After the injury: initial evaluation of a web-based intervention for parents of injured children

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Abstract

The purpose of this study was to survey parent knowledge of child injury reactions (including post-traumatic stress symptoms) and to evaluate parent satisfaction and learning outcomes following a video- or web-based intervention. Fifty parents of children ages 6–17 years who were injured within the past 2 months were recruited from emergency and inpatient settings. A repeated-measures experimental design was employed in which participants were assigned to either a web-based or video intervention. Parent knowledge was assessed pre- and post-intervention. Learning outcomes and satisfaction were evaluated post-intervention. Parents showed high levels (~70\% accuracy) of knowledge about potential psychological injury reactions at baseline and post-intervention. In addition, post-intervention parents were able to generate new positive strategies to help their child recover and became more specific about types of reactions to monitor (e.g. avoidance). Participants reported high levels of satisfaction with both web and video interventions. While parents possess high levels of basic knowledge about child recovery from injury, the Web site and video tools provided concrete guidance that was useful in enhancing parent understanding of specific traumatic stress reactions to monitor in children post-injury.

Introduction

Pediatric injury is a common potentially traumatic event for US children: 20 million children incur injuries each year, resulting in 8.7 million emergency department visits and 241 000 inpatient admissions [1]. Children who incur an injury are at risk for developing post-traumatic stress disorder (PTSD) [2–4]. The severity of a child’s injury does not predict PTSD [5, 6], which can make it difficult for medical professionals to determine when a child will develop psychological symptoms. Preventing PTSD symptoms is essential since symptoms contribute to functional impairment and poor recovery [2–4]. Evidence suggests that persistent traumatic stress might be prevented with early intervention [7], but available preventive resources are limited. Low-cost easily accessible interventions for secondary prevention of persistent traumatic stress are needed to reduce the burden of childhood injury.

Parents are the main source of support for children after injury [8], but the research indicates that many parents have difficulty assessing their child’s emotional reactions to injury [9] or knowing how best to help their child cope with these reactions.
Promising approaches to prevent psychological symptoms include psychoeducation about processes of coping and social support [7, 10, 11] and suggestions for coping with specific reactions (e.g. avoidance or hyperarousal) [10, 12]. To our knowledge, no study has quantified gaps in parent knowledge of common injury reactions (including potential post-traumatic stress symptoms).

There is initial evidence that print informational interventions can be efficacious in addressing traumatic reactions in youth and their parents. Kenardy et al. implemented an intervention which provided families with handouts with psychoeducational information about expected reactions to injury and found lower child anxiety at 1 month and fewer parent PTSD symptoms at 6 months for the intervention group. There is also growing empirical evidence supporting the feasibility and efficacy of delivering mental health preventive and treatment self-care interventions for adolescents and adults via the web [13, 14], but no study has evaluated the use of the web for the delivery of interventions targeted to parents to prevent the development of mental health symptoms (including persistent traumatic stress) in their children.

Our recently developed intervention was designed to secondarily prevent persistent traumatic stress in injured children by providing parents with evidence-based injury information and psychoeducation. The tools go beyond the simple provision of information about injury care and reactions to include specific evidence-based ways parents can assist in their child’s recovery and respond appropriately to traumatic stress symptoms. In order to increase accessibility of the intervention, the content was made available either by an interactive Web site or by a stand-alone DVD containing the intervention’s video content.

We have developed a multistep plan to evaluate the ability of our secondary preventive intervention to reduce the incidence and severity of child (and parent) post-traumatic stress symptoms after injury [15]. This study presents the results of the first step in the evaluation plan: assessment of parent baseline knowledge of post-traumatic stress symptoms related to child injury and immediate parent learning outcomes and satisfaction after the intervention.

### Methods

#### Participants

Study participants were parents of injured children treated at a large urban Level I pediatric trauma center in the northeastern United States. Parents were eligible for the study if their child was 6–17 years of age and had sustained an injury within the last 2 months (including children who returned to the hospital after the initial discharge for additional treatment of their injury). Exclusion criteria included child traumatic brain injury, parent inability to read or understand English and suspected abuse or family violence. The study was approved by the hospital’s Institutional Review Board.

#### Procedure

Potential participants were identified via Emergency Department and inpatient injury admissions lists. After study personnel obtained informed consent, parents completed a demographic survey and Parent Knowledge Assessment (open-ended questions followed by a checklist) and received the intervention (see below). Post-intervention parents again completed the Parent Knowledge Assessment and a Satisfaction Questionnaire (to assess their reaction to the intervention). Information regarding the nature, mechanism and treatment of the child’s injury was obtained from the medical record following discharge.

#### Description of intervention

The intervention was delivered via an interactive Web site, AfterTheInjury.org, or via a DVD containing the video content of the Web site. The goal of the intervention was to prevent persistent traumatic stress in injured children through the provision of injury information and psychoeducation to parents about how they can help their children in the early months after the injury. As the intervention was designed for secondary prevention rather than treatment, families with more serious or persistent symptoms were given information on when and how to get outside support. The intervention offers information and guidance for parents about emotional recovery from injury, injury care and parents’ role in helping their child with all
aspects of recovery (see Fig. 1). The site incorporates features of electronically delivered interventions that have shown efficacy in improving parents’ knowledge and confidence regarding participation in their child’s health care [16] including interactive features, engaging videos and the opportunity for parents to rate specific child reactions and receive tailored tips and a printable care plan. For more details on the development of the Web site see Kassam-Adams et al. [15]. The stand-alone video includes the same six video segments available on the Web site: ‘You are not alone’, ‘Reactions to injury’, ‘What are traumatic stress reactions?’ ‘How long do reactions last?’ ‘How to talk to your child’, and ‘How to deal with new fears and worries’. Using sequential sampling, the first 25 participants received the intervention via the web, while the second 25 participants received the intervention via DVD. This intervention is designed for parents’ direct use (without assistance from medical professionals) in a medical setting or in their own home. For this study of the intervention’s efficacy, we provided each parent with a 20-min ‘dose’ of the intervention to ensure that all parents were exposed to the same predetermined key intervention components.

Study intervention procedures

Web-delivered intervention procedure. Parents completing the intervention via the web were guided by trained research assistants through a standard set of activities that included key elements of the AfterTheInjury.org Web site. During the intervention, parents used the Web site to read information and view selected video clips about traumatic stress reactions, to read and listen to tips from other parents about providing coping assistance and to create a personalized care plan based on the parent’s own ratings of their child’s symptoms.

Video-only intervention procedure. Parents completing the intervention via watching the DVD were guided by trained research assistants to view all six video segments available on the Web site.

Measures

Parent Knowledge Assessment. Parental knowledge of child injury reactions was assessed via four open-ended questions and a 16-item checklist covering the following topics: normative and problematic stress reactions after injury, how parents can help with a child’s recovery and when to seek additional mental health service for their child. The open-ended portion of the assessment was administered verbally and parent responses recorded verbatim.

The self-report checklist portion of the Parent Knowledge Assessment was identical in administration both pre- and post-intervention. The checklist was developed specifically for use in this study and included 16 items tapping parent knowledge of child normative versus problematic reactions after an injury. For example, parents were asked to indicate whether a given reaction (e.g. ‘Your child refuses to talk about what happened’) was ‘probably a normal reaction’ or was a sign that a child ‘might need extra help’. The checklist was scored for correct responses and a total correct score (highest possible = 16) was computed.

Pre-intervention open-ended questions were

1. What sorts of things do you plan to do to help your child as she/he recovers from this injury?
2. If your child feels upset or afraid, what sorts of things would you do to help them deal with it?
3. What stress reactions should parents watch for after a child is injured?
4. When should a parent seek additional assistance (e.g. from a counselor or psychologist) for their child’s reactions to an injury?

Post-intervention Questions 1 and 2 were asked by adding the stem ‘After [watching this video/using this Web site], is there anything different you would plan to do?’ Questions 3 and 4 were presently identically pre- and post-intervention. Responses to open-ended questions were coded by expert raters. (See below for coding procedures.)

Coding procedures for parent responses to open-ended Parent Knowledge Assessment questions

Open-ended responses to Parent Knowledge Assessment were coded for the presence or absence
of accurate responses derived from theory and data according to the following categories:

Question 1: Plans to support child for injury recovery (16 themes collapsed into 4 types of help): address physical injury/pain, provide comfort/support, address emotional responses to injury, and seek help for child.

Question 2: Plans to help child deal with reactions (12 themes collapsed into three types of help): provide comfort/support, address emotional responses, and seek help for child.

Question 3: Stress reactions to watch for post-injury (20 themes collapsed into 6 categories): non-specific behavior changes, emotional withdrawal, physical symptoms, re-experiencing, avoidance, arousal.

Question 4: When to seek additional help for child’s reactions (12 themes collapsed into 5 categories): course of reactions, interference of symptoms with daily functioning, non-specific behavioral symptoms, PTSD symptoms, and parents’ need of assistance.

Coders were experienced research assistants (bachelor’s degree or higher), knowledgeable about parent and child reactions to injury and PTSD. To ensure good inter-rater reliability, coders were trained by independently rating the first 10 sets of responses (double-coding 20% of responses), meeting together (with the project supervisor) to identify differences in coding and setting shared standards for the remainder of protocols. Coders were blinded both to the intervention condition (video/web) and time of assessment (pre/post) for the responses they rated. Coders rated the presence/absence of specific themes derived from theory (e.g. expected reactions from children following traumatic events such as

Fig. 1. First step (homepage) in the Web site intervention.
PTSD symptoms [17], type of coping parents can encourage to decrease PTSD symptoms [10–12] and initial review of parent responses (i.e. an inductive approach used to add and code themes based on parent responses). Coders then utilized a 3-point scale to rate the accuracy of each response (as accurate, partially accurate or inaccurate; responses coded as inaccurate or partially inaccurate are grouped together for analyses). ‘Accuracy’ in this context is the extent to which a parent’s response is correct (i.e. clinically recommended), appropriate and/or adaptive with regard to promoting child recovery from injury. After responses were coded for presence of themes and accuracy, coders (now unblinded) compared each participant’s pre- and post-responses to rate novelty (new responses generated post-intervention that had not been mentioned pre-intervention).

Parent Satisfaction Questionnaire. This is a 9-item validated satisfaction questionnaire that is widely used to assess user satisfaction with Web sites (with added several items specific to our materials) [18]. Parents rated (7-point Likert scale) the reliability and clarity of the intervention content as well as their likeliness to use the video or web tools in the future and recommend them to others.

Analytical procedures
We examined demographic characteristics of the current sample and utilized chi-square analyses to compare study participants to eligible parents who chose not to participate. We conducted descriptive analyses to summarize participants’ pre- and post-intervention knowledge assessed via open-ended questions and checklist items. Changes in knowledge scores pre- to post-intervention were analyzed using paired samples t-tests. We analyzed parent satisfaction with the intervention by conducting item-level frequencies.

Results
Preliminary analyses
During the enrollment period, 52 parents were enrolled in the study (2 were dropped due to incomplete data), and 27 parents chose not to participate. The most common reasons for participant refusal included feeling overwhelmed, believing the information was not relevant to their child or wanting to focus on their child’s discharge from the hospital. Children of parents who refused participation were older ($t_{67} = 3.93, P < 0.001$) than children of participating parents. There were no significant differences between web-delivered or DVD-delivered intervention groups for child gender or race/ethnicity. Independent samples t-tests showed no significant differences in knowledge scores (pre or post) between the two intervention groups; thus, groups were collapsed for subsequent analyses.

Sample characteristics
Mean parent age was 40.6 years ($SD = 7.1$); mean child age was 11.2 ($SD = 3.0$). Parent participants were highly educated with 76% ($n = 38$) pursuing education beyond a high school diploma and approximately 50% identified as White. Sports and recreation, falls and motor vehicle accidents were the most prevalent mechanisms of child injury, and the nature of the injury varied widely, from extremity fractures to sprains/strains. All injuries met a level of severity which required medical treatment, with 72% of children requiring inpatient admission to the hospital (28% were treated in the Emergency Department and discharged to home). For those children hospitalized, days in the hospital ranged from less than 1–15 with the median hospital stay being 2 days (mean = 3.25, SD = 3.18). The mean number of days post-injury to parent enrollment (and use of the intervention) was 5.2 days (median = 1 day). See Table I for complete sample characteristics including mechanism and nature of injury.

Knowledge at baseline
Overall, participants’ knowledge of expected injury reactions was high as measured by the checklist portion of the Knowledge Assessment [mean = 11.46 (71.6% accurate), $SD = 2.84$] at baseline. However, both strengths and gaps in knowledge were noted at baseline in response to the open-ended questions. Pre-intervention parents were
most knowledgeable about physical injury recovery and were less likely to identify emotional recovery as issues to which they should pay attention following their child’s injury.

When asked about plans to support their child for injury recovery (Question 1), parents described plans to care for physical injury/pain (support physical recovery, modify activities or provide extra assistance to accommodate injury and manage pain) followed by plans to provide comfort/support and seek help for child. Very few parent responses addressed emotional responses to injury. (See Table II for proportion of accurate responses pre-intervention.) On average, parents responded with 1.64 (SD = 1.22, range 0–5) accurate responses and 0.92 (SD = 1.08, range 0–5) inaccurate responses. Sample accurate responses included ‘Encourage her to get back into her normal routine (what she can still do)’ and ‘Follow recommendations of healthcare professionals’. Inaccurate responses included ‘I’ll be with him at all times’.

When asked about plans to help child deal with reactions (Question 2), parents described plans to address emotional responses (talk to their child about his or her worries and allow their child to express feelings if he or she wants to) followed by plans to provide comfort/support or seek help for child. (See Table III for proportion of accurate responses pre-intervention.) On average, parents responded to with 1.22 (SD = 0.93, range = 0–4) accurate responses and 0.92 (SD = 1.08, range = 0–4) inaccurate responses. Sample accurate responses included ‘Talk about fears and worries’ and inaccurate responses included ‘I’ve never known him to be upset or afraid’.

When asked about stress reactions to watch for after injury (Question 3), parents most frequently described non-specific behavioral changes [behavior changes (44%), new fear or worsening of pre-existing fear (20%) and irritability or anger (20%)] followed by physical symptoms and emotional withdrawal. Very few parents mentioned re-experiencing, avoidance or hyperarousal (post-traumatic stress) symptoms. (See Table IV for proportion of accurate responses pre-intervention.) On average, parents provided 1.4 (SD = 1.39, range = 0–5) accurate responses and with a mean of 0.72 (SD = 0.81, range = 0–3) inaccurate responses. Sample accurate responses included ‘Fear, disruption in sleep or normal routine’ and ‘Social withdrawal or lack of concentration’. Sample inaccurate responses included: ‘I don’t know, pain level’ and ‘Overreacting’.

When asked about what would prompt seeking additional help for their child’s reactions (Question 4), parents most commonly mentioned non-specific behavioral changes, followed by course of reactions and parents’ need of assistance. Fewer responses included interference in daily functioning or post-traumatic stress reactions. (See Table V for proportion of accurate responses pre-intervention.) On average, parents included 0.84 (SD = 0.87, range = 0–3) accurate responses and 0.63 (SD = 0.78, range = 0–3) inaccurate responses. Sample accurate
responses included ‘If they interfere with other areas of life or if they persist’ and ‘A couple weeks after the surgery if they haven’t adjusted’. Sample inaccurate responses included ‘If they become overly dramatic’.

Post-intervention outcomes

No significant differences emerged between parents’ knowledge scores pre-/post-intervention on the checklist portion of the Parent Knowledge Assessment. Post-intervention closed-ended knowledge

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**Table II.** Frequencies of themes coded from Question 1 pre- and post-intervention

<table>
<thead>
<tr>
<th>What sorts of things do you plan to do to help your child as she/he recovers from this injury?</th>
<th>Accurate responses (%)</th>
<th>Pre-intervention</th>
<th>Change in post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address physical injury/pain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide general support of physical recovery</td>
<td>54</td>
<td>+16</td>
<td></td>
</tr>
<tr>
<td>Promote physical activities to help with pain or healing</td>
<td>46</td>
<td>+6</td>
<td></td>
</tr>
<tr>
<td>Modify activities/provide extra assistance to accommodate injury</td>
<td>22</td>
<td>+18</td>
<td></td>
</tr>
<tr>
<td>Give advice about safety/injury prevention</td>
<td>8</td>
<td>+2</td>
<td></td>
</tr>
<tr>
<td>Provide comfort/support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase time with family and/or friends</td>
<td>18</td>
<td>+8</td>
<td></td>
</tr>
<tr>
<td>Provide physical consoling or comfort</td>
<td>8</td>
<td>+4</td>
<td></td>
</tr>
<tr>
<td>Encourage child to return to normal routines</td>
<td>8</td>
<td>+8</td>
<td></td>
</tr>
<tr>
<td>Let child know they are safe</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Address emotional responses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow child talk or draw to express feelings</td>
<td>8</td>
<td>+18</td>
<td></td>
</tr>
<tr>
<td>Talk to child about worries</td>
<td>4</td>
<td>+6</td>
<td></td>
</tr>
<tr>
<td>Reassure child that his/her reactions are normal</td>
<td>4</td>
<td>+6</td>
<td></td>
</tr>
<tr>
<td>Help child approach fears in safe ways</td>
<td>0</td>
<td>+2</td>
<td></td>
</tr>
<tr>
<td>Tell child it is not his/her fault</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Seek outside help for child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take child to therapist or counselor or doctor</td>
<td>10</td>
<td>+8</td>
<td></td>
</tr>
<tr>
<td>Seek help if necessary</td>
<td>6</td>
<td>+10</td>
<td></td>
</tr>
</tbody>
</table>

| Table III. **Frequencies of themes coded from Question 2 pre- and post-intervention**

<table>
<thead>
<tr>
<th>If your child feels upset or afraid, what sorts of things would you do to help them deal with it?</th>
<th>Accurate responses (%)</th>
<th>Pre-intervention</th>
<th>Change in post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide comfort/support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide physical consoling or comfort</td>
<td>30</td>
<td>+20</td>
<td></td>
</tr>
<tr>
<td>Reassure child that his/her reactions are normal</td>
<td>12</td>
<td>+14</td>
<td></td>
</tr>
<tr>
<td>Encourage child to return to normal routines</td>
<td>12</td>
<td>+10</td>
<td></td>
</tr>
<tr>
<td>Help child make appropriate safety efforts</td>
<td>8</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Let child know he/she is safe</td>
<td>8</td>
<td>+10</td>
<td></td>
</tr>
<tr>
<td>Address emotional responses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talk to child about his/her worries or feeling upset</td>
<td>64</td>
<td>+52</td>
<td></td>
</tr>
<tr>
<td>Let child talk or draw to express feelings if she/he wants to</td>
<td>60</td>
<td>+52</td>
<td></td>
</tr>
<tr>
<td>Act as ‘reality check’ for child’s fears or worries</td>
<td>4</td>
<td>+2</td>
<td></td>
</tr>
<tr>
<td>Help child approach fears in safe ways</td>
<td>4</td>
<td>+8</td>
<td></td>
</tr>
<tr>
<td>Help child understand trauma reminders or avoidance</td>
<td>0</td>
<td>+2</td>
<td></td>
</tr>
<tr>
<td>Seek help for child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seek help if necessary</td>
<td>10</td>
<td>+22</td>
<td></td>
</tr>
</tbody>
</table>
scores remained high (post = 73.0% accurate). However, most parents reported that they learned new information by participating in the intervention \((n = 43, 86\%)\), which was demonstrated by increases in knowledge for the open-ended portion of the Parent Knowledge Assessment: parents included additional correct responses post-intervention (see Tables II–V).

Post-intervention parents responded with additional accurate responses to their ‘plans to support child for injury recovery’ (Question 1), including allowing their child to express him/herself and modifying activities/providing extra assistance to accommodate injury. Additional post-intervention accurate responses to how parents ‘intended to help their child deal with feeling upset or afraid’ (Question 2) included addressing emotional reactions, with over half of parents providing new responses suggesting that they intended to talk to their child about his/her worries and to allow their child to express his/her feelings. Another 20–22% of parents reported that they intended to provide physical comfort and seek additional help for their child when needed.

After the intervention, an increased number of parents mentioned specific traumatic stress reactions in response to Question 3 (stress reactions to look for after a child is injured). Paired samples \(t\)-tests identified a difference in the mean number of accurate responses pre- to post-test for parents’ noting re-experiencing \((t_{(48)} = 2.68, P < 0.05; \text{Cohen’s } d = 0.46)\) and avoidance symptoms \((t_{(48)} = 6.74, P < 0.001; \text{Cohen’s } d = 0.86)\).
Cohen’s $d = 1.03$). Gains in parent knowledge were also indicated by new accurate responses generated after the intervention: 80% of participants ($n = 40$) responded to this question on the post-test with at least one accurate and novel response (see Table IV).

Post-intervention parents more frequently included accurate responses to Question 4 (when parents should seek additional assistance for child reactions). Paired samples $t$-tests revealed a difference in parents’ report of considering the persistence of child reactions ($t_{(49)} = 3.07, P < 0.01$; Cohen’s $d = 0.51$). Parents’ responses more frequently included specific references to the duration of their child’s emotional reactions as a factor in determining whether to seek additional assistance. Additionally, 64% of parents ($n = 32$) had at least one accurate and new response to this question after the intervention (see Table V).

**Parent satisfaction/reactions to intervention materials**

Parents reported high levels of satisfaction with both Web site and video intervention materials. The only significant difference in parent satisfaction between video and web groups was parents’ self-reported likelihood of using the intervention tools in the future ($t_{(43)} = 2.20, P < 0.05$). Parents who used the Web site were more likely to indicate that they would utilize the materials in the future than those who viewed the video (76% web versus 44% video). Parents indicated that the web and video tools met their expectations (88%), appeared reliable (84%) and helped them feel more connected to other parents (64%). The vast majority of parents (80%) indicated that they would recommend the intervention tools to other parents.

**Discussion**

This study demonstrates that parents possess a reasonably high level of basic knowledge about child recovery from injury. However, parents can achieve more detailed and practical knowledge about how to monitor and respond to specific traumatic stress reactions from the concrete guidance provided by AfterTheInjury.org (via the web or video). This information was found useful by parents in both formats, allowing for broad accessibility. Widely accessible prevention interventions can help parents support their child, filling a crucial gap for the millions of children who suffer injuries each year. While most children achieve full recovery over
time, many experience acute traumatic stress reactions, which persist and cause impairment for a significant minority. Thus, many children can benefit from early secondary prevention programs [19–21].

**Parent baseline knowledge**

This study sought first to provide a basic understanding of what parents of recently injured children know about promoting full injury recovery in their child. Findings suggest that parents possess relatively high levels of general knowledge and knowledge about promoting physical recovery but that there are gaps in their knowledge of specific traumatic stress responses. This is consistent with previous research that has indicated that parents have difficulty assessing their child’s emotional reactions to injury [9].

Parents in this sample scored high on the baseline knowledge checklist, possibly due to the high education level of parents in this sample. A statistically significant increase could not be detected in checklist-assessed knowledge post-intervention likely due to a ceiling effect. However, open-ended questions highlighted positive changes between pre- and post-intervention responses.

Before the intervention, when asked how they intended to help their child recover, parents were far more likely to mention that they planned to provide assistance with physical recovery rather than address emotional responses. Parents rarely mentioned watching for child reactions that indicate traumatic stress, such as their child avoiding reminders of what happened or experiencing intrusive thoughts or images. This suggests room for growth in parental knowledge of these particular reactions in children after an injury.

**Effect of the intervention on parent knowledge**

Prior research has suggested that increasing knowledge about post-traumatic stress can lead to symptom reduction [10–12, 22] and that informational interventions can be helpful early preventative tools [7]. We evaluated proximal outcomes (parents’ learning outcomes and satisfaction) immediately after using the video- or web-based AfterTheInjury intervention. This is the first step in a multifaceted evaluation that will eventually assess the efficacy of the intervention in enhancing parent support of children and reducing persistent traumatic stress [15].

The AfterTheInjury web and video tools aim to help parents promote emotional recovery in their child by increasing knowledge in three areas: the normal course of emotional responses (including traumatic stress) after injury, what parents can do to help their child and when a child’s reactions warrant seeking additional help from a professional. Findings were promising for the effect of the psychoeducational intervention in each of these three areas. Parents’ responses to open-ended questions demonstrated an increase in knowledge and recognition of specific emotional reactions to watch for, especially traumatic stress. Regarding what parents can do to help their child, after the intervention, more than half of the parents provided a new response suggesting that they intended to talk with their child about feelings or worries and to allow their child to express his/her feelings. With regard to knowing when to seek further (professional) assistance, parents demonstrated an increased understanding that persistent traumatic stress would warrant this support, and nearly one-fourth stated a new intention to seek additional help for their child if needed. Parent checklist responses did not show a change in pre- to post-intervention knowledge scores, likely due to ceiling effects at baseline.

Video and web intervention groups had similar scores. Being able to provide these materials through multiple channels increases their potential reach. The intervention (video- or web-based activities) is easily accessible via the Internet, and the video can be self-administered by any parent with a DVD player. The Web site has the advantage of offering multiple ways to use the intervention (watching, reading and using interactive tools). When rating ‘I would be likely to use this Web site/video again in the future’, parents who used the web-based materials were more interested in using the tool again, suggesting a stronger interest in the web-based tools than the video.
Parent satisfaction
Parents reported satisfaction with the intervention materials, finding them easy to use, informative and helpful. The positive response of parents may be attributable to the team’s inclusion of parental feedback throughout the site design process and to the inclusion of features (interactivity, engaging videos, tailored tips and care plan) that have shown efficacy in other electronically delivered interventions for parents [16].

Limitations and future directions
The relatively homogeneous study sample limits generalizability of the results; a larger more heterogeneous sample of parents would be useful in future studies. Limited variability in pre-intervention scores on the knowledge checklist hindered interpretation of findings regarding changes in these constructs. To build upon the current study’s pre-post sequential sampling design, future research using randomized study design with a no-intervention control group would allow additional analyses of the efficacy of the intervention. The current study did not assess parents’ engagement in the intervention and how this could be related to their perceived need of assistance in helping their child recover (e.g. do parents of children with more severe injury believe the intervention to be more relevant?) and parent knowledge outcomes. Though findings are promising, future studies are needed to gauge the effectiveness of the intervention as parents use the web-based intervention independently and to determine optimal means of dissemination to reach parents at the critical post-injury time period. Future studies incorporating follow-up assessments will be able to examine effects on child and parent traumatic stress symptoms (the ultimate goal of this prevention effort) and to evaluate the relationship between knowledge gains and traumatic stress symptom levels.

Conclusions
While parents appear to have a basic understanding about what to expect during their child’s physical recovery from injury, they are less aware of specific emotional reactions to monitor and specific coping assistance techniques to offer. The results of this study serve to identify target areas for improvement in parental knowledge (i.e. recognition and knowing how to address specific traumatic stress symptoms). Clinicians can help by ensuring that they provide anticipatory guidance regarding specific reactions to injury and ways that parents can help children cope and by referring parents to easily accessible resources such as AfterTheInjury.org for further information. Promising findings from this study suggest that video- and web-based prevention tools may be efficacious in increasing parental knowledge about child recovery and reactions after pediatric injury. Additional research will clarify the role of these tools in promoting full recovery in children and parents after injury.


