Slide 1

Obsessive-Compulsive Disorder: Diagnosis and Modern Treatment

Gerhard M. Friehs, M.D., Ph.D.

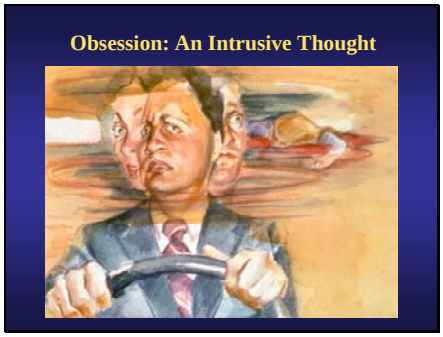
Department of Clinical Neurosciences (Neurosurgery)

Slide 2

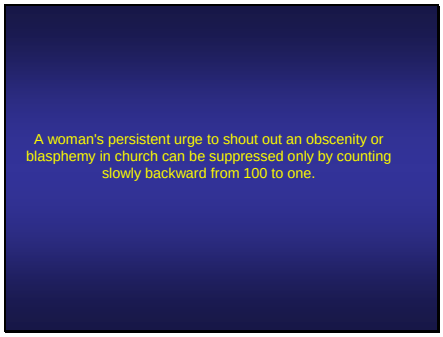
Slide 3

A man will not go to public places because he fears he will have intolerable sexual thoughts or falsely accuse someone of committing a crime.

Slide 4



Slide 5



Slide 6

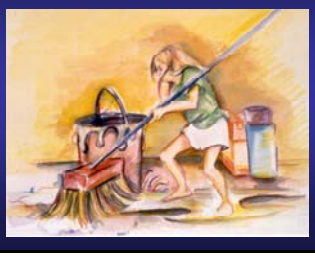
Slide 7

For eight years a man spends an hour a day washing his hands, showering, and dressing. He has stopped grooming and changing his clothes because the rituals required take too long. He stays in his room, eating only a few carefully selected foods and constantly checking to see that furniture is in exactly the "right" place.

Slide 8

Slide 9

Contamination Obsessions and Cleaning

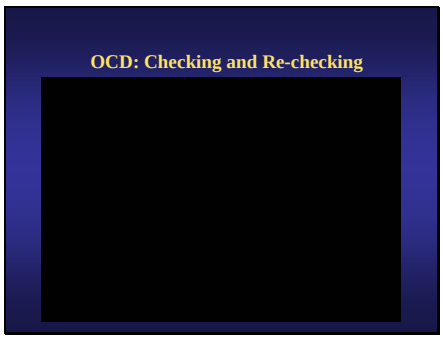


Slide 10

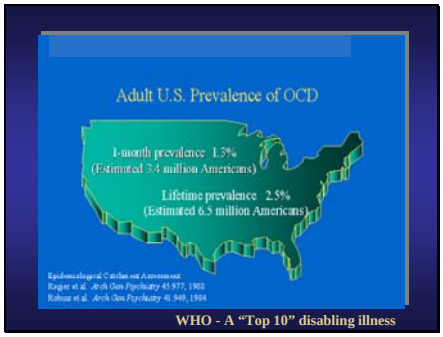
Slide 11

Slide 12

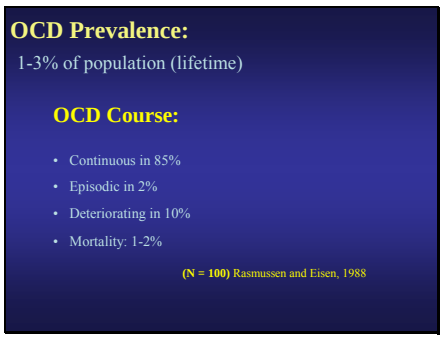
Slide 13



Slide 14

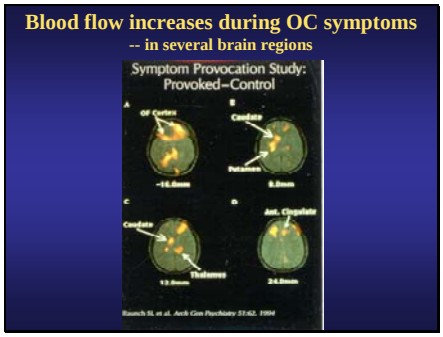


Slide 15

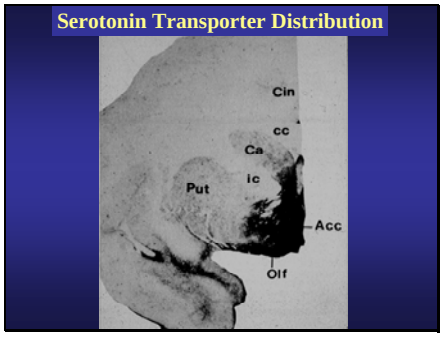


Slide 16

Slide 17



Slide 18



Slide 19

Summary of Results of PET Studies in Untreated Patients with OCD

Source	N	Eyes/Task	Increased Metab v Nls
Baxter	14	Open/none	L. Orbital
Baxter	14	Open/none	R. & L. Orbital
Nordahl	8	Closed/auditory	R. & L. Orbital
Swedo	18	Closed/none	R. Orbital L. Ant. Cingulate

Slide 20

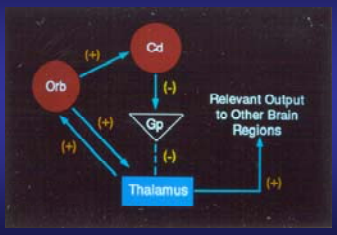
Orbitomedial Cortex

- Neurons that selectively maintain firing following stimuli that signal an upcoming appetitive or aversive stimulus have been found in MOFC.
- These cells update the expectation of the aversive or appetitive nature of the events by making changes in reinforcement contingencies.

Slide 21

Orbital - Basal Ganglia - Pallidal -Thalamic Loop

In more detail….



Slide 22

WORKING MEMORY

A internal representation of the world is created and held in awareness, retrievable instantly, to guide behavior

(prefrontal cortex)

Slide 23

Implicit Memory in OCD

(some evidence we're on the right track)

- OCD patients and controls were given an implicit memory task (learned a motor sequence on a keyboard)
- OCD patients performed normally, but
- Basal ganglia activated in controls (expected) but not in OC patients
- Instead, OC patients used an explicit memory system (temporal lobe) to solve an implicit memory task

S. Rauch et al

Slide 24

OCD Core Features

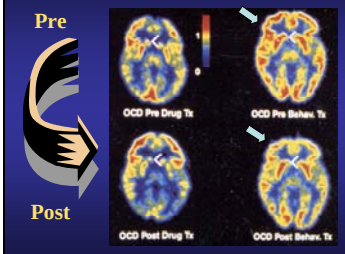
What if? How can I be sure? Stuck.

Slide 25

When Treatment Works, What Happens in the Brain ?

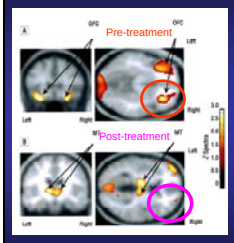
Slide 26

OCD: Metabolic Changes When Treatments Work



Slide 27

FDG-PET: OCD and SRI treatment



Decrease glucose metabolism in right orbitofrontal cortex after SRI (Paroxetine) treatment

Saxena et. 2002

Slide 28

A Screening Test for Obsessive-Compulsive Disorder

Wayne K. Goodman, MD, 1994,
University of Florida College of Medicine

People who have Obsessive Compulsive Disorder (OCD) experience recurrent, unpleasant thoughts (obsessions) and feel driven to perform certain acts over and over again (compulsions). Although sufferers usually recognize that the obsessions and compulsions are senseless or excessive, the symptoms of OCD often prove difficult to control without proper treatment. Obsessions and compulsions are not pleasurable; on the contrary, they, are a source of distress. The following questions are help people determine if they have symptoms of OCD and could benefit from professional help.

Slide 29

Have you been bothered by unpleasant thoughts or images that repeatedly enter your mind, such as:
1. concerns with contamination (dirt, germs, chemicals, radiation) or acquiring a serious illness such as AIDS?
2. overconcern with keeping objects (clothing, groceries, tools) in perfect order or arranged exactly?
3. images of death or other horrible events?
4. personally unacceptable religious or sexual thoughts?

Have you worried a lot about terrible things happening, such as:
5. fire, burglary, or flooding the house?
6. accidentally hitting a pedestrian with your car or letting it roll down the hill?
7. spreading an illness (giving someone AIDS)?
8. losing something valuable?
9. harm coming to a loved one because you weren't careful enough?

Have you worried about acting on an unwanted and senseless urge or impulse, such as:
10. physically harming a loved one, pushing a stranger in front of a bus, steering your car into oncoming traffic, inappropriate sexual contact, or poisoning dinner guests?

Have you felt driven to perform certain acts over and over again, such as:
11. excessive or ritualized washing, cleaning, or grooming?
12. checking light switches, water faucets, the stove, door locks, or emergency brake?
13. counting; arranging; evening-up behaviors (making sure socks are at same height)?
14. collecting useless objects or inspecting the garbage before it is thrown out?
15. repeating routine actions (in/out of chair, going through doorway, re-lighting cigarette) a certain number of times or until it feels **just right**
16. need to touch objects or people?
17. unnecessary re-reading or re-writing; re-opening envelopes before they are mailed?
18. examining your body for signs of illness?
19. avoiding colors ("red" means blood), numbers ("13" is unlucky), or names (those that start with "D" signify death) that are associated with dreaded events or unpleasant thoughts?
20. needing to "confess" or repeatedly asking for reassurance that you said or did something correctly?

(If YES to 2 or more continue with Part B)

Slide 30

Neurosurgery for OCD

- Anterior Capsulotomy (Europe)
- Anterior Cingulotomy (U.S.)
- Orbitofrontal, aka limbic leukotomy (U.K.)
  - Different procedures but similar results
  - Stereotactic MRI localization of lesions
- Gamma-knife surgery
  - Lesions produced by cross-firing of cobalt-60 gamma irradiation

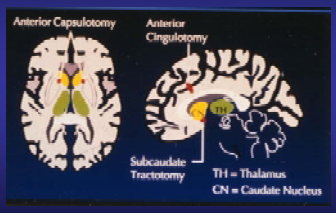
Slide 31

Background

- 5-10% percent of OCD patients are severely ill and refractory to all proven treatments
- Neuroimaging studies implicate corticolimbic–basal ganglia-thalamic dysfunction in OCD pathogenesis
- Neurosurgical interruption of corticobasalthalamic connections leads to therapeutic improvement

Slide 32

Modern Neurosurgery in OCD



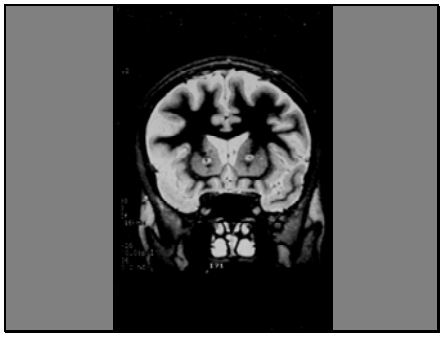
Slide 33

" It is necessary to alter these synapse adjustments and change the path chosen by the impulses in their constant passage so as to modify corresponding ideas and force thoughts into different channels…By upsetting the existing adjustments and setting in movement in other [connections] I [Expect] to be able to transform the psychic reactions and to relieve the patient thereby"

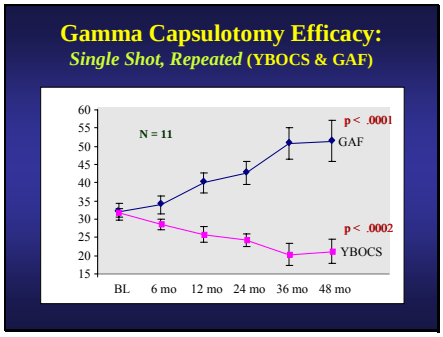
– Egas Moniz (1935)

Slide 34

Slide 35



Slide 36



Slide 37

Inclusion Criteria

- Adherence to strict InclusionCriteria*
- Age 18-60 years
- Disabling OCD
  - Yale Brown Obsessive Compulsive Score (Y-BOCS) Y-BOCS >28
  - Global Assessment of Functioning (GAF) <45
- Disease lasting >5 years
- Adequate trial of at least three or more SSRIs including clompramine; augmentation of SSRI with clonazepam, and neuroleptics
- Adequate trial of Behavioral Therapy (≥ 20 sessions; consider residential Tx)
- Able to understand and comply with instructions and to come for multiple therapies
- Drug free or stable regimen for at least 6 weeks
- Good overall health

Slide 38

Exclusion Criteria

- Current or past psychotic disorder
- Current substance abuse
- History of either Body Dysmorphic Disorder (BDD) or severe personality disorder (strong relative contraindications)
- Neurological disorder affecting brain function except
  - Motor tics or Tourette syndrome
- Surgical contraindications to DBS

Slide 39

Patient Characteristics and Protocol

- 15 patients (7 males, 8 females) operated from 1998-2002
  - Butler & RI Hospitals/Brown U., Rhode Island
  - Cleveland Clinic, Ohio
  - University of Leuven, Belgium
- Age at onset of OCD: 14.7 years old (range 7-28)
- Age at implantation: 36 years old (range 22-60)
- Most common symptoms
  - Checking
  - Contamination fears
  - Perfectionism/incompleteness
  - Pervasive rituals
  - Arranging
  - Washing
  - Intrusive obsessions
  - Need for reassurance
  - Counting
  - Fear of harming

Slide 40

Pre-operatvie Assessments-Studies

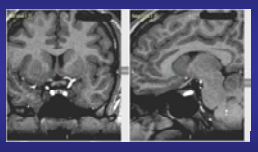
- Pre operative Assessment measures
  - –Clinical and Structured Diagnostic Interviews (SCID-IV)
  - –Yale Brown Obsessive Compulsive Score (Y-BOCS)
  - –Global Assessment of Functioning (GAF)
  - –Hamilton depression and anxiety scores (HAM-D) and (HAM-A)
  - –Neuropsychological battery
  - –Quality of life (MOS-36, Q-LES-Q) and Other measures
- MRI
- PET Scan

Slide 41

Surgery

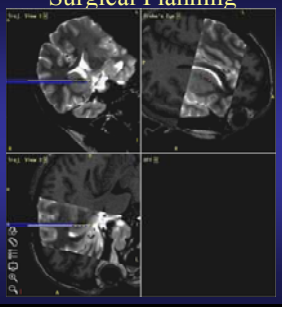
- Stereotactic image-guidance and navigation
- Initial target same as capsulotomy
  - Bilateral anterior limb of internal capsule
- Anatomical targeting
  - High resolution MRI (volumetric gradient echo, inversion recovery, T2)
- Microrecording
- Macrostimulation
- Target is evolving
  - Optimal target yet to be determined

Slide 42



Slide 43

Surgical Planning



Slide 44

DBS in Neuropsychiatry: Not a New Idea

"... focal controlled stimulation of the human brain is a new technique… that is here to stay, having potential advantages over… destructive procedures by virtue of the fact that it does not destroy brain tissue but nevertheless seems capable of yielding satisfactory therapeutic results."

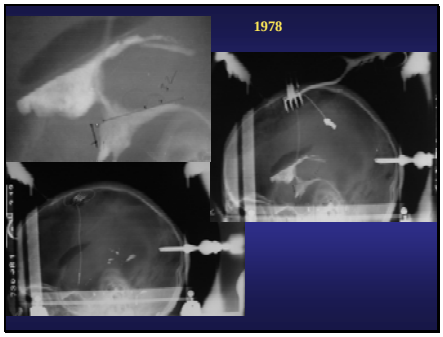
- J.L. Pool, 1948

Slide 45

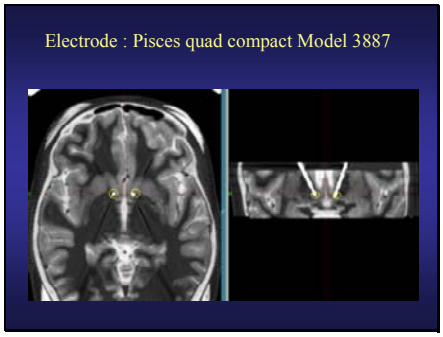
DBS Implantation

Slide 46

Slide 47



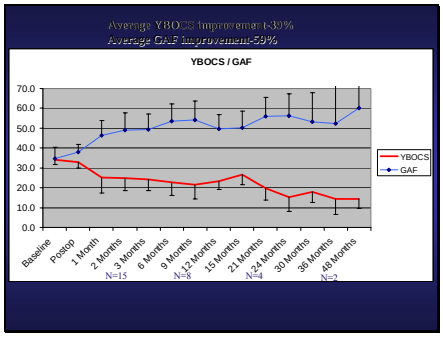
Slide 48



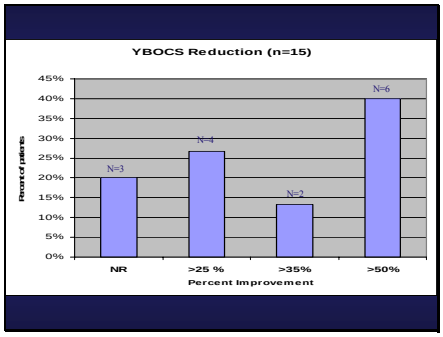
Slide 49

DBS Advantages	Adverse Effects
• Precise • Controlled • Reversible – Not destructive • Adjustable – Refine Target Site – Maximize benefit – Minimize side effects	• Surgical: – Hemorrhage (~1-2%) – Seizure (≥1%; w/in 24 hrs) – Infection (2-3%) – Other surgical • From Stimulation: – Mood changes (hypomania, depression, anxiety also possible) – Sleep changes/insomnia – Sensory/motor effects – Stimulation OFF effects – Device malfunction

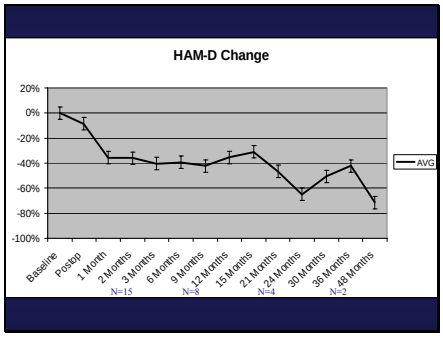
Slide 50



Slide 51



Slide 52



Slide 53