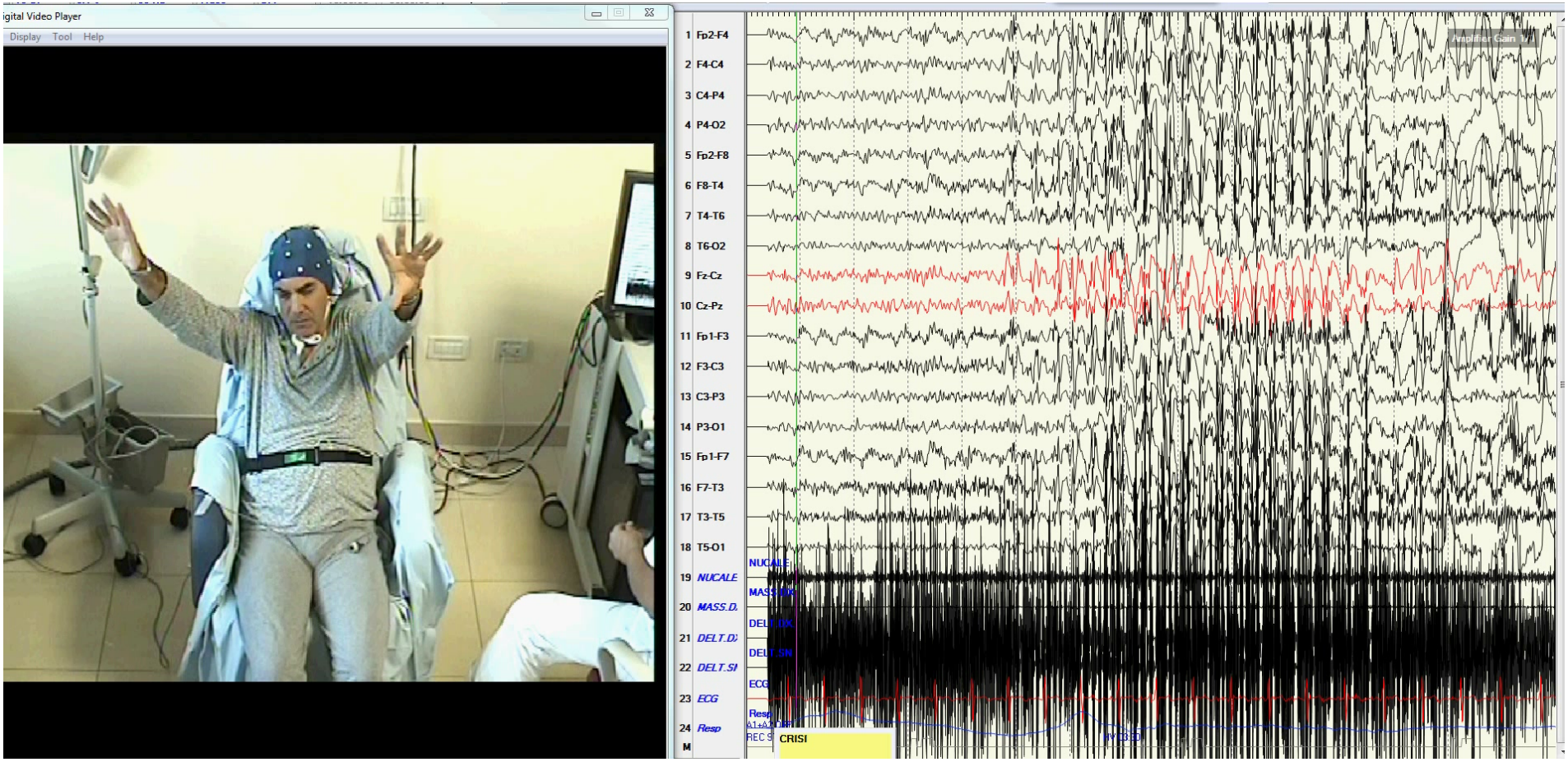

A
B
C3
C1
Cz
C2
C4
L.Delt.
10 µV
100 µV
-200
0
200 ms
C1
Cz
C2
L.Delt.
20 µV
200 µV
-200
0
200 ms


Fp2-F4
F4 - C4
C4 - P4
P4 - O2
Fp2-F8
F8 - T4
T4 - T6
Fz - Cz
Fp1 - F3
F3 - C3
C3 - P3
P3 - O1
Fp1 - F7
F7 - T3
T3 - T5
R.Delt.
L.Delt.
ECG
Thor.resp.
50µV
1sec

clonic+tonic+atonic


13:53:52


15:30:00


igital Video Player
Display
Tool
Help
1 Fp2-F4
2 F4-C4
3 C4-P4
4 P4-O2
5 Fp2-F8
6 F8-T4
7 T4-T6
8 T6-O2
9 Fz-Cz
10 Cz-Pz
11 Fp1-F3
12 F3-C3
13 C3-P3
14 P3-O1
15 Fp1-F7
16 F7-T3
17 T3-T5
18 T5-O1
19 NUCALE
20 MASS.D.
21 DELT.D
22 DELT.SI
23 ECG
24 Resp
M
NUCALE
ECG
CRISI

Epilepsia, **41**(6):687–693, 2000
Lippincott Williams & Wilkins, Inc., Baltimore

Clinical Research

Distinct Behavioral and EEG Topographic Correlates of Loss of Consciousness in Absences

*†P. Vuilleumier, *F. Assal, *O. Blanke, and *P. Jallon