Involuntary Movements in Children and Adolescents: Is it Seizure, Tic or Something Else?

California Association of Nurse Practitioners
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Paroxysmal Involuntary Movements

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Paroxysmal Involuntary Movements

Definition

- Episodic involuntary body movements which are present only during attacks
  - [http://www.dystonia-foundation.org/pages/more_info/68.php](http://www.dystonia-foundation.org/pages/more_info/68.php)

- Other terms for paroxysmal involuntary movements
  - Paroxysmal dyskinesia
  - Movement disorder

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Paroxysmal Involuntary Movements

Description of Symptoms

- Stereotypic appearance
- Not associated with a change in level of consciousness
- Abate or disappear during sleep
- Not accompanied by EEG changes
Paroxysmal Involuntary Movements

Etiology

- Hereditary conditions – Family History?
  - “Uncle Jack”

- Medications
  - Metoclopramide
  - Stimulant
  - Neuroleptic

- Toxicity
- Seizures*
- Illnesses and unusual diseases
  - Thyroid disease
  - Hypoglycemia
  - Lupus
  - Streptococcal infections

* While seizures are in the differential diagnosis of paroxysmal involuntary movements they will be covered more thoroughly in another presentation
Paroxysmal Involuntary Movements

Pathophysiology

- Usually associated with abnormalities of the basal ganglia
  - The basal ganglia are paired masses of gray matter in each cerebral hemisphere of the brain
  - Control large subconscious movements of the skeletal muscles
  - Regulate muscle tone required for specific body movements
Paroxysmal Involuntary Movements

Evaluation

- Description of involuntary movements
  - Verbal description is inadequate
  - Best evaluation: direct observation
  - Video of movements helpful if abnormal movements are infrequent

- Number of movements

- Body parts involved

- Bilateral or unilateral

- Rhythmic or non-rhythmic

- Suppressible or non-suppressible
Paroxysmal Involuntary Movements Evaluation

- Are there associated features with the abnormal movement?
  - Alteration of consciousness
  - Eye fluttering
  - Facial contortion
  - Twitching
  - Drooling
  - Other sensations
  - Fatigue
  - Weakness
  - Pain
  - Interference with motor activities
Paroxysmal Involuntary Movements Evaluation

- Further history
  - Onset
  - Frequency
  - Timing
  - Duration
  - Pattern
  - Exacerbating factors

- Noises (with or without abnormal movements)

- Additional symptoms
Paroxysmal Involuntary Movements: Hyperkinetic

- **Tic**
  - Complex, stereotypic movements or utterances that are brief, sudden and purposeless

- **Tremor**
  - Involuntary, oscillating movement with a fixed frequency

- **Myoclonus**
  - A sudden, shock-like muscle contraction
  - Myoclonic jerks may occur singly or repetitively
  - Unlike tics, myoclonus cannot be controlled even briefly
Paroxysmal Involuntary Movements: Hyperkinetic

- **Dystonia**
  - Repetitive muscle contractions that are often sustained at the peak

- **Chorea**
  - Rapid movements affecting any body part
  - Incorporates into a voluntary movement to hide, giving the appearance of restlessness
  - Movement is random but, neither rhythmic or stereotyped
  - Movement migrates from side to side and limb to limb
Paroxysmal Involuntary Movements: Hyperkinetic

- Ballismus
  - High amplitude, violent flinging of a limb from shoulder or pelvis
- Ataxia
  - Disturbances of fine control of posture and movement
- Athetosis
  - Withering movements of the hands
- Akathisia
  - Restlessness and a desire to move to relieve uncomfortable sensations
Paroxysmal Involuntary Movements: Hypokineti

- Bradykinesia
  - Slowness of movement

- Freezing
  - Inability to begin a movement or involuntary stopping of a movement before completed

- Rigidity
  - Increase in muscle tension when an arm or let is moved by an outside force

- Postural Instability
  - Loss of ability to maintain upright posture
  - Caused by slow or absent righting reflexes
Paroxysmal Involuntary Movements
Medications and Treatments

- Detailed medication history:
  - Stimulants
  - Neuroleptics

- OTC:
  - Supplements (vitamins, herbal, homeopathic, nutritional)

- Additional Assessment:
  - Weight/BMI

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Medical Update:

- Past history of illness related to the onset of movements
- Current illness associated with the onset or exacerbation of symptoms
- Fever
- Rash
- Sore throat
- Cough
- URI
- Ear pain
- GI complaints
- Dehydration
- Weight loss

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Medical Update:

- Past and recent laboratory testing:
  - CBC
  - Thyroid analysis
  - Electrolytes
  - Cultures (Although controversial, history of positive streptococcal infection)

- Also consider:
  - Co-morbid medical problems
  - Environmental risk factors
  (Swedo, 2004; Kaplan, 2000)
Paroxysmal Involuntary Movements
General Health and Psycho-Social Issues

- **Behavior**
  - Temperament (age appropriate)
  - Worsening or new behaviors & triggers
  - Behavior management

- **Psychiatric/Neuro-Psychological**
  - ADD/ADHD
  - Obsessive-compulsive disorder
  - Anxiety
  - Autism spectrum disorder
  - Other mental illness or disorder
  - Counseling or psychiatric care
Paroxysmal Involuntary Movements: School and Therapy Programs

- Therapeutic interventions
  - OT, PT, ST, Adaptive PE
    - Frequency
    - Length of sessions
    - Response to interventions

- Impact of disease process at school:
  - Severity and frequency of movements
  - Effects of medication upon ability to perform:
    - Focus/attention
    - Interaction with teacher or peers
  - Movements interference with motor activities or tasks
  - Safety assessment
Paroxysmal Involuntary Movements Management: Medications

- **Anti-epileptic**
  - Primidone
  - Phenytoin
  - Valproate
  - Carbamazepine
  - Phenobarbital

- **Benzodiazepines**

- **Anti-cholinergic**
  - Levodopa
  - Flunarazine
  - Tetraabenazine

- **Muscle Relaxants:**
  - Baclofen
  - Tizanidine
Paroxysmal Involuntary Movements
Management: Treatments

- **Treatments**
  - Botulinim toxin injections
  - Physical therapy
  - Occupation therapy
  - Splinting/Bracing
  - Surgical implants

- **Alternative therapies**
  - Relaxation
  - Biofeedback
  - Acupuncture
  - Homeopathy
  - Touch therapy
  - Postural alignment therapy

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Resources

- Worldwide Education and Awareness for Movement Disorders (We Move)
  - [http://www.wemove.org/syd/pediatric/](http://www.wemove.org/syd/pediatric/)
- Movement Disorder Virtual University
  - [http://www.mdvu.org/library/pediatric/](http://www.mdvu.org/library/pediatric/)
- Pediatric Neurotransmitter Disease Association
  - [http://www.pndassoc.org](http://www.pndassoc.org)
- United Cerebral Palsy Association
  - [http://www.ucp.org](http://www.ucp.org)
- United Mitochondrial Disease Foundation (UMDF)
  - [http://www.umdf.org](http://www.umdf.org)
- International Rett Syndrome Foundation
  - [http://www.retnsyndrome.org](http://www.retnsyndrome.org)
- Brain Injury Association of America
  - [http://www.biausa.org](http://www.biausa.org)
- Wilson's Disease Association International
  - [http://www.wilsonsdisoease.org](http://www.wilsonsdisoease.org)