

RAS and BHS and what is breath-holding anyway?

Dr William Whitehouse

Senior Clinical Lecturer in Paediatric Neurology

University of Nottingham



www.stars.org.uk

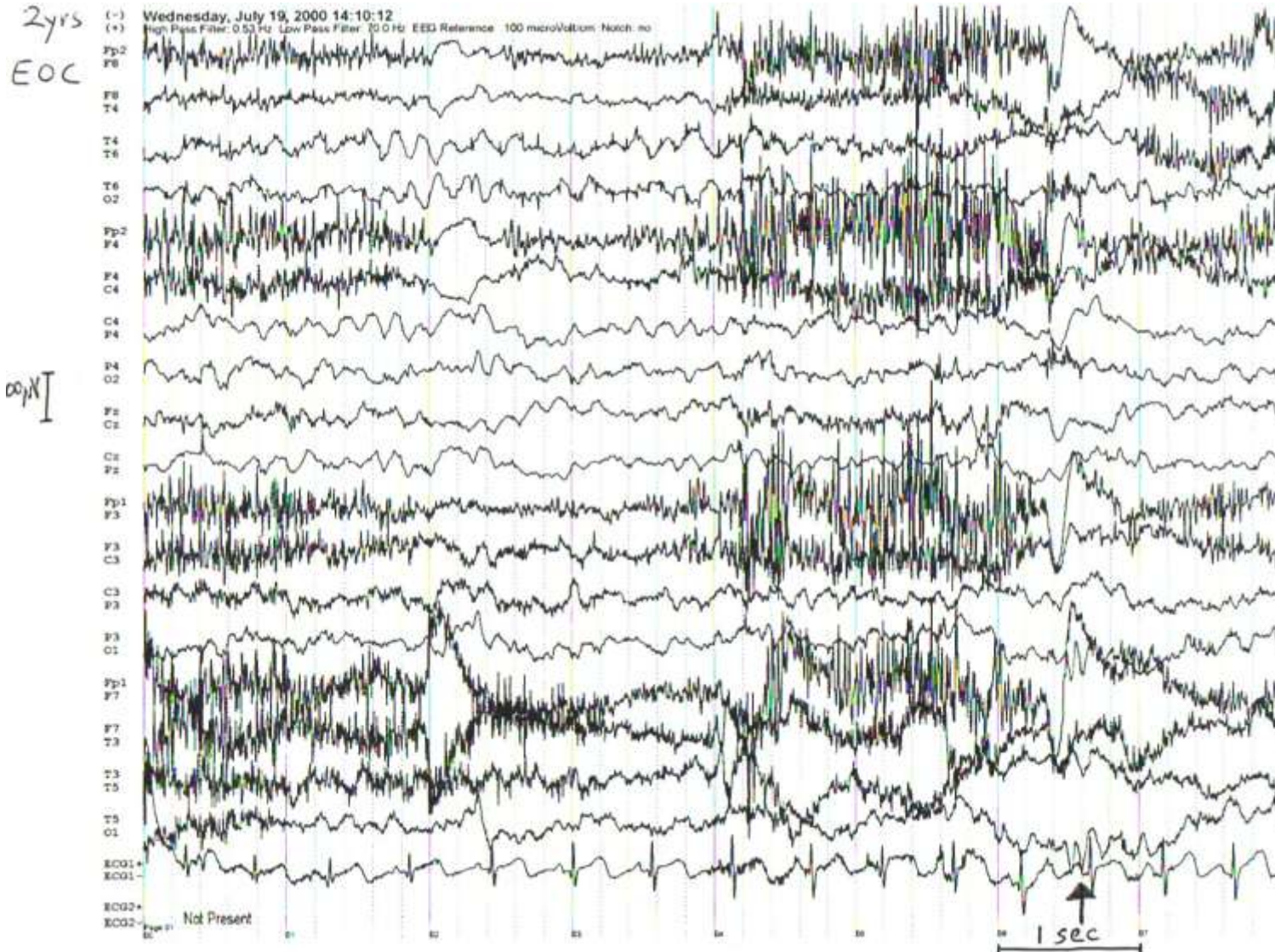
- What is RAS?
- What is BHS?
- What is breath-holding?

- Clarify the confusing terminology!

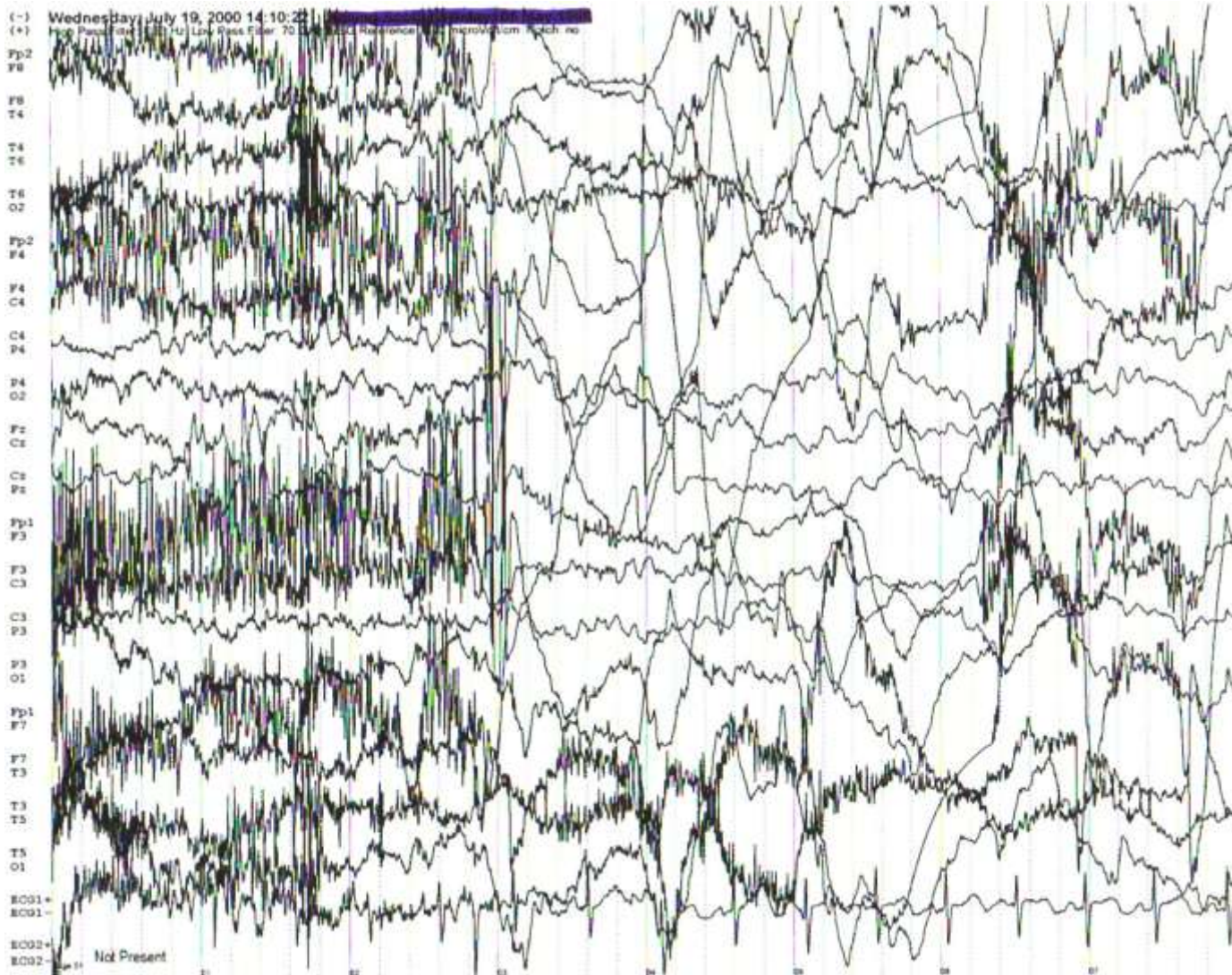
RAS



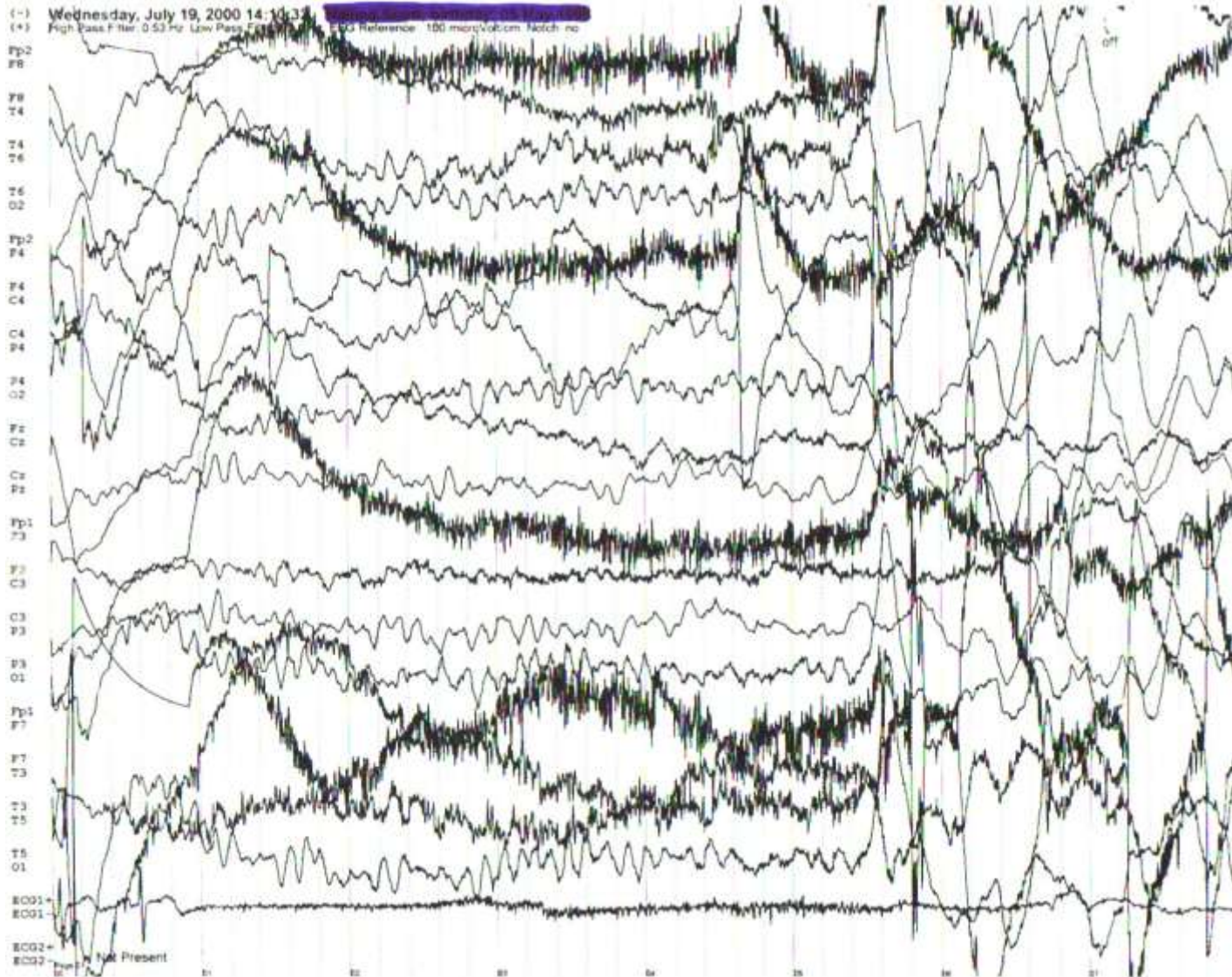
EEG-ECG a



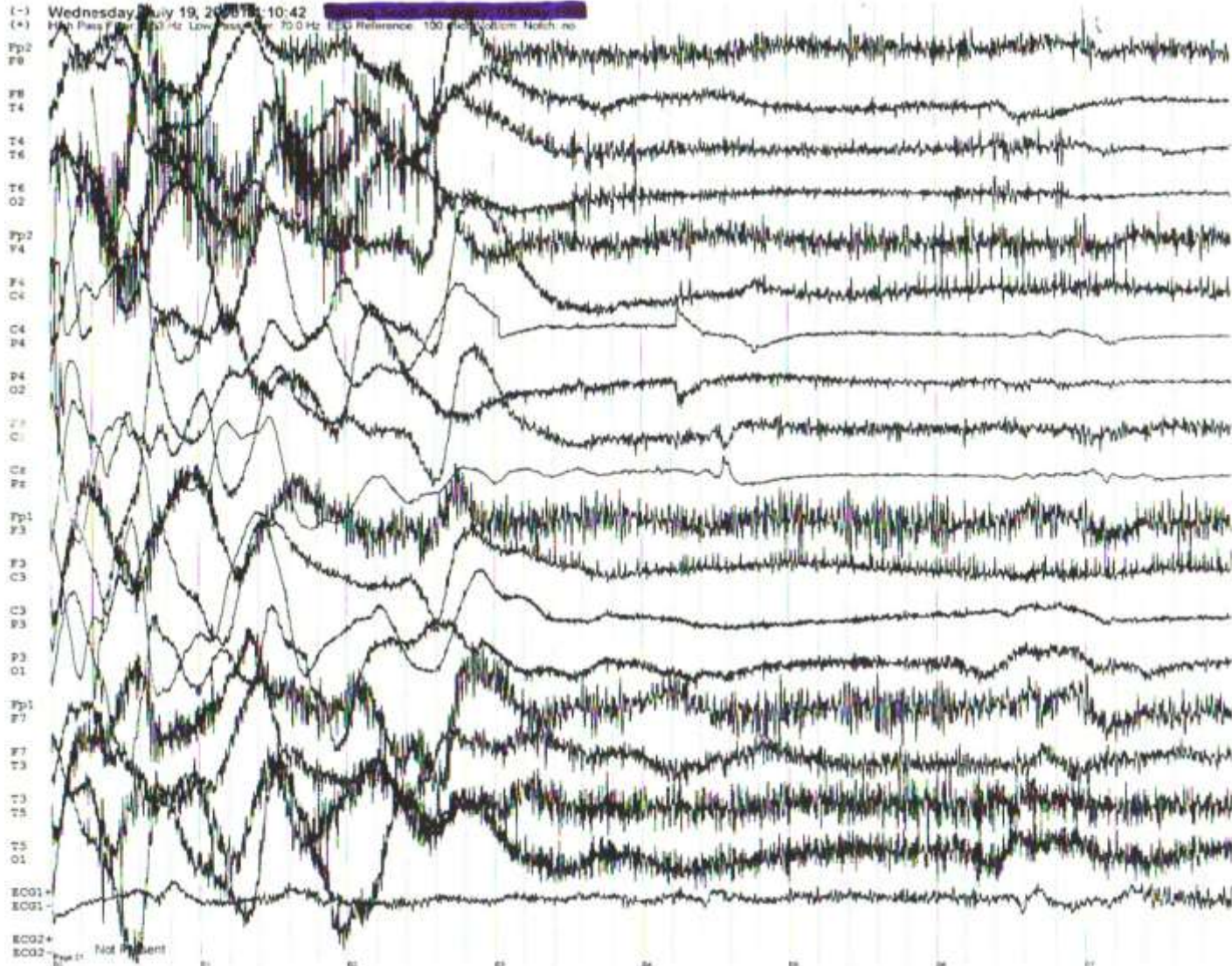
EEG-ECG b



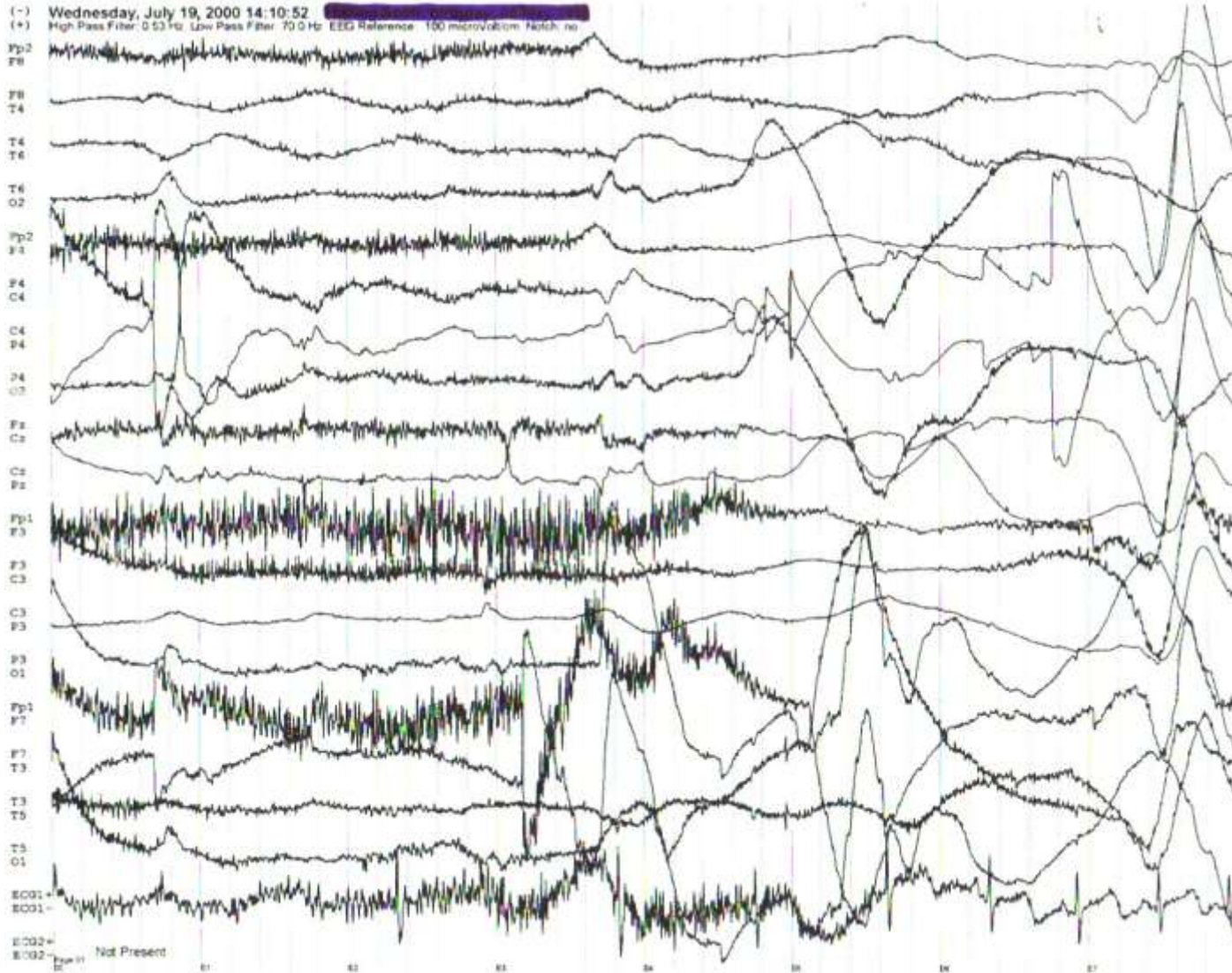
EEG-ECG c



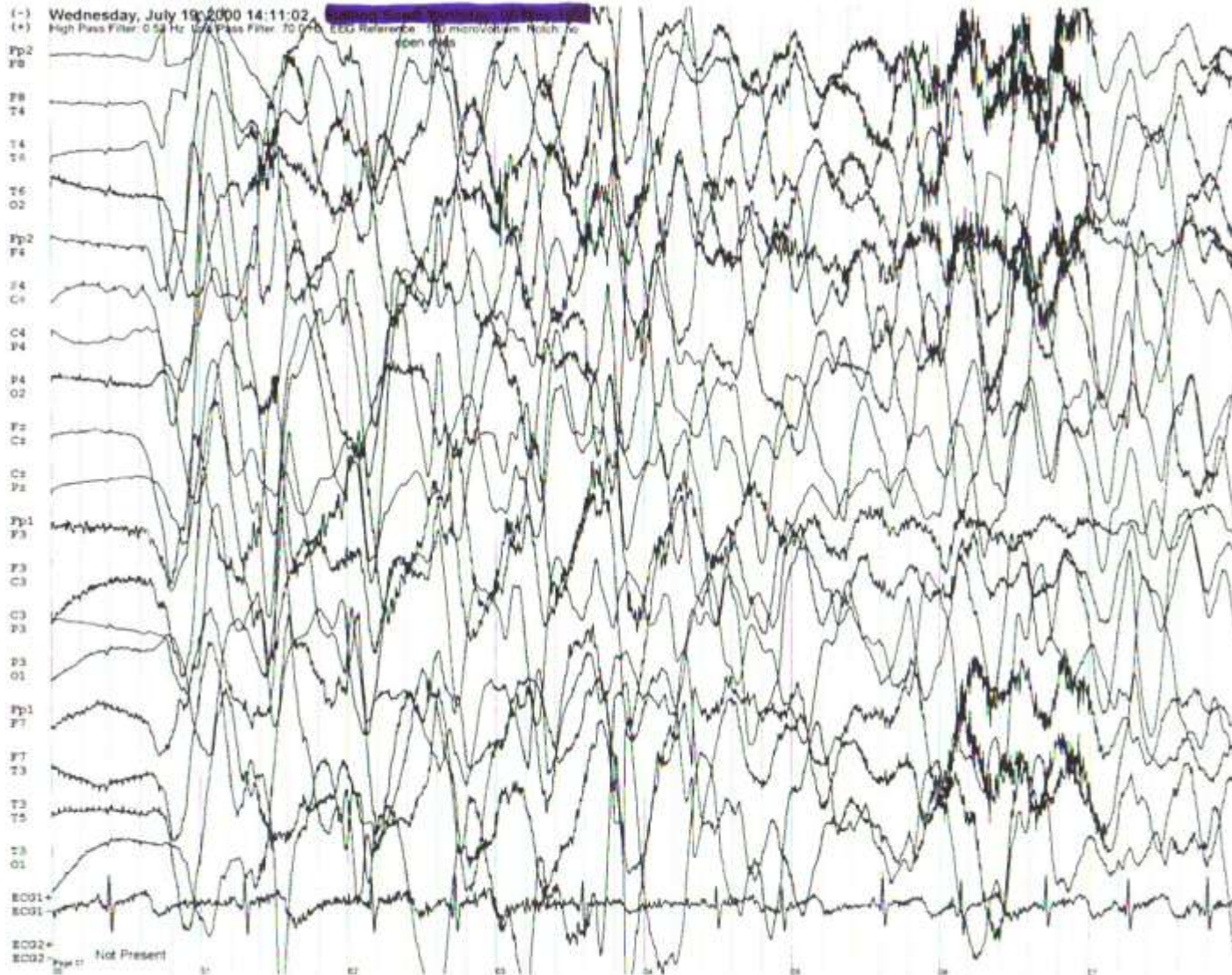
EEG-ECG_d



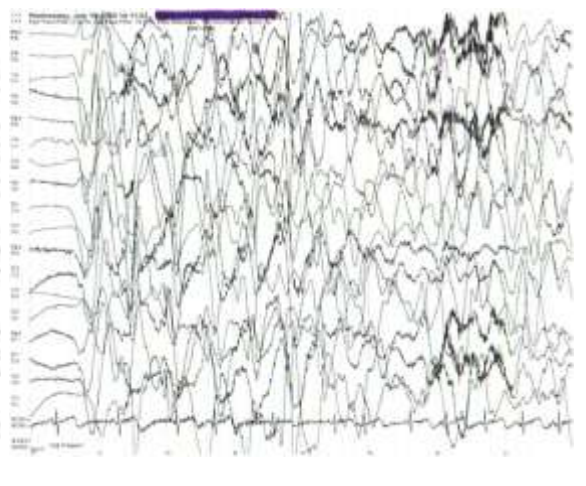
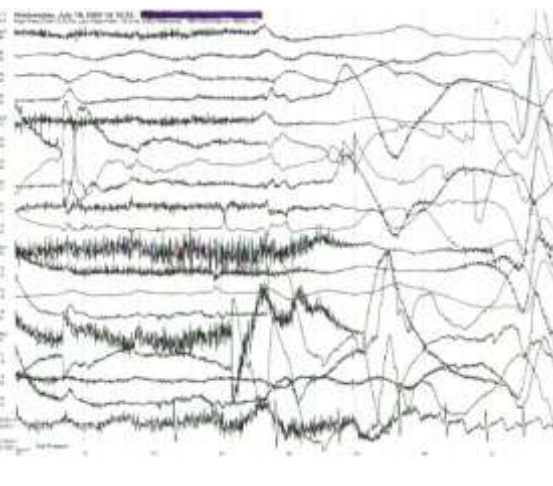
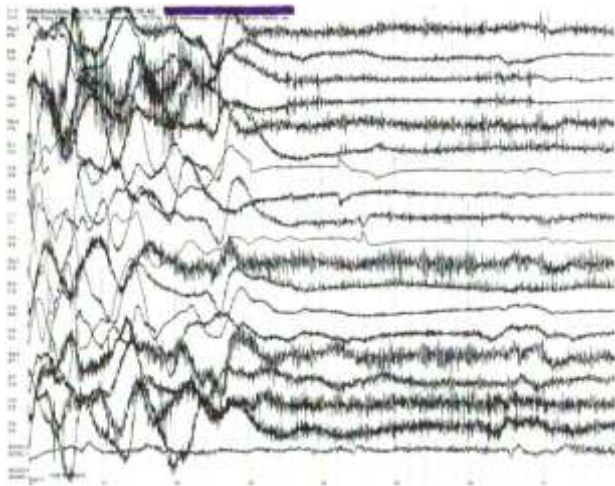
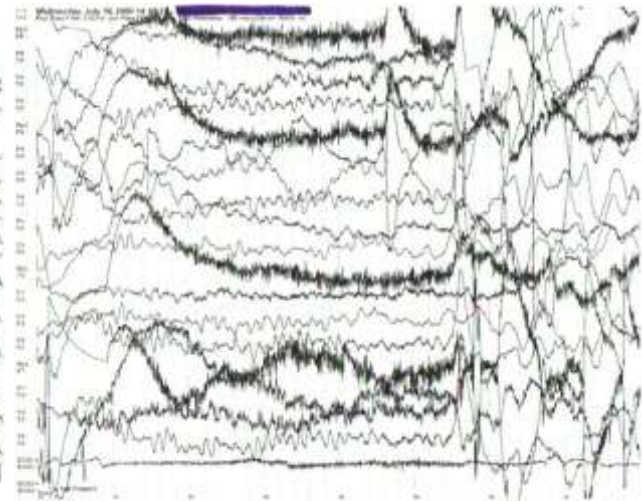
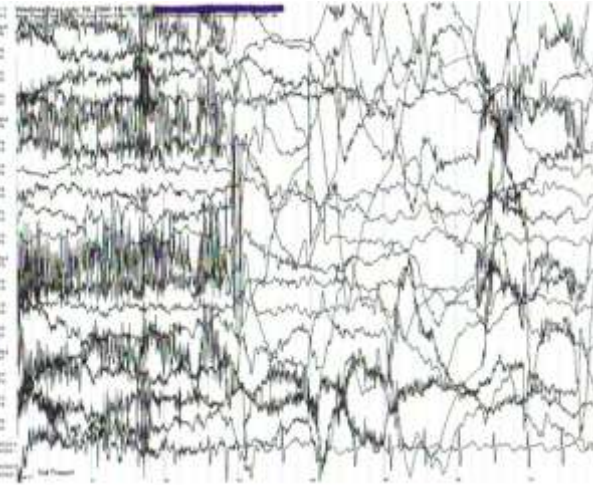
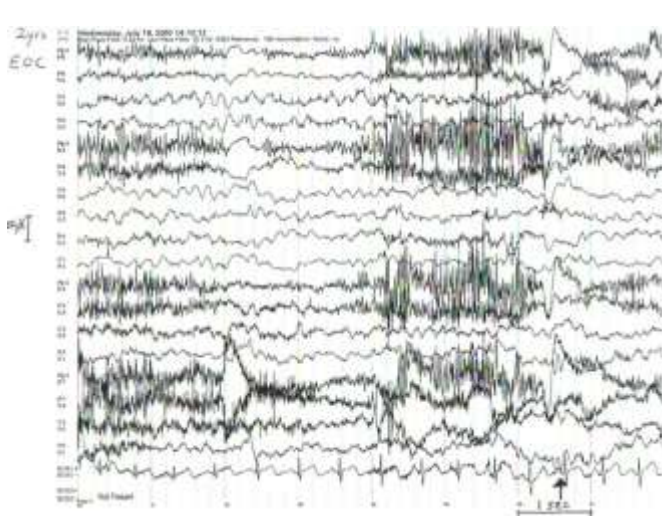
EEG-ECG_e



EEG-ECG f



RAS on ECG-EEG



RAS: the typical clinical syndrome

- Paroxysmal disorder
- Neuro-developmentally intact
- Pre-school child
- *Reflex:* attacks triggered by sudden pain, surprise
- *Asystolic:* vagally mediated
- *Syncope:* transient loss of consciousness with transient brain blood / O₂ interruption

RAS:

the typical clinical syndrome

- *Reflex:* triggered by sudden pain, surprise
- *Anoxic:* brain blood / O₂ interruption
- *Seizures:* attacks

RAS: in other words

- *Reflex Asystolic Syncope*
- *Reflex Anoxic Seizures*
- *Infantile Vaso / Vagal Syncope*
- *White Breath Holding*

BHS

BHS: the typical clinical syndrome

- Paroxysmal disorder
- Neuro-developmentally intact
- Pre-school child
- Crying
- Cannot catch their breath
- End-expiratory apnoea
- Causing TLOC / Syncope
- Heart rate continues normally

BHS

- Crying
- Cannot catch their breath
- End-expiratory apnoea
- Involuntary
- Causing TLOC / Syncope
- Heart rate continues normally

Not

- Taking and holding in a big breath
- Inspiratory apnoea

EAS

- Crying
- Cannot catch their breath
- End-expiratory apnoea
- Involuntary
- Causing TLOC / Syncope
- Heart rate continues normally

Not

- Taking and holding in a big breath
- Inspiratory apnoea

EAS: in other words

- *Expiratory Apnoea Syncope*
- *Breath Holding Spells*
- *Blue Breath Holding*

Diagnosis of Reflex Asystolic Syncope

Detailed attack description

- Some attacks have no trigger
- Some children have end-expiratory apnoea
- Some attacks have end-expiratory apnoea
- Some children have *near-misses*
- Some attacks *look* epileptic
- Some attacks *look* behavioural

Generally *clinical* diagnosis is enough...

Ictal recording of RAS

- By chance during ECG or EEG recording
- *Recollect* or similar ambulatory digital loop ECG
- Ocular compression: 10 sec
- Head-up tilt test: 15 min rest
45 min at 60°
- *Reveal* implanted digital loop ECG
- Video-EEG-ECG-polygraphy

Burden of RAS

- To child: frequency, duration (severity)
duration & severity post-ictal
protection & restriction
- To family: child looks dead
emotional toll
social isolation
anger at health workers
- To health: cost of false diagnosis high
cost of correct diagnosis low

Treatment of RAS

- Explanation
- Reassurance & *empathy*
- Avoid trivialization
- Family support group *STARS*

www.stars.org.uk

If incapacitating or very distressing consider:

- Atropine, Glycopyrronium
- Cardiac pacing

After confirmation of ictal asystole

- What RAS is
- What BHS is
- What breath-holding is

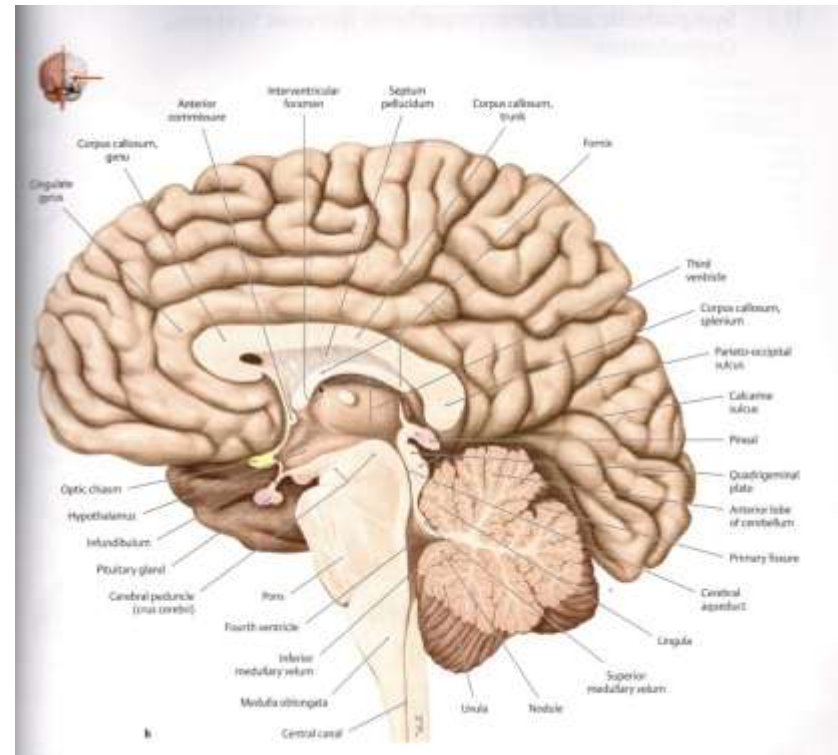
- Clarify the confusing terminology?

Thank you for your attention!

Any questions?

Transient Loss of Consciousness

- Temporarily
- Switching off the brain
- Loss of awareness
- Loss of responsiveness
- Loss of memory



Cardiologist's syncope

- Transient
- Self-limited
- Loss of consciousness
due to
- Transient global cerebral hypoperfusion

ESC Guidelines. Europace 2004; 6: 467-537

Physiologist's syncope

- Transient loss of consciousness
due to
- Insufficient supply of O₂ to the brain

Hainsworth R. Clin Auton Res 2004; 14: S1; 18-24

Neurologist's syncope

- Arrest of cortical cerebral activity with
- Transient loss of consciousness due to
- Transient impairment of cortical and or brain stem blood and or oxygen supply

Many clinical and aetiological varieties

Seizure

- Paroxysmal abnormality
- Motor, sensory, autonomic, cognitive function
- Due to transient brain dysfunction

Including: *epileptic*

syncopal (anoxic)

brainstem (hydrocephalic, coning)

emotional (psychogenic pseudo-)

undetermined

Convulsion

Motor seizure or attack with

- *Tonic* or *dystonic* spasm (stiffening)
- *Clonic* or *myoclonic* (jerking)
- *Hyper-motor* (thrashing)

Including: *epileptic*

syncopal

brainstem

emotional

undetermined