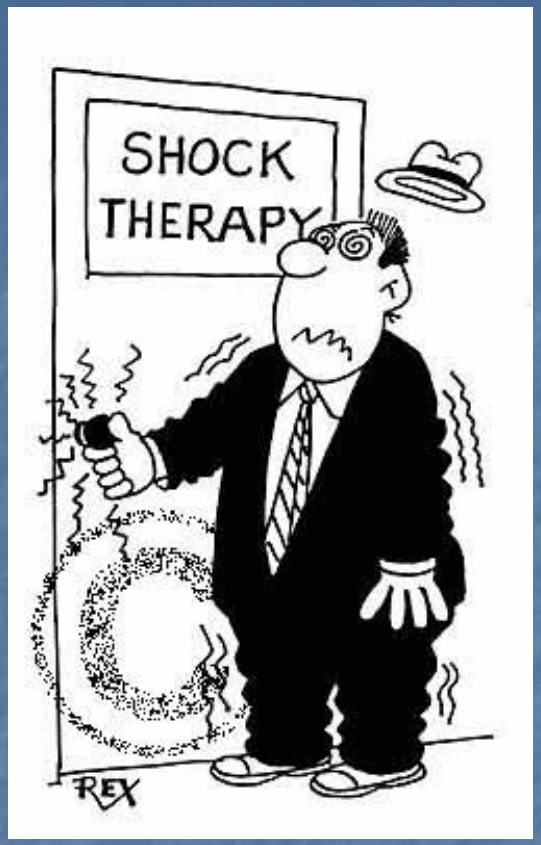


GASW
GREATER AUSTIN SOCIAL WORKERS

3-17-15

ECT 101

Michelle Magid, MD
Clinical Associate Professor, UT Southwestern
Clinical Assistant Professor, UTMB, Texas A&M
Clinical Assistant Professor, Texas A&M
Clinical Faculty, Dell Medical School
Director of ECT, Seton Shoal Creek 2007-12

Objectives

- Review the history of ECT
- Explain the risks and benefits of ECT
- Identify which patients are and are not appropriate for ECT
- Recognize when and how to refer a patient for ECT
- Explain the most recent ECT research and findings

Conflicts

- Young Investigator Grant Brain and Behavior Institute
- Consultant- Allergan Pharmaceuticals

NO TRIAL HAS EVER FOUND AN ALTERNATIVE SUPERIOR TO ECT FOR THE TREATMENT OF DEPRESSION

Real Patients

50 yo female with hx. of 1 psychotic depressive episode 3 years ago. That episode lasted 8 months and finally resolved with Zyprexa and Zoloft.

She is admitted to Seton Main because she hasn't eaten x 5 days. She is also minimally responsive to conversation. She thinks she is a bad person and she is in the hospital to be killed. Her husband reports that she this episode is very similar to her episode 3 years ago but "much much worse." It's been going on x 6 months. She is not sleeping, has an NG tube in for nutrition, is worried about "everything," and won't leave the house.

On exam, the patient is extremely slowed. She is barely able to move her head to face me. She is unable to answer basic questions (e.g. What is your name?).

Her husband and family are cooperative, educated and are very much want her to get ECT.

ECT treatment

History

1917 Malaria-induced fever to treat neurosyphillis- Julis Wagner

1927 Insulin-induced seizures and coma to treat schizophrenia- Sakel

1934 Metrazol-induced seizures to treat schizophrenia- Meduna

1937 Electroshock therapy to treat schizophrenia- Cerletti

1910 1920 1930 1940

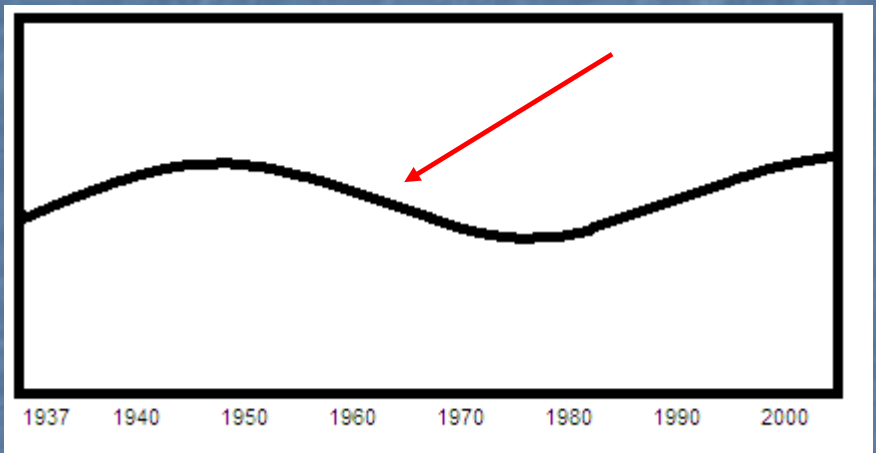
Website:http://www.cerebromente.org.br/n04/historia/shock_i.htm

1940s

1960s

2000s

ECT Popularity



Website:http://www.cerebromente.org.br/n04/historia/shock_i.htm

Indications

- Depression
- Mania/mixed states
- Catatonia
- Schizophrenia/Schizoaffective- acute exacerbation
- Parkinson's Disease

Major Depression

- Sadness
- Sleep
- No interest
- Guilty
- Energy
- Concentration
- Appetite
- Psychomotor changes
- Suicidal thoughts

Major Depression

- Failure to respond to two or more adequate trials of antidepressants
- Psychotic depression
- Life threatening depression
- Responded to ECT in the past
- Pregnancy

Treatment severity does much better than treatment-resistance

Samuel B. Guze. Washington University, Adult Psychiatry. 1997. Chapter 22, pp 352-53

Major Depression

- CORE (Consortium for research in ECT) remission rates
  - 86% (341/394 pts)
- CUC (Columbia University Consortium) remission rates
  - 55% (159/290 pts)
- PRIDE (Prolonging Remission in depressed elderly) remission rates
  - 63% (89/141 pts)
  - 10% non-remitters (14/141 pts)
  - 27% drop-out (38/141 pts)

JAMA July 18th, 2007- Vol 298 No 3

Sackeim, HA, Continuation pharmacotherapy in the prevention of relapse following electroconvulsive therapy: a randomized trial. JAMA 285: 1299-1307, 2001

Kellner CH et al, Continuation ECT vs. pharmacotherapy for relapse prevention in major depression. CORE trial. Arch. Gen. Psychiatry 63: 1337-1344, 2006

PRIDE Study Efficacy of Right Unilateral Ultrabrief Pulse Electroconvulsive Therapy (ECT): Data from Phase 1 of the PRIDE Study. Poster presented at AAGP 2013. http://www.ajgponline.org/article/S1064-7481(12)00285-0/pdf

Major Depression

- STAR*D remission rates (n=4000) (response 1842) remission rate: approx. 46%)
  - Level 1:
    - Citalopram 30% (level 1) (n=1200)
  - Level 2
    - Bupropion 23% (n=214) Sertraline 21% (n=195) Venlafaxine 25% (n=233)

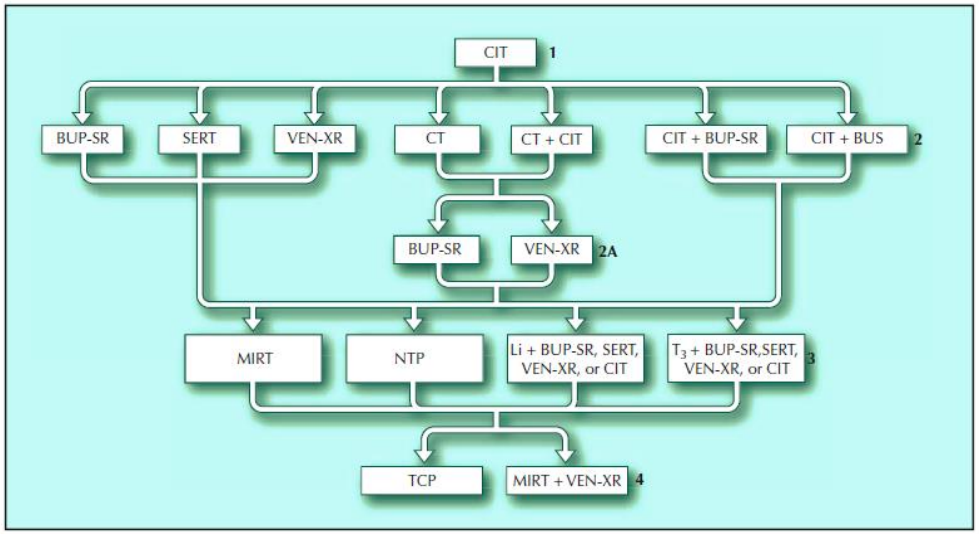


Figure 1. Treatment strategies and options in Levels 1 to 4. BUP-SR—bupropion sustained release; BUS—buspirone; CIT—citalopram; CT—cognitive therapy; Li—lithium; MIRT—mirtazapine; NTP—nortriptyline; SERT—sertraline; T_3—triiodothyronine; TCP—tranylcypromine; VEN-XR—venlafaxine extended release.

Howland RH. Sequenced Treatment Alternatives to Relieve Depression (STAR*D). Part 2: Study outcomes. Journal of Psychosocial Nursing. 46(10):21-4, 2008 Oct.

Warden, Diane, et al. "The STAR* D Project results: a comprehensive review of findings." *Current psychiatry reports* 9.6 (2007): 449-459.

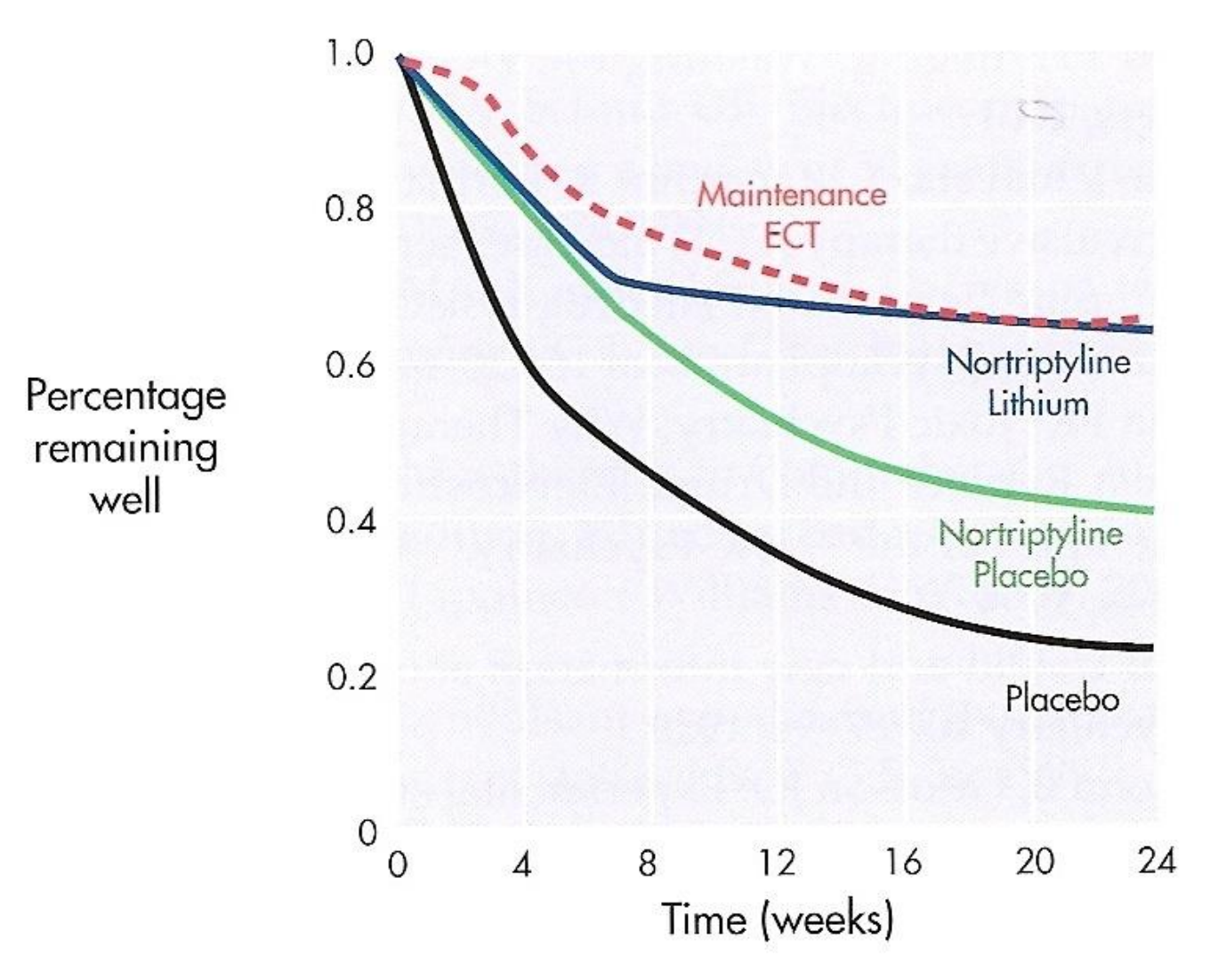
Major Depression

- Relapse Rates at 6 months after ECT course
  - Placebo- 84%
  - Nortryptiline- 60%
  - Nortryptiline/Lithium- 39%, 32%
  - Maintenance ECT- 37%

JAMA July 18th, 2007- Vol 298 No 3

Sackeim, HA, Continuation pharmacotherapy in the prevention of relapse following electroconvulsive therapy: a randomized trial. JAMA 285: 1299-1307, 2001

Kellner CH et al, Continuation ECT vs. pharmacotherapy for relapse prevention in major depression. CORE trial. Arch. Gen. Psychiatry 63: 1337-1344, 2006



Brain Stimulation therapies for Clinicians Higgins 2009, pp 71

Sackeim, HA, Continuation pharmacotherapy in the prevention of relapse following electroconvulsive therapy: a randomized trial. JAMA 285: 1299-1307, 2001

Kellner CH et al, Continuation ECT vs. pharmacotherapy for relapse prevention in major depression. CORE trial. Arch. Gen. Psychiatry 63: 1337-1344, 2006

Major Depression with Psychosis

- Antidepressants alone
  - 30% remission rate
- Antipsychotics alone
  - 50% remission rate
- Combination of antidepressants and antipsychotics
  - 70% remission rate (in 4 months)
- ECT (CORE Study)
  - 95% remission rate (in 4 weeks)

JAMA July 18th, 2007- Vol 298 No 3

Mania

- Remission in 80-90% of patients
- With effective antimanic medications ECT usually reserved for:
  - Treatment-resistant mania
  - Emergent need of stabilization
  - Pregnant patients

Samuel B. Guze. Washington University, Adult Psychiatry. 1997. Chapter 22, pp 352-53

Schizophrenia

"Before the advent of neuroleptic drugs, ECT was considered an effective treatment for dementia praecox. The main reason for discarding ECT was not its lack of efficacy, nor even the risks of its use, but the convenience, ease of administration, lower cost, and political and social acceptance of neuroleptic drugs."

"There is a strong possibility that ECT alters the natural course of the illness"

Max Fink

Max Fink. Harold Sackeim. Convulsive Therapy in Schizophrenia? Vol 22 No 1 1996

Schizophrenia

- 70-80% response rate in acute schizophrenia episode
- In contrast, only 10% of patients with chronic, residual symptoms exhibit benefit with ECT
- Best candidates:
  - Younger adults with more acute onset
  - shorter duration of symptoms
  - higher pre-morbid functioning (ie paucity of schizoid traits, intelligence and promise)

Samuel B. Guze. Washington University, Adult Psychiatry. 1997. Chapter 22, pp 352-53

Max Fink. Harold Sackeim. Convulsive Therapy in Schizophrenia? Vol 22 No 1 1996

Schizophrenia

- Some clinicians believe that pts with treatment resistant schizophrenia should be offered at least one trial of ECT.
- APA task force:
  - ECT is effective in treating schizophrenia in the following situations:
    - Catatonia
    - When affective symptomatology is present
    - When there is a history of good response to ECT
- Combination of antipsychotics and ECT is superior than either treatment alone

Max Fink. Harold Sackeim. Convulsive Therapy in Schizophrenia? Vol 22 No 1 1996

Neurological Illness

- Parkinson's Disease
- Epilepsy (surprisingly)

Impact on Suicide Risk

- Principal cause of death in patients with mood disorders. Half of suicides occur within weeks of seeing a health care provider (often PCP).
- CORE study (444 patients)
  - 1/3 Patients had baseline suicidal thoughts
  - No SI in 61% of pts. after 2 weeks
  - No SI in 81% of pts. at end of course

JAMA July 18th, 2007- Vol 298 No 3

Kellner CH. et al. Relief of expressed suicidal intent by ECT: a consortium for research in ECT study. American Journal of Psychiatry. 162(5):977-82, 2005 May.

What ECT Doesn't treat

- Axis II disorders
- Substance Use
- Dysthymia (or non-episodic depression)
- PTSD
- Dementia/Mental Retardation

Risks of ECT

- Mortality 1 / 10,000 patients (or 1 in 80,000 treatments)
- Cardiac Events (rare, but serious)
- Pulmonary events (aspiration)
- Headaches/Muscle Aches/Jaw Pain (45% of pts)
- Retrograde and anterograde amnesia (29-55%)
- Neurological (Prolonged Seizures, delirium, status epilepticus)
- Treatment Emergent Mania
- Dentition
- Fractures- no!

APA, The Practice of ECT: Recommmendations for treatment, training, and Privileging. Washington DC, APA press 2001

Brain Stimulation therapies for Clinicians Higgins 2009, pp 63-66

Rose D, Fleischmann P, Wykes T, et al. Patients' perspectives on electroconvulsive therapy: systematic review. *BMJ.* 2003;326:1363

Risk/Benefit Analysis

High Benefit

Episodic

Mood nonreactive to environment

Neurovegetative sx/ Treatment severity

Family Hx

Older

Good Relationships/ Holds a job

Low Risk

On minimal medications (less cognitive side effects and anesthesia interactions)

No Medical Problems/Younger

No hx. of Trauma

No Paranoia (low risk to the doctor ☺)

Strong support from family

Low Benefit

Chronic

Mood reactive to environment

No "normal" baseline

Axis II Comorbidity

PTSD

Substance abuse comorbidity

On Long Term Disability

High Risk

Multiple Medications

Cardiac history

Traumatic Brain Injury or brain mass

Severe HTN

Severe Pulmonary Problems

Older

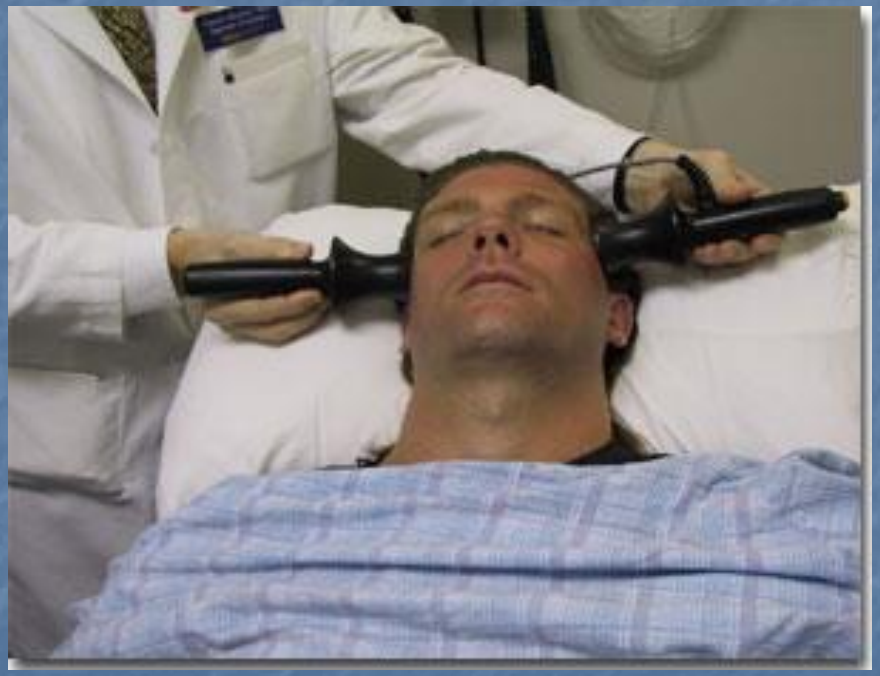
Litigious

ECT Logistics

- Pre-ECT psychiatric assessment
- Pre-ECT anesthesia clearance
  - Labs- CBC, CMP, TSH
  - Pseudocholinesterase level
  - EKG
  - Medical History and Physical
  - Other tests prn- CXR, cardiac work-up
- Need someone to drive you to and from treatments
- Recommend taking time off work
- NPO after midnight
- Consent signed

Electrode Placement

Bitemporal vs. Right Unilateral vs. Bifrontal



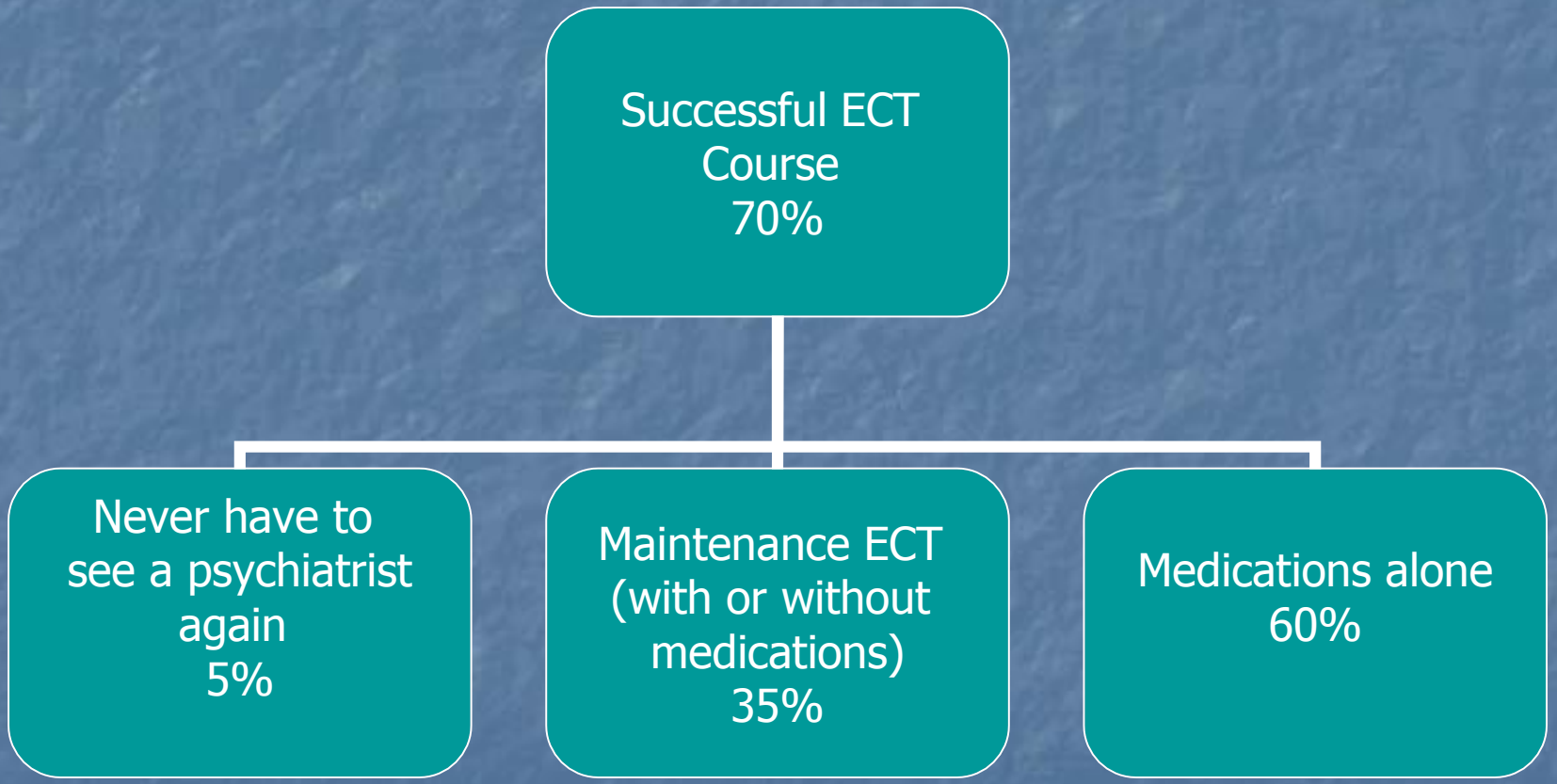
Anesthesia

- Induction agents—methohexital, etomidate, propofol
- Paralytics—succinylcholine
- Anticholinergics—atropine, glycopyrrolate
- Beta-blockers
- NSAIDS, Antiemetics
- Proconvulsants

Meds with ECT

- Concomitant antidepressants are most likely helpful
- Some data suggesting antipsychotics are helpful
- Lithium is associated with increase risk of post-ECT delirium
- Benzodiazepines and anticonvulsants should be used with caution

Continuation Treatment



ECT in Austin 2006-2010

*Real Patients

28 yo female with hx of bipolar disorder currently depressed, admitted after second suicide attempt. Reports all sx of depression and is still suicidal.

Last manic episode was 2 years ago where she flew to Hawaii, got married, got pregnant, got several tattoos and spent $6000 in 3 days. She is unable to work x 1 month and has given up custody of her child to the dad because she is afraid that she cannot take care of it.

Has tried Depakote, Geodon, Zyprexa, Tegretol, multiple antidepressants.

Is a Seton employee x 6 years. Has wonderful friends and family. Last time she felt "normal" was 6 months ago.

*Real Patients

20 yo adopted male with a history of reactive attachment disorder. The patient does not remember his childhood but "I hear it was pretty f**ked up." The patient is obsessed with death. He has been researching online the best way to kill himself. He is excited about the idea of poisoning himself with strychnine. He states he will definitely kill himself but "not for at least a year– I have school debts to pay off, and that's not cool to leave my parents with that burden."

On exam, he states he is "depressed" but has a full, bright full affect. Very engaged. Spontaneous.

He has no medical history.

He has tried multiple medications and "every type of therapy known to man."

His parents are desperate. They want us to try ECT. He says he'll do it, because his parents want him to and he has nothing to lose.

*Real Patients

65 yo male with history of depression. He has tried "every medicine out there" with minimal benefit. The last time he felt normal was "never– maybe when I was 10 years old." He describes his depression as chronic, without episodes. He is currently suicidal and has been so for 5 years. His depression has remained a 7/10 for the last 5 years.

He has no medical problems.

He has been married 3 times and is estranged from his 3 daughters. He is a recovering alcoholic x 20 yrs. He has no friends. He is currently involved in 12 lawsuits, including one against his former psychiatrist.

He is very interested in ECT, saying "I feel like crud all the time. I can't go on living like this. What do I have to lose?"

Real Patients

55 year old female with history of severe depression and ETOH dependence. Patient states this episode started 2 years ago. She has been drinking heavily for the last 18 months to "self medicate." She has tried multiple medications and therapy, without any benefit.

This is her 3rd major Depressive Episode. The other two occurred when she was "sober."

She currently drinks 2 bottles of wine a night. She still holds a job as an executive at a high profile real estate company.

She states she drinks because she is depressed, and she could stop drinking if her depression was fixed. She has been suicidal x 2 weeks. This is the worst she has ever felt. Her last time feeling normal was 2 years ago.

On exam she is tearful and clearly looks tired, depressed, with restricted affect.

She really wants ECT and her husband is supportive of this decision.

*Real Patients

35 year old female, mother of 2, married x 10 years, engineer with no significant psych hx, suffering from post-partum depression and psychosis x 8 months.

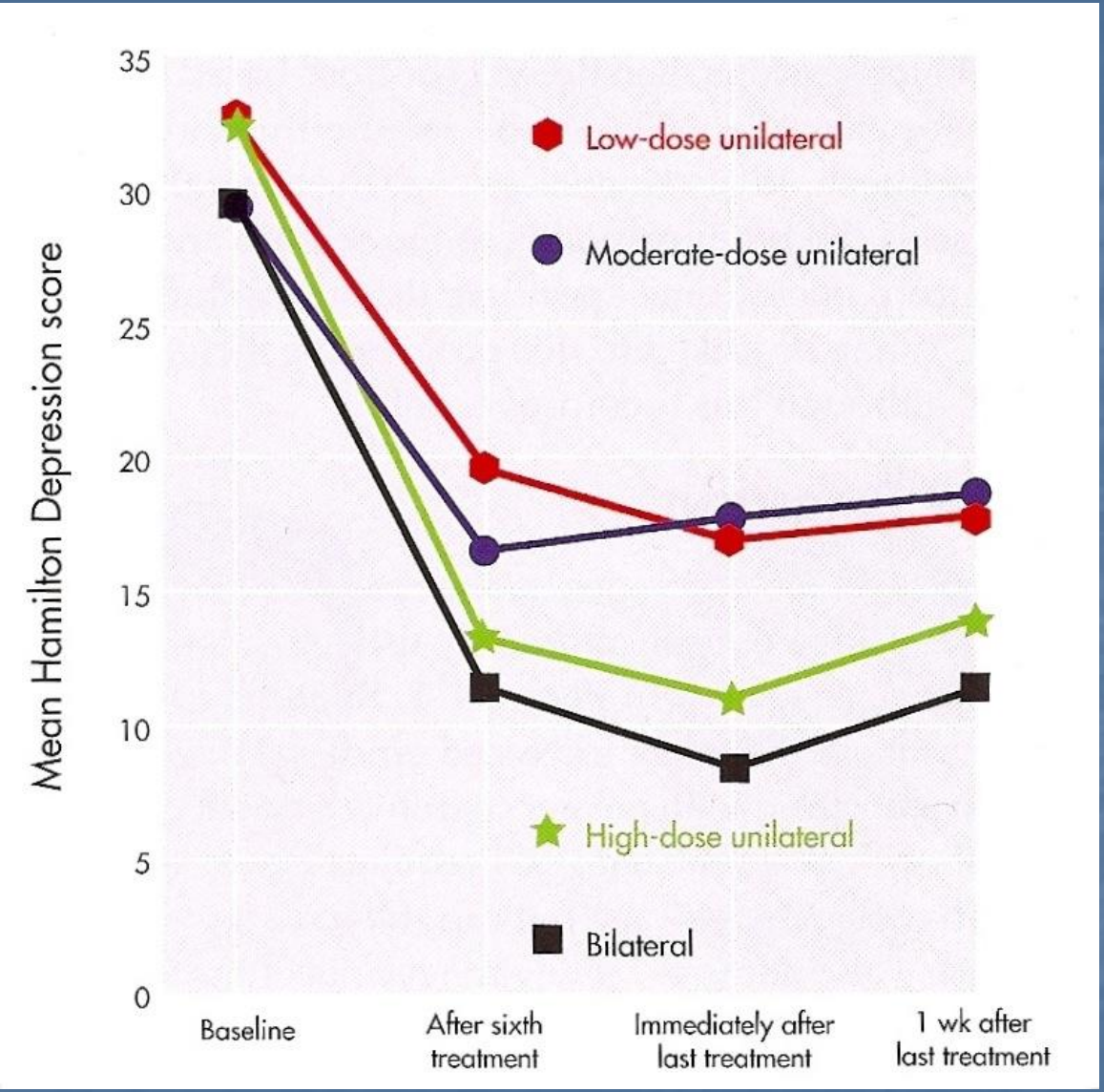
Eight months ago, she started believing that the spiritual demons were commanding her to do special things. Her body needed spiritual cleansing, so she stopped eating anything except for pure sugar. She was admitted to St. David's where she refused all medications. She was court ordered to take Zyprexa. She did so for a few months with minimal benefit, but now she has stopped taking it again.

She was admitted to Seton Shoal Creek for ECT. Prior to admission, she hadn't eaten for 3 days. She has not left her home for 4 months. Her husband will not allow her around the children because he is afraid she will hurt them.

On exam, she will not answer any of my questions, stating "It's because of the spiritual world , you wouldn't understand." When asked if she would hurt her kids, she replies, "I have not been told to do so." She has a flat affect except for the occasional burst of tears.

Prior to eight months ago, she had many friends and was high functioning.

Her husband and her parents are begging us to do ECT. "If you don't do this, she will kill our children." She is adamantly refusing ECT.



65% Efficacy rate for both B/L and high dose R/U treatments

A Prospective, Randomized, Double-blind Comparison of Bilateral and Right Unilateral Electroconvulsive Therapy at Different Stimulus Intensities Harold A. Sackeim, et al *Arch Gen Psychiatry.* 2000;57:425-434

Brain Stimulation therapies for Clinicians Higgins 2009, pp 56

Electrode Placement

Bilateral vs. Right Unilateral

TIME TO RECOVER ORIENTATION IN MINUTES

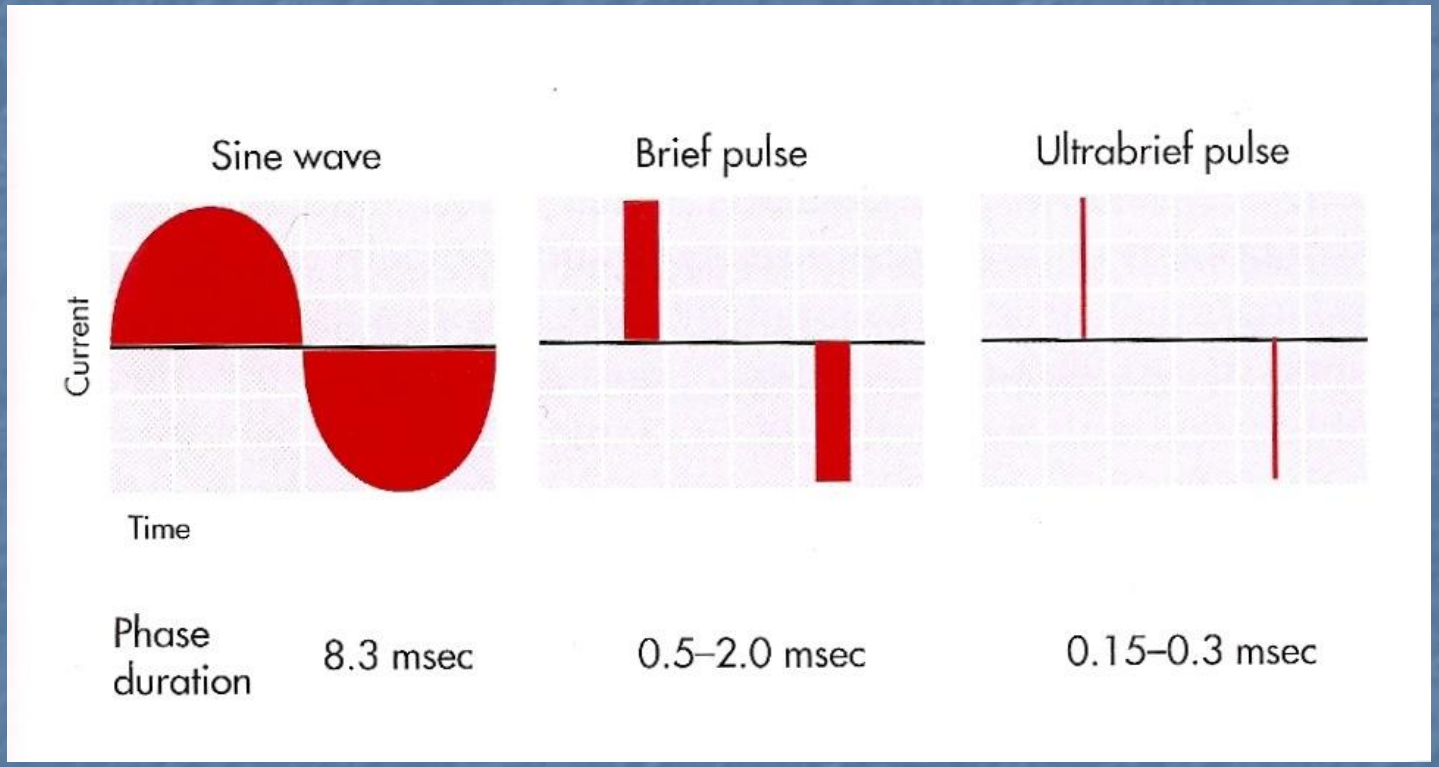
High Dose R/U	Bilateral
31	46

RETROGRADE AMNESIA FOR FAMOUS EVENTS

High Dose R/U	Bilateral
-2	-17

Brain Stimulation therapies for Clinicians Higgins 2009, pp 57

Ultrabrief Stimulation



Brain Stimulation therapies for Clinicians Higgins 2009, pp 57

Ultrabrief Stimulation

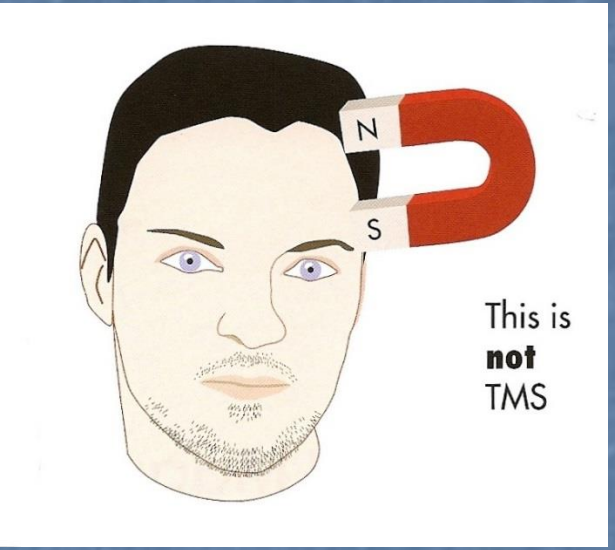
- 3 Big Studies, less than 200 patients
- Remission rates
  - 73% for ultrabrief RUL
  - 65% for regular BL
  - 59% for regular RUL,
  - 35% for ultrabrief BL
- Less cognitive side effects
- More treatments- need 10-14 vs 6-12.
  - Insurance companies don't like this ☺

Other Brain Stimulations ECT vs. TMS. vs. VNS. vs. DBS

- Most favorable TMS study (n=46) improvement in 22% of patients

vs. 58% improvement in patients who received ECT (at subtherapeutic doses 2.5x seizure threshold R/U).

- Most trials show no improvement over "sham" treatment.



JAMA July 18th, 2007- Vol 298 No 3

Eranti S. Mogg et all A randomized, controlled trial with 6-month follow-up of repetitive transcranial magnetic stimulation and electroconvulsive therapy for severe depression. American Journal of Psychiatry. 164(1):73-81, Jan 2007.

Brain Stimulation therapies for Clinicians Higgins 2009

TMS

Thus far, less promising for <u>severe</u> illness

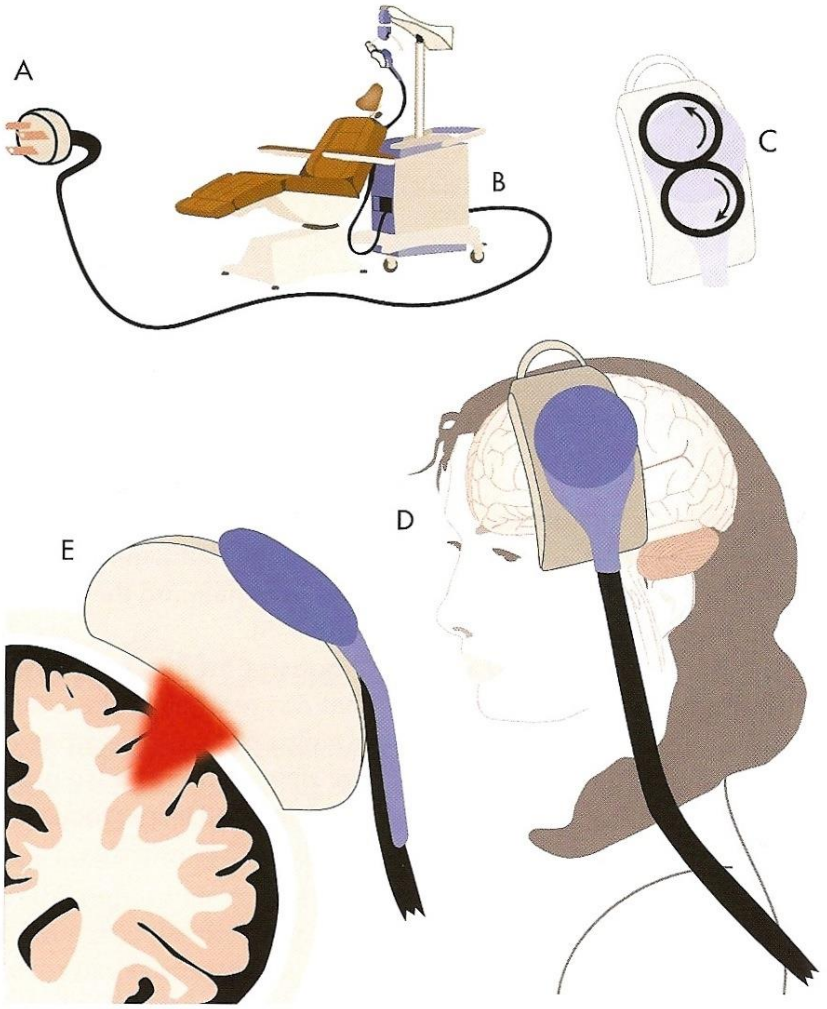
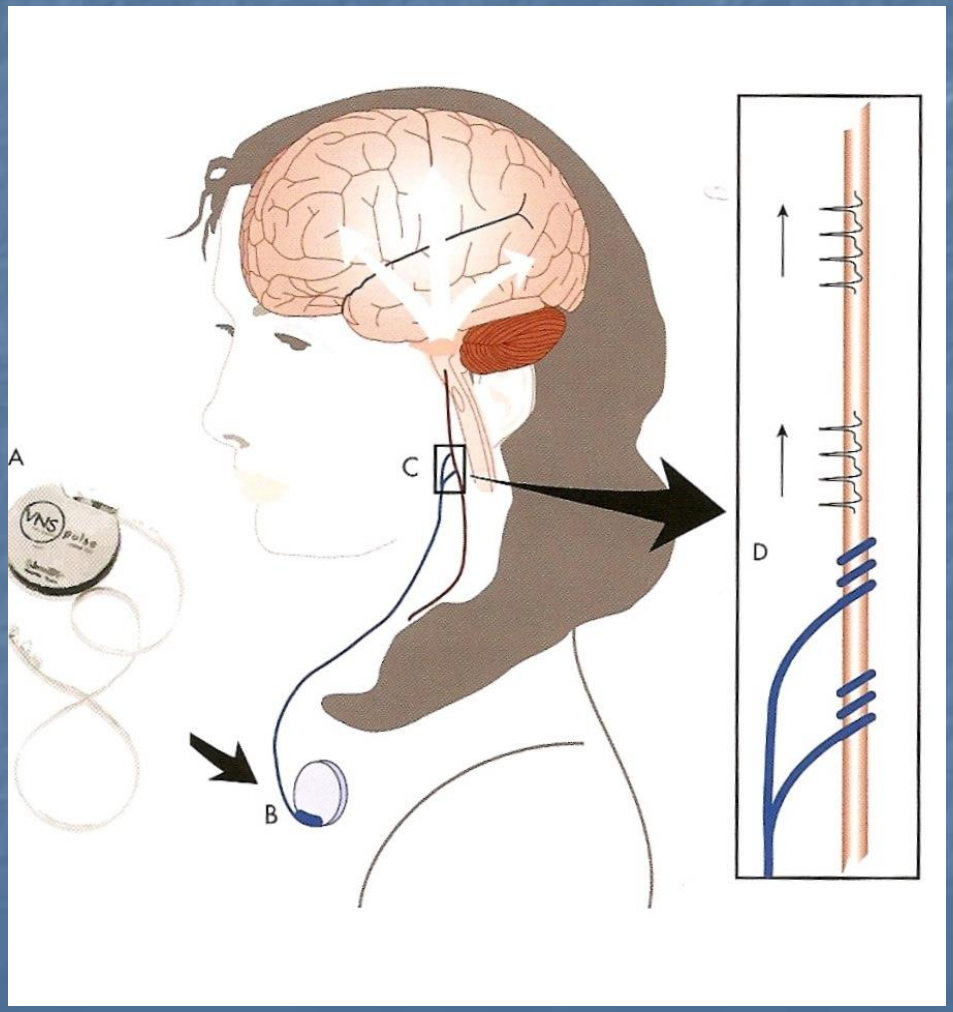


FIGURE 6–5. The TMS apparatus and how it is commonly used to treat depression.

Alternating current from the wall (A) is used to charge a bank of large capacitors (B). A pulsating electrical current generated in coils inside the device produces a pulsating magnetic charge. The patient reclines in the chair and the TMS coil is placed over his or her left prefrontal cortex (D). The electrical charge is rapidly discharged through the magnetic coil and induces a magnetic field that travels through the skin and skull. This fluctuating magnetic field, in turn, induces an electrical current in brain areas just below the skull, depicted in (E).

VNS



Mostly for epilepsy
28-31% decrease in seizures

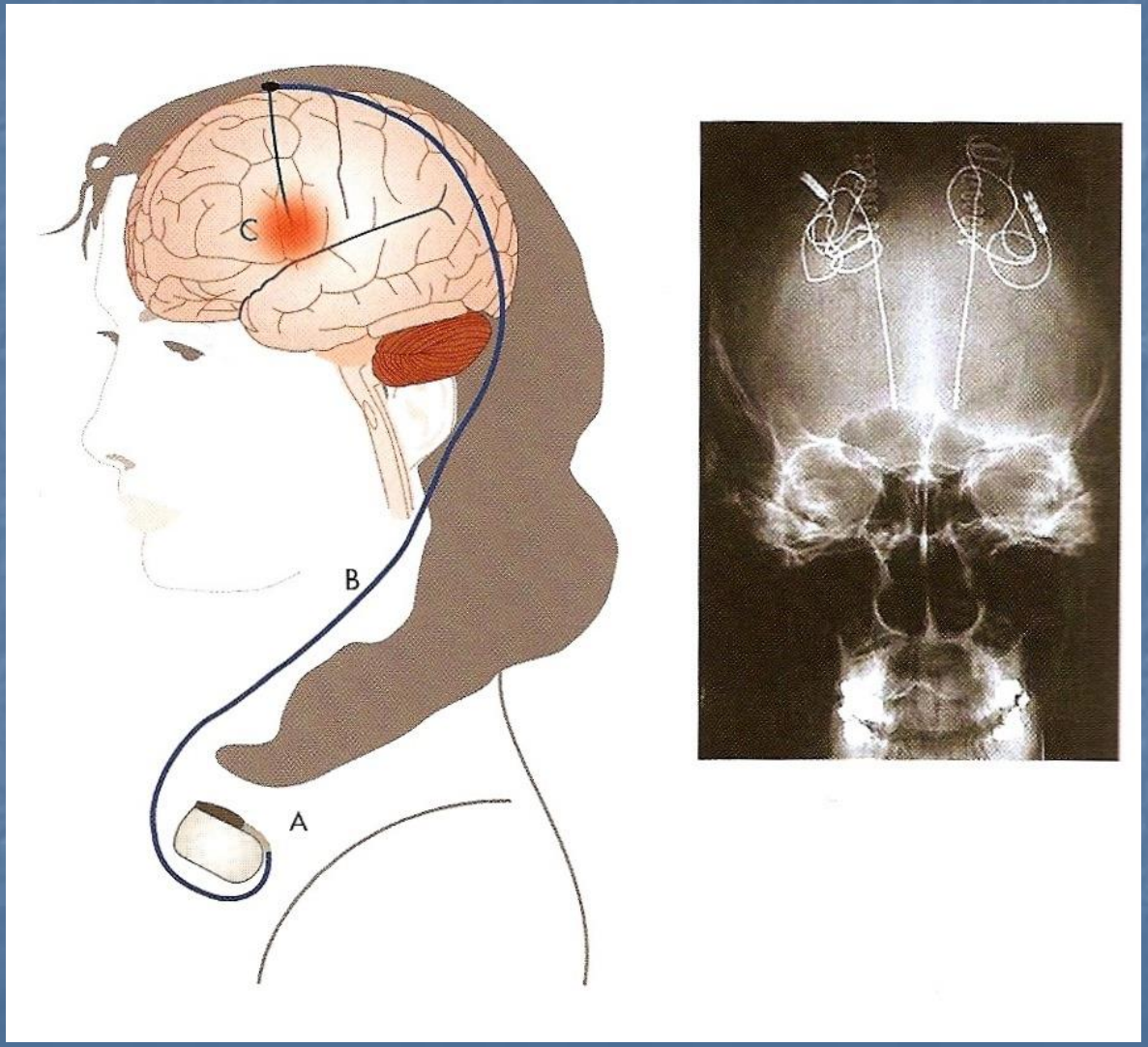
Possible use for chronic pain.

Depression n=59
30% response rate in most encouraging trial

Other trials 15% response rate compared to 10% response rate in "sham"

Brain Stimulation therapies for Clinicians Higgins 2009

DBS



Mostly for Parkinson's

(can implant in subthalamic nucleus)

<50 pts in the world have used DBS for Depression. Thus far, results very promising.

Brain Stimulation therapies for Clinicians Higgins 2009

ECT Education

- Not required subject in medical school
- Not required rotation in psychiatry resident training
- This limits the ability of clinical psychiatrists to recognize patients for whom ECT may be a good treatment option.

Community Practice

- Efficacy is lower than expected (30-47%)
- Practice varies widely
- Treatment resistance (vs. severity) is becoming a larger part of referral base
- A survey of 59 treatment sites showed:
  - 2% sites using sine wave treatment
  - 45% were not titrating to determine seizure threshold
  - 80% were using bilateral treatment
  - 18% were using fixed (presumably max) doses
  - 45% Discontinued all meds
  - 18% Used continuation ECT

Prudic et al Biol Psych 2004
Prudic et al Psychol Med 2001

Summary

ECT safe

ECT effective

ECT good 

Questions?????

Special Thanks

- Kemuel Philbrick, MD Mayo Clinic
- Keith Rasmussen, MD Mayo Clinic
- Theresa Rummans, MD Mayo Clinic
- The most phenomenal ECT staff that ever existed- Vance Tilton, Danny Robinson, Carolyn Pena

How does ECT work?