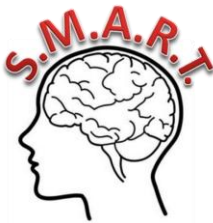


A "SMART" Approach to Managing Concussion:

Development and Pilot Trial of a Web-Based, Self-Monitoring Activity-restriction and Relaxation Training (SMART) Program for Kids with Mild Traumatic Brain Injury (mTBI)

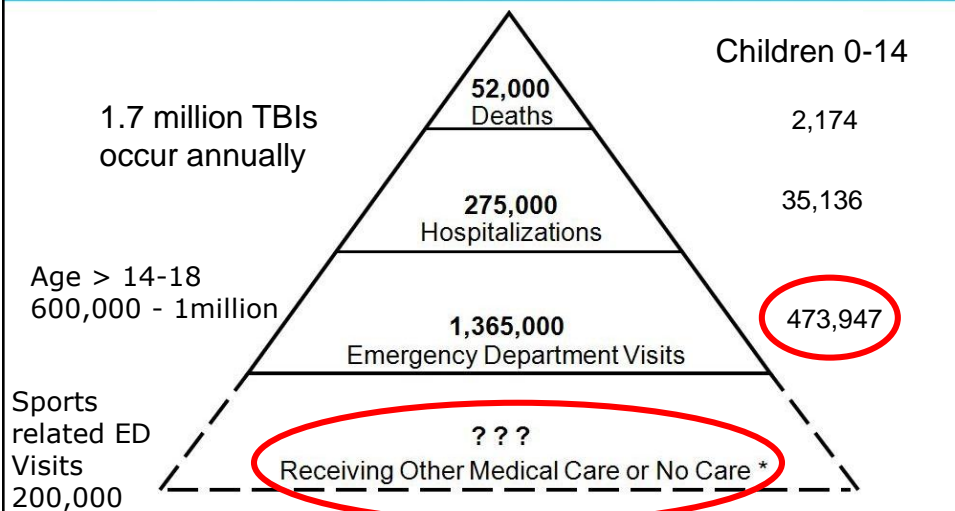


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Telehealth Interventions for Pediatric Brain Injury
 The International Society for Research on Internet Interventions (ISRII), 6th Annual Conference
 May 18, 2013

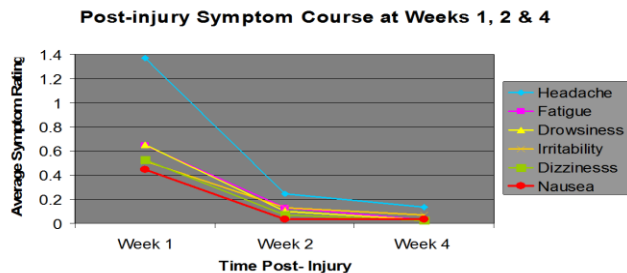
Brad Kurowski, MD, MS
 Lynn Babcock, MD, MS
 Shari Wade, PhD
 Judith Dexheimer, PhD
 Nicole McClanahan, BA

Epidemiology



Background

- Mild traumatic brain injury (mTBI) is one of the most common injuries sustained by youth in the US
- > 50% will incur physical, cognitive, emotional, and/or sleep-related dysfunction
- Heavy symptom burden initially
- 30% still symptomatic at 3 months



Background

- Only three treatment trials to date in children targeted at reducing the impairment
- Evidence for
 - Information, reassurance, and education
 - Stepwise return to activities
 - Cognitive behavior therapy
- Co-I Wade developed a web-based therapy program for youth with complicated mild to severe TBI
 - Feasible
 - Restored executive function
 - Improved behavioral symptoms



Self-Monitoring Activity-Restriction and Relaxation Training (SMART) Program

- Typical care for mTBI
 - ED/PCP/Trainer initial visit
 - Follow-up visits every few weeks
 - Rx at visits: anticipatory guidance, rest, hydration, stepwise return to play, symptom management
- GOAL: Develop a treatment for mTBI
 - Accessible
 - Cost-effective
 - Evidence-based
 - Real-time individual symptom management
 - Cognitive-behavioral skills / therapy



Aim 1

- **Build and refine SMART, a web-based intervention providing real-time individualized symptom management and cognitive-behavioral skills, for youth ages 11 to 18 years with mTBI**
- Outcomes: Using stakeholder feedback and usability data, we will build and refine a program that is acceptable, comprehensible and relevant for youth with mTBI and their families.



The SMART Program

- Patient/Participant
 - Daily symptom / activity reporting
 - Feedback / guidance for modulation of activities
 - 8 Modules
- Parent
 - 8 Modules
- Administrator
 - Usage logs



Please Login

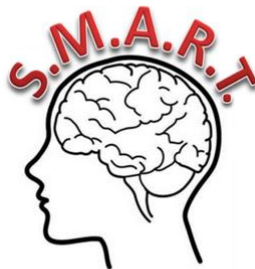
Username: *

Password: *

Login

Reset Password

Forgot UserName



Self-Monitoring Activity-Restriction and Relaxation Training

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Home page: Module selection



Self-Monitoring Activity-Restriction and Relaxation Training

Logout

- Module 1: Introduction + Self-monitoring
- Module 2: Symptom Maintenance
- Module 3: Return to Activities
- Module 4: Taking Care of You
- Module 5: Staying Positive
- Module 6: Staying Focused
- Module 7: Stop, Think, Problem Solve
- Module 8: Managing Stress

*Session is complete if BLACK
*Session is incomplete if GREEN
*Session is not open if GREY

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Impact/PCSS questions

S.M.A.R.T. Self-Monitoring Activity-Restriction and Relaxation Training

Logout

Please check the box below that indicates the degree to which you are currently experiencing the following symptoms*
*0 = not experiencing any symptom; 1-2 = Mild; 3-4 = Moderate; 5-6 = Severe

Headache

0 1 2 3 4 5 6

No symptom Severe

Nausea

0 1 2 3 4 5 6

No symptom Severe

Vomiting

0 1 2 3 4 5 6

No symptom Severe

Balance Problem

0 1 2 3 4 5 6

No symptom Severe

Dizziness

0 1 2 3 4 5 6

No symptom Severe

Fatigue

0 1 2 3 4 5 6

No symptom Severe

Back

Next

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Daily Activity questions

S.M.A.R.T. Self-Monitoring Activity-Restriction and Relaxation Training

Logout

1. How many hours did you sleep yesterday?

0 6 12 18 24 Hours Minutes

2. Did you go to school yesterday?

a. Yes
 b. No
 c. Not Applicable (Saturday, Sunday, Holiday, Vacation, Summer Break)

2b. If yes, how long did you go to school for?

No School Less Than Half Day Half Day More Than Half Day Full Day Full Day Extra Curricular Activities

3. Screen Time. How much time did you spend playing video or computer games, watching TV or movies, or playing on your phone or tablet?

0 3 6 9 12 Hours Minutes

4. Brain Time. How much time did you spend reading, studying, doing homework, doing math or word puzzles, taking tests, practicing your musical instrument.

0 3 6 9 12 Hours Minutes

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Child/Participant Feedback

S.M.A.R.T. Self-Monitoring Activity-Restriction and Relaxation Training

Logout

IT SEEMS LIKE YOU ARE DOING WORSE
Why do you think that is?

Use the table below to show how each of the 6 items may have affected your current brain health. Check one box for each of the 6 items.

	Too Much	Too Little	Just Right	Not Done
Sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
School	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Brain Activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Screen Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Daily Activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical Activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Any other reasons?

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Making a plan for tomorrow

S.M.A.R.T. Self-Monitoring Activity-Restriction and Relaxation Training

Logout

What will you change tomorrow?

Use the table below to show how you can change each the 6 items to better your brain health for tomorrow. Check one box for each of the 6 items.

	Increase	Decrease	No Change	Not Doing
Sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
School	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Brain Activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Screen Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Daily Activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical Activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Any other changes?

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Introduction module

S.M.A.R.T. Self-Monitoring Activity-Restriction and Relaxation Training

Home

Logout

Welcome to **SMART** A Problem Solving Approach to Coping with Brain Injury

Purpose of the Program

Traumatic Brain Injury can bring up a lot of questions for teenagers.

- What is mild traumatic brain injury (mTBI) or concussion?
- Is this problem because of the injury?
- How long will it take to get better?
- Will I ever be like I was before?

You might also be frustrated that things are harder than they used to be or that you are not allowed to do things because of the head injury. These are normal feelings.

Sometimes teens feel scared when they are not sure of what to expect. It is okay to be worried or afraid. These feelings are a normal part of the recovery process.

How You Face These Challenges is Critical for Success!

Previous

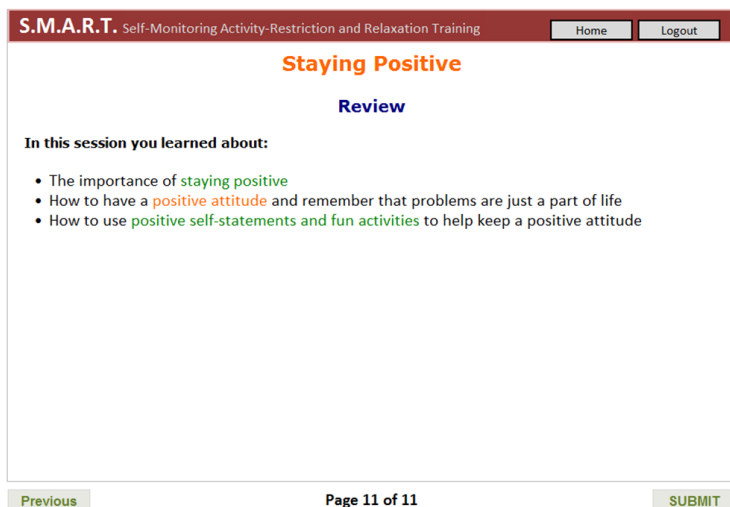
Page 1 of 10

NEXT

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Each module has Preview and Review pages



S.M.A.R.T. Self-Monitoring Activity-Restriction and Relaxation Training

Home Logout

Staying Positive

Review

In this session you learned about:

- The importance of **staying positive**
- How to have a **positive attitude** and remember that problems are just a part of life
- How to use **positive self-statements and fun activities** to help keep a positive attitude

Previous Page 11 of 11 SUBMIT

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Progress to Date

- Built the program – self-monitoring + modules
- Developed/tested the logic
 - Administration / timing of modules based on progress and time from injury
 - Self-monitoring guidance based on symptom burden that day and the previous day
- Usability testing in progress
- Building database
 - Feasibility statistics
 - Usability ratings
 - Weekly in-depth patient outcome measures



Usability Scores

Goal SUS 68

- N = 8 participants
 - 4 adolescents
 - 4 parents
- Mean: 85
- Range: 47.5 – 97.5



System Usability Scale (SUS), J. Brooke 1996



Common Themes

- Technical Issues
 - Dead air after videos in Introduction module
 - The slider bar on the daily tracking page is not intuitive; 2/3 children tried to type in the number of hours slept
 - The questions on the Daily Activities page were not easily understood by 2 children



Common Themes

- Reading
 - Modules had too much reading
 - Audio was good and parents would read the information to their child
- Timeline for Module Completion
 - Tasks were too intensive to do soon after injury
- Supplemental Pieces
 - Liked the videos
 - Liked the information
- Miscellaneous
 - Liked the tailored aspect of the program



Parent feedback

“It’s very informative, because I played sports in high school and I had a concussion before and so some of the things I read I didn’t know”

“I liked those videos..... it would have helped her because she kept asking, “is this normal, is this normal” and it would have put it in to perspective for her that she isn’t the only and what was going on was normal.”



Next Steps

- Refine modules based on feedback
- Perform small pilot randomized trial this summer/fall with emergency department population, adolescents 11-18 years (Aim 2)
- Future Directions
 - Further refine
 - Utilize in other settings (outpatient clinics)



Acknowledgements

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 - Lynn Babcock, Brad Kurowski, Shari Wade, Judith Dexheimer, Nicole McClanahan, Alex Talks, Sunny Thakkar, Jenna Gilb
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