Treatment of Tic Disorders and Other Repetitive Behaviors

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<table>
<thead>
<tr>
<th>Consultant</th>
<th>Advisory Board</th>
<th>Speaker’s Bureau</th>
<th>Royalties</th>
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<tbody>
<tr>
<td>Tourette Syndrome Assoc.</td>
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<td>Oxford Press Guilford Press Wolters Kluwer</td>
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Discussion of Off Label Use of Medication

- Discussion of all medications should be considered “off label” unless specifically noted otherwise.

- All clinical material has been adapted to protect confidentiality.
Historical Context

- Childhood chorea (Sydenham’s chorea)
- Charcot and Freud, and Tourette
- Psychology
- Neurology
- Neuropsychiatric
  - Neurological
  - Genetics and environment
  - Behavioral and functional
Sorting Out Clinically Complex Cases

- What do complex cases look like?

- **TS Plus** = TS + ADHD + OCD + Condition X
Complex Clinical Presentations

- Tics Plus and separation anxiety disorder
- Tics Plus and other anxiety disorders
- Tics Plus and ASDs
- Tics Plus and disruptive behavioral disorders
- Tics Plus and major depression
- Tics Plus and bipolar disorder
- Tics Plus and substance abuse
- Tics Plus and personality disorders
Tic Disorder Treatment

- Antipsychotic efficacy studies
  - Haloperidol, pimozide, ziprasidone, risperidone, abilify, ecopipam
- Alpha agonists – clonidine and guanfacine
- Other somatic treatments
  - ECT
  - Repetitive transcranial magnetic stimulation
  - Deep brain stimulation
- Behavioral treatment
  - Numerous very small studies focusing on habit reversal training
  - Large scale trials in children and adults
Tic Suppression Interventions
Small, Medium and Large

- Small – Commonly used
  - Clonidine
  - Guanfacine
- Medium – Not commonly used
  - TCAs
  - Benzodiazepines
Tic Suppression - Large

- Old antipsychotics
  - Fluphenazine (Prolixin®)
  - Pimozide (Orap®)
  - Haloperidol (Haldol®)

- New Antipsychotics
  - Risperidone (Risperdal®)
  - Aripiprazole (Abilify®)
  - Ecopipam
  - Ziprasidone (Geodon®)
  - Tetrabenazine/Deutetrabenazine
  - Quetiapine (Seroquel®)
  - Olanzapine (Zyprexa®)
  - Clozapine (Clozaril®)
  - others
Antipsychotics - European Style

- Sulpiride
- Tiapride
Tic Suppression - Larger Botulinum Toxin

- Single muscle
- Long acting
- Reversible
Tic Suppression - Larger

- Electroconvulsive treatment
  - Self-injurious behavior
- Repetitive Transcranial Magnetic Stimulation (rTMS)
Tic Suppression - Largest Behavioral Neurosurgery

- Ablative surgery
  - Complex cases
  - Results for tics are mixed
- Deep brain simulation
  - News worthy cases
  - One small open trial
First Large Prospective Study

- Servello et al., JNNP, 2007
- 18 patients
- Vo-CM-PF thalamus
- Blinded on-off eval (but not reported in detail)
- F/U 3 – 17 months
- 2 complications: 1 from picking at incision, 1 abdominal hematoma
Tic Suppression - Newest
Cannabis

- To early to tell
- Lots of potential risks
- Strategies to minimize risk
Summary

- Many treatment options for people with Tourette syndrome
- Many somatic treatments
  - Tics
  - Co-occurring conditions
Non Pharmacological Strategies for Tics
Tics and the Environment

- Tic worsening
  - Excitement and stress
  - Fatigue
  - Attending to tics
  - Free to tic

- Tic improvement
  - Calm focused activities
  - Deep relaxation
  - Inhibiting environments

- Adults’ experience with behavioral strategies
Comprehensive Behavioral Intervention for Tics

▪ Theoretical Model
▪ Habit Reversal Training
  ▪ Awareness training
  ▪ Competing response training
  ▪ Sustaining adherence
▪ Function-based Intervention
  ▪ Contextual factors that support or maintain tic expression
Theoretical Model

- Tics only early
- Increased self consciousness
- Increased attention by others
- Self-identification of tic patterns and ad hoc management strategies
- Onset of premonitory sensation ~age 10
- Ticcing to relieve premonitory sensation
Habit Reversal Training

- Awareness training
- Purpose of CR
  - A voluntary behavior that is physically incompatible with the tic urge or tic itself
- Characteristics of CR
  - Incompatible with the tic
  - Less socially noticeable than the tic
  - Patient can do CR for the required duration across multiple situations
  - Can fade the CR over time
## Sample competing responses

<table>
<thead>
<tr>
<th>Tic</th>
<th>Competing Response</th>
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<tbody>
<tr>
<td>Arm Movements</td>
<td>Push hand down on thigh or abdomen and push elbow in towards hip</td>
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<tr>
<td>Eye Blinking</td>
<td>Systematic, voluntary, soft blinking conciously main-tained at a rate of one blink per 3-5 seconds</td>
</tr>
<tr>
<td>Leg Movements</td>
<td>Place feet flat on floor and push downward. If standing, lock knees</td>
</tr>
<tr>
<td>Vocal Tics</td>
<td>Diaphragmatic breathing keeping in mind inhale/exhale pattern in context of tic</td>
</tr>
<tr>
<td>Mouth/facial Movements</td>
<td>Clench jaw while pressing lips together</td>
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Function-based Interventions

- Assess and address antecedents and consequences
  - Provoking experiences
  - Social consequences
    - Positive reinforcement – active rewards
    - Negative reinforcement – escape consequences
## Types of Reinforcement and Related Treatment Options

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<thead>
<tr>
<th></th>
<th>Positive Reinforcement</th>
<th>Negative Reinforcement</th>
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<tbody>
<tr>
<td><strong>Internally Reinforcing</strong></td>
<td>Provides gratification <em>(Raise the cost)</em></td>
<td>Relieves distress <em>(Exposure RP)</em></td>
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<tr>
<td><strong>Externally Reinforcing</strong></td>
<td>Attention and support <em>(Redirect parents and others)</em></td>
<td>Avoidance <em>(Re-engage, not escape)</em></td>
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Behavior Therapy for Children With Tourette Disorder
A Randomized Controlled Trial

John Piacentini, PhD
Douglas W. Woods, PhD
Lawrence Seabill, PhD, MSN
Sabine Wilhelm, PhD
Alan L. Peterson, PhD
Susanna Chang, PhD
Golda S. Ginsburg, PhD
Thilo Deckersbach, PhD
James Dziura, PhD
Sue Levi-Pearl, MA
John T. Walkup, MD

Context  Tourette disorder is a chronic and typically impairing childhood-onset neurologic condition. Antipsychotic medications, the first-line treatments for moderate to severe tics, are often associated with adverse effects. Behavioral interventions, although promising, have not been evaluated in large-scale controlled trials.

Objective  To determine the efficacy of a comprehensive behavioral intervention for reducing tic severity in children and adolescents.

Design, Setting, and Participants  Randomized, observer-blind, controlled trial of 126 children recruited from December 2004 through May 2007 and aged 9 through 17 years, with improving Tourette or chronic tic disorder as a primary diagnosis, randomly assigned to 8 sessions during 10 weeks of behavior therapy (n=61) or a control treatment consisting of supportive therapy and education (n=65). Responders received 3 monthly booster treatment sessions and were reassessed at 3 and 6 months following treatment.

Intervention  Comprehensive behavioral intervention.

Main Outcome Measures  Yale Global Tic Severity Scale (range 0-50, score >15 indicating clinically significant tics) and Clinical Global Impressions–Improvement Scale (range 1 [very much improved] to 8 [very much worse]).

Results  Behavioral intervention led to a significantly greater decrease on the Yale Global Tic Severity Scale (24.7 [95% confidence interval CI], 23.1-26.3) to 17.1 [95% CI, 15.1-19.1]) from baseline to end point compared with the control treatment (24.6 [95% CI, 22.3-26.9] to 21.1 [95% CI, 19.2-23.0]) (P < .001, difference between groups, 4.1; 95% CI, 2.0-6.2) (effect size = 0.68). Significantly more children receiving behavioral intervention compared with those in the control group were rated as being very much improved or much improved on the Clinical Global Impressions–Improvement scale (52.5% vs 18.5%, respectively, P < .001; number needed to treat = 3). Attrition was low (12/126, or 9.5%); tic worsening was reported by 4% of children (5/126). Treatment gains were durable, with 87% of available responders to behavior therapy exhibiting continued benefit 6 months following treatment.

Conclusion  A comprehensive behavioral intervention, compared with supportive therapy and education, resulted in greater improvement in symptom severity among children with Tourette and chronic tic disorder.

Trial Registration  clinicaltrials.gov Identifier: NCT00218777

JAMA. 2010;303(19):1929-1937 www.jama.com
Randomized Trial of Behavior Therapy for Adults With Tourette Syndrome

Sabine Wilhelm, PhD; Alan L. Peterson, PhD; John Piacentini, PhD; Douglas W. Woods, PhD; Thilo Deckersbach, PhD; Denis G. Subhodolsky, PhD; Susanna Chang, PhD; Haibei Liu, MPH; James Dzurna, PhD; John T. Walkup, MD; Lawrence Scahill, MSN, PhD

Context: Tics in Tourette syndrome begin in childhood, peak in early adolescence, and often decrease by early adulthood. However, some adult patients continue to have impairing tics. Medications for tics are often effective but can cause adverse effects. Behavior therapy may offer an alternative but has not been examined in a large-scale controlled trial in adults.

Objective: To test the efficacy of a comprehensive behavioral intervention for tics in adults with Tourette syndrome of at least moderate severity.

Design: A randomized controlled trial with posttreatment evaluations at 3 and 6 months for positive responders.

Setting: Three outpatient research clinics.

Patients: Patients (N=122; 78 males; age range, 16-69 years) with Tourette syndrome or chronic tic disorder were recruited between December 27, 2005, and May 21, 2009.

Interventions: Patients received 8 sessions of comprehensive behavioral intervention for tics or 8 sessions of supportive treatment for 10 weeks. Patients with a positive response were given 3 monthly booster sessions.

Main Outcome Measures: Total tic score on the Yale Global Tic Severity Scale and the Clinical Global Impression--Improvement scale rated by a clinician masked to treatment assignment.

Results: Behavior therapy was associated with a significantly greater mean (SD) decrease on the Yale Global Tic Severity Scale (24.0 [6.47] to 17.8 [7.32]) from baseline to endpoint compared with the control treatment (21.8 [6.59] to 19.3 [7.40]) (P < .001; effect size = 0.57). Twenty-four of 63 patients (38.1%) were rated as much improved or very much improved on the Clinical Global Impression--Improvement scale compared with 4 of 63 (6.4%) in the control group (P < .001). Attrition was 13.9%, with no difference across groups. Patients receiving behavior therapy who were available for assessment at 6 months after treatment showed continued benefit.

Conclusion: Comprehensive behavior therapy is a safe and effective intervention for adults with Tourette syndrome.

Trial Registration: clinicaltrials.gov Identifier: NCT00231983

Arch Gen Psychiatry. 2012;69(8):795-803
CBITS Study Design

Assessment Schedule:

<table>
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<th>Week</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>23</th>
<th>36</th>
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</thead>
</table>

248 Subjects with TS or CTD

CBIT

Psychoeducation Support

Booster Booster Booster Booster
Responder Status at Week 10

(CGI-Improvement = 1 or 2)

P<0.0001
Child Moderators

- None
- Close
  - Med status
  - ADHD
Durability

- 87% of child responders to acute phase treatment maintained response
- 80% of adult responders to acute phase maintained treatment response
What does this all mean?
Change In Advice

- Old - intuitive
  - Ignore tics
  - Can’t be controlled
  - Don’t punish
  - Behavioral treatments don’t work
  - Don’t try to suppress
  - Suppression worsens tics
  - Suppression worsens premonitory urges
  - New tics develop when you suppress

- New - counterintuitive
  - Become more aware
  - Learn to manage
  - Reward successful management
  - Use behavioral strategies
  - Tics don’t get worse with behavioral treatment
  - Premonitory urge will fade away
  - New tics don’t develop when you use behavioral strategies
New Treatment Paradigms

- Readiness for reducing tic severity
  - Comorbidity management
  - Family and child intervention for “CBIT Lifestyle”
- CBIT
- CBIT + Meds
- Meds + CBIT
- Meds + CBIT to CBIT only
- Training nurses in Neurology clinics
- Training OT for broad dissemination
- CBIT + Parent training for children under 9 yrs
Summary

- New effective treatments bring excitement and hope
  - Behavioral strategies
  - Neurosurgery
- If you think about it, it makes sense
- Lots more to learn to realize the full promise of new treatments for tic severity