

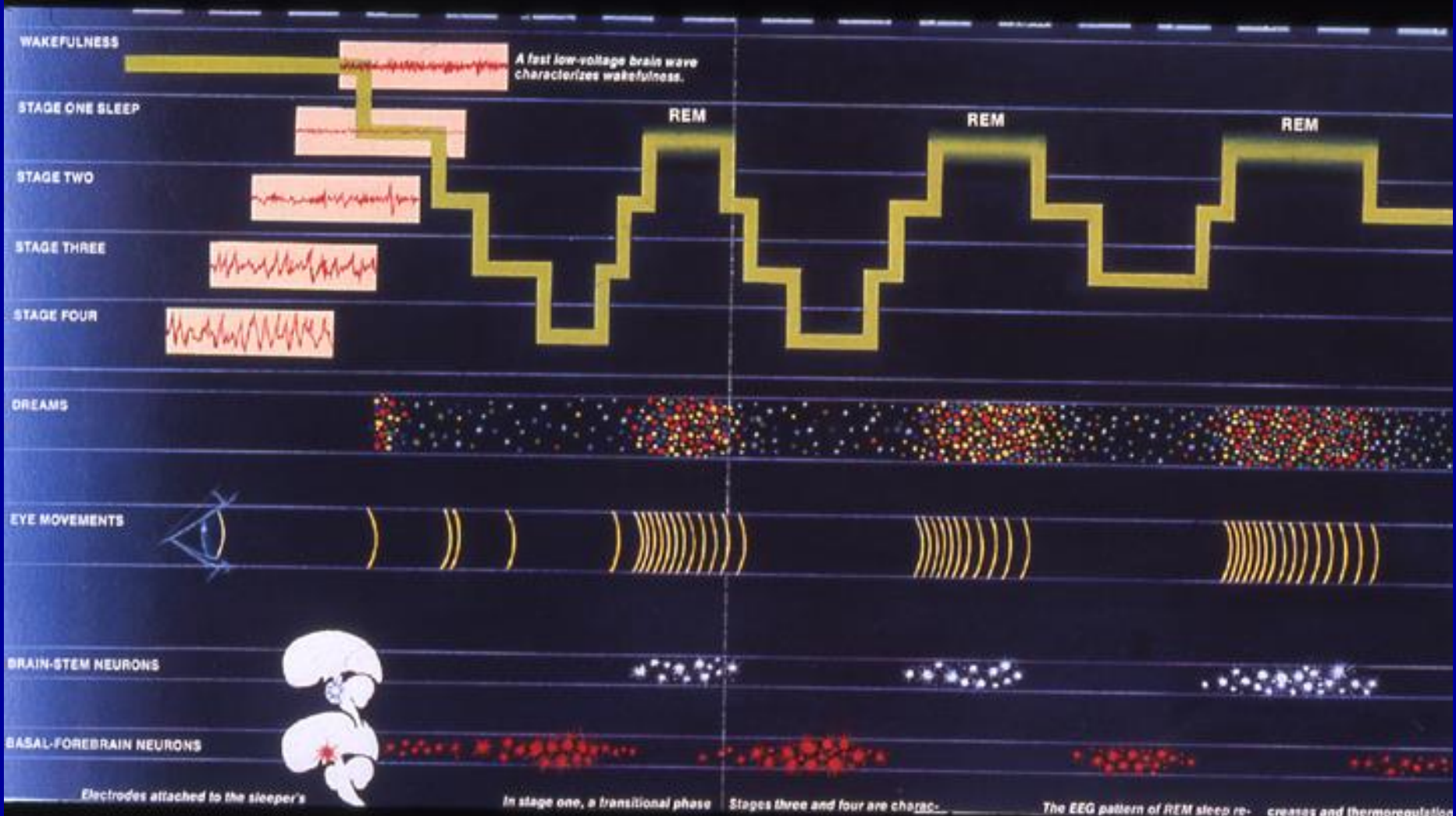
Parasomnias and the Release of Primitive Instincts During Sleep: Are Dreams Always Wishes?

Carlos H. Schenck, M.D.

Minnesota Regional Sleep Disorders Center
University of Minnesota Medical School
Department of Psychiatry

Festival of Medical Sciences
Bologna April 22, 2017





Electrodes attached to the sleeper's

In stage one, a transitional phase

Stages three and four are charac-

The EEG pattern of REM sleep re- ceases and thermoregulation

Parasomnias

(Linguistic Derivation)

“Para” (Greek prefix): “alongside of”

“Somnus” (Latin noun): “sleep”

“Para-somnus”: events that accompany sleep

Clinical meaning: abnormal or undesirable
events that accompany sleep

Parasomnias--Definition

Undesirable behavioral, autonomic nervous system & experiential events that occur during:

- 1) Transitions into sleep or out of sleep.
- 2) During any stage of sleep (NREM, REM).
- 3) During partial arousals from any sleep stage.

N.B. All of sleep carries a parasomnia risk.

International Classification of Sleep Disorders
3rd Edition (ICSD-3) (2014)

Parasomnias

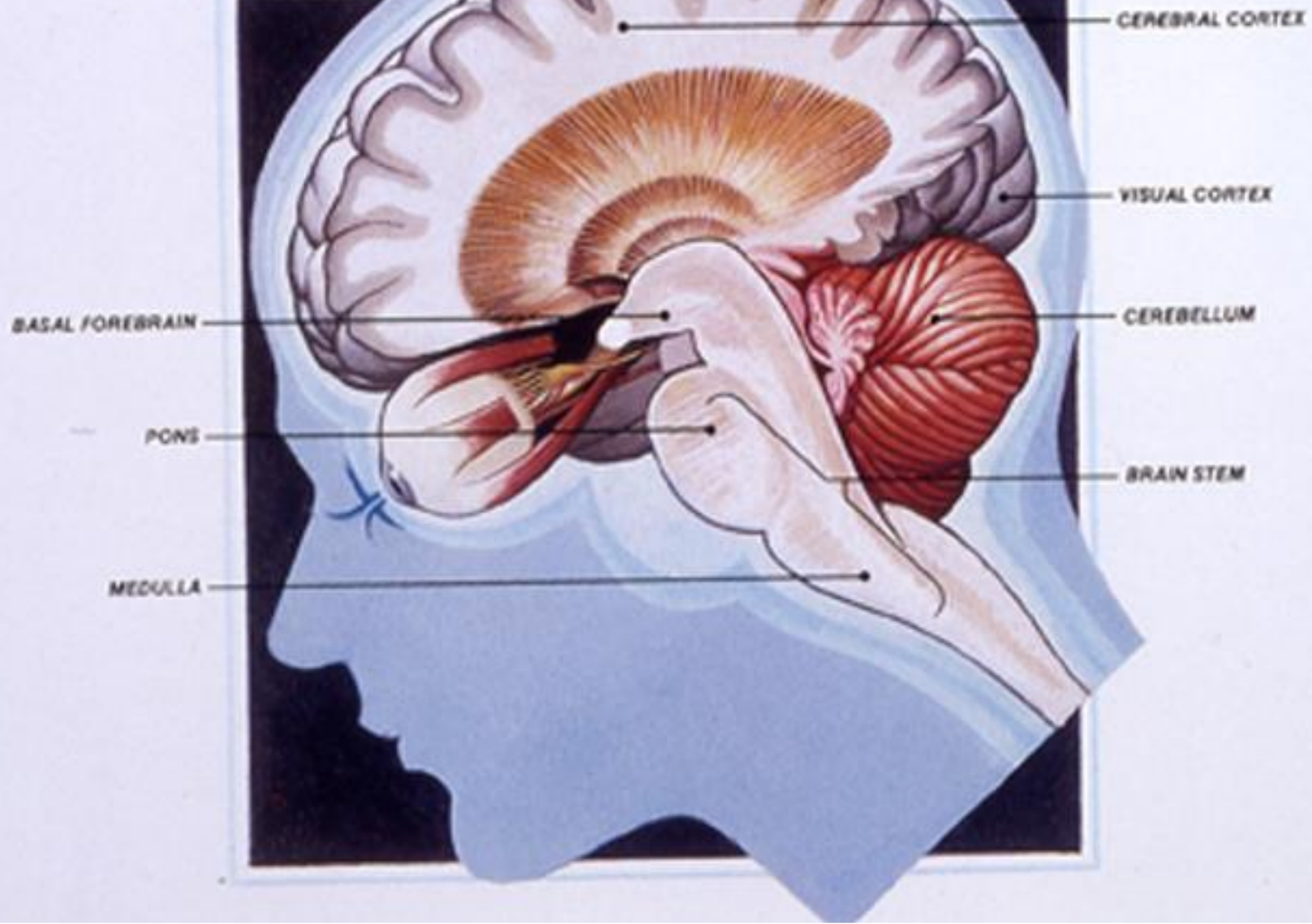
- Instinctual behaviors and experiences emerge pathologically during sleep:
- **Eating** (“Sleep Related Eating Disorder”)
- **Sex** (“Sexsomnia”)
- **Aggression** (REM behavior disorder)
- **Locomotion** (Somnambulism)
- **Fear** (Pavor Nocturnus—Sleep Terrors)
- **Sleep** itself is an instinctual behavior.

“Central pattern generators for a common semiology in fronto-limbic seizures and in parasomnias. A neuroethologic approach”

C.A. Tassinari, et al.

Neurol Sci 2005; 26:s225–s232

CPGs are genetically determined neuronal aggregates in the mesencephalon, pons and spinal cord subserving innate motor behaviours essential for survival, feeding, locomotion, reproduction, etc.).



Parasomnias

Key Points

- 1) The body is activated in sleep to engage in complex behaviors—while the mind is still asleep.
- 2) Therefore, severely compromised judgment.
- 3) Highly vulnerable and dangerous state.
- 4) Video-Polysomnography: invaluable tool.

Parasomnias: Comments

- 1) Parasomnias can appear spontaneously *or* can emerge with another sleep disorder, e.g. Obstructive Sleep Apnea, Restless Legs Syndrome.
- 2) Major gender differences exist across the parasomnias.
- 3) Family history is common in the Non-REM sleep parasomnias.

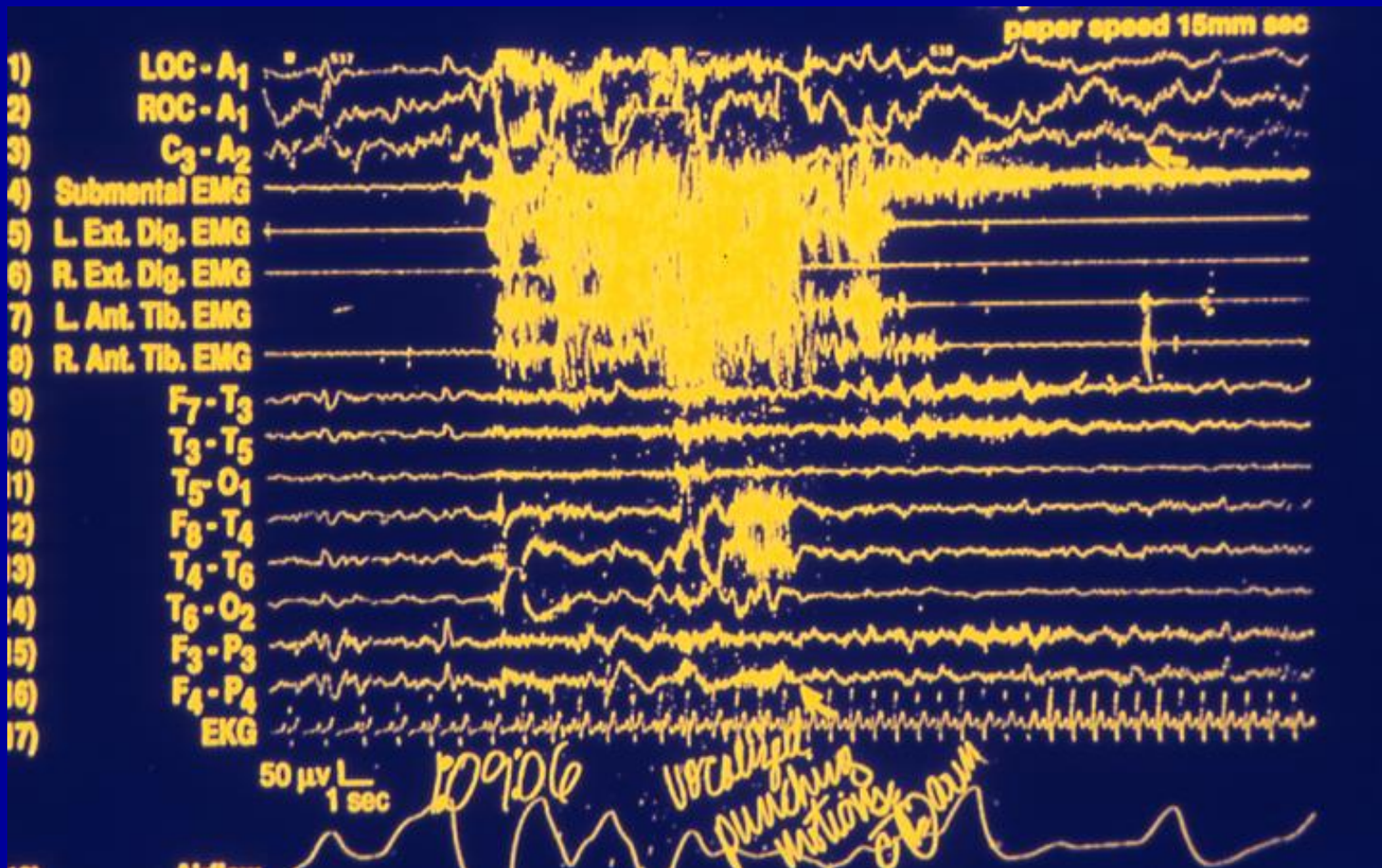
Parasomnias: Comments

4) Forensic consequences of sleep related violence, and sexsomnia:

- “Parasomnia-Suicide”
- Inadvertent Homicide/attempted homicide
- Inadvertent sexual assault/rape—including with minors.

5) The field of Sleep Medicine (Parasomnia) Forensics is rapidly developing.

Disorder of Arousal From NREM Sleep



Sleepwalking Suddenly Emergi from Slow-Wave Sleep in a 3 Year-Old Female

*Please reference the included CD-ROM
or footnotes related to this video.*

Violent Sleep Terror Episode in 21 Year-old Man

*Please reference the included CD-ROM
for footnotes related to this video.*

Fearful Partial Arousal From Delta NREM

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Pavor Nocturnus Mimic



“Atypical” Pavor Nocturnus Mimic



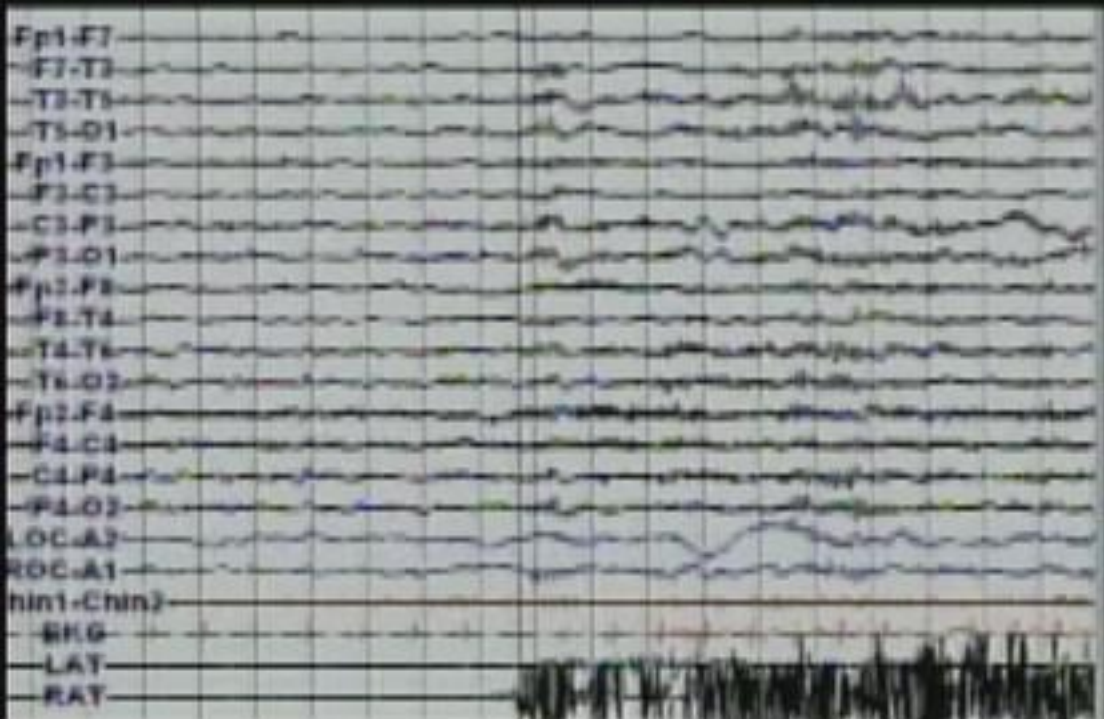
**Episodes of Drinking and
Eating Throughout Non-REM
Sleep in a 21 Year Old Woman**

**Please reference the Included CD-ROM
for footnotes related to this video.*

Waking Arising From Stage 2 Sleep in a 47 Year-old Woman

*Please reference the included CD-ROM
for footnotes related to this video.*

Sexsomnia



“Sexual Behaviors During Sleep
Associated With Polysomno-
graphically Confirmed Parasomnia
Overlap Disorder” [2 cases]

Sleep Medicine 2011;12: 523-528

Cicolin A, et al. (Torino, Italy)

[5 NREM/REM Motor Parasomnias: each patient!]

Sexsomnia: Definition

1. *Problematic* sexual behaviors emerging during sleep.
2. Often chronic, recurrent.
3. ICD-3: Classified as a variant of a Disorder of NREM Sleep Arousals—
“Often has major interpersonal, clinical and occasional criminal consequences.”²²

“Sleep and Sex: What Can Go Wrong?
A Review Of The Literature On Sleep
Disorders and Abnormal Sexual Behaviors
and Experiences”

Sleep 2007; 30: 683-702.

Schenck CH, Arnulf I, Mahowald MW

Sexsomnia

“Update on Sexsomnia, Sleep Related Sexual Seizures, and Forensic Implications”

NeuroQuantology 2015; 4: 518-541

Schenck CH

Sexsomnia: 49 cases

Males: 75.5%

Females: 24.5%

Age, 35 \pm 10 years

Duration: 7 \pm 6 yrs

Masturbation: 23%

Sexual vocal/verbal: 19%

Fondling bedpartner: 36%

Sexual intercourse: 48%

Sexsomnia: 49 cases

Amnesia for sleepsex: 96%

Assaultive behaviors: 37%

Sleepsex with minors: 20%

Legal repercussions: 24%

Parasomnias/patient: 2.1 ± 1.2

(mean)

(range: 1-5)

Disorders Causing Sexsomnia

1. NREM Sleep Parasomnia: >80% cases
2. Obstructive Sleep Apnea: ~15% cases

Sexsomnia Treatment Efficacy

1) Clonazepam: 86%

(NREM para)

2) nCPAP: 100%

(sleep apnea)

REM Sleep Behavior Disorder

1986 *or* 1605?

The dream-enacting parasomnia during
REM sleep.

Miguel de Cervantes, *Don Quixote* (1605)

“...he was thrusting his sword in all directions, speaking out loud as if he were actually fighting a giant. And the strange thing was that he did not have his eyes open, because he was asleep and dreaming that he was battling the giant...”

“...He had stabbed the wine skins so many times, believing that he was stabbing the giant, that the entire room was filled with wine...”

*Don Quijote de la Mancha, I, Cap. XXXV
(Aventura De Los Cueros De Vino)*

Paradox Lost

MIDNIGHT IN THE BATTLEGROUND OF SLEEP AND DREAMS



VIOLENT MOVING NIGHTMARES — REM SLEEP BEHAVIOR DISORDER

DR. CARLOS H. SCHENCK, MD

REM Sleep Synonyms

Active Sleep Paradoxical Sleep

- Activated brain state, *but* generalized muscle paralysis (“REM-atonía”): the paradox.
- A large amount of the increased brain energy in REM sleep is devoted to maintaining REM-atonía: must be important. Self-protect.

(*Paradox Lost*. Loss of REM-atonía--RBD)

September 11, 1982

Donald Dorff, 67 years old

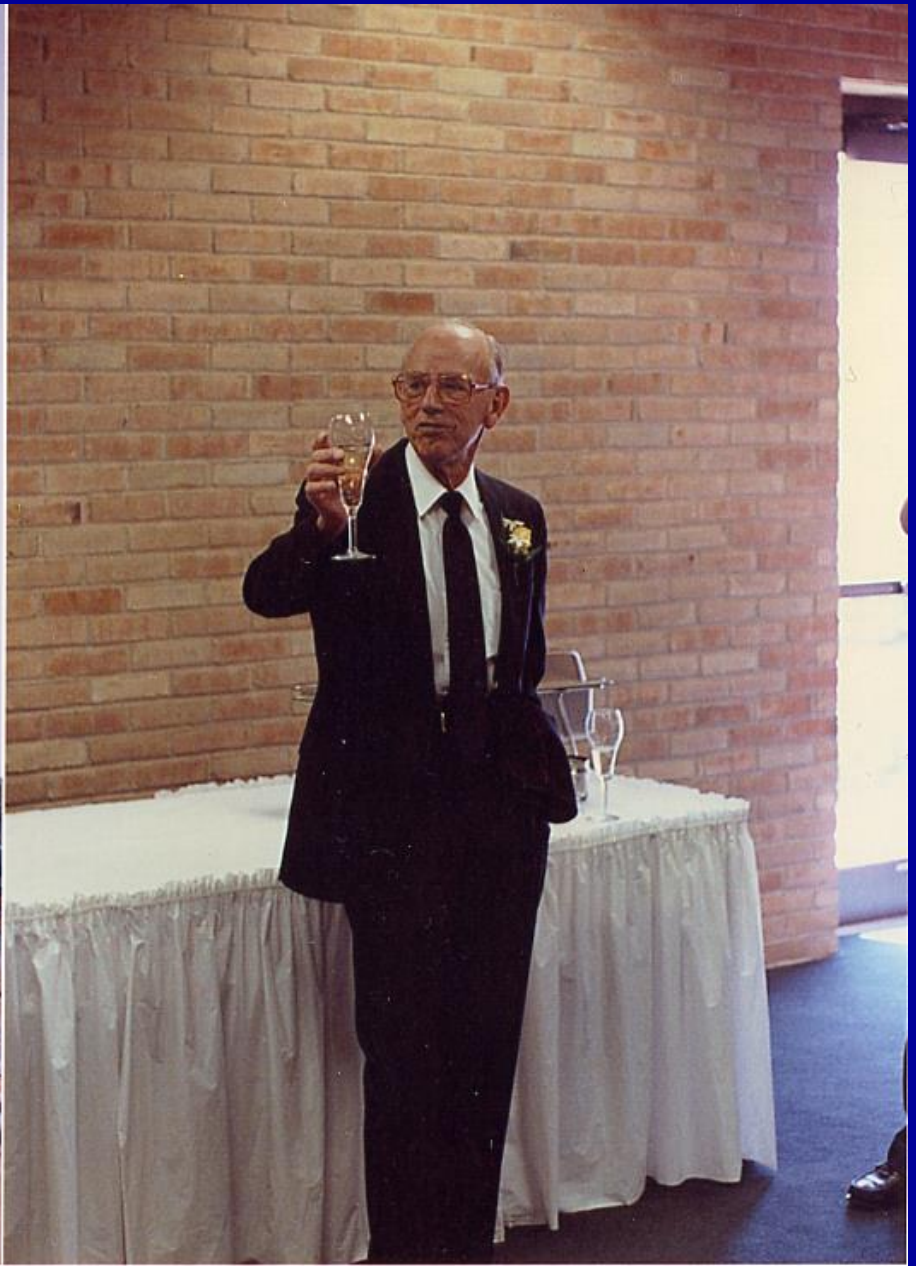
Golden Valley, Minnesota

Married 41 years

“Physical Moving Dreams”

“Violent Moving Nightmares”

American Football Dream







Mel Abel: RBD (second patient)

“Hunting Deer Under the Blanket”

Stern Magazine (Germany) March 24, 1988

*“The Man Who Mistook His Wife For a
Deer”*

New York Times Sunday Magazine

February 2, 2003

Los Angeles Man with RBD



Los Angeles Man with RBD




RBD - Bed Safety (Hong Kong)



Montage of Vigorous, Aggressive and Violent Behaviors During REM Sleep in RBD

*Please reference the included CD-ROM
or footnotes related to this video.*



2:43:55 AM

Vignettes from *Paradox Lost*

The Importance of Understanding the First Person Perspective When Confronted With a Newly Recognized Medical Disorder.

This is the First Part of the Circle that Needs to Be Completed.

57 Year Old Man with RBD and Wife

- “It seems like I am extra strong when I sleep.”
- “It almost seems like a force picks him up.”-Wife
- “He is sleeping and his body is in motion.”-Wife.
- “I don’t think he ever could hit as hard while awake as he hits during sleep. A year ago he punched right through a wall board in our bedroom at our lake cabin.”—Wife.
- “Oh yes, there were always bloody sheets.”Wife

67 Year Old Man with RBD and Wife

- “It’s amazing. You should see the energy behind that activity. Oh, it’s so unreal.”—Wife.
- “He pounded my head one night and my head still hurt for another 2 weeks.”—Wife.
- “His legs go fast, just like he’s running.”—Wife.
- “We’ve put as much distance between us in bed as we can.”—Wife.
- “I didn’t really sleep soundly until he got up in the morning.”—Wife.

65 Year Old Man with RBD and Wife

- “I was wrestling someone and I had her by the head. What scares me is what a catastrophe that would be to wake up and find that I had broken her by the neck.”
- This went on for 3 years, and then I retired—
but nothing changed afterwards whatsoever.”
- “What happens to people like my husband who don’t get diagnosed? Do they kill their wives in these experiences? Do we know?”—Wife.

RBD

The Power of Love

The Strength of Marriage

True Love Shines Through the Darkest of Nights

“Violent Moving Nightmares”

Sleep

9(2):293–308, Raven Press, New York

© 1986, Association of Professional Sleep Societies

Chronic Behavioral Disorders of Human REM Sleep: A New Category of Parasomnia

Carlos H. Schenck, Scott R. Bundlie, Milton G. Ettinger, and
Mark W. Mahowald

*Minnesota Regional Sleep Disorders Center, Hennepin County Medical Center, University of
Minnesota, Minneapolis, Minnesota, U.S.A.*

Chronic RBD

- 4 men, 67-72 years old, had 4-month to 6-year histories of injuring themselves or their spouses with aggressive & injurious behaviors during sleep—often during dream enactment.
- A 60 year old woman had disruptive but non-violent sleep and dream behaviors.

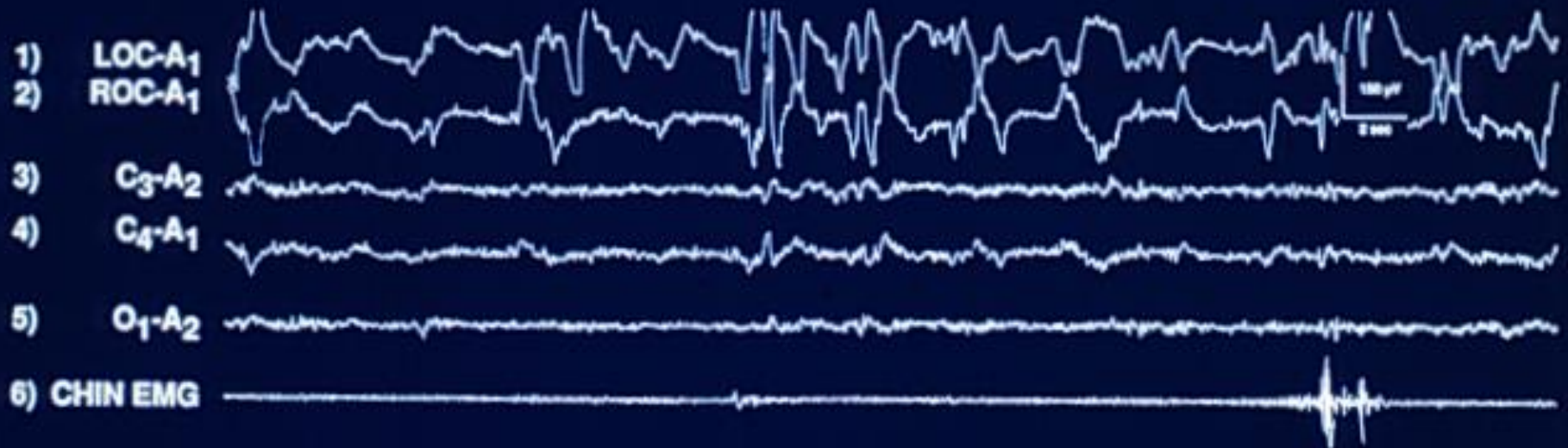
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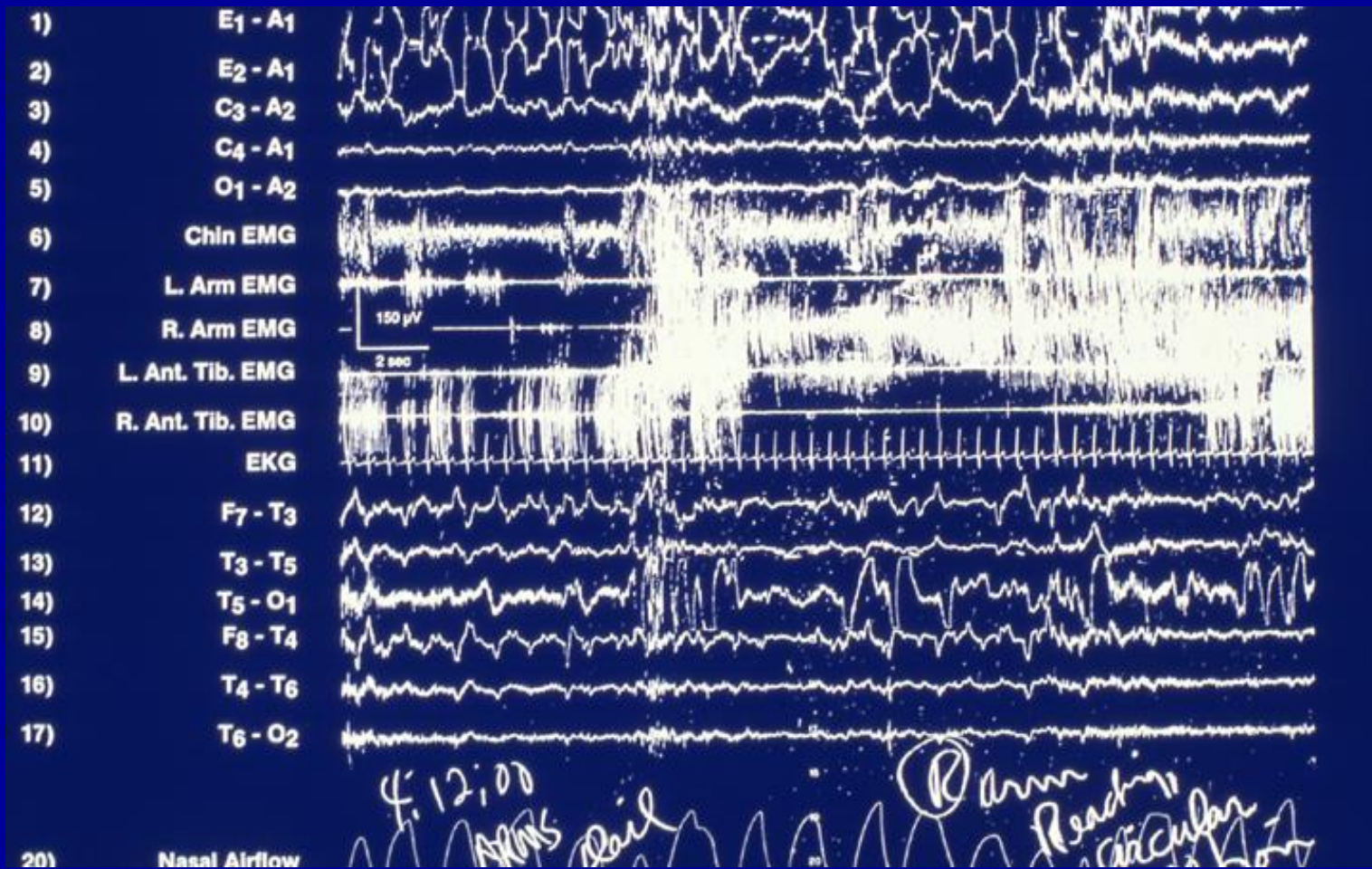


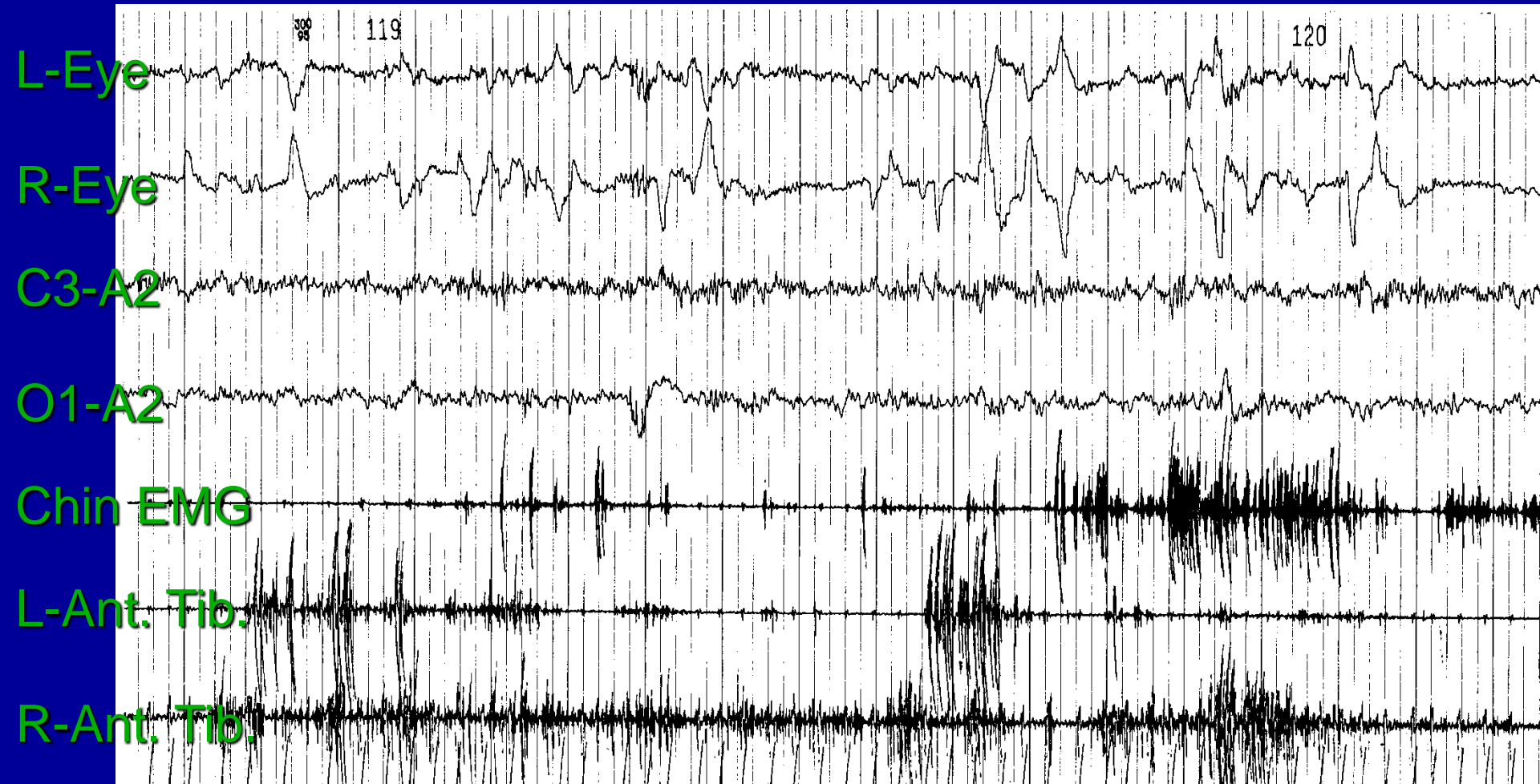
- RBD behaviors (with abnormal dreaming)-
emerging with loss of “REM-atonia”.
- The essential objective finding in RBD:
Loss of the usual mammalian generalized
muscle paralysis of REM sleep “REM-
Atonia.”

L.H. 55 YEAR OLD MAN

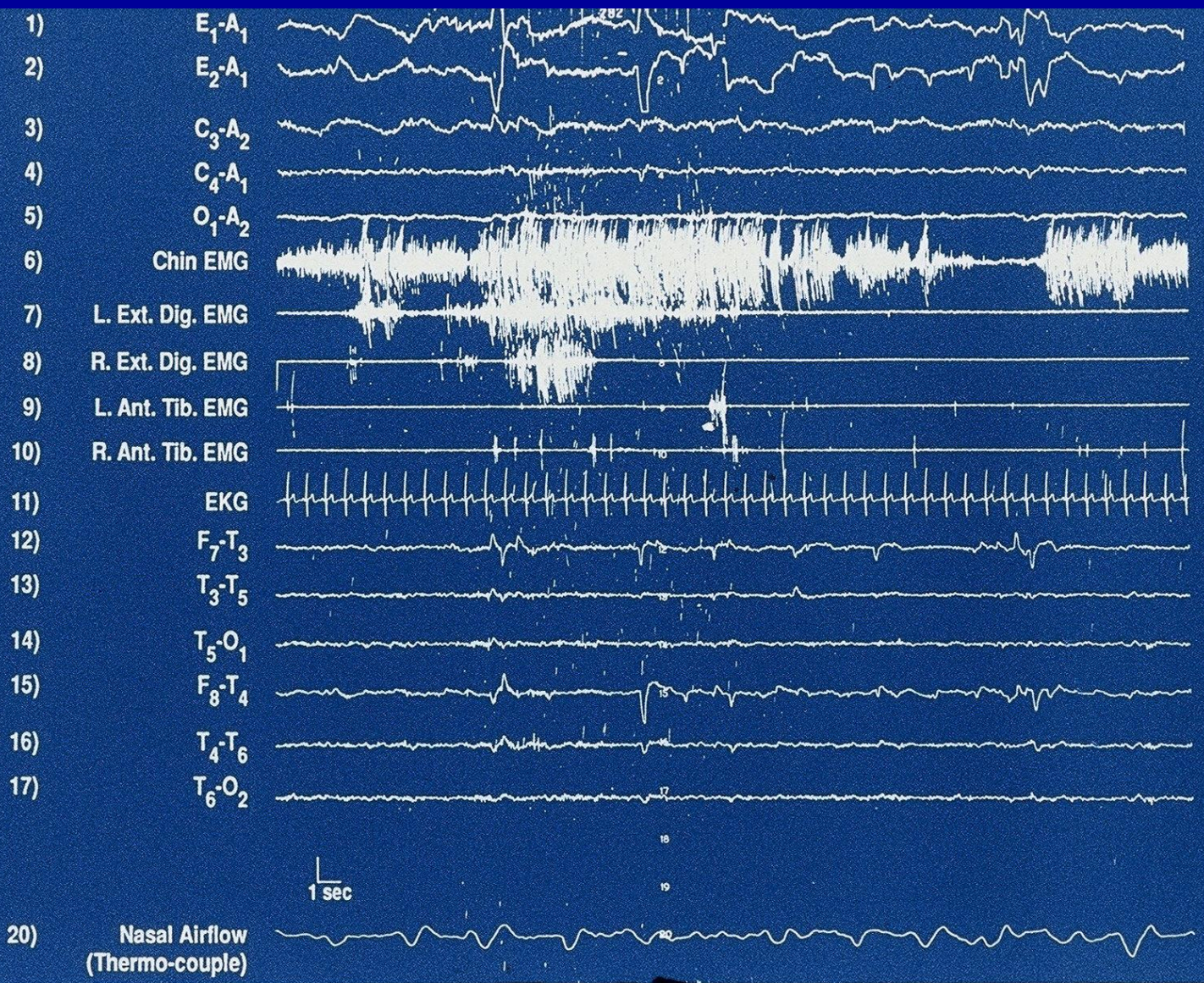


REM Sleep Behavior Disorder— Dream-Enacting Episode





Intermittent loss of REM-Atonia in Parkinsonism



RBD behaviors (with abnormal dreaming)-- emerging with loss of REM-atonia:

- 1) Minimal: limb twitching and jerking
- 2) Complex: hand waving, hand grabbing, reaching and searching motions, gestures
- 3) Vigorous and violent: punching, kicking
- 4) Vocalizations: simple talking, yelling, swearing profanities, prolonged talking (with anger, laughter, or nonsensical)

1) RBD—Altered Dreams (typical)

- Vivid, intense, full of action, unpleasant.
(dream process change)
- Dreamer is being threatened or attacked by unfamiliar people, animals, insects—and responds by punching, kicking, running away, shouting, cursing.
(dream content change)
- Dreamer is rarely the primary aggressor.⁵⁸

RBD: Behavior Disorder & Dream Disorder: Tightly Linked

- Date of onset
- Progression over time
- Response to medication (clonazepam)
- Relapse (temporary or longstanding)
- Presumably they share a common pathophysiology (brainstem generated?)

RBD Dream-Enacting Behaviors

No Sexual Acting-Out!

Sigmund Freud would be very surprised (and disappointed?)

RBD appears to be a prototypical “ID release state”—but no sexual release.

RBD & Sexsomnia

Sigmund Freud might wonder...

Why is RBD not Sexsomnia, and
why is Sexsomnia not RBD?

Could the answer lie in the brainstem,
and not in the cerebral cortex?

“Aggressive Dream Content Without
Daytime Aggressiveness In REM
Sleep Behavior Disorder”

Neurology 2005;65:1010-1015

(Fantini ML, Corona A, Clerici S,
Ferini-Strambi L)

Major Findings

- 1) Men with RBD had significantly more aggressive dreams than control men.
- 2) Men with RBD while awake were not more aggressive than control men.

RBD—Altered Dreams

The Dream Changes in RBD

Rarely Have Psychodynamic Meaning

The Dream Changes in RBD are Not

Relevant to the Person's life—

Past or Present

Are Dreams Always Wishes?

In RBD: Rarely

“Atypical Dream-Enacting Behaviors in
REM Sleep Behavior Disorder (RBD),
Involving Abuse/Retaliation Dreams,
Culture-Specific Dreams, and Religion-
Specific Dreams”

Sleep 2008;31(Suppl):A263-264

(Schenck CH, Mahowald MW, Tachibana N, Tsai C-S)

I) Abuse/Retaliation dreams with RBD

(Dreams can be wishes—and dream-enactment can become wish fulfillment)

3 Patients

I) Abuse/Retaliation dreams (USA)

Case 1: 43 Year Old Woman

- Dream-enactments on many nights observed by her husband: defensive posturing, arm flailing, and punching that occurred with dreams of her mother & sister who often screamed at her and beat her during childhood.

- She never retaliated in childhood--but only later during dream-enactment with RBD.
- Wish fulfillment with retaliation had to wait until she developed RBD later in life!
- Clonazepam controlled RBD dream-enacting behaviors and the associated retaliation dreams.
- Standard therapy of RBD controlled the wish-fulfillment retaliation dreams.

I) Abuse/Retaliation dreams with RBD

Case 2: 43 Year Old Man

- Developed RBD with “fighting dreams” observed by his wife that involved hitting back at his previously verbally and physically abusive alcoholic father.

I) Abuse/Retaliation dreams with RBD

Case 3: 58 Year Old Man

- Developed RBD with some of his recurrent dream-enactments involving “punching out” a hypercritical father during his childhood, while he was actually hitting his wife in bed.

58 Year Old Man

- In the mornings upon awakening, he never felt remorse about retaliating and punching out his father.
- Prior to developing RBD, he did have dreams about his hypercritical father—but he did not have retaliation dreams.

58 Year Old Man

- Therefore, he needed to develop RBD later in his life in order to start having retaliation dreams against his father:
- Psychodynamic dream-disinhibition facilitated by the onset of RBD!
- Clonazepam therapy at bedtime controlled both the dream-enacting behaviors and the retaliation dreams.

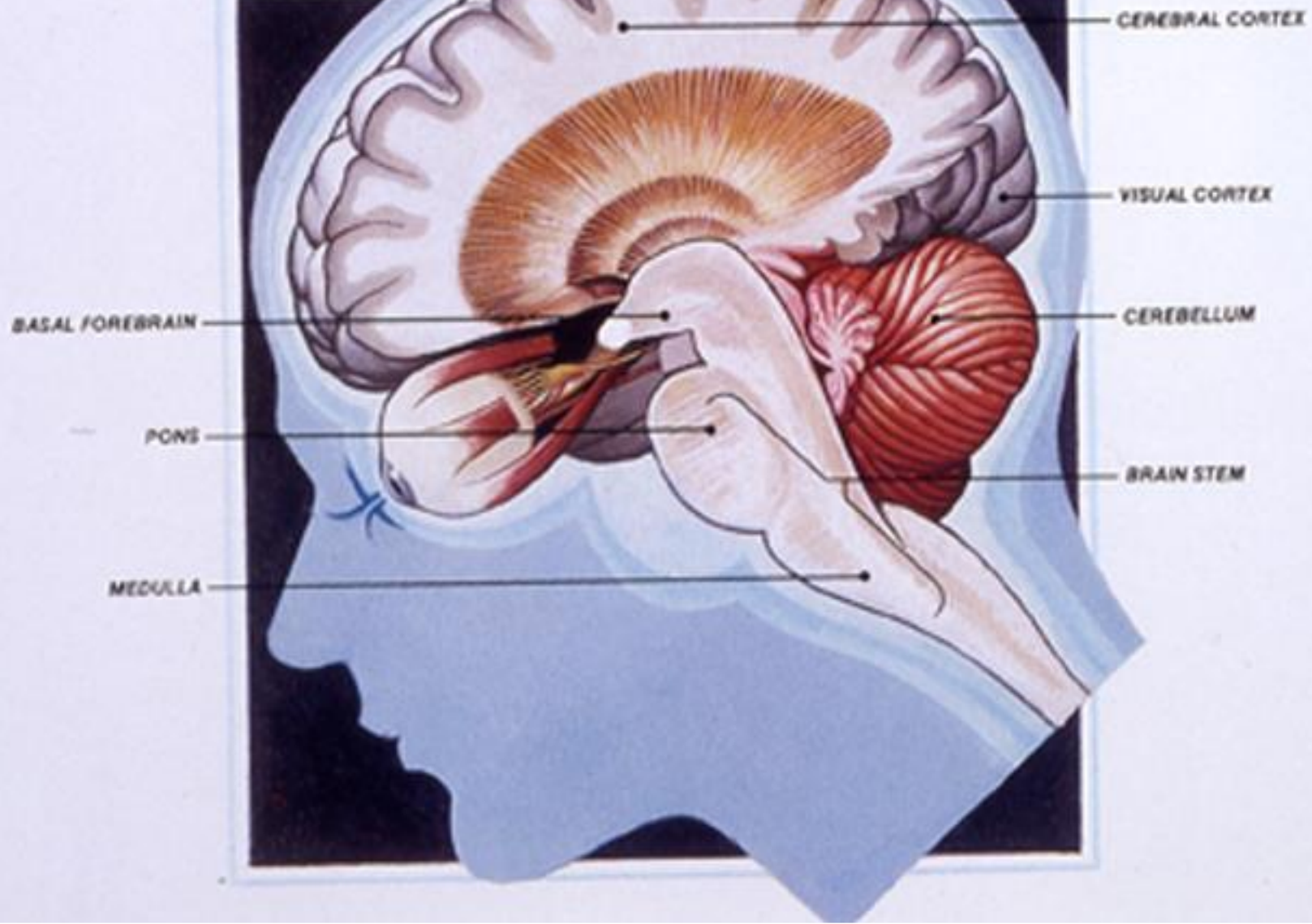
RBD—Animal Model

REM without atonia (1965)

Jouvet and Delorme (Lyons, France)

Created an animal model of RBD in cats.

Bilateral pontine lesions (peri-locus ceruleus): spectrum of behaviors released during unequivocal REM sleep.



RBD—Animal Model

4 Categories of Behaviors In REM Sleep

1. Unorganized head and limb movements
("minimal RBD syndrome")
2. Orienting, searching behaviors
3. Attack
4. Locomotion, including running
("complex RBD syndrome")

*These positive findings closely match human RBD*⁷⁸

RBD—Animal Model

Sexual behaviors, grooming, urinating, defacating--never found.

These negative findings closely match human RBD

Proposed Pathophysiology of REM Sleep Behavior Disorder in Humans

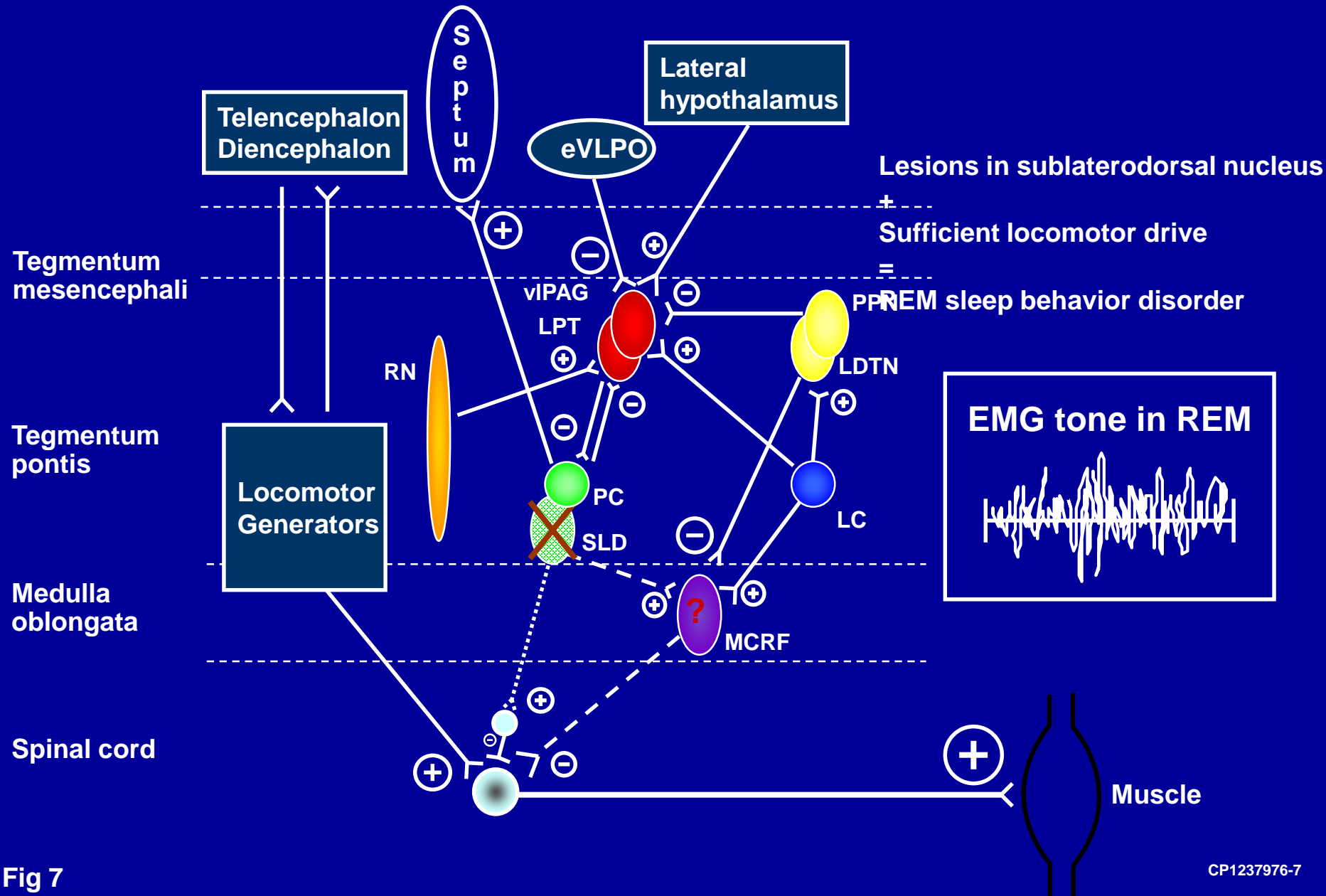


Fig 7

Chronic RBD

- A) Idiopathic (Cryptogenic)
- B) Associated with Neurologic Disorders**
- C) Medication-induced (antidepressants)
- D) Miscellaneous

Chronic RBD--Neurologic Disorders

Most Common Associations

- Neurodegenerative Disorders (esp. parkinsonian disorders)
- Narcolepsy-cataplexy (≤60% of cases)
- Cerebro-vascular Disorders
- Virtually all types of neurologic disorders can cause RBD:
Location of the lesion is critical.

RBD and Parkinsonism

Minnesota Regional Sleep Disorders Center

Experience: 1986-present

Newly diagnosed RBD patients:

1. 50% idiopathic
2. 50% symptomatic (neurologic disorders)

What was the outcome of idiopathic RBD?

What happened to the idiopathic RBD patients over time?

A disorder of dream-enacting behaviors can often be the first sign of a classic brain disorder: Parkinson's disease and related neurodegenerative disorders.

The study of human behavior during sleep can shed light on brain dysfunction during wakefulness.

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

Neurology 1996; 46: 388-93

Schenck CH, Bundlie SR, Mahowald MW

Minnesota Group iRBD Outcome Data

- 80.8% (21/26): eventual conversion rate.
- 14.2 ± 6.2 years: mean interval, RBD onset to onset of parkinsonism/dementia.

Sleep Med 2013; 14 (8): 744-748.

Schenck CH, Boeve BF, Mahowald MW

“Delayed emergence of a parkinsonian disorder or dementia in 81% of older males initially diagnosed with idiopathic REM sleep behavior disorder (RBD): 16 year update on a previously reported series”

Barcelona Group iRBD Outcome Data

82% (36/44) of patients with idiopathic RBD eventually developed neurodegeneration.

Lancet Neurology 2013; 12 (5): 443-453.

Iranzo A, Tolosa E, Gelpi E, et al.

“Neurodegenerative disease status and post-mortem pathology in idiopathic rapid-eye-movement sleep behaviour disorder: an observational cohort study”

- N=16 Parkinson's Disease
- N=14 Dementia with Lewy Bodies
- N= 1 Multiple System Atrophy
- N= 5 Mild Cognitive Impairment

Onset of RBD to Onset of Parkinsonism/Dementia/MCI

Rate of Conversion From Idiopathic RBD

- 81% Schenck et al. (2013)--Minnesota
- 82% Iranzo et al. (2013)—Barcelona

Mean Latency Period

- 14.2 yrs (range 5-29) Schenck et al. 2013
- 11.5 yrs (range 5-23) Iranzo et al. 2013
- 12.0 \pm 9.6 years Postuma et al. 2009⁹³

RBD Prevalence in Parkinsonism

- $\leq 46\%$ in Parkinson's Disease:
 - 1) Non-tremor predominant subtype.
 - 2) The presence of RBD in PD is associated with widespread increased PD morbidity.
- 90% in Multiple System Atrophy
- 76% in Dementia with Lewy Bodies

RBD is a marker of widespread neurodegeneration and increased morbidity in PD

PD-RBD vs. PD (without RBD)

- 1) Increased level of PD motor impairment.
- 2) Increased level of cognitive impairment.
- 3) Increased visual hallucinations.
- 4) Increased autonomic dysfunction.
- 5) Greater impairment in quality of life status.

RBD & Parkinsonism— Scientifically Understandable

- REM-atonia nuclei/circuits and
REM phasic motor nuclei/circuits:
 - 1) Located in the brainstem extra-pyramidal region.
 - 2) They have strong reciprocal connections with the motor nuclei degenerating from parkinsonism.

Rapid Eye Movement Sleep Behavior Disorder

Carlos H. Schenck (Editor)

Aleks Videnovich, Birgit Hogl (Assoc. Editors)

(First Textbook on RBD) (Springer: Late 2017)

47 Chapters

Indicates The Breadth and Depth of Clinical and
Basic Science Research on RBD

31 Years (1986-2017)

Rapid Eye Movement Sleep Behavior Disorder

Chapter 42

“Genetics of REM Sleep Behavior Disorder”

Ziv Gan-Or & Guy A. Rouleau

McGill University

Genetics: Gateway to Precision Medicine
in RBD and Neurodegenerative Disorders?

Part VI: RBD: Challenges & Opportunities

- Future Directions in Clinical Care and Research
- Neuroprotection and Disease Modification:

N.B. This is the Crucial Final Step to Complete the Circle Begun by First Person Narratives Shared by the Patients and Spouses: Prevent the Progression to Neurodegenerative Disorder.

International RBD Study Group

- Formed in 2007, legally incorporated in Marburg, Germany (2009).
- 9 international symposia.
- Clinical and basic science research.
- 9 peer-reviewed journal articles published.

RBD Special Issue

Sleep Medicine 2013;14

Preface (page 701)

- “RBD is situated at a strategic and busy crossroads of sleep medicine and the neurosciences.”
- “RBD offers great breadth and depth of research opportunities, including extensive inter-disciplinary and multinational research opportunities.”

Thank You!

