



Chulalongkorn University
จุฬาลงกรณ์มหาวิทยาลัย
Pillar of the Kingdom



Semiological differences between Adult and Pediatric Epilepsy Patients

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Talk overview

1. Brain maturation and seizure semiology development

2. Semiological differences according to ages

- < 3 year-old
- 3-6 year-old
- > 6-10 year-old

➤ **> 10 year-old** ★

3. Rarely seen vs Seen semiology in adults

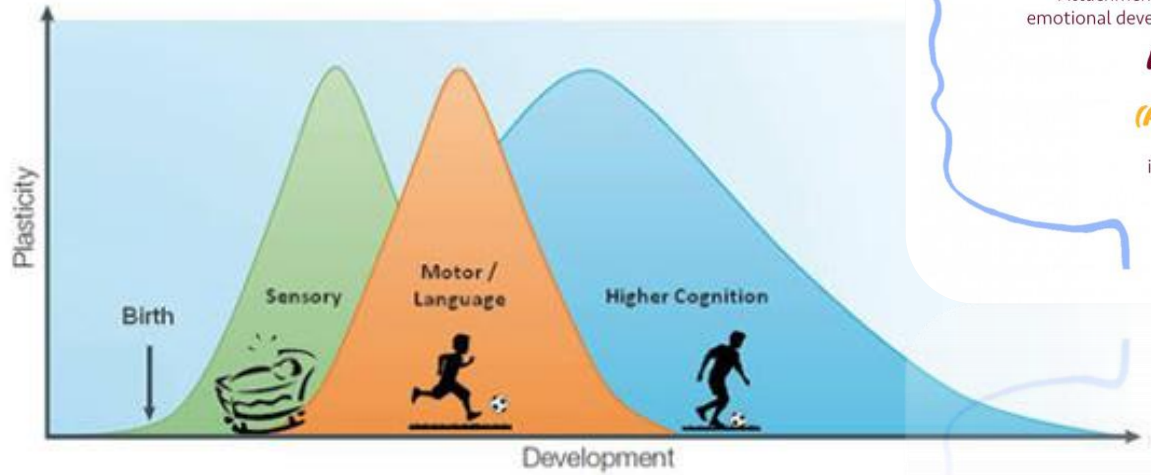


1. Brain maturation and seizure semiology development

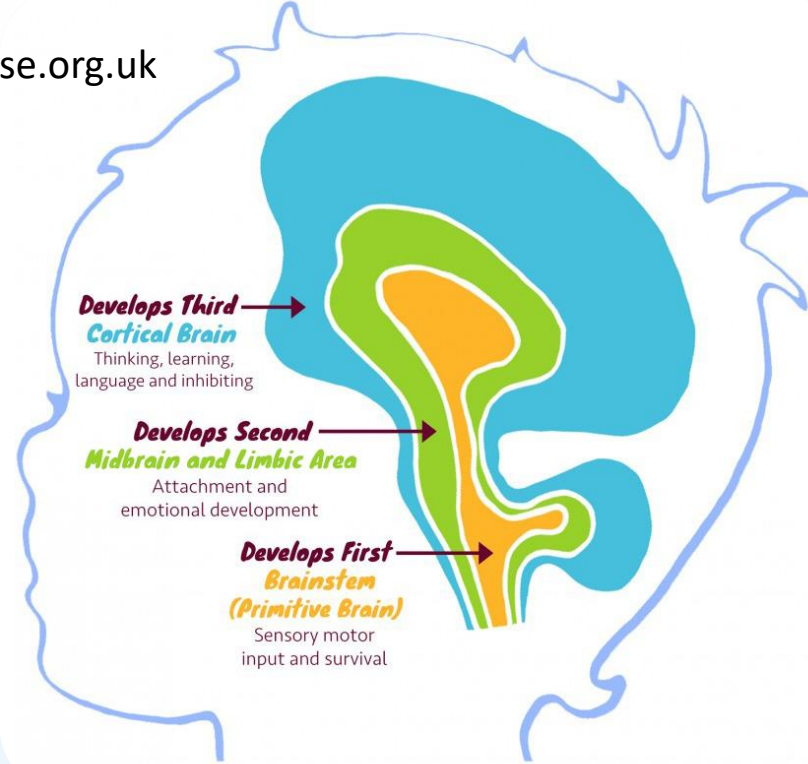


www.beaconhouse.org.uk

Fig 1: Windows of plasticity in brain development



Adapted from Hensch, T. K. (2005). Critical period plasticity in local cortical circuits. *Nature Reviews Neuroscience*, 6(11), 877-888.



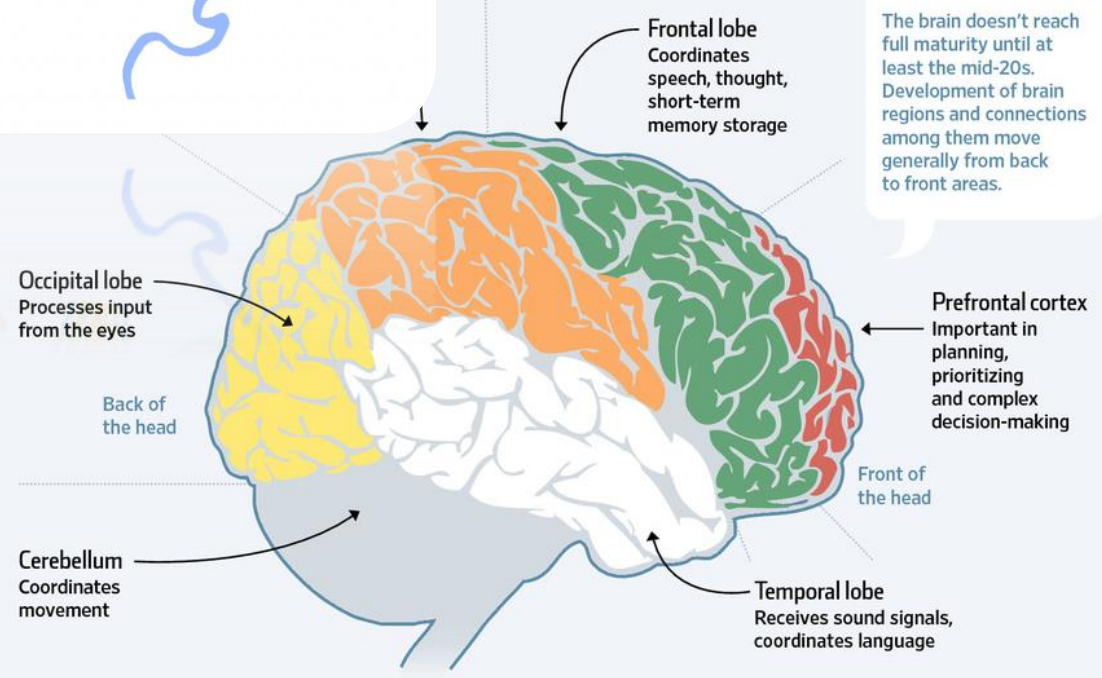
Develops Third
Cortical Brain
Thinking, learning,
language and inhibiting

Develops Second
Midbrain and Limbic Area
Attachment and
emotional development

Develops First
Brainstem
(Primitive Brain)
Sensory motor
input and survival

"Bottom up"
"Primary motor/sensory
→ higher-order regions"

Myelination
(posterior to anterior)



Source: Massachusetts Institute of Technology

The Wall Street Journal



2. Semiological differences according to ages

THE SIGNS USED FOR LOCALIZATION SHOULD FULFILL THESE CRITERIA

- 1) **Easy to identify** and have a high interrater reliability
- 2) It has to be **the first or one of the earlier components** of the seizure in order to have localizing value
- 3) The **symptomatogenic zone** corresponding to the recorded ictal symptom has to be clearly defined and well documented

- **Exercise (Video Case by Lüders H et.al.)**

Lüders H et.al.; Epileptic Disorder 2019



**More than
One seizure component
In Adults**

Semiology: *Aura → Rt versive,
M2e → Rt face tonic → bilateral
tonic-clonic*

Lateralizing signs:
*Rt versive; Rt face tonic; Figure of
4 (Rt arm extended)*

Complex motor seizure in Adults

Semiology:

Emotional hypermotor

Lateralizing signs:

None

Simple motor seizure in Infancy and Early Childhood

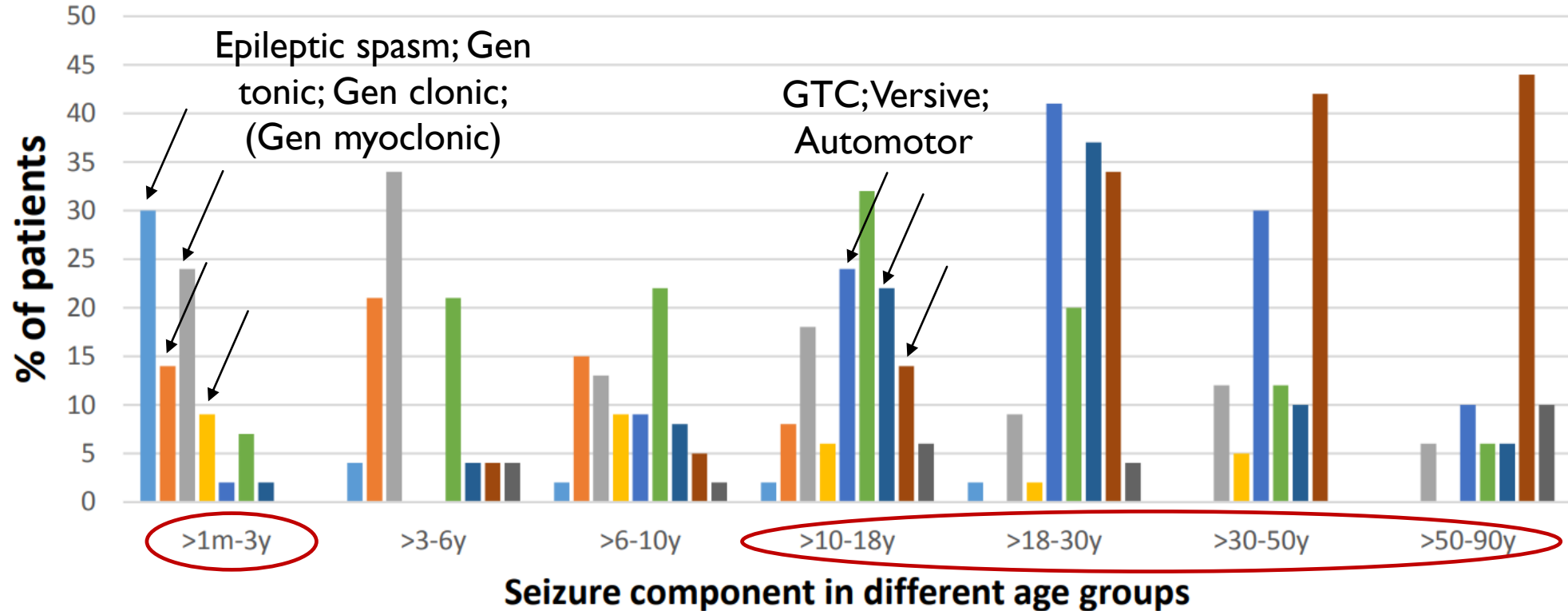
Semiology:

*Bilateral asymmetric tonic →
bilateral asymmetric clonic
→ Lt clonic*

Lateralizing signs:

Lt clonic

Figure 3 supplementary: Motor seizures in different age groups



- Ep spasms
- Gen tonic
- Gen myoclonic
- Gen clonic
- GTC
- Focal tonic or clonic
- Versive
- Automotor
- Hypermotor

Nonmotor seizure

Figure 2 supplementary: Aura, Dialeptic and Hypomotor seizures

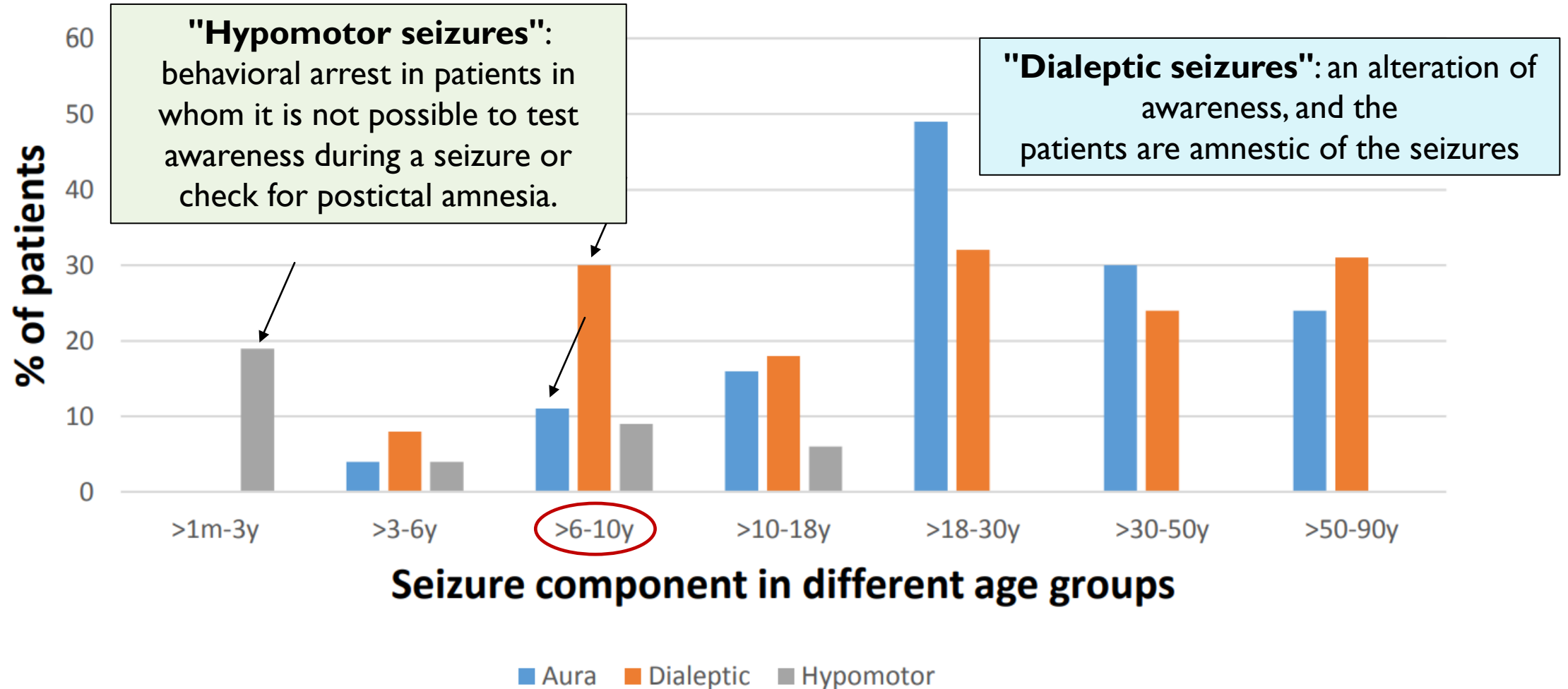
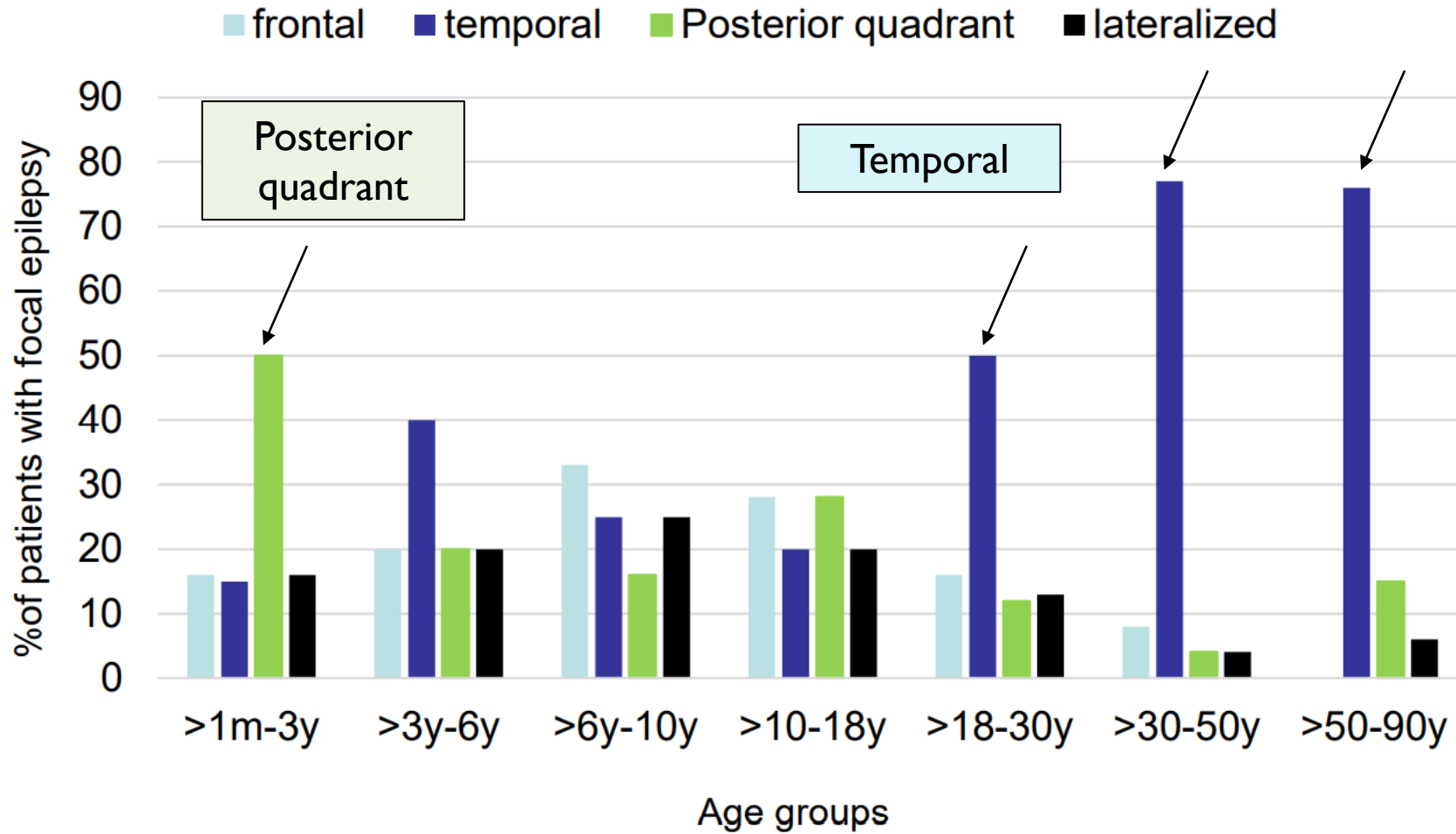


Figure 1 supplementary: Focal Epilepsy at different age groups





3. Rarely seen vs Seen semiology in adults

Seizure semiology changes with age

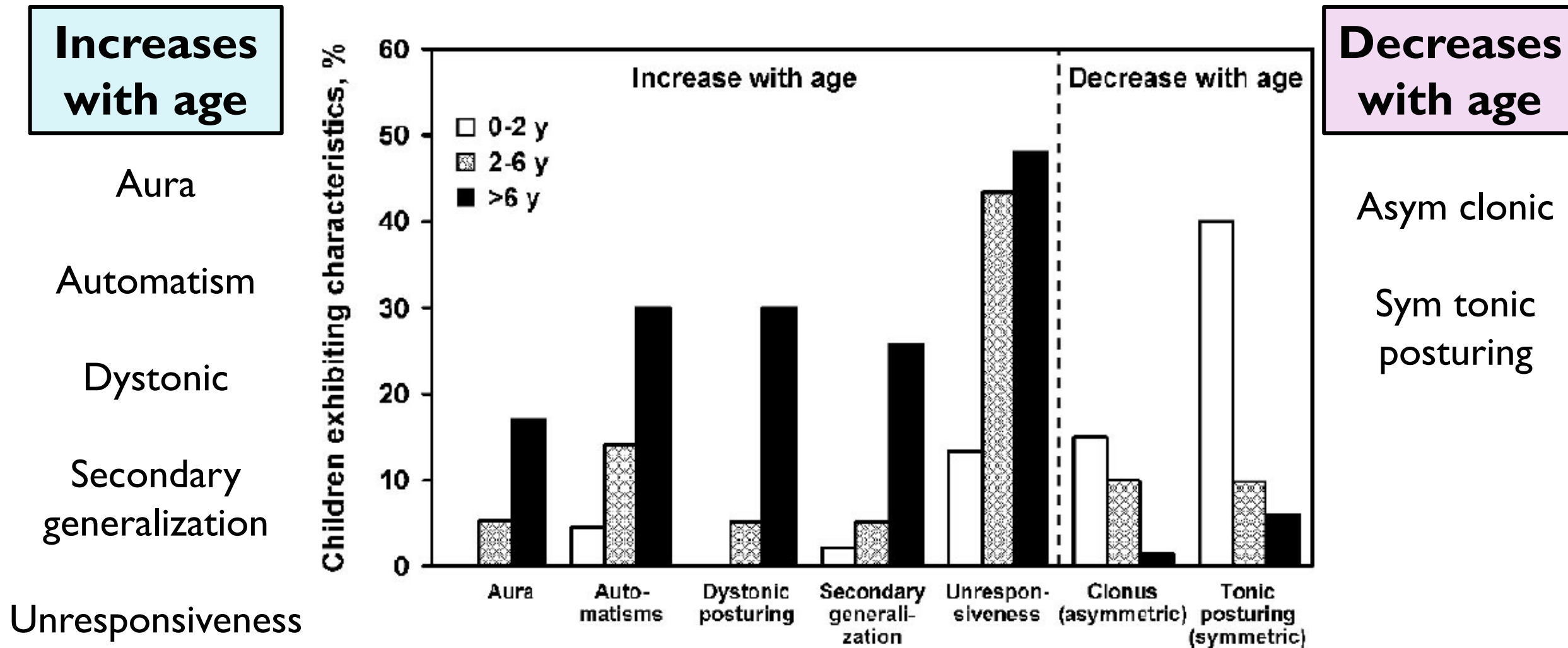


FIGURE 2. Seizure characteristics that change with age. (Modified from Nordli et al., 2001. Used with permission.)



Rarely Seen vs Seen in Adults

Rarely seen (usually seen < 10 y)

- Epileptic spasm
- Gen tonic
- Gen clonic

Seen (> 10 y)

- **Aura** (youngest 5.7 y)
- **Automotor** (youngest 3.7 y)
- **GTC** (6 m; 6.6 y; 9 y)
- **Versive**
- **> one seizure component**

Fernandez-Baca Vaca G et.al.; Epileptic Disorder 2018
Nordli DR; Handbook of Clin Neurol 2013
Hamer HM et al.; Epilepsia 1999

AS AURAS ARE THE FIRST CLINICAL EXPRESSION OF A SEIZURE, THEY FREQUENTLY PROVIDE EXTREMELY USEFUL LOCALIZING INFORMATION ABOUT THE SEIZURE ONSET ZONE (I)

Type of aura	Symptomatogenic zone
Somatosensory aura	Primary sensory cortex (S1); Second sensory area (S2); SSMA
Visual aura	Striate/Parastriate cortex (elementary) ; Parieto-temporal cortex (complex)
Auditory aura	Heschl's gyrus (elementary) ;Auditory association cortex (complex)
Olfactory aura	Amygdala; Orbitofrontal cortex
Gustatory aura	Insula (Temporal > ETE)
Psychic aura	Temporal association cortex (visual/auditory) (neocortical > mesial temporal)
Epigastric aura	Insula
Autonomic aura	Mesial temporal; Basal frontal; Ant. Cingulate; Insula

Automotor seizure

In adolescence and adults

The automatic movements typical of automotor seizures became more prominent with increasing age, characterized by **stronger and faster movements**

In young children

Relatively mild lip smacking (which was clearly different from the patient's interictal behavior)

VDO นี้ใช้เพื่อการ
เรียนการสอนเท่านั้น
ไม่อนุญาตให้ทำการ
บันทึกหรือถ่ายภาพ

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GTC
(Bilateral tonic-
clonic seizure)

Tonic-clonic evolution,
followed by postictal coma

** GTC seizures should be approximately symmetric, starting with a **generalized tonic contraction**, in decorticate or decerebrate posture. This is followed by a generalized “**jittery phase**” that evolves into generalized clonic jerking **

** GTC in young age: brief tonic phase (3 s); no postictal EEG suppression; rapid recovery **

Secondary GTC

**(Asym clonic sz; Side-to-side
axial movements**

Primary GTC

**(Sym clonic sz; No side-to-side
axial movements**

Versive seizure

Forceful, sustained, unnatural head positioning

Lt versive → bilat tonic-clonic seizure

Symptomatogenic zone: FEF

**CONTRALATERAL SOZ
(>90%)**

VDO นี้ใช้เพื่อ
การเรียนการสอน
เท่านั้น ไม่นุญาต
ให้ทำการบันทึก
หรือถ่ายภาพ

Dystonic hand posturing

Unnatural tonic posturing with
a **rotatory** component

Rt hand dystonic seizure

CONTRALATERAL SOZ (92-100%)

**Mesial temporal > Lateral neocortical
temporal**

Stoyke C et.al.; Epileptic Disorder 2011

VDO นี้ใช้เพื่อการ
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Thank you for your attention



Panel Discussion (Q & A)