Sleep Disorders

- An Approach to childhood and adult Parasomnias - Diagnosis and treatment

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In all of us, even in good men, there is a wild -beast nature which peers out in sleep

Plato, The Republic
Parasomnias

From Goulies and Ghosties
And three leggity beasties and
things that go bump in the night,
Good Lord deliver us.
Old Scottish Prayer

Bloody Sheets
Wiggling Like a Seal
Padded Waterbed

“He Flew Out Of Bed And
Landed On The Floor With
Tremendous Strength” -- Wife

“A Hole In The Wall—Just Like A Soup
Bowl—Where My Head Fit In”

“It’s Just Like Having A Little Child At
Home. You Lie On The Bed With One
Ear And One Eye Open, Just Kind Of
Waiting For Something To Happen”
Nightly: 4-6 cycles of Non Rapid Eye Movement (NREM) sleep
- Each cycle: 4 stages of NREM \( \rightarrow \) one stage Rapid Eye Movement (REM) sleep
- Stage 3 and stage 4 of NREM, and the one stage of REM sleep, signify:
  - Electroencephalogram (EEG) slow waves or deep (restorative) sleep
  - Generalized loss of muscle tone

ICSD—Definition of Parasomnia
Undesirable behavioral, autonomic nervous system, and experiential phenomena that occur during:
1) Entry into sleep.
2) During any stage of sleep (NREM, REM).
3) During partial or full arousals from any stage of sleep.

Two Necessary Concepts
- Sleep and wake are not mutually exclusive states
- The various components of sleep may dissociate or oscillate rapidly
Classification

- Disorders of arousal (from NREM sleep)
- Parasomnias associated with REM sleep
- Other Parasomnias

PARASOMNIAS

- Disorders of Arousal (NREM Sleep)
  - Confusional arousals
  - Sleep walking
  - Sleep terrors
PARASOMNIAS

- Associated with REM Sleep
  - REM Sleep Behavior disorder
  - Recurrent Isolated Sleep paralysis
  - Nightmare Disorder

OTHER PARASOMNIAS

- Sleep related Dissociative disorders
- Sleep Enuresis
- Sleep related Groaning (Cathathrenia)
- Exploding head syndrome
- Sleep related hallucinations
- Sleep related Eating Disorder
- Unspecified Parasomnia, those due to drug or substance, medical conditions

Sleep-wake transition disorders (previously listed as parasomnias)

- Sleep related rhythmic movement disorder
- Sleep starts
- Sleep talking
- Nocturnal leg cramps

Occur in transition from wakefulness to sleep and vice versa, more rarely in sleep stage transitions. Common in healthy persons
Parasomnias can appear spontaneously or in a variety of disturbed states—sleep deprivation, stress, fever, medical-neurological disorders, medications, alcohol, drugs, etc.

Parasomnias can emerge with another sleep disorder and its treatment: e.g. Obstructive Sleep Apnea and n-CPAP therapy.

Parasomnias--Evaluation

- Medical Records: review
- Questionnaire: Sleep/Medical/Psychiatric History & Review of Systems, Family History.
- Questionnaire: should also cover the use of prescription & OTC medications; caffeine use, alcohol and drug use/abuse; herbal products.
- Interview with patient and bed partner/family: “play detective” concerning precipitating factors.

- Neurologic examination (may need a formal consultation, as with REM behavior disorder)
- Screening psychological tests (Minnesota Multiphasic Personality Inventory--MMPI, Beck Depression/Anxiety Inventories, Symptom Checklist-90, Dissociative Experiences Scale)
- Consider formal psychiatric examination
- PSG monitoring: mandatory for RBD diagnosis, and recommended for other parasomnias.
In ICSD-2, only 1 Parasomnia requires PSG documentation for its diagnosis: REM sleep behavior disorder (RBD).

There are 3 compelling reasons why RBD requires PSG documentation.

PARASOMNIAS AND OSA
1) Sleep Related Eating Disorder
2) Confusional Arousals with Sleepsex
3) Sleep Related Aggression & Violence
4) OSA Induced Sleepwalking
5) Sleepwalking or Sleep Terrors with SWS rebound during n-CPAP therapy
6) OSA “pseudo” REM sleep behavior disorder

PARASOMNIAS AND OSA
7) OSA induced seizures with complex behaviors
8) OSA induced bruxism
9) OSA and Rhythmic Movement Disorder
10) OSA and CPAP induced panic attack
11) OSA and CPAP induced dissociative states—post traumatic stress & traumatic memory activation in the sleep lab
SLEEP RELATED RHYTHMIC MOVEMENT DISORDER

- Involve repetitive and stereotyped movements of large muscles and occur during sleep-wake transitions
- Occur during sleep onset at bedtime, at naptimes, following nighttime arousals as well.
- Bodyrocking, headbanging and bodyrolling are the most common types

RHYTHMIC MOVEMENT DISORDER

- Children engage in these behaviors to soothe themselves during sleep
- Rhythmic humming or chanting may accompany the movements
- Can last several minutes to hours
- Significant injury is rare
- Benign—normal developing children
- In children with autism, developmental delays or blindness, risk of injury exists

RHYTHMIC MOVEMENT DISORDER

- 2/3 of 9 month old have some form of rhythmic behavior
- < 50% continue these at 18 months
- 8% at 4 yrs of age
- 3-15% have significant head banging
- Most children with Rhythmic behaviors have an onset less than a year of age, with BR occurring earlier than HB
RHYTHMIC MOVEMENT DISORDER

- **Body rocking** - rocking forward and back, usually while on hands and knees; earliest to start at 6 mos of age

- **Head banging** - around 9 months
  * lying prone and lifting the head to bang down
  * rocking on hands and knees and banging head into the wall or headboard
  * sitting upright and banging head backward into the headboard or wall

RHYTHMIC MOVEMENT DISORDER

- **Head rolling** – side to side movements of the head, usually when supine, age of onset around 10 months

- **Body rolling** – rare – entire body rolls from side to side

RHYTHMIC MOVEMENT DISORDER - TREATMENT

- Reassurance
- Most outgrow by 2-3 yrs of age, can persist very rarely into adulthood
- Safety
- Discontinue attempts to protect the child as injury generally is extremely rare
- Avoid reinforcement of behavior by responding
- Dampen noise
- Increase sleep
- Treat Underlying possible sleep disorders OSA
- Treat ear infections
- Short term use of BZD, TCA or hydroxyzine
SLEEP RELATED GROANING

- Chronic usually nightly disorder with expiratory groaning especially in REM.
- Deep inspiration followed by a protracted expiration with a monotonous vocalization resembling groaning.
- Affected person is unaware.
- Groaning stops with body position change only to restart again.
- Exam is unremarkable.

SLEEP RELATED EATING DISORDER

- Recurrent episodes of involuntary eating and drinking during arousal from sleep with problematic consequences.
- Most have no recall of event, some do.
- Problematic consequences include:
  a) Consumption of peculiar kinds of foods and even toxic substances—raw bacon, frozen pizza, buttered cigarettes, cat food, salt sandwiches, coffee grounds, ammonia cleaning solutions.
  b) Insomnia from sleep disruption.
  c) Sleep related injury.
  d) Morning anorexia and abdominal distension.
  e) Weight gain and anxiety.

- Occurs anytime during sleep cycle.
- High calorie foods consumed, hunger and thirst are typically absent. Alcohol never consumed.
Sleep Disorders

SLEEP RELATED EATING DISORDER

- Onset can be associated with smoking and alcohol cessation, stress, onset of narcolepsy, autoimmune hepatitis, encephalitis
- Can be associated with daytime eating disorder
- Female predominance

Mean age of onset 22-29 yrs
- Idiopathic or associated with a sleep disorder
- "Sleep walking variant" disorder
- Sleep walking in childhood may be present
- PLMD, RLS, OSA, Irregular SW cycle disorder are commonest
- Medication induced—Ambien (Zolpidem), Triazolam, Lithium and Anticholinergics

Patient Concerns--SRED

- Weight gain: most common concern
- Morning anorexia/abdominal distention
- Feeling “out of sorts” during the daytime
- Repeated loss of control over nocturnal eating
- Nocturnal injuries from burning, cutting, choking self during food preparation and/or consumption
There is a striking prevalence of longstanding, nightly eating of high-caloric foods.
- Multiple nightly feedings (up to 8 times) often occurred.
- Eating was distributed across the sleep cycle in most cases.

Sweets, pasta, peanut butter and milk are preferred food items.
- Fruits and vegetables are rarely consumed.
- Some patients prepared elaborate meals.

Examples of inappropriate consumption of food or non-nutritive substances:
- Raw, frozen or spoiled foods;
- Salt or sugar sandwiches;
- Buttered cigarettes;
- Odd mixtures prepared in a food blender.
- Some ate large meals with their bare hands.
- Some patients had food-related dreams during their night eating episodes.
Major Findings

- High-caloric nocturnal binging: most cases.
- Careless/sloppy, nocturnal eating: most cases
- Level of consciousness during night eating:
  a) Partial consciousness: half of cases
  b) “Total” unconsciousness: a third of cases
  c) Nearly complete consciousness: about 15%

SRED---Major Findings

- Female-predominant disorder: 66%-83% of patients in reported series
- Mean age of onset: reported as 22-29 yrs
- Nightly frequency of nocturnal eating: very common (>50% of reported cases).
- Prevalence: a preliminary study found a 4.6% rate in university students & higher rates in out pts/ in pts with Eating Disorders

Zolpidem-Induced Amnestic SRED

CONCLUSIONS

- Zolpidem appears to be the most common drug that can induce (amnestic) SRED.
- Nevertheless, only a small % of patients treated with zolpidem will develop SRED.
Zolpidem-Induced Amnestic SRED

CONCLUSIONS

- Females with insomnia taking 10-20 mg zolpidem and taking medications for major dep. & other psychiatric, sleep or medical disorders appear to be most vulnerable: complex cases.
- Physicians should thus alert patients about this possible side effect when prescribing zolpidem.

NOCTURNAL EATING DISORDER

- Overeating between evening meal and nocturnal sleep onset
- Eating during complete awakenings from sleep with complete recall
- Absence of bizarre and toxic food ingestion
- Absence of a primary sleep disorder
- Less prevalent in females
- Mood disorders are more common

SLEEP RELATED EATING DISORDER

- Treatment:
  a) Control of sleep disorders
  b) Topiramate (Topamax) is specific
  c) Benzos and Zolpidem can worsen situation
**SRED--Treatment**

1. Treat the underlying primary sleep disorder--nasal CPAP for OSA
   --dopaminergics for RLS/PLMD
   sometimes with opiates/benzodiazepines

2. Sleepwalking and idiopathic subtypes—
   a) Dopaminergics, and/or codeine at bedtime can be effective in controlling the nocturnal eating.
   (Suggests that dopaminergic/opioid dys control may promote nocturnal eating, or that SRED could be the first sign of eventual RLS/PLMD.

**NREM Sleep**

- Normal
- Hypnagogic imagery
- Sleep starts
- Disorders of arousal
- Abnormal

*Disorders of arousal*
Disorders of Arousal - Pathophysiology

- A physiological dysfunction in neural regulation of generalized cortical activation
- An increase in sleep instability and arousal oscillation

Disorders of Arousal

- Common in childhood
- Cluster in families
- Decrease with increasing age

Prevalence of disorders of arousal

<table>
<thead>
<tr>
<th>Disorders</th>
<th>CHILDREN</th>
<th>ADULTS</th>
<th>CONCERN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confusional arousal</td>
<td>17%</td>
<td>2.5-4%</td>
<td><em>sexomnia</em></td>
</tr>
<tr>
<td>Sleep walking</td>
<td>17%, peak around 8-12 yrs of age</td>
<td>Up to 4% (1/3 presented more than 16 yr of age)</td>
<td>Sleep driving</td>
</tr>
<tr>
<td>Sleep terror</td>
<td>1-7%</td>
<td>2-3%</td>
<td>Injury</td>
</tr>
</tbody>
</table>
DISORDERS OF AROUSAL

- CONFUSIONAL AROUSALS
- SLEEP WALKING
- SLEEP TERRORS

Disorders of Arousal

a) Onset in Slow wave sleep
b) Typically associated with impaired responsiveness with difficulty to be awakened
c) Frequent amnesia for event
d) Occurring usually during the first third of the sleep period

e) Often presenting as co-existing, overlapping and/or mixed cases
f) Predisposing factors: young age, sleep deprivation, CNS depressants (alcohol), fever, external and internal stimuli
g) Majority outgrow disorders of arousal, so offer reassurance, ? Role for BZD
CONFUSIONAL AROUSAL - Pathophysiology

- Is thought to be from an incomplete awakening from SWS, leading to an intensification and prolongation of the normal period of transition from sleep to wakefulness (AKA sleep inertia)

CONFUSIONAL AROUSALS

- Characterized by mental or behavioral confusion, most typically from NREM slow wave sleep in the first part of the night, although sleep inertia in young adults may occur on arising (sleep drunkenness)
- May occur with other sleep disorders such as idiopathic hypersomnolence, narcolepsy or OSA
- DD; other parasomnias, partial complex seizures

Confusional Arousals

- Behavior may be very inappropriate, vigorous, resistive, sexual, even violent or murderous—especially during forced awakenings.
- Episodes can last minutes to hours.
CONFUSIONAL AROUSALS

- Behavior: vigorous, highly resistive, violent or even murderous, lasting minutes to hours
- Individual appears to be awake
- Forced awakenings often precipitate an episode especially in occupations demanding high levels of performance—when called at night react inappropriately
- Sleep talking, occasional shouting, bruxism can occur

CONFUSIONAL AROUSALS

- Common in children < 5 y/o
- Can be seen in adults
- The individual is disoriented in time and space, with slow speech, diminished mentation, blunted response to questions
- Prominent anterograde and retrograde memory loss
- During episode, especially if forcefully awakened, may exhibit very inappropriate behavior

CONFUSIONAL AROUSALS

- In children, episodes are bizarre and frightening to parents—“staring right through” the observer
- Child may become more agitated with any attempts to console by parent
- Most episodes last 5-15 minutes, but can extend up to 30-40 minutes
Confusional Arousals

Predisposing and Precipitating Factors:

- Genetic factors—predominant role.

- Other predisposing factors: rotating shift work, night shift work, other sleep disorders (hypersomnia, insomnia, circadian rhythm disorders), psychiatric disorders (anxiety, depression, bipolar disorder).

- Precipitating factors: recovery from sleep deprivation, stress, alcohol use/abuse, drug abuse, medications, OSA, PLMD, forced awakenings.
Confusional Arousals

Clinical Subtypes:
1) Severe Morning Sleep Inertia (Sleep Drunkenness) occurs during the morning transition from sleep to wakefulness.

2) Sleep-Related Abnormal Sexual Behaviors ("atypical sexual behavior during sleep," "sexsomnia," and "sleepsex").

Sleep Inertia

- Time of relative confusion between sleep and wakefulness

CONFUSIONAL AROUSALS

- Childhood form – benign, decreases after age 5
- Young children with C. Arousals often go on to have Sleep walking as adolescents
- Adult variant form (severe morning inertia) – usually persists without much remission -- can be associated with serious complications - sleep related injury, violence, poor attendance, interpersonal difficulties, risk of road accidents
CONFUSIONAL AROUSALS - TREATMENT

Rarely necessary
- Avoid precipitating factors [Alcohol, sleep loss (i.e. irregular SW schedule), CNS depressants]
- Efforts to curtail behavior to be avoided - May lead to aggression and prolongation of spell
- Episode should simply be allowed to run itself out

Severe Morning Sleep Inertia - Treatment
- Methylphenidate-SR (20-40 mg) - at bedtime
- Bupropion-SR (100-300 mg) - at bedtime
- Combination of the above 2 medications at bedtime.
- Instruct patient to take immediately at bedtime, immediately before falling asleep.
- Usually very effective and well-tolerated therapy
Sexomnia
Treatment Efficacy
(controlling sleepsex)

1) Clonazepam: 90% (9/10: 6/7 NREM para 3/3 RBD)
2) Nasal CPAP: 100% (3/3 Obstructive Sleep Apnea)

TREATMENT OF ABNORMAL SLEEPSEX
Besides pharmacotherapy, consider referral (of patient and significant other) to a psychologist or psychiatrist for one of two reasons (or both):

1) Explore marital/interpersonal relationship as a contributing factor to the sexual parasomnia.
2) Deal with the adverse consequences (personal and interpersonal) of the sexual parasomnia.

SLEEP-RELATED VIOLENCE
1. In most cases, adults with sleep-related violence do not purposefully intend to be aggressive towards themselves or their bed partner, and act completely out of character from their daytime personality.
2. In most cases, a psychiatric disorder is not associated with sleep-related violence.
Sleepwalking

Essential Features:

Sleepwalking consists of a series of complex behaviors that are usually initiated during sudden arousals from slow-wave sleep and culminate in walking around with an altered state of consciousness and impaired judgment.

### Sleepwalking - Somnambulism

- Benign common behavior in SWS
- 15-40% of children sleep walk, at least on one occasion
- 3-5% have frequent (weekly, monthly episodes)
- Onset 4-6 yrs, peaks 4-8 yrs, 10% continue to SW for 10 yrs

### Sleepwalking--Demographics

- Usually benign in childhood, but could become hazardous with increasing age.
- May persist and intensify into adulthood.
- Up to 4% of adults have sleepwalking, including de novo sleepwalking.
- “Christmas Eve” sleepwalking story.
Sleepwalking--Demographics

- Prevalence: up to 17% of children, >2 episodes
- Prevalence: up to 50% of children, 1 episode
- Peak incidence: 8-12 years of age.
- No gender differences in childhood sleepwalking.
- 10 times greater incidence in relatives.
- Monozygotic twin concordance is 6 times greater than in dizygotic twins.
- Therefore, strong genetic influence.

SLEEPWALKING

- May terminate spontaneously or sometimes cause inappropriate behavior
- Falls and injuries may occur
- Occasional aggressive behavior when attempts to restrict mobility are made
- 85% of adult sleep walkers did so in childhood
- Can be part of eating disorder
All the characteristics of somnambulism underline the difference between wakefulness and consciousness.

SLEEP TERRORS

- Sudden arousal from SWS with autonomic and behavioral manifestations of intense fear
- Piercing scream or cry
- Tachycardia, tachypnea, dilated pupils, sweating, flushing of skin
- Incoherent vocalization and micturition may occur
- Attacks end spontaneously
- Agitation and violence can occur if compelled awakening attempted
SLEEP TERRORS

- 3% of children experience sleep terrors especially during preschool and elementary years
- Usual age of onset—4-12 yrs
- Frequency often highest at onset and at a younger age
- Prevalence of ST in children who SW is 10%
- Most outgrow ST by adolescence
SLEEP WALKING - SOMNAMBULISM
SLEEP TERROR - PAVOR NOCTURNUS

- Partial arousal parasomnias
- Characteristics of both wake and deep sleep states
- Autonomic and skeletal muscle disturbances, autonomic behaviors, disorientation
- Exclusive to SWS, no dreaming involved
- 1-2 hrs of sleep onset, last few minute-hr, retrograde amnesia

- During an episode, children or adolescents have the appearance of being awake
- Can be triggered by stress
- Neither behavior indicates an underlying psychological disorder or trauma
- 80-90% likelihood that a child with either disorder has an affected first-degree relative

- More common in individuals with migraine headaches, Tourette's syndrome- Serotonin metabolism alteration
- Exacerbating factors:
  - Sleep deprivation (acute/ chronic)
  - Irregular sleep schedule
  - Fever, medications
  - Sleeping with a full bladder, noisy or different environment
SLEEP WALKING - SOMNAMBULISM
SLEEP TERROR - PAVOR NOCTURNUS

- Evaluation:
  a) Generally benign. May have associated history suggestive of OSA, RLS, behavioral sleep issues, seizure disorder
  b) Family history often positive, EDS is unusual
  c) Developmental history and Exam—unremarkable
  d) PSG not required unless OSA, seizures suspected

SLEEP WALKING - SOMNAMBULISM
SLEEP TERROR - PAVOR NOCTURNUS

- Associated features:
  a) Injury risk—falling down stairs, walk into traffic, trying to escape
  b) Impact on social functioning—Avoid social situations such as overnight visits to friends, summer camps
  c) Parental anxiety—due to unusual nature parents are anxious—meaning to episodes, how to respond, concern on not being present when it happens etc.

SLEEP WALKING - SOMNAMBULISM
SLEEP TERROR - PAVOR NOCTURNUS

- Treatment:
  Safety
  A) Safety measures—gates, locks, proper lighting
  B) Parent notification measures—alarm or bell attached to bedroom door
  Sleep hygiene
  Ensure adequate sleep, maintain schedules
SLEEP WALKING - SOMNAMBULISM
SLEEP TERROR - PAVOR NOCTURNUS

- Behavioral management
  a) Address behavior based night-time awakenings or bedtime refusal
  b) Avoid awakening during episode
  c) Avoid interfering as it can prolong event
  d) Avoid next-day discussions - can worry child, increase night-time resistance
  e) Guide child back to bed
  f) Role for scheduled awakenings - if nightly basis events present

SLEEP WALKING- SOMNAMBULISM
SLEEP TERROR- PAVOR NOCTURNUS

- Pharmacological treatment:
  When: a) frequent/disruptive episodes
        b) high risk of injury
        c) violent behavior
        d) serious family disruption
  What to use: Clonazepam (0.25-2mg) or oxazepam (5-20mg) - BZD suppress SWS
  L-hydroxy tryptophan 2mg/kg/day at bedtime has been tried in ST and has shown to modulate the arousal level in children with long term improvement - Eur J Ped 2004 July

Arousal Disorders - When to Evaluate

- Indications:
  - Potentially injurious or violent behaviors
  - Severe disruption of other household members
  - Resultant excessive daytime sleepiness
  - Atypical clinical features
Arousal Disorders - Treatment

- Most need no treatment
- Improved sleep hygiene
- BZD, TCA, Hypnosis

Disorders of Arousal--Treatment

- Sleep hygiene, including maintenance of a regular sleep-wake schedule, and sufficient total sleep time.
- Stress reduction—at times focused counselling may be indicated
- Psychotherapy—more global counselling
- Relaxation techniques
- Learning self-hypnosis
- Pharmacotherapy: in selected cases

Disorders of Arousal--Treatment

- Benzodiazepines (taken 30-75 min before bedtime); e.g. clonazepam 0.25-1.0 mg, but virtually any benzodiazepine can be used.
- Also, imipramine in children.
Disorders of Arousal--Treatment

Common treatment scenario:
- Short-term (or intermediate-term) benzodiazepine therapy (weeks-months) to “cool down” the nervous system, while the patient is learning relaxation techniques, using self-hypnosis, and/or engaging in some form of psychotherapy.

SLEEP PARALYSIS
- Consist of a period of inability to perform voluntary movements at sleep onset (hypnagogic) or upon awakening at night or in the morning (hypnopompic)
- Ocular and respiratory movements intact
- 1- several minutes, stops spontaneously or by external stimulus
- Isolated, familial or part of Narcoleptic tetrad
- 50% of normal subjects at least once in a lifetime
- Rx- anti-depressants/ REM suppressants

Sleep disorders where disturbed “dreams” are common

<table>
<thead>
<tr>
<th>CODE</th>
<th>Sleep stage</th>
<th>Prevalence</th>
<th>Essential features</th>
</tr>
</thead>
<tbody>
<tr>
<td>307.57</td>
<td>REM</td>
<td>Child: 1-5% Adult: 2-5%</td>
<td>Frightening dreams, abrupt awakening</td>
</tr>
<tr>
<td>307.57</td>
<td>Sleep onset</td>
<td>Rare Narco: 4-8%</td>
<td>Terrifying sleep onset dreams</td>
</tr>
<tr>
<td>781.01</td>
<td>Sleep onset</td>
<td>Lifetime: 30%</td>
<td>Sudden brief jerks associated with feeling of falling</td>
</tr>
<tr>
<td>780.56</td>
<td>Sleep onset or offset</td>
<td>Lifetime: 40-50% Familial: Rare</td>
<td>Voluntary muscle paralysis, anxiety</td>
</tr>
</tbody>
</table>
**Nightmares vs. Sleep Terrors**

<table>
<thead>
<tr>
<th>Nightmares</th>
<th>Sleep terrors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out of REM Sleep</td>
<td>Out of SWS—3/4</td>
</tr>
<tr>
<td>Aware of content</td>
<td>Little or no awareness</td>
</tr>
<tr>
<td>Last half of night</td>
<td>Usually first 1-2 hrs</td>
</tr>
<tr>
<td>Mild to moderate physiological arousal</td>
<td>Severe physiological arousal</td>
</tr>
<tr>
<td>Elaborate description of events, people, actions</td>
<td>If any awareness: usually single image e.g. snakes, spiders</td>
</tr>
<tr>
<td>Recurrent content or themes</td>
<td>Occasionally stereotyped</td>
</tr>
<tr>
<td>Typically, longer wake time after incident</td>
<td>Able to fall asleep easier after arousal</td>
</tr>
</tbody>
</table>

**NIGHTMARE DISORDER**

- Frightening dreams, occurring during REM sleep, that results in awakening from sleep.

- Content of nightmares varies:
  - Toddlers – being separated from parents
  - By age 2 - monsters, imaginary creatures
  - Young children - getting lost, immunization, barking dog etc.
  - Older children - frightening movies, TV, disturbing daytime experience

- 75% of children report at least 1 nightmare
- 10-15% of young children have nightmares requiring parental interaction during the night
- Chronic nightmares (> 3 months) - 24% for ages 2-5 and 41% for ages 6-10
NIGHTMARE DISORDER

- **Etiology/ Risk Factors:**
  
  Stress/Trauma including child abuse
  Anxiety and anxiety disorders (PTSD, phobias)
  Sleep deprivation - recovery REM sleep
  Fever, illness, ADE, withdrawal from sleeping pills, effect of alcohol or abrupt withdrawal

Drugs reported to increase nightmares

<table>
<thead>
<tr>
<th>DRUG</th>
<th>FUNCTION</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betaxolol</td>
<td>Beta-blocker</td>
<td>Mort (1992)</td>
</tr>
<tr>
<td>Donepezil</td>
<td>Cholinesterase inhibitor</td>
<td>Ross (1998)</td>
</tr>
<tr>
<td>Fluoxetine</td>
<td>antidepressant</td>
<td>Markowitz (1991)</td>
</tr>
<tr>
<td>Naproxen</td>
<td>NSAID</td>
<td>Bakht and Miller (1991)</td>
</tr>
<tr>
<td>Verapamil</td>
<td>Calcium channel blocker</td>
<td>Hodges and Kumar (1988)</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>Antibiotic</td>
<td>Williams (1988)</td>
</tr>
<tr>
<td>Triazolam</td>
<td>Benzodiazepine hypnotic</td>
<td>Pagel (1987)</td>
</tr>
</tbody>
</table>

NIGHTMARE DISORDER

- **Maintain a sleep diary**

- **Bedtime resistance can become a problem because they associate sleep with nightmares**
NIGHTMARE DISORDER

- Reduce likelihood of nightmares:
  a) Avoid exposure to frightening or over stimulating images before bedtime - TV, movies
  b) Reduce stressors
  c) Avoid sleep deprivation
  d) Parental reassurance - "it was only a dream"
  e) Security objects - family pets
  f) Dim low nightlight

NIGHTMARE DISORDER - ADDITIONAL STRATEGIES

- Imagery rehearsal therapy - drawing the dream and crumpling it up, devising a positive end to the dream, hanging a dream catcher
- Relaxation techniques - Guided imagery and PMR
- Systematic desensitization - invoking a hierarchy of fear invoking activities paired with a relaxing activity - useful if recurrent specific theme is involved.

NIGHTMARE DISORDER - PHARMACOLOGICAL TREATMENT

- Limit SSRI's
- Clonazepam 0.5-3 mg
- Trazodone 50-300mg 30-60 minutes especially for PTSD
Proportion of other family members in various parasomnias

<table>
<thead>
<tr>
<th>Gender</th>
<th>Childhood</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>69%</td>
<td>-</td>
</tr>
<tr>
<td>F</td>
<td>70%</td>
<td>-</td>
</tr>
<tr>
<td>M</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>F</td>
<td>57%</td>
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Co-occurrence of Parasomnias in adults

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<th>Sleep talking</th>
<th>Nightmares</th>
<th>Bruxism</th>
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<tr>
<td>Sleep talking</td>
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<td>39%</td>
<td>30%</td>
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REM SLEEP BEHAVIOR DISORDER

- The parasomnia most commonly associated with Neurodegenerative disease
- Dream enactment behavior associated with loss of muscle atonia in REM sleep

RBD/Parasomnias—PSG Evaluation

- Hospital-based PSG monitoring is mandatory
- Extensive montage is strongly recommended
- Seizure montage
- Fast paper speeds (15-30 mm/sec)
- Chin and limb (arms/legs) EMG monitoring
- Continuous audio-visual monitoring: time-synchronized with PSG monitoring
- Sleep lab technologist in continuous attendance to assure the patient's safety, and to ask about any dreaming linked with parasomnia behavior.

3 compelling reasons why RBD requires PSG documentation:

1. Diagnostic PSG abnormalities for RBD are present virtually every night (assuming a sufficient amount of REM sleep is present), with little night-to-night variability.
2. RBD commonly heralds the future emergence of parkinsonism/dementia (>65% in 1 series).
3. Dream-enacting behaviors are not specific to RBD: also found with SW, ST, OSA, etc.
RBD—Altered Dreams

- Vivid, intense, full of action, unpleasant.
- Dreamer is being threatened or attacked by unfamiliar people, animals, insects.
- Dreamer is rarely the primary aggressor.
- Fear and anger are predominant moods.
- Dreamer is often defending his wife in a dream while actually beating her in bed.
REM SLEEP BEHAVIOR DISORDER
- Characterized by complex vigorous motor activities and injurious behaviors representing attempts of vivid, action filled violent dreams
- Occurs at least 90 minutes of sleep onset and predominantly in the second half of the night. In patients with Narcolepsy, emerges earlier--SOREMP
- Risk for injury—Self and bed partner

RBD—Demographics (N=96)
- Mean age of onset: 52 (+17) years (range: 9-81)
- Males: 87%
- Therefore, RBD is typically a disorder of middle-aged and older males—but females and any age group can be affected

REM SLEEP BEHAVIOR DISORDER
- Demographics:
  - Age at presentation 52.4 yrs (9-81)
  - Male 88%
  - Prodrome 25%
  - Chief complaint
    - Sleep injury 79%
    - Sleep disruption 21%
  - Daytime sleepiness is uncommon generally
  - PLMS are very common with RBD
REM SLEEP BEHAVIOR DISORDER

• Predisposing factors:
  Male sex, Age 50 or older  
  Parkinsonism, Dementia with Lewy Bodies, Narcolepsy, Stroke  
  Medication - SSRI's, Effexor, Remeron (Mirtazapine), except Bupropion

REM SLEEP BEHAVIOR DISORDER

• Typical presenting complaints:
  Sleep injury 79%  
  Sleep disruption 21%  
  Altered dreams 88%  
  Dream–enacting behavior 88%

REM SLEEP BEHAVIOR DISORDER

Wide range of behaviors

Violent agitation, flailing
Kicking, jumping
Punching, slapping
Running
Leaping from bed, swearing, gesturing
Verbalization, swearing
Yelling, shouting
Walking (rare)
REM Sleep And Marriage
Restraint (REM-atonia)
Is the Better Part of Honor
RBD-Violent Moving Nightmares

"A Hole In The Wall—Just Like A Soup Bowl—Where My Head Fit In"
It Was Unexplainable, Because I Don’t Hunt And I Don’t Like Guns"
"I Don’t Know How I Could Do It In One Move: Go From The Middle Of The Bed All The Way To The Floor"

RBD—Prodrome (Subclinical RBD)
In 25% of patients, there is a prodrome that precedes the frank emergence of RBD by 1-4 decades, consisting of sleep-talking, yelling, limb twitching and jerking—observed and experienced by the Bed partners.
Wedding night surprise!
REM SLEEP BEHAVIOR DISORDER

- Idiopathic
- Neurologic — Vascular, toxic/metabolic, Tumor, Infectious, Degenerative, Traumatic
- Narcolepsy - 36% with Narcolepsy report symptoms suggestive of RBD

REM SLEEP BEHAVIOR DISORDER

- Two forms:
  - Acute  a) Withdrawal from alcohol or sedative—hypnotics  b) Intoxication
  - Chronic - typically once weekly, may occur as often as four times nightly for several consecutive nights
RBD—Clinical Findings: Two Forms

1) **ACUTE RBD**

A) Alcohol/drug/medication withdrawal

B) Drug intoxication (anti-cholinergics, tricyclic anti-depressants, MAOIs)

C) Relapsing Multiple Sclerosis

2) **Chronic RBD**

A) Idiopathic

B) Associated with Neurologic Disorders

C) Medication-induced: Beta-blockers, SSRIs, venlafaxine (Effexor), mirtazapine (Remeron), tricyclic antidepressants—BUT NOT bupropion (Zyban, Wellbutrin), a dopaminergic antidepressant.

D) Caffeine, chocolate; late, high fat dinners (?)
RBD—Sleep-Related Injury
- Bruises
- Lacerations
- Fractures (including C2 “hang man”)
- Subdural hematomas
- Dislocations
- Abrasions/rug burns
- Tooth chipping, hair pulling
- Miscellaneous (ankle/wrist sprains, rug burns)

RBD: DIAGNOSTIC CRITERIA
I) POLYSOMNOGRAPHIC CRITERIA
1) Excessive EMG tone (submental) during REM sleep: Loss of REM-atonia, and/or
2) Excessive limb EMG twitching during REM sleep.
3) Absence of EEG epileptiform activity during REM sleep.
Sleep Disorders

**Venlafaxine - Induced RBD**

- L Eye
- R Eye
- C3-A2
- Chin EMG
- L Extensor Dig
- R Extensor Dig
- L Ant.
- R Ant.

**REM Sleep Without Atonia in Parkinsonism**

**RBD in Patient with Narcolepsy on SSRIs**
RBD—Major PSG Findings

- REM %: normal (20-25%).
- REM/Non-REM cycling: normal.
- PLMs of Non-REM sleep: >60% of pts
- Increased SWS % (15-46%) for age: >50% of patients.

RBD: DIAGNOSTIC CRITERIA

II) BEHAVIORAL CRITERIA

1) History of problematic sleep-related behaviors—often, but not necessarily, dream-enacting behaviors that are injurious or potentially injurious, and/or disruptive of sleep. and/or

2) Documented REM sleep behaviors during PSG (without associated EEG epileptiform activity).

REM SLEEP BEHAVIOR DISORDER

- The majority of patients will have an underlying neurodegenerative disorder—synucleinopathies

- Parkinson’s Disease (15-33%)
- Dementia with Lewy bodies (92%)
- Multiple System Atrophy (69-90%)
REM SLEEP BEHAVIOR DISORDER

- Delayed emergence of a neurodegenerative disorder, often more than a decade after the onset of RBD, is very common in male 50 yrs or older—PD, LBD

RBD–Neurologic Disorders

Most common Neurologic Disorders associated with RBD:

1) Neurodegenerative Disorders (esp. parkinsonian disorders)
2) Narcolepsy
3) Cerebro-vascular Disorders

However, virtually all types of neurologic disorders can cause RBD.
RBD may be the heralding manifestation of PD by many years
- Idiopathic PD is the most common neurological disorder that occurs after the onset of PD
- 38% of patients with idiopathic RBD developed PD after mean interval of 3.7 yrs from RBD diagnosis
- The average age of onset of PD in the RBD population was 68 yrs
- The mean duration between onset of RBD symptoms and onset of PD symptoms is 13+_7 yrs

RBD—Treatment of Behavioral and Dream Disturbances

Initial (Environmental) Considerations
- Maximize the safety of the sleeping environment:
  -- Move bedside table and any hard objects that are close to the bed.
  -- Bed away from any window.
  -- Mattress on the floor.
  -- Bed partner moves to a separate bed?

RBD—Treatment
- Clonazepam (mean dose is 0.75 mg-1.25 mg) can go up to 3 mg, is the drug of choice—Suppresses the excess phasic motor activity
- Melatonin 3-12 mg is alternatively used—restores REM atonia. May be less effective for suppressing behaviors
- Environmental safety precautions are critical
Figure 5—Complete preservation of background REM-atonia (as indicated by the submental EMG [7]), despite prominent phasic twitching of upper extremity EMGs (6-9), along with some lower extremity EMG twitching (10-11), is revealed in this polysomnographic tracing. Moreover, the background REM-atonia (7) continues to be preserved while the man with RBD is noted to be punching the bed during an episode of dream enactment. This sequence illustrates how the pathophysiology of RBD can involve enhanced phasic motor activation that is powerful enough to overcome the customary background REM-atonia.

Figure 3—Polysomnographic correlates of nocturnal dream-enacting behaviors. RBD sleep contains dense, high-voltage REM activity (1-2), and an activated fast-frequency, low-voltage electroencephalogram (EEG) (3-6,10,17), that is characteristic of REM sleep. This electroencephalogram (11) has a constant rate of 64/min, despite vigorous limb movements, a finding consistent with REM sleep and inconsistent with a conventional arousal. Chan [i.e. submental electroencephalogram (EMEG)] tone is augmented with phasic annotations (5). Arms (7-8) and legs (6,10) show sporadic bursts of intense EMG twitching, which accompany gross behaviors noted by the technician. This sequence culminates in a startlingly realistic experience, when the man reports a dream of dropping down a fraction of a meter and finding himself on a ledge that is looking back and forth. He feels hounded and des-\n\n
Figure 4—Prominent loss of REM-atonia is illustrated in this REM sleep polysomnographic (PSG) tracing from an elderly man with chronic RBD. The submental EMG (7) has augmented tone throughout virtually all of this tracing, with superimposed prominent phasic twitching. The arrows show the sudden gamma of the submental EMG (7) is coincident with the onset of leg twitching (12), with sudden phasic twitching of the submental EMG, then being coincident with cessation of the leg twitching. This sequence demonstrates how there can be abrupt conduction of motor inhibition with motor evolution during REM sleep, when a bilateral submental EMG channels in PSG tracings of RBD. Bursts of EMG (1-2) are present that have some temporal concomitant with prominent submental EMG twitching (7), although the latter are also shown to occur in the absence of REMs, as seen in the far left side of the tracing, and also with the final burst of submental EMG twitching towards the right side of the tracing.
RBD—Differential Diagnosis (including the Differential Diagnosis of Dream-enacting Behaviors)

- Nocturnal seizures
- Disorders of arousal (SW, ST)
- Nocturnal psychogenic dissociative disorder
- Obstructive sleep apnea
- Malingering

RBD—PARKINSONIAN LINK

“Delayed emergence of a parkinsonian disorder in 38% of 29 older males initially diagnosed with idiopathic REM sleep behavior disorder”

Schenck CH, Bundlie SR, Mahowald MW. REM behavior disorder (RBD): delayed emergence of Parkinsonism and/or dementia in 65% of older men initially diagnosed with idiopathic RBD...

*Sleep* 2003; 26: A316

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**RBD–Parkinsonism/Dementia**

- Therefore, men >50 years of age with “idiopathic” RBD, and their wives, should be told about the high risk for future Parkinsonism/dementia, so they can plan their future lives.

- An honest clinical discussion should take place about the risk for a synucleinopathy: Parkinson's disease, Dementia with Lewy bodies, Multiple System Atrophy, Pure Autonomic Failure

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**RBD and PD**

Interval between RBD onset and emergence of a parkinsonian disorder: 12.7 ±7.3 years

RBD associated with Parkinsonism is clinically identical to RBD linked with other disorders or medications or with idiopathic RBD.
Parasomnias: Take Home Messages

- Parasomnias are surprisingly common.
- Parasomnias are usually not a manifestation of psychopathology despite their bizarre clinical features.
- Parasomnias are usually diagnosable and treatable.
- Parasomnias can emerge in the context of other sleep disorders & their Rx (esp. OSA).
I KNOW IT ALL.

I JUST CAN'T REMEMBER IT ALL AT ONCE.