

Seizure mimics in children

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Are these all epileptic seizures?

Paroxysmal nonepileptic events

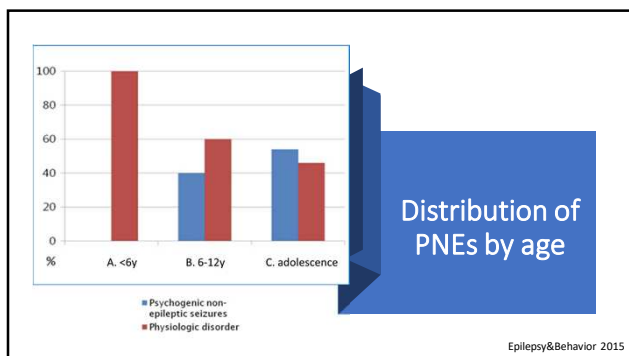
- Paroxysmal events which resemble epileptic seizures
- Sudden, involuntary changes in behavior, sensation or consciousness
- Not accompanied by abnormal ictal EEG changes
- 43% of children who underwent vEEG (Bye et al.)
- 5-10% of outpatient epilepsy have nonepileptic seizures compared with 20-40% of inpatient epilepsy

Epilepsy&Behavior 2015
 Seminars in neurol 2008

Differential Dx of epileptic seizures

Non-neurological conditions	Neurological disorders
<ul style="list-style-type: none"> • Physiological phenomenon • Behavioral phenomenon • Psychiatric disorders • Sleep disorders 	<ul style="list-style-type: none"> • Migraine • TIA • Movement disorders

Aust Fam Physician 2005

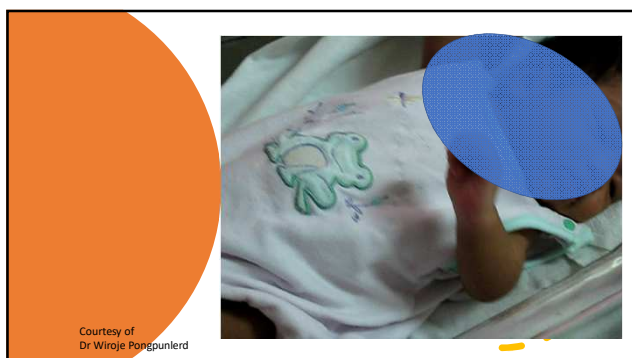


Paroxysmal nonepileptic events by age

<ul style="list-style-type: none"> • Newborn <ul style="list-style-type: none"> - apnea - jitteriness - Benign neonatal sleep myoclonus • Infant: <ul style="list-style-type: none"> - Breath holding spell - shuddering - spasmus nutans - Sandifer syndrome 	<ul style="list-style-type: none"> • Childhood <ul style="list-style-type: none"> - tics - Self gratification - Sleep myoclonus - Sleep disorders • Adolescence <ul style="list-style-type: none"> - syncope - Paroxysmal dyskinesia - Migraine - Cataplexy-narcolepsy - Pseudoseizure - Hyperventilation syndrome
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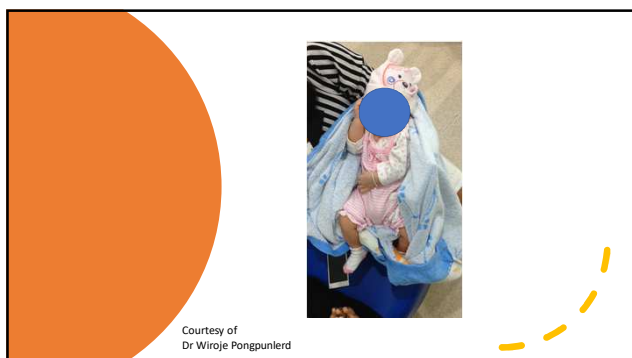
Neonatal period

- Apnea
- Jitteriness
- Benign neonatal sleep myoclonus




Jitteriness

- Most common in neonatal period
- Age at onset <1wk, Resolution before 6mo
- Generalized, symmetric, rhythmic oscillation
- Stimulus sensitive, but suppressible
- Cause
 - Idiopathic
 - Associated with: HIE, ICH, hypoglycemia, hypo- Ca/Mg, drug withdrawal
- Outcome: depends on underlying cause
- No treatment needed



Benign neonatal sleep myoclonus

- Repetitive myoclonus only in sleep (most likely in quiet (non-REM) sleep)
- Onset during first week of life
- Prevalence 0.8-3 per 1000 births
- Diminish in the 2nd mo and usually gone by 6 mo
- Neuro exam and EEG: normal
- No treatment required and normal outcome



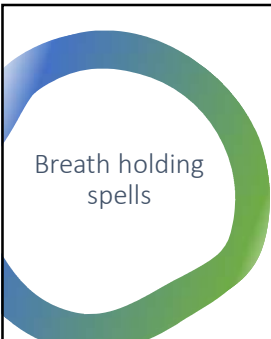
Infant period

- Breath holding spells
- Shuddering attacks
- Sandifer syndrome
- Spasmus nutans



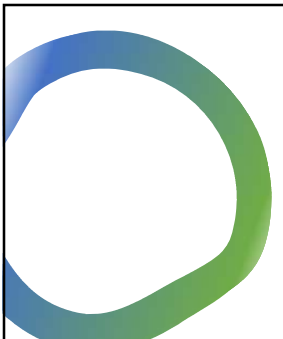


Crying episode persists till child holds breath in expiration

Cryoutube




Breath holding spells

- Involuntarily holding breath during expiration
- Incidence 4.6-4.7%
- Onset 6-18 mo
- 2 types: cyanotic vs pallid
- Resolution: 50% by 4 yr of age
: almost all by age 7-8 yr
- 30% of these develop syncopal episodes in adolescence
- Treatment: reassurance, iron therapy
- Reflex anoxic sz may follow spells





Cryoutube



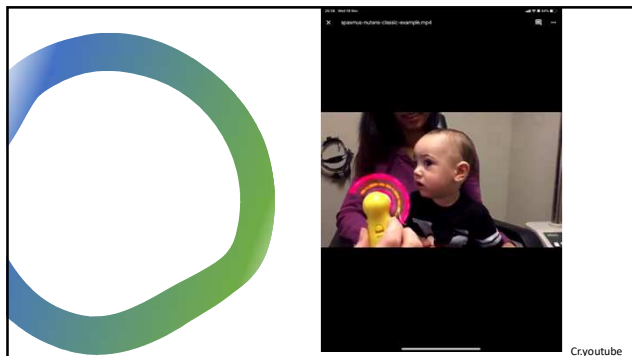
Shuddering attacks

- Shivering, rapid tremor of head, shoulders and arms (+face grimacing)
- Triggered by excitement, frustration or surprise
- Key: Preservation of consciousness, predictable triggers, ability to abort an episode when distracted and normal EEG
- Onset in infancy to early childhood
- Treatment is generally not needed



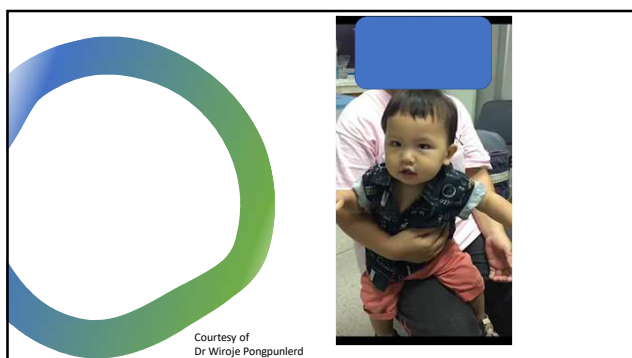
Sandifer syndrome

- Generalized stiffening and opisthotonic posturing, may be with apnea, staring, and minimal jerking
- Often occur after a feed (30 min)
- Associated with reflux
- Confirm diagnosis, treatment of reflux



Spasmus nutans

- Triad: head tremor, nystagmus, and torticollis
- Onset 3-8 mo of age
- Unknown cause
- Visual abnormalities and posterior fossa lesion should be excluded
- Generally resolves within several months



Head nodding

- Occur in older infants and toddlers (< 3y)
- Head movement at frequency of 1-2 Hz, laterally or vertically
- No nystagmus, suppressible
- Remission is spontaneous
- Developmental and neuro outcomes are unaffected
- DDX with bobble-head syndrome that caused by tumor/lesion of third ventricle

Childhood

- Tics
- Self gratification
- Sleep myoclonus
- Sleep disorders (parasomnia)

Tics 1

- sudden, rapid, repetitive, and nonrhythmic movements or vocalizations
- Urge to do, briefly suppressible
- Exacerbated by stress, anxiety, excitement or fatigue
- Onset motor tics: 4-8 yr
- Waxing and waning course, remission can occur in later teen years

Tics 2

- Motor tics: simple (blinking, nose wrinkling, shoulder shrugging)
: complex (facial and body contortion, hitting, jumping)
- Vocal tics : simple (grunt, bark, sniff, throat clearing)
: complex (repetition of words, phrases)
- Treatment: behavioral therapy (CBIT), acupuncture, rTMS
: pharmacotherapy (nonneuroleptic, typical and atypical neuroleptics, and others)



Courtesy of Dr Wiroje Pongpunlerd

Self gratification

- Infantile masturbation
- Onset: 2months to 3 years
- Stereotyped posturing, pressure to pubic area
- Quiet, grunting, diaphoresis or facial flushing
- Lasting less than a minute (but can be hours)
- No alteration of consciousness
- Cessation with distraction
- Parent education and reassurance are important

Childhood parasomnias

Features	Nightmares	Night terrors
Age of onset	2-5 years	4-8 years
Duration	<1-2minute	>5 minutes
Semiology	Cling, verbalize	vary/autonomic
Stage sleep	REM	NREM III & IV
Time	early am	first third of night
Recall	usually able	not able

Adolescence & adulthood

- Syncope
- Cataplexy-Narcolepsy
- Hyperventilation syndrome
- Pseudoseizure
- Paroxysmal dyskinesia
- Migraine

Syncope

- Transitory, brief loss of consciousness with loss of postural tone
- Caused by a decrease in global cerebral perfusion



Differences between sz and syncope

	Seizures	syncope
Precipitant	Sleep deprivation	Pain, fright, standing
Premonitory symptoms	No	Dizziness, vision loss, pallor
Duration of conscious loss	Minutes	Seconds
Clonic jerking	Yes	Sometimes
Recovery from attack	Delayed	Rapid
Postictal	Yes	No
EEG	Abnormal	Normal

Aust Fam Physician 2005



Courtesy of Dr Wiroje Pongunierd

	Psychogenic seizure	Epileptic seizure
Onset/offset	Slow onset and offset	Acute onset, abrupt offset
Duration	Usually > 3 minutes	Typically < 3 minutes
Movement	Flailing, thrashing, combativeness	Synchronous
Pelvic thrusting	More common	Never
Injury during event	uncommon	Frequent
Incontinence	Occasional	Frequent
Ictal Eye Closure	Frequent	Rare
Provocation	Common	Rare
Time of day	During wakefulness	During awake or asleep
Postictal behavior	None	Common (lethargy, confuse)
EEG	Normal	Abnormal

Pseudoseizure (psychogenic nonepileptic sz)

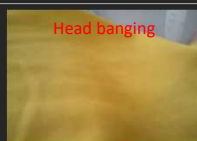
Cataplexy

- Sudden, transient muscle weakness in all skeletal muscles (exc. Extraocular and resp. muscles)
- Associated with emotional stimulus (e.g. laughter)
- Most specific symptom of narcolepsy (type1) which is childhood onset
- Dx: polysomnography and MSLT
- Treatment of cataplexy: antidepressants



Diagnosis of paroxysmal events

- History and careful observation
- VIDEO RECORDING
- Investigation
 - Video EEG monitoring → seizure
 - Polysomnography → sleep disorders
 - Brain imaging → brain lesions
 - EKG monitor → syncope



Take
home
message

- History and observation is important
- Video recording is very helpful
- Epileptic & nonepileptic events may coexist!!



Thank you