

# Introduction to Comprehensive Behavioural Intervention for Tics (CBIT)

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**SickKids**<sup>®</sup>

| Garry Hurvitz Centre for  
Brain & Mental Health

Tourette  
OCD   
Alberta  
Network

# Disclosures

*Dr. Jody Levenbach has no financial conflicts of interest  
in relation to the content of this presentation*

# Learning Objectives

1. Describe the **core components** and **supporting features** of CBIT
2. Discuss current research and evolving rationale for **habit reversal training** (HRT)
3. Recognize the foundational principles of **function-based assessment and intervention** as they relate to tics

# Overview

What is it and how do we know it works?

# Origins of CBIT

- Developed in early 2000's to provide non-drug treatment for TS, integrating ***habit reversal training*** and ***functional interventions***
- NIH-funded trials showed CBIT reduces tic severity more than supportive therapy in children and adults
  - Approximately **52% of children and adolescents** showed clinically meaningful improvement, in addition to daily functioning and QOL
  - In children, CBIT's effectiveness was **comparable to pharmacological treatments** such as pimozide and risperidone.
  - Improvement was noted in **38% of adults**, likely reflecting the chronicity and entrenchment of symptoms over time.
  - Benefits continued at 6-month follow-up
- Conclusion that CBIT is safe, well-tolerated and effective therapy

# CBIT Research: Progress Beyond Early RCT's

- A **meta-analysis** reviewing 10 RCT's found that CBIT (HRT) significantly reduced tic severity with small-to-medium effect sizes
- RTC **comparing CBIT to medication** found that CBIT offers similar tic reduction with better long-term outcomes and fewer side effects; combined approach may help more severe cases
- Sustained improvements lasting up to 11 years post-treatment compared to supportive therapy
- CBIT is recommended by Canadian and international guidelines as first-line treatment for tics

# Rationale and Structure of CBIT

# Tic Characteristics Relevant to CBIT

- A tic is *not* voluntary behaviour, which is intentional and goal-directed. Tics are ***semi-voluntary***: purposeless, urge-driven, and often unconscious.
- Tics can be influenced by a person's internal states (e.g., hunger, worry) as well as their external environment (e.g., location, activity). They can be modified by consequences.
- Tics are often preceded by a **premonitory urge**, making them somewhat predictable. They are **suppressible**, with much effort and discomfort. Doing a tic provides relief from this discomfort.





# Treatment Rationale

Tics can be minimized by **modifying environmental antecedents and consequences** that are making tics worse.

Tics can be minimized by **training alternate behaviours** that are more adaptive and less impairing than the tic.

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# Structure of Therapy

- Designed for ages 9+ years
- Typically weekly, 45 – 60 minutes per session
- Approximately 8 sessions plus follow-up
- Always work on one tic at a time
- Modifications to standard protocol have been found effective
  - Virtual clinician-led sessions
  - Internet-delivered without direct therapist involvement (iCBIT)
  - Condensed, intensive sessions over 1 week
  - Family-based, game-formatted (CBIT-Jr)
  - Modified for outpatient medical clinics, group format, ADHD modules

## Managing Tourette Syndrome

*A Behavioral Intervention for Children and Adults*

*Therapist Guide*

Douglas W. Woods  
John C. Piacentini  
Susanna W. Chang  
Thilo Deckersbach  
Golda S. Ginsburg  
Alan L. Peterson

# Primary Components

## Function-based Intervention

- Assess to identify **antecedents** (triggers) and reinforcing **consequences**
- Make environmental changes to minimize tics

## Habit Reversal Training

- Develop **awareness** of tic and tic signals
- Learn to use an alternate behaviour (**competing response**) when tic shows up

# Additional Components

## Assessment

## Psychoeducation

## Relaxation Techniques

- Deep Breathing
- Progressive Muscle Relaxation

## Motivation Control

- Inconvenience reviews
- Social support
- Rewards

## Relapse Prevention

## Follow-up/Booster Sessions

# Habit Reversal Training

Developing awareness of the tic and then using a competing response

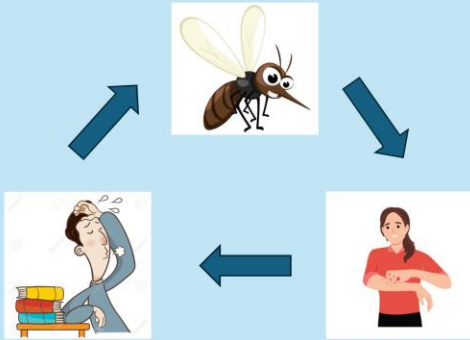
# Habit Reversal Training

One tic at a time

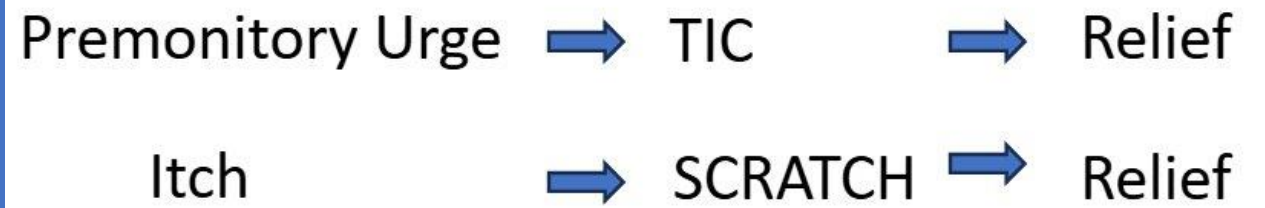
Process has three parts:

- **Awareness Training**
  - helping the client become more aware of when the tic is happening, or about to happen
- **Competing Response Training**
  - teaching the client to do an opposing movement (competing response) instead of the tic
- **Social Support**
  - Teaching caregiver to prompt the use of competing response when needed, and to reinforce the client for attempting the competing response

Like a mosquito bite



Negative reinforcement



Relief

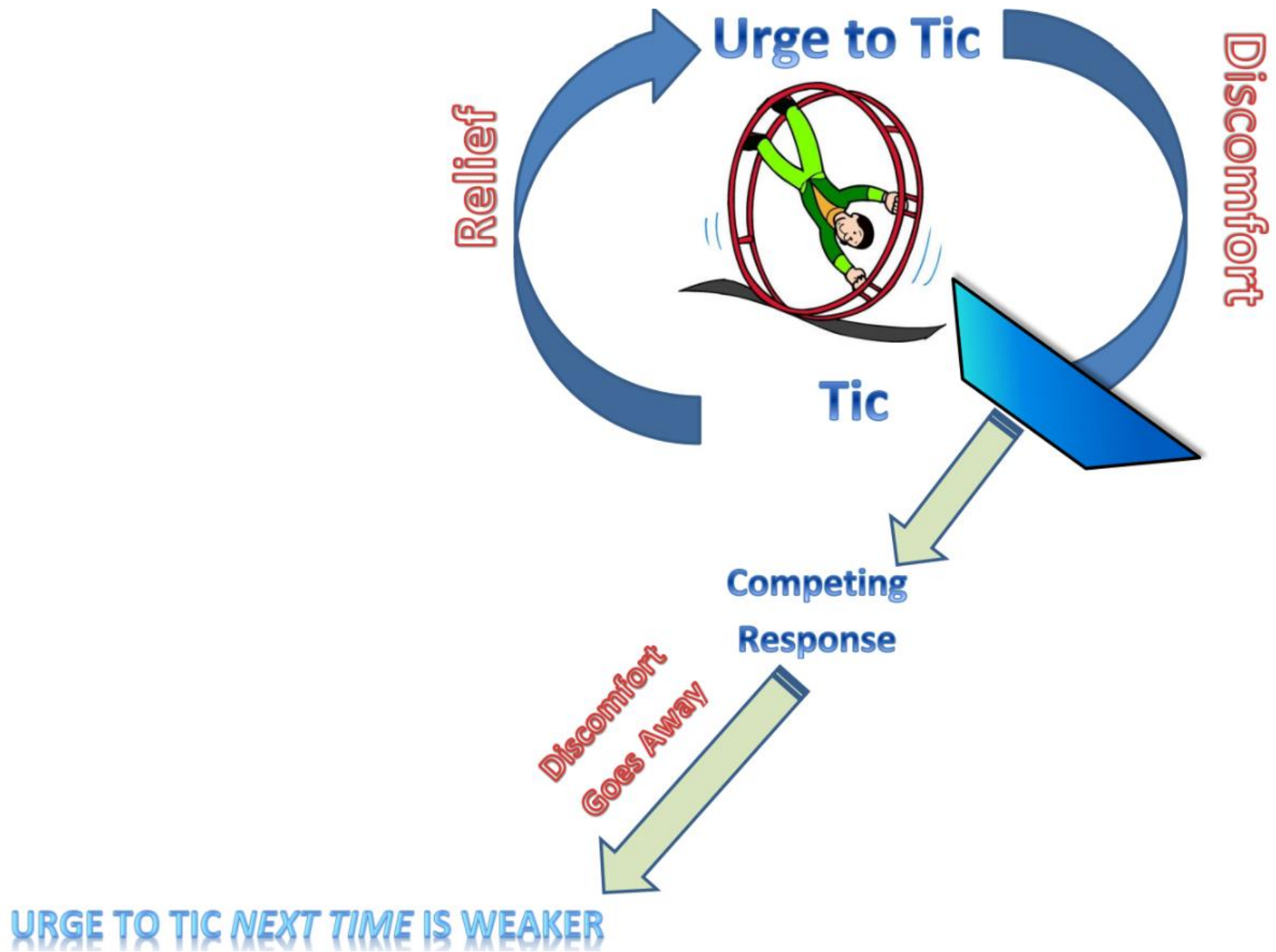
Urge to Tic

Discomfort

Tic







# Awareness Training



Monitor tic at home



Describe tic and tic signal  
in detail



Identify tic and tic signals  
with therapist

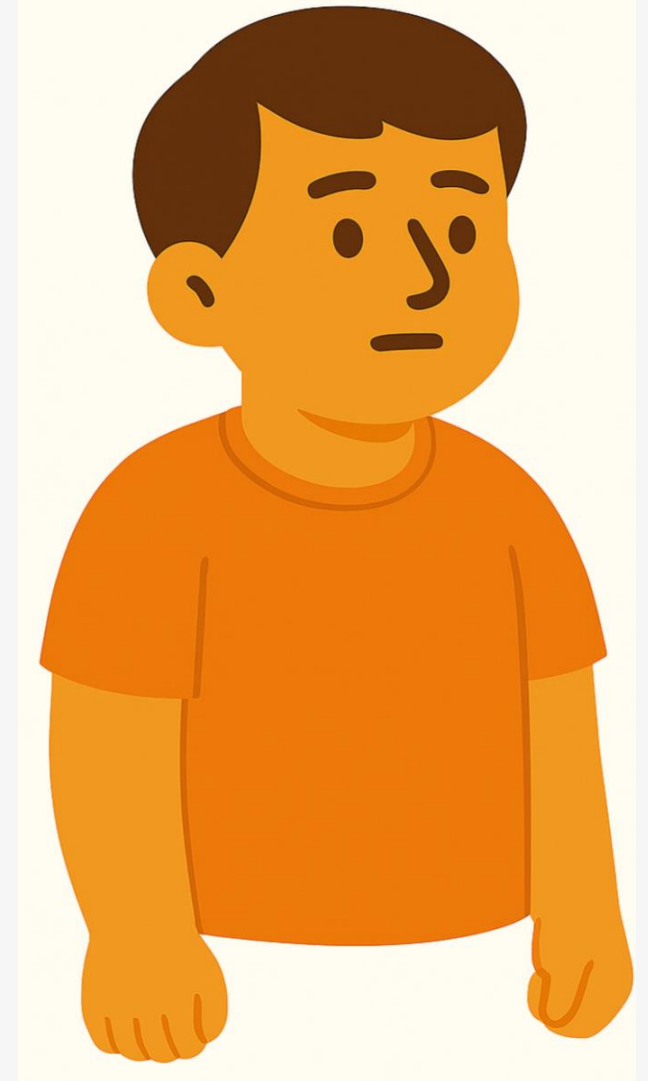
**A solid awareness of the tic and tic signals must be achieved for the next step - Competing Response Training - to be effective.**

# Competing Response Training

- Introduce principles of a good competing response ("tic block")
- Choose an appropriate competing response – physically incompatible with the tic
- Practice in session – initially without the tic, then contingent on the tic
- Practice at home with "coach" in planned and unplanned situations

**Tic:** Arms fling up and bend towards the face, with fingers extended

**Tic Block:** Hold arms against body, making light fists



Tic	Competing Response
Head jerk upwards	Hold head tilted slightly downwards, looking forward
Licking lips	Purse lips lightly, rest tongue on roof of mouth
Wrist flicking	Rest hand on side of leg, press in lightly
Saying words	Close mouth, lips together, controlled breathing in and out of nose

# Why Does the Competing Response Work?

The underlying "mechanism of change" is still unclear.

Some or all of the following may be involved:

- Interrupts negative reinforcement cycle; tic fades when it is no longer reinforced
- Competing response prevents tic, allowing habituation to the urge over time
- Increases tolerance for the premonitory urge, making it easier to resist urge
- Disrupts an automatic, unconscious motor pattern; involves learning of new, more adaptive behaviour
- Improves conscious control of motor behaviour

We **do** know:

- Necessary for the competing response to be applied in response to tic urge (or start of tic)
- The competing response does not actually have to be physically incompatible



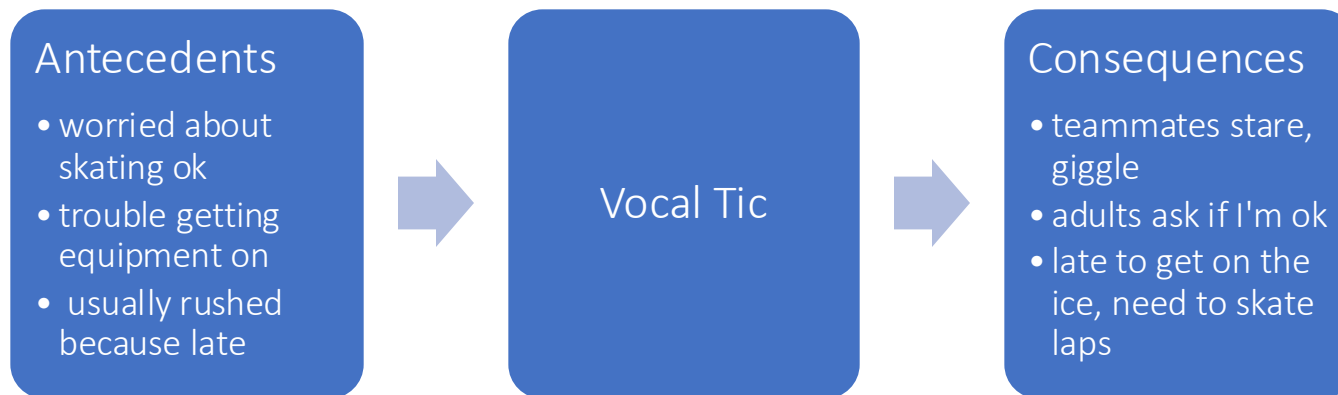
# Function-Based Assessment and Intervention

Identifying tic triggers and consequences, and making environmental changes

# Purpose and Rationale

- Determine what factors make tics worse and make changes to reduce them
- Uses and Antecedent-Behaviour-Consequence (ABC) model to understand tics
- **Antecedents:** internal states like hunger or anxiety, and external situations like settings or people, which occur *before* the tic and are presumed to trigger them in some way
- **Consequences:** events that occur *after* the tic in response

In change room before hockey practice



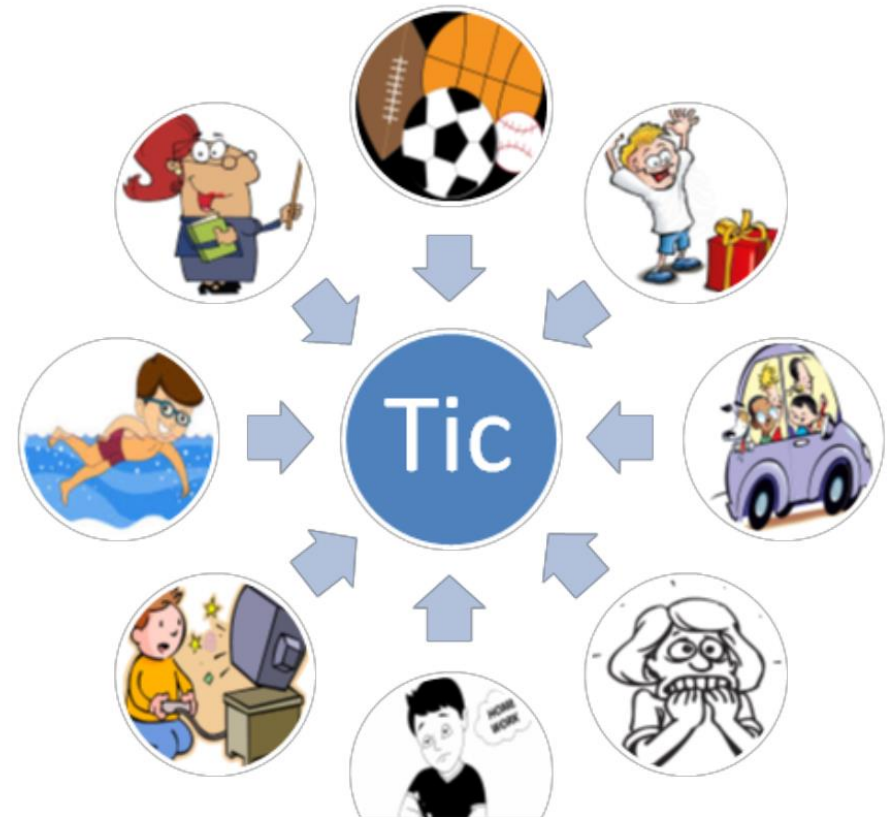
# Method

- Conducted for each targeted tic
- Two steps:
  - **Function-based assessment**
    - Structured interview during session (client and caregiver)
    - Tracking sheet between sessions, filled out by client
  - **Function-based intervention**
    - With client (and caregiver), develop plans to eliminate or minimize triggers and consequences
    - Plans are assigned as part of home practice



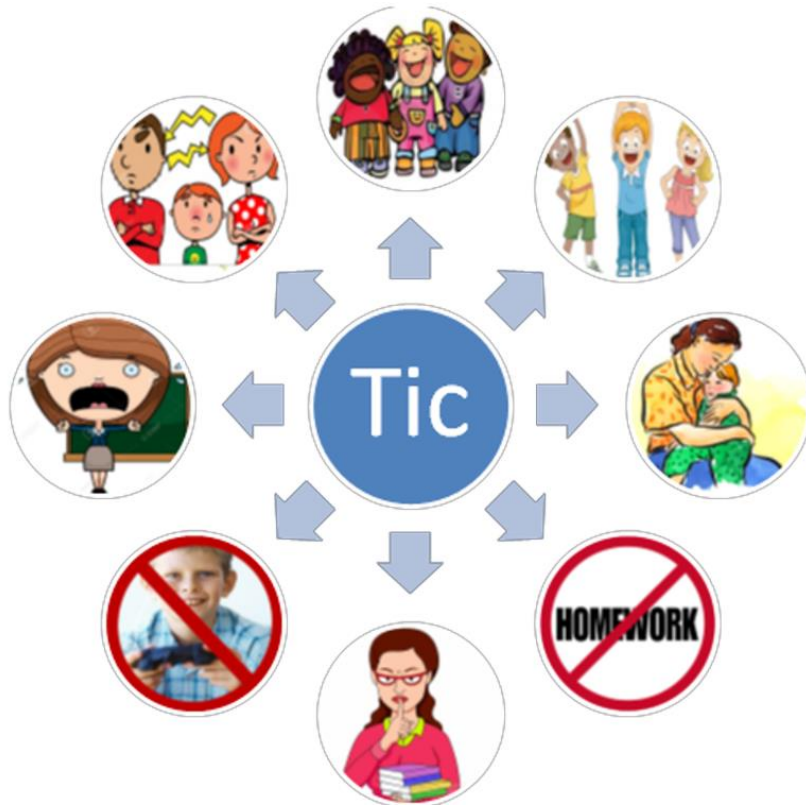
# Antecedents or "Triggers"

- things that happen *right before* to make a tic more likely to occur (e.g., people, places, activities, feelings).



# Consequences

- things that happen *right after* to make a tic more likely to occur (e.g., people, places, activities, feelings).



Tic (From Hierarchy)									
<b>ANTECEDENTS</b>									
Classroom									
At Home After School									
Public Place Other Than School									
Watching TV/Video Games									
Playing Sports									
During Meals									
Bedtime									
Doing Homework									
In Car									
Other Anxiety -Thoughts about people judging him									
Other_____									
Other_____									







Functional Assessment Form (FAF)—Child Version

Date completed: \_\_\_\_\_

Patient: \_\_\_\_\_

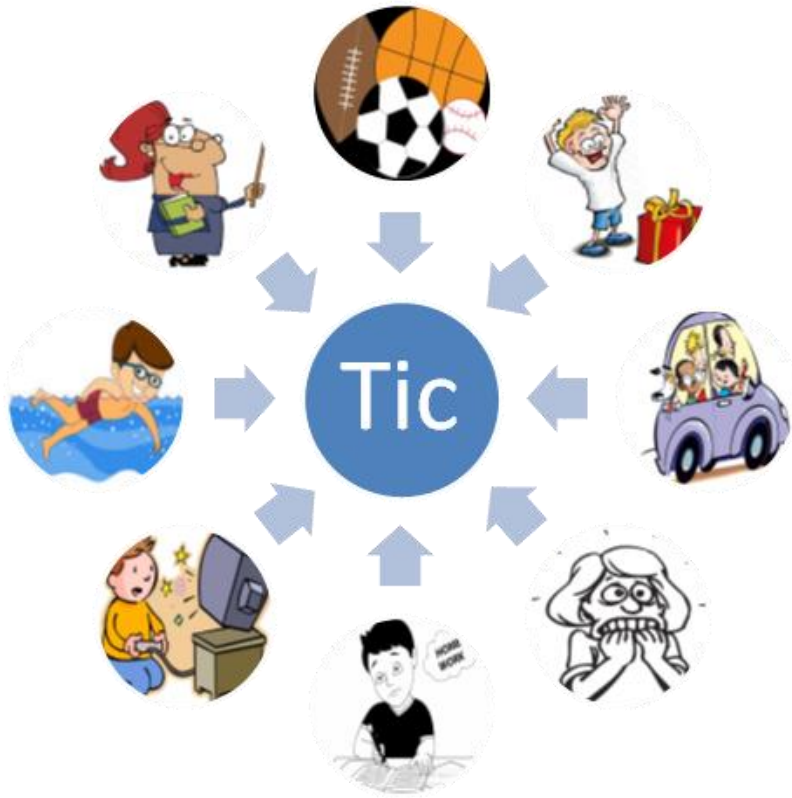
<b>CONSEQUENCES</b>									
Parent Tells Child to Stop Tics									
Teacher/Other Adult Tells Child To Stop									
Peer/Sibling Tells Child to Stop									
Parent/Teacher/Sibling Comforts Child									
Someone Laughs at or With the Child									
Child is Asked to Leave the Area									
Child Doesn't Complete Meal, Homework, or School Task									
Child Gets to Stay up Later									
Child Doesn't Have to do Chores or Other Required Activity									
Other_____									
Other_____									
Other_____									

## Functional Assessment Self-Report Form

Day	Where were you?	What was happening?	Who was there?	How were you feeling?	What happened <b>after</b> the tics?
					
Monday	Living room	Playing video games	Dad and brother	Excited	Brother told me "shhh"; he got sent to his room

Day	Where were you?	What were you doing?	Who was there?	Feelings?	Reactions to the tics?
Monday	Lunchroom at work	Eating lunch	4 co-workers	Nervous and embarrassed	My co-workers kept looking at me

# Principles for Antecedent Interventions

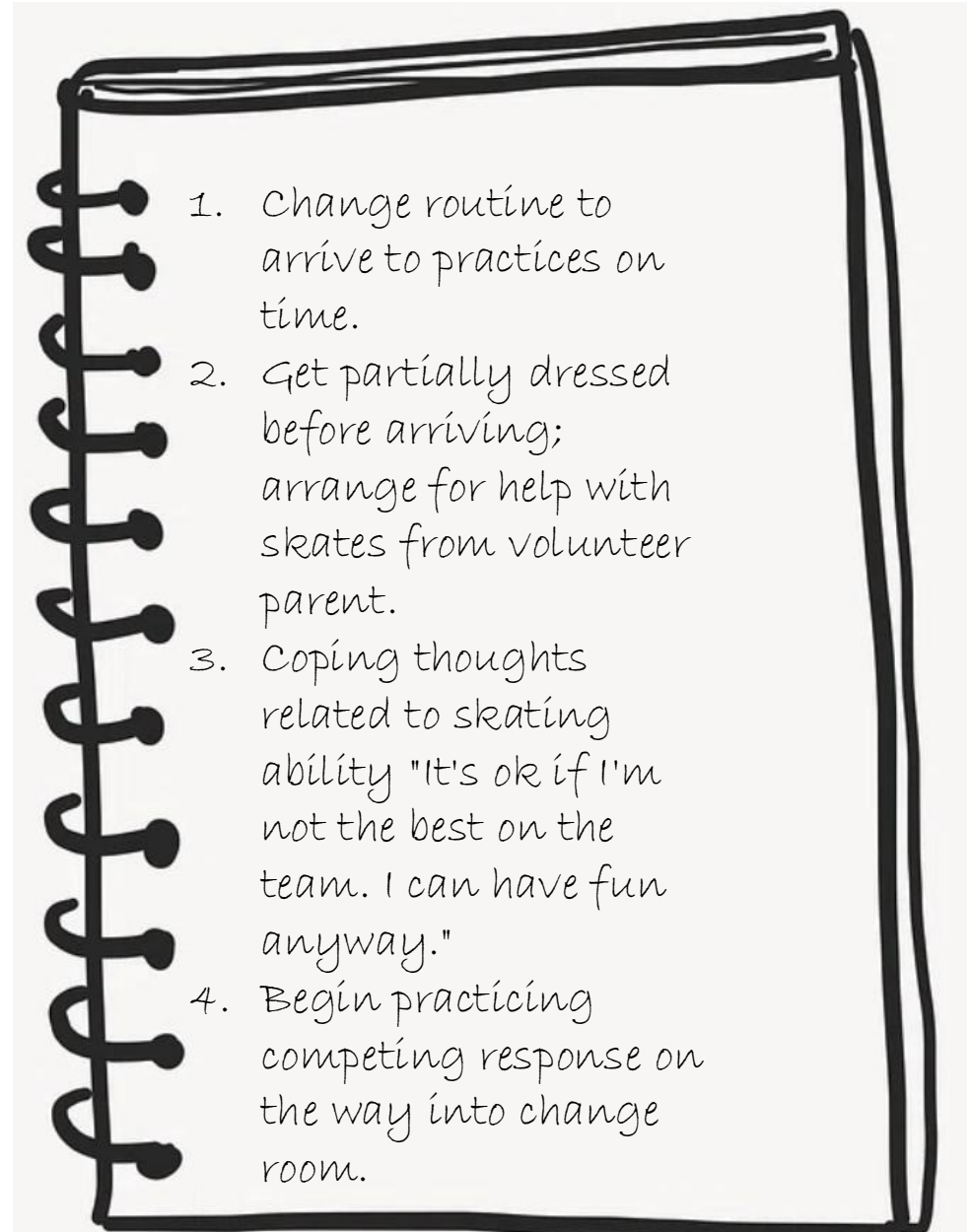


- Unnecessary situations or settings that make tics worse should be minimized or avoided whenever possible.
- When a situation can't be avoided, try to help the client manage any emotions related to the situation (e.g., relaxation strategies, coping thoughts).
- Promote the use of habit-reversal strategies when entering a situation where tics are likely to occur.

# Antecedents

- worried about skating ok
- trouble getting equipment on
- usually rushed because late

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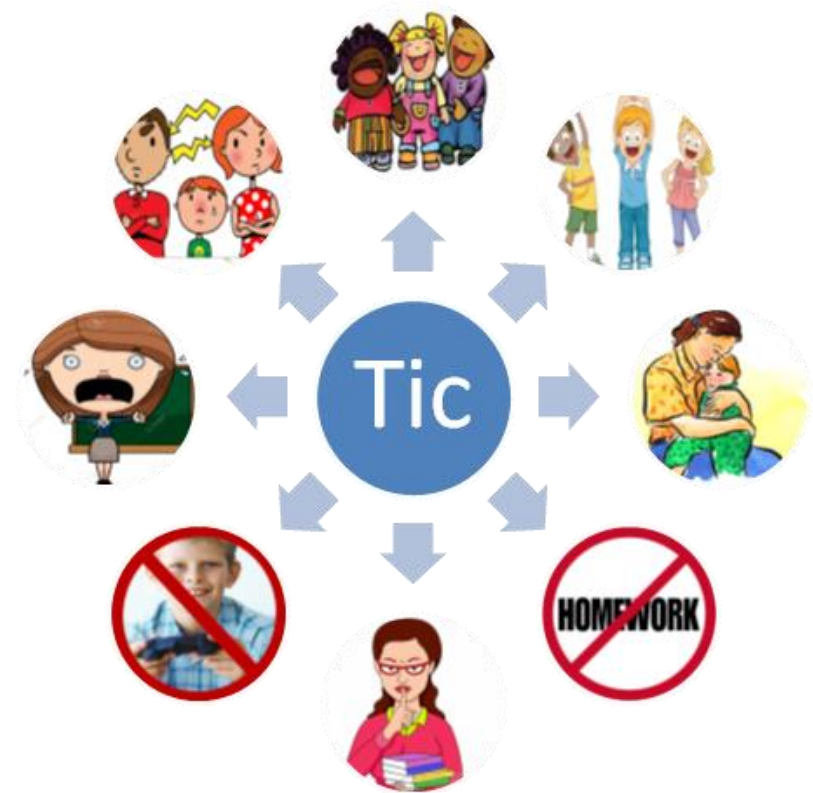


1. Change routine to arrive to practices on time.
2. Get partially dressed before arriving; arrange for help with skates from volunteer parent.
3. Coping thoughts related to skating ability "It's ok if I'm not the best on the team. I can have fun anyway."
4. Begin practicing competing response on the way into change room.



# Principles for Consequence Interventions

- In situations where tics are likely, reduce **any** type of attention or clear consequence (e.g., no commenting, comforting, stopping the activity). Strive for a "tic neutral" environment where nothing is contingent on tics.
- Minimize the physical and social impact of the tics (e.g., neck pillow for pain, teaching others how to react, school accommodations).



# Consequences

- teammates stare, giggle
- adults ask if I'm ok
- late to get on the ice, need to skate laps

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Function-Based Intervention Form

Target Tic:

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Strategies to manage *trigger* situations:

If social attention is a contributing *consequence*, ways that this attention can be reduced:

If escape from an unwanted activity or situation is a contributing *consequence*, ways that this can be reduced:

Other Components of CBIT

# Assessment

## Initial Interview

- History of tic disorder and past interventions
- Review of comorbid conditions, particularly ADHD & OCD
- Current tic presentation

## Pre- and Post Therapy Measures

- Yale Global Tic Severity Scale (YGTSS)
- Premonitory Urge Scale for Tics (PUTS)
- Parent Tic Questionnaire (PTQ) or Adult Tic Questionnaire (ATQ)

## Ongoing assessment

- Weekly tic hierarchy – list current tics, get distress rating for each
- Home practice monitoring – 30 mins several times a week

# Psychoeducation

- Geared to needs of client
  - offer parent only session
  - can be abbreviated, gamified
  - spread over several sessions
  - provide handouts, rec's for books and websites
- Essential information
  - definition of tics
  - DSM5 diagnoses
  - genetic and neurological basis
  - prevalence
  - natural history and prognosis
  - treatment options

## TACKLING TICS

**What Are Tics?**

- Repetitive movements or sounds that are not done "on purpose" although they can look that way.
- It happens when the brain sends a wrong message to the muscles.
- Can have a "tic signal" also known as a *premonitory urge*.

**Types of Tics**

- MOTOR** (red button)
- VOCAL** (pink button)
- SIMPLE** (dark green button)
- COMPLEX** (light green button)

**What Causes Tics?**

- Genetics
- Brain differences
- Environmental triggers

**When Do They Happen?**

- Begin around six-years-old
- Peak at ten- to twelve-years-old
- Often decrease from thirteen- to eighteen-years-old.

**Therapies for Tics**

- Exposure and Response Prevention (ERP)** (purple box)
- Comprehensive Behavioural Intervention for Tics (CBIT)** (orange box)
- Medication** (grey box)

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# Relaxation Strategies

## Deep Breathing

- Inhale slowly and deeply, hold briefly, and then slowly exhale; repeat several times
- Intentional and slow, involving diaphragmatic engagement, promoting full lung expansion
- Many child-oriented teaching tools available
- Guided by app, use of props, storytelling

## Progressive Muscle Relaxation

- Clients are guided to systematically tense and then release specific muscle groups, typically progressing from head to toe
- Enhances awareness of physical tension and promotes deep relaxation
- Can be shortened or simplified for younger clients, e.g., "Squishy Lemons", "Robot Ragdoll"
- Guided instructions with calming music can be helpful

# Motivation Management

## Social Support

- Caregiver or partner involved in sessions and home practice
- Support person trained to encourage and reinforce use of CR
- Focus on praise and acknowledgement for effort rather than outcome

## Rewards

- System planned with therapist in first session
- Rewards for attendance, homework completion and use of CR

## Inconvenience Review

- Completed for each target tic
- Identify reasons for targeting tic
  - Physical (pain, fatigue)
  - Social (teasing, stares)
  - School (distracting)
  - Daily life (can't get to sleep)



# Rewards



Working on your tics is hard work. Sometimes it takes a while to see results. That's why it's often helpful to have some short-term rewards for practicing the tough stuff. These rewards are for **doing the work** (e.g., coming to sessions, working hard in sessions, practicing outside of the session, etc.), not for stopping your tics. What matters is **effort**, not results.

Brainstorm some rewards you might want to work for:

## Ideas for Rewards

**Things** (e.g., trading cards, art supplies, download music or video game, books, money)

**Outings** (e.g., park, swimming, beach, Laser Tag, museum, movie, bowling, amusement park, restaurant)

**Social Time** (e.g., playdate, sleepover, special activity with parent like cooking/reading/board game)

**Privileges** (e.g., stay up late, extra screen time, choose favourite dinner, getting out of doing chores, dinner with tv on)

## Behaviours and Point Values

Practicing at Home – 2 pt each

Completing Tic Monitoring Sheet – 5 pts

Other: \_\_\_\_\_

10 pts = \_\_\_\_\_

25 pts = \_\_\_\_\_

40 pts = \_\_\_\_\_

## Record of Points



# Inconvenience Review



What I don't like about this tic:

- ☐ It makes me feel embarrassed
- ☐ It's annoying
- ☐ It stops me from doing things I want to do
- ☐ It makes me tired
- ☐ It makes me feel out of control
- ☐ People stare at me or ask me about it
- ☐ It makes my body hurt
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

**\*\* Use this list to remind yourself about why it's important to you to try to stop**

Tic Name: \_\_\_\_\_

What do you particularly dislike about this tic? What makes it annoying, inconvenient, embarrassing and/or painful?

How will life be better when this tic is reduced or gone?

**\*\* Use this list to remind yourself about why you are working on this tic**

# Maintaining Progress

## Relapse Prevention

- Encouraged to prepare for symptom change over time and with stress
- Client taught to:
  - independently develop CR for new tics and use HRT strategies
  - use relaxation techniques
  - know when to seek additional help
- Supporter taught to:
  - manage triggers and consequences
  - not over-protect from stress; encourage stress management

## Follow-up/Booster Sessions

- Number of sessions and timing tailored to individual needs
- Purpose of sessions:
  - Reinforcement of skills
  - Monitoring progress
  - Troubleshooting challenges
  - Maintaining motivation