



Published in final edited form as:

Prof Psychol Res Pr. 2007 December ; 38(6): 629–639.

Assessment and treatment of PTSD after a motor vehicle collision: Empirical findings and clinical observations

J. Gayle Beck¹ and Scott F. Coffey²

¹University at Buffalo, SUNY

²The University of Mississippi Medical Center

Abstract

Individuals who experience a serious motor vehicle accident (MVA) are at increased risk for psychological problems, particularly Posttraumatic Stress Disorder (PTSD). In this article, we review the literature on PTSD among MVA survivors, with particular attention to available instruments to screen for and assess symptomatology of the disorder. Approaches to the treatment of PTSD in this population are reviewed, separated into interventions designed to prevent PTSD in unselected samples, treatment targeting individuals with Acute Stress Disorder that are designed to prevent subsequent development of PTSD, and therapy for individuals with chronic PTSD. Treatment process issues are discussed, in an effort to integrate empirical findings with clinical observations. The empirical literature suggests several approaches to treatment that have good potential outcomes, although continued work is needed to identify factors that predict treatment response, as well as augment individual-based treatment formats.

Keywords

Trauma; Road traffic accidents; Cognitive Behavior Therapy; Supportive Psychotherapy; Acute Stress Disorder

As Cathy sat at the traffic light thinking about the errands she was running, she could hear her two year-old singing in the backseat. Suddenly, a violent blow from behind launched her car forward approximately 15 feet. Immediately, she felt a sharp pain in her neck. With her ears ringing from the noise of the collision, she at once thought, “my baby is dead”. Whipping her head around despite the intense pain, she saw her baby wide-eyed and surprised, but completely uninjured as he sat buckled in his car seat. For months following the collision she asked herself, “It was just a wreck- like people have every day ... Why am I having bad dreams about it, a hard time driving, and I can’t seem to relax anymore”. If you have a patient in your office who sounds like this, you are not alone. Millions of motor vehicle accidents (MVAs) occur each year, many with serious consequences (U.S. Department of Transportation, 2004). For example, in 2004 just under 6.2 million traffic accidents were reported to police departments in the United States resulting in approximately 2.8 million injuries. Despite the large number of MVAs and injuries that result from these accidents, only recently have the psychological consequences of MVAs been fully recognized (see Blanchard & Hickling, 2004). In this article, we will review the available knowledge about emotional after-effects of serious collisions, with particular emphasis on the assessment and treatment of PTSD.

Correspondence concerning this article should be sent to J. Gayle Beck at the Department of Psychology, Park Hall, University at Buffalo – SUNY, Park Hall, Buffalo, New York, 14260 or via email to jgbeck@buffalo.edu.

J. Gayle Beck, Department of Psychology, University at Buffalo – SUNY, Scott F. Coffey, Department of Psychiatry and Human Behavior, The University of Mississippi Medical Center

Psychological consequences of a serious motor vehicle accident

PTSD

One serious psychological consequence often associated with serious MVAs is posttraumatic stress disorder (PTSD). PTSD is an anxiety disorder that often follows a traumatic event involving actual or threatened death, serious injury, or threat to the physical integrity of oneself or others (American Psychiatric Association, 2000). For many individuals, the symptoms of PTSD following a serious MVA may include psychologically re-experiencing the trauma (e.g., intrusive thoughts about the accident, distressing dreams about the accident), persistent avoidance of thoughts or situations associated with the accident (e.g., reluctance or refusal to drive, actively avoiding thoughts about the MVA), numbing of emotional responsiveness (e.g., greatly reduced or absence of emotions, feeling detached from others), and increased physical arousal (e.g., exaggerated startle, irritability, disturbed sleep).

Reported rates of MVA-related PTSD can vary across studies depending on methodologies employed in the various studies. However, from the approximately two dozen studies assessing samples consisting largely of MVA survivors (often recruited from emergency room admissions or hospital wards) and using well validated structured interviews, the presence of PTSD at least 30 days post-MVA is approximately 25-33% (e.g., Bryant, Harvey, Guthrie, & Moulds, 2000; Harvey & Bryant, 1998; Ursano et al., 1999). Although these samples may be seeking medical attention, the presenting problem in these studies typically is not psychological in nature so they would not be classified as psychological treatment seekers. As might be expected, the rates of PTSD found in assessment or psychological treatment-seeking samples of MVA survivors tends to be higher (e.g., Blanchard & Hickling, 2004). In looking at the general population, Norris (1992) conducted a large survey of four Southern cities ($n = 1,000$; response rate 71%) and found the lifetime prevalence rate of PTSD to be 7.4% and that MVAs were among the leading cause of PTSD in her sample. These data, along with a lower rate of MVA-related PTSD found in a survey of relatively young Americans (Breslau et al., 1991), leads to a conservative estimate that MVA-related PTSD may affect 2.5 to 7 million people in the United States, reflecting a significant public health problem (Blanchard & Hickling, 2004).

Comorbidity

In addition to PTSD, a number of other psychological problems often are present after a MVA. Mood disturbances are particularly common, with one report indicating that 53% of patients with PTSD have concurrent mood disorders (Blanchard et al., 1995). In a sample of MVA survivors seeking an assessment and treatment for trauma-related symptoms at the University at Buffalo ($n = 237$), 25% of the overall sample reported symptoms consistent with a major depressive episode. However, of those meeting criteria for PTSD ($n = 103$), 41% reported symptoms consistent with a major depressive episode. These data are somewhat consistent with a larger epidemiological study (National Comorbidity Survey, NCS) examining psychiatric comorbidity among individuals with PTSD in which approximately 48% of those with PTSD also experienced a major depressive episode (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). However, the rates of co-occurrence of PTSD and depression in the Buffalo sample may be higher than rates reported in the NCS because the NCS assessed *lifetime* comorbidity while the Buffalo MVA sample represents *current* comorbidity. Additional anxiety disorders also can be present, with rates ranging from 7% to 31%, depending on gender and the specific disorder in question (Kessler et al., 1995). In addition, the presence of PTSD increases an individual's risk of meeting criteria for a substance use disorder. For example, Helzer et al. (1987) reported that men and women with PTSD were 5 and 1.4 times more likely, respectively, to have a substance use disorder compared with the general population. In contrast, rates of a current drug or alcohol abuse disorder (0% and 1.6%, respectively) among

MVA survivors with PTSD are relatively low and did not differ between MVA survivors with PTSD, MVA survivors without PTSD, and non-MVA controls (Blanchard et al., 1995). So while MVA survivors with PTSD appear to present for treatment with high rates of depression, substance use disorders may be somewhat lower in this PTSD population compared to other PTSD populations. Further research is needed to test this hypothesis.

Chronic pain

Among the issues that are associated with MVA-related PTSD, the presence of chronic pain may be the single most defining characteristic. For example, in a psychometric study assessing PTSD in 229 MVA survivors, Coffey, Gudmundsdottir, Beck, Palyo, & Miller (2006) found that 69% of the sample reported chronic pain that could be attributed to their MVA. For an individual to be described as having MVA-related chronic pain, it was required that pain symptoms be attributed to injuries sustained during their MVA and that the pain symptoms had not responded to standard medical treatment after one month. In addition, the reported pain caused significant lifestyle limitations, impairment, or significant distress, determined on the basis of behavioral restriction (e.g., unable to work), continued utilization of health care for pain relief, or consistent use of pain medication. In a study of a MVA survivors presenting with chronic headache and other pain, Hickling and Blanchard (1992) found a 50% prevalence rate for PTSD. In another study of MVA survivors by this research group (Blanchard et al., 1995), physical injury was associated with the development of PTSD (and subsyndromal PTSD). Finally, in a sample of litigating MVA survivors with chronic pain and posttraumatic stress symptoms, Duckworth and Iezzi (2005) found that high posttraumatic stress symptoms were related to physical impairment, psychological distress, and maladaptive pain coping strategies. In sum, it is clear that pain often co-occurs in assessment and treatment seeking MVA survivors. The role that chronic pain may play in treatment will be discussed below.

MVAs, symptom presentation, and litigation

Litigation is a ubiquitous feature of working with MVA survivors. Clinical lore suggests that litigation markedly affects symptom presentation among MVA survivors. Specifically, many believe that litigation is the driving force behind complaints of PTSD symptoms in MVA survivors and once litigation is concluded (e.g., a favorable ruling is won by the litigant), symptom presentation will improve. As cogently reviewed in Blanchard and Hickling (2004), there is little evidence that litigation affects symptoms among assessment or treatment seeking MVA survivors. Although a number of researchers have investigated the effects of litigation on symptom presentation and an individual's willingness/ability to return to work, Mayou and colleagues have produced the largest body of work to date (e.g., Mayou, 1995, 2002; Mayou, B. Bryant, & Duthie, 1993). Following a group of 171 MVA accident survivors seen at an emergency room in England, Mayou and colleagues, at three-year follow-up, found no differences in symptom presentation between the 96 individuals who were involved in MVA-related litigation and the 75 who had not filed claims (Mayou, 1995; Mayou et al., 1993). At 6 year follow-up, 81 of the 96 individuals pursuing litigation were located and re-assessed (B. Bryant, Mayou, & Lloyd-Bostock, 1997). Sixty-nine of the 81 cases had been settled but there were no dramatic improvements in physical complaints, mental state, or social functioning among those with settled cases compared to those whose cases were still active. These data have been largely replicated in an Australian sample ($n = 106$) of MVA survivors who were hospitalized because of their injuries (R. A. Bryant & Harvey, 2003). Although it is always possible that an individual involved in an MVA may be less than genuine when describing psychological or physical symptoms attributed to the MVA, at this point, the available data does not support that contention that there is widespread deceit among assessment or treatment seeking MVA survivors.

Assessment of MVA-Related PTSD

PTSD screening and treatment outcome measures

Given the high prevalence of MVA-related PTSD described above, it is prudent to screen clients who report a serious MVA for PTSD. Shrout and colleagues have recommended a two-step approach to identifying PTSD (Shrout, Skodol, & Dohrenwend, 1986). In the first step, individuals are administered self-report measures relevant for a particular disorder. If a predetermined cutoff score is exceeded, a more extensive and time-consuming diagnostic evaluation can be conducted. By administering a self-report measure first to identify cases that are most likely to require additional assessment and possibly treatment, clinicians can efficiently allocate services where they are potentially most needed. In the case of MVA survivors, easy to administer self-report screening tools may help to identify individuals in both psychological and medical settings who are suffering serious psychological sequelae of an MVA and increase referrals to effective MVA-PTSD treatment (e.g., Blanchard & Hickling, 2004; Taylor & Koch, 1995).

Although, there are a number of psychometrically sound measures of PTSD symptoms, three measures may be particularly useful in screening clients for MVA-related PTSD; one because of its excellent psychometric properties and widespread use and two others because they are psychometrically sound and have established screening scores specific for MVA-related PTSD. These three measures also can be used to index change during the course of treatment, as they have been shown to be sensitive to change in this population.

One of the most widely used PTSD screening measures is the *PTSD Checklist* (PCL; Weathers, Litz, Huska, & Keane, 1994). The items of the PCL correspond to the 17 symptoms of PTSD in DSM-IV (APA, 2000). Respondents rate each item in terms of how much the symptom has bothered them in the past month using a 1 (*not at all*) to 5 (*extremely*) scale. Internal consistency coefficient of the PCL total score has been reported to be 0.94 (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Ruggiero, Del Ben, Scotti, & Rabalais, 2003) and two-week test-retest reliability correlation coefficient has been reported to be 0.68 (Ruggiero et al., 2003). When the PCL is used as a screening tool, perhaps the most commonly reported scoring strategy is to simply sum the scores of the 17 items into a total score. Individuals whose total score fall at or above the cutoff score, likely will meet diagnostic criteria for PTSD and should be assessed with a diagnostic interview. Various cutoff scores for the PCL have been identified in the literature but the two most commonly reported are 50 and 44. Weathers et al. (1994), using a sample of combat veterans, identified a total score of 50 as an appropriate cutoff score for screening purposes. In contrast, Blanchard and colleagues evaluating a small sample of MVA and sexual assault survivors (n=40; 92% female) recommend a cut off score of 44 (Blanchard et al., 1996). Blanchard and Hickling (2004) hypothesize that the difference in recommended cutoff score in these two studies may be due to the sharp gender difference in the two samples (and the chronicity of PTSD in the Vietnam veteran sample used by Weathers et al.). The PCL is available from the National Center for PTSD at <http://www.ncptsd.va.gov/index.html>.

In addition to the PCL, two other self-report PTSD symptom scales, the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) and the PTSD Symptom Scale-Self Report (PSS-SR; Foa, Riggs, Dancu, & Rothbaum, 1993), have been used as screening tools with MVA survivors. The PSS-SR contains 17 items, reflecting the DSM-IV symptoms of PTSD, which are rated on a 4-point Likert scale, ranging from *not at all* to *5 or more times/week - almost always*. The highest possible score on the PSS-SR is 51. Foa et al. (1993) evaluated the psychometric properties of the PSS-SR with 46 female rape victims and 72 female non-sexual assault victims, noting that the scale showed high internal consistency ($\alpha = .91$), good one-month test-retest reliability ($r = .74$), and adequate convergent validity (.52 to .81) (Foa et al., 1993). The IES contains 15 items that are distributed across two subscales, which assess

intrusion (7 items) and avoidance (8 items). The frequency of each item is rated on a 4-point scale: 0 (*not at all*), 1 (*rarely*), 3 (*sometimes*), or 5 (*often*). The highest possible total score on the IES is 75. The IES has been shown to have high internal consistency with alpha coefficients of .78 for the intrusion subscale and .82 for the avoidance subscale in a sample of 66 outpatients (Horowitz et al., 1979). Split-half reliability of the total scale was .86 and the one-week test-retest reliability was .89 for the intrusion subscale and .79 for the avoidance subscale (Horowitz et al., 1979). For a recent review on the psychometric properties of the IES, please see Joseph (2000).

Using a sample of 229 men and women who suffered a serious MVA and responded to recruitment flyers at health clinics, newspaper advertisements, and referrals from health care providers, Coffey and colleagues compared various total scores on the IES and PSS for their ability to identify those individuals with and without PTSD (Coffey et al., 2006). A widely used and psychometrically sound diagnostic interview (i.e., Clinical Administered PTSD Scale) was used to establish a PTSD diagnosis. By comparing total scores on the self-report measures with results from a diagnostic interview (i.e., the “Gold Standard”), three useful metrics can be calculated to assess the utility of the self-report measure: *sensitivity*, or the chance that a condition that is present will be detected, *specificity*, or the chance that a condition that is not present will be found to be absent, and *overall correct classification*, or the proportion correctly diagnosed by an instrument (Kessel & Zimmerman, 1993). For the IES using a cutoff score of 27, sensitivity was .91, specificity was .72 and overall correct classification was .80. For the PSS-SR using a cutoff score of 14, sensitivity was .91, specificity was .62 and overall correct classification was .74.

It is important to note that use of the recommended cutoff scores for the PCL, IES, or PSS-SR will produce a relatively high rate of false positive cases. That is, the total score for an individual may exceed the recommended cutoff score but, using a diagnostic interview, the individual may not meet criteria for MVA-related PTSD. Relatively high false positives rates are seen as acceptable on screening measures given that the self-report measures only take a few minutes to complete and the primary goal of the screener is to have a measure with high sensitivity (i.e., capture the vast majority of true positive cases) that can then be followed by a more stringent, but time consuming, structured interview.

Diagnosing MVA-related PTSD

Following a positive screening for PTSD symptoms, a well established structured interview should be administered. While general structured interviews provide reliable and valid diagnoses, discussion within this article will be limited to a well established structured interview specifically designed to assess PTSD, the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995). The CAPS is a structured interview developed at the Boston branch of the National Center for PTSD, a multisite research, clinical, and education center within the Veterans Administration. The CAPS assesses the 17 symptoms of PTSD identified in DSM-IV. The CAPS includes standardized questions to determine the frequency and intensity of PTSD symptoms in the preceding month, using a 5-point Likert scale (e.g., 0 indicates that the symptom does not occur or does not cause distress and 4 indicates that the symptom occurs nearly every day or causes extreme distress and discomfort). The CAPS also includes standardized questions assessing subjective distress and impairment in social and occupational functioning due to these problems. Because of the prevalence of pain in MVA survivors, it is helpful to add probes to the interview to determine whether each symptom is related to PTSD or if it is better attributed to chronic pain. For example, if a patient reported difficulty sleeping, a clinician can assess whether this symptom is due to pain. If the symptom can be attributed to pain, a clinician may decide to not count the symptom toward a diagnosis of PTSD. This more conservative scoring approach of the CAPS has been used by researchers developing

treatments and assessment approaches for MVA-related PTSD (e.g., Beck & Coffey, 2005). The CAPS has strong psychometric properties (e.g., Weathers, Keane, & Davidson, 2001) and has been shown to be sensitive to the detection of PTSD in individuals following a MVA (Blanchard, Hickling et al., 1996). A common scoring procedure is to count a symptom toward a diagnosis of PTSD if both a rating equal to or greater than 1 is provided for the frequency of the symptom and a rating equal to or greater than 2 is provided on the severity of the symptom. A diagnosis of PTSD can be given if the number of positive symptoms meet or exceeds DSM-IV criteria and the participant reports distress or interference due to these symptoms. The CAPS is available from the National Center for PTSD at http://www.ncptsd.va.gov/publications/assessment/adult_interviews.html.

Exposure to trauma is a relatively common human experience. Trauma exposure was experienced by 60.7% of men and 51.2% of women in the NCS and 34.2% of men and 24.9% of women experienced exposure to more than one traumatic event (Kessler et al., 1995). Therefore, in addition to assessing for MVA-related PTSD, it is also recommended that MVA survivors be assessed for non-MVA potentially traumatic events (PTE). Although a number of measures are available to assess PTE, one reliable broad spectrum trauma assessment tool is the Traumatic Life Events Questionnaire (TLEQ; Kubnay et al., 2000). The TLEQ is a self-report measure that enables a clinician to assess a broad range of PTE and to establish whether the event satisfies the requisite stressor (i.e., Criteria A) for PTSD according to DSM-IV (APA, 2000).

There are a number of other assessment devices available in the literature, in addition to the measures that are reviewed here. Although not all of these measures have been used with MVA survivors, a good starting point for an overview to these measures is Wilson and Keane (2004). In reviewing the available assessment instruments, it may be useful to consider which ones would be helpful to re-administer during the course of treatment, in order to index the impact of intervention on an individual's symptomatology.

Treatment of PTSD among MVA survivors

Within the empirical literature on psychological treatments of MVA survivors, one can find information about several different types of therapy. One collection of treatment approaches is designed to prevent the development of PTSD in individuals who have experienced a serious MVA. The second collection of treatments address diagnosed PTSD in MVA survivors. Each of these approaches will be reviewed below. An interesting aspect of treating MVA-related PTSD is that to receive standard psychosocial treatment, it is very likely the patient must engage in his or her most feared activity: driving or being driven in a motor vehicle. Engaging in the trauma-related activity so as to attend therapy is unique in the PTSD treatment field and in the section below entitled "Anxiety during treatment session" we describe attempts to cope with the in-session distress elicited by driving a motor vehicle to treatment.

Can early intervention prevent the development of PTSD in MVA survivors?

Several different preventative approaches have been examined with MVA survivors. The first approach includes studies that have applied one-session interventions to injured MVA survivors within a short interval following the traumatic accident. For example, Conlon, Fahy, and Conroy (1999) examined the impact that a single counseling session had on individuals presenting to a trauma center immediately following a MVA. In this trial, none of the participants sustained injuries serious enough to warrant hospitalization. Half of the participants were given a 30-minute counseling session, which encouraged the expression of emotions and thoughts about the MVA, as well as education about PTSD and possible coping strategies (psychological debriefing). The other participants did not receive debriefing. All individuals were re-assessed 65-210 days after the MVA. No differences were noted between

individuals who had received debriefing and those who did not with respect to PTSD-related morbidity. Similar results were reported by Hobbs, Mayou, Harrison, and Worlock (1996), who worked with more seriously injured MVA survivors. In this trial, the 1-hour debriefing was administered 24 to 48 hours after the MVA in the hospital and again, did not appear to have helped participants. A 3-year follow-up with individuals who were involved in the Hobbs et al. (1996) study indicated that participants who had received debriefing had a significantly worse outcome (e.g., more self-reported psychiatric symptoms, greater anxiety about auto travel, greater pain, lower overall levels of functioning, and more financial problems, Mayou, Ehlers, & Hobbs, 2000). These studies, in combination, suggest that single session debriefing is not advised in the immediate aftermath of a serious MVA. It is salient to note that clinical researchers continue to seek effective prevention methods (e.g., Litz, Gray, R.A. Bryant, & Adler, 2002), an effort that needs to be conducted carefully, in light of the potential for negative outcomes. Based on the small available database, psychological first aid is an appropriate initial intervention although it does not serve a preventative or a therapeutic function (Litz et al., 2002). Clearly this is an area that deserves much greater attention.

Although intervention immediately following a traumatic accident is not advisable, some studies suggest that in those instances where an individual is reporting Acute Stress Disorder (ASD), a brief cognitive behavioral treatment (CBT) may be helpful. The diagnosis of ASD is used to codify posttraumatic responses that occur between 2 and 28 days after a traumatic event (APA, 2000). Although diagnostic criteria for ASD are somewhat similar to PTSD, they include greater emphasis on dissociative symptoms. Research suggests that individuals who develop ASD are at a substantially higher risk for PTSD, relative to those without ASD in the immediate aftermath of a trauma (e.g., Harvey & R. A. Bryant, 1998). Thus, it is salient to consider whether treatment can reduce the likelihood that an individual with ASD will develop PTSD.

To address this issue, R. A. Bryant, Harvey, Dang, Sackville, and Basten (1998) compared a brief CBT with brief nondirective supportive counseling for 24 individuals with ASD following a serious MVA or industrial accident. Both treatments involved 5 sessions (once weekly). CBT included education about expected reactions to trauma, relaxation training, imaginal and in-vivo exposure, and cognitive re-structuring. Supportive counseling included education about trauma reactions, in addition to general problem-solving skills and unconditional support. Following treatment, only 8% of the CBT group was diagnosed with PTSD, in contrast with 83% of those who had received supportive counseling. The relative ineffectiveness of supportive counseling in the prevention of PTSD suggests that although support and understanding may be appreciated by individuals with ASD, these elements alone do not seem to constitute an effective intervention. A related study by R. A. Bryant, Sackville, Dang, Moulds, and Guthrie (1999) examined a similar CBT package, in comparison with prolonged exposure and supportive counseling. Individuals in the prolonged exposure condition received treatment that concentrated on imaginal and in-vivo exposure, supplemented by supportive counseling. Participants included 45 survivors of either a serious MVA or a nonsexual assault, who were diagnosed with ASD and were treated within two weeks of their trauma. Fewer patients developed PTSD following prolonged exposure (14%) and CBT (20%), in comparison with supportive counseling (56%). These two studies when taken together strongly suggest that treatment that is oriented at trauma-related symptoms such as re-experiencing, hyperarousal, avoidance, and emotional numbing, has greater success at preventing individuals with ASD from developing PTSD in the aftermath of a serious auto accident. Clearly, more information about individual differences that might enhance or diminish the effects of CBT would be very useful.

Following from these studies, Hickling, Blanchard, and Kuhn (2005) describe an abbreviated CBT for individuals with ASD that is designed to reduce direct contact time for both therapist and client. As noted by these authors, it can be somewhat difficult to engage individuals in

psychotherapy shortly after their accident. Although there are no clear reasons for this difficulty, it is possible that a brief intervention which reduces the demands placed on clients may be more acceptable and tolerated to a greater extent, in the immediate aftermath of a MVA. Hickling and colleagues included two sessions, of 60 to 90 minutes' duration each, with a scheduled telephone session in-between. In the first session, CBT included psychoeducation about reactions to a trauma, instruction in the use of exposure-based techniques, relaxation training, and practice in developing and using coping self-statements. The second session began with a review of practice homework and included in-session exposure to the audiotaped description of the MVA. A series of three cases suggests that this abbreviated CBT may hold promise, although it deserves considerably more research prior to large-scale dissemination.

What are effective treatments for PTSD in MVA survivors?

Although preventative efforts ultimately may reduce the emotional toll of MVAs, the majority of patients do not seek help shortly after their MVA. More typically, individuals do not understand the emotional symptoms of PTSD and may not seek help for several years, which at that point, PTSD has become chronic and may be difficult to treat. Although four types of psychological interventions have been endorsed by a panel of experts (Foa, Keane, & Friedman, 2000), only one of these treatments, (CBT) has been examined for its efficacy with individuals who have survived a serious MVA. In the next section, we review the treatment literature, which illustrates that CBT and to a lesser extent, supportive psychotherapy appear to be helpful for reducing PTSD in this population.

Cognitive Behavioral Therapy

As reviewed by Blanchard and Hickling (2004), the first reports of treatment of PTSD among MVA survivors originated from behavioral practitioners. These case presentations focused on the use of imaginal and in-vivo exposure, typically delivered in a massed schedule (termed 'flooding', e.g., Kuch, Swinson, & Kirby, 1985; McCaffrey & Fairbank, 1985). Subsequent efforts included inclusion of cognitive interventions, as well as efforts to increase the individual's social support network (e.g., Hickling, Blanchard, Schwarz, & Silverman, 1992; Horne, 1993). In 1999, Fecteau and Nicki published the first controlled treatment study in this literature. In this report, 20 individuals were assigned either to treatment or to an assessment only condition. Treatment was structured, involved four 2-hour sessions, and revolved around a cognitive-behavioral formulation. Interventions included psychoeducation, relaxation training, repeated exposure to the audio-taped description of the MVA, cognitive reappraisal training, and a small amount of in-vivo exposure. At the end of treatment, all of the control group continued to meet diagnostic criteria for PTSD, while only 60% of the treatment group satisfied diagnostic criteria. Although promising, it is clear that treatment of MVA-related PTSD required more than this initial four session approach.

Building on these findings, Blanchard and Hickling (2004) expanded and refined their CBT program. This treatment package is designed to be individualized, with varying degrees of emphasis placed on specific interventions depending of the individual's needs (see Table 1). Treatment may last between 8 and 12 sessions, with an anticipated mode of 10 sessions. This program places heavy importance on exposure-based interventions, which is in keeping with current theories of PTSD (e.g., Foa & Kozak, 1986) and available data that documents the central role that exposure-based interventions play in the treatment of PTSD, irrespective of trauma type (e.g., Rothbaum, Meadows, Resick, & Foy, 2000). Importantly, its efficacy has been examined in two large-scale controlled trials. Blanchard et al. (2003) compared this CBT with supportive psychotherapy and a wait list, in an effort to examine the effectiveness of this treatment above and beyond provision of emotional support. Participants included 98 individuals (73% female) who met diagnostic criteria for PTSD or severely symptomatic sub-syndromal PTSD following a MVA. All participants had experienced their accident between

6 and 24 months prior to entering the study. Individuals were randomized to the CBT treatment, supportive psychotherapy (to be described in a following section), or a wait-list condition, wherein they were informed that treatment would be delayed for 2 to 3 months. Importantly, Blanchard et al. used experienced, community therapists for this study, ensuring that the results would be applicable to a typical practice setting. Both treatment protocols allowed the therapist flexibility in determining the number of sessions. As described by Blanchard and colleagues (2003), the sample included individuals with notable other problems in addition to PTSD (including Major Depressive Disorder, other anxiety disorders, and continuing physical limitations owing to injuries sustained during the MVA), which also ensures greater applicability of the findings to a typical practice setting.

Results indicated that 27 individuals completed CBT, with 10 additional individuals discontinuing the trial early. Of the 21 individuals who met full criteria for PTSD prior to treatment, 76% ($n = 16$) no longer satisfied criteria following treatment. Of the 6 individuals who reported severe sub-syndromal PTSD, 83% ($n = 5$) no longer satisfied criteria for this classification after treatment. The benefits of CBT generalized to other disorders, with significant decreases in depressive and generalized anxiety disorders. The mean number of CBT visits was 9.8 (SD 1.2), suggesting that augmentation of the early CBT program enhanced the overall effectiveness of this treatment approach. CBT was significantly more effective than the wait list condition on all measures, which included both clinician ratings and self-report questionnaires. These results were maintained at a 3-month follow-up.

A very similar study recently was completed in Germany by Maercker, Zöllner, Menning, Rabe, and Karl (2006). The purpose of this study was to test the efficacy of a modified version of the CBT manual developed by Blanchard and Hickling (2004). The manual was translated and additional elements were added, including expansion of cognitive therapy to address accident-related cognitions as described by Ehlers and Clark (2000), inclusion of interventions to address guilt, and greater discussion of positive outcomes that accrued from the MVA, including personal growth. Maercker and colleagues were careful to replicate many of the methodological features of Blanchard et al. (2003), which allows for close comparison of these studies. Forty-two individuals completed the study, with 21 randomly assigned to CBT and the remainder to a wait list condition. Participants experienced chronic PTSD with an average of 5.3 years elapsed between their accident and participation in the trial. Maercker and colleagues report slightly lower rates of drop-out than Blanchard, with only two people discontinuing CBT prior to completion. An average of 11.4 (SD 3.2) sessions of CBT were delivered by community psychotherapists. At post-treatment assessment, 75% ($n = 9$) of individuals who had originally met full criteria for PTSD did not receive the diagnosis. Of individuals reporting severe sub-syndromal PTSD, 78% ($n = 7$) did not meet this classification at post-treatment. Results on both clinician and self-report measures were similar to those obtained by Blanchard and colleagues, with significant differences found in all contrasts with the wait list condition. Taken together, these two studies strongly support the effectiveness of CBT for MVA-related PTSD.

As positive as the development of an individual-format CBT has been in reaching the needs of individuals with MVA-related PTSD, some writers have noted that individual-format therapies are not terribly cost-effective (e.g., Miller & Magruder, 1999). In contrast, group-format treatment offers the possibility of reaching more individuals, while reducing the workload for any given therapist. Group therapy also costs less. However, adapting individual-format therapies to be appropriate for a group setting is not clear-cut. As discussed by Resick and others (Hickling & Blanchard, 1999; Resick & Schnicke, 1993), when treating PTSD within a group setting, careful consideration must be paid to both the content and process of intervention. Recently, Beck and Coffey (2005) describe the adaptation of individual CBT to a group treatment setting. As part of the development of this group CBT, Beck and Coffey

considered various features of individual CBT that would not easily translate to a group setting. For example, patients with MVA-related PTSD may be very anxious upon arrival for session, owing to the need to drive to get to therapy. These individuals may be preoccupied during treatment which can be somewhat “contagious” to other group members. This same issue can occur with group members who are highly irritable after observing a dangerous driver on the way to therapy. As such, management of the therapeutic environment within the group setting is salient. Additionally, detailed discussion of group member’s MVAs has the potential to heighten everyone’s feelings of anxiety, especially if similarities exist among group member’s accidents (Fedoroff, Taylor, & Koch, 1999). Consequently, management of the group includes setting norms for how information about each person’s accident is shared and what information does not need to be discussed. It also is necessary to adapt exposure exercises for group treatment. Within individual format CBT, the patient reads aloud a description of their MVA. This procedure has a high likelihood of creating distress if conducted within group treatment. Thus, exposure exercises are modified for group therapy, with the majority of exposure occurring outside of session. Although this could dilute this important aspect of treatment, it is required by the group format. At present, preliminary outcomes for the group CBT with a sample of individuals with chronic PTSD after a MVA seem promising, with 88% of patients free of PTSD after treatment (in contrast with 31% who were diagnosis-free following a minimal contact control condition, Beck, Coffey, Foy, Keane, & Blanchard, 2006).

A related form of CBT also has been developed, which places substantially greater emphasis on cognitive interventions, relative to the CBT developed by Blanchard and Hickling (2004). Ehlers, Clark, Hackmann, McManus, and Fennell (2005) describe a cognitive therapy program that has three goals: 1) To modify excessively negative appraisals of the trauma and its sequelae, 2) To reduce re-experiencing by elaboration of the trauma memories and discrimination of triggers, and 3) To reduce dysfunctional behaviors and cognitive strategies (e.g., avoidance). These targets for treatment directly stem from Ehler and Clark’s model of PTSD (2000), which places emphasis on the sense of threat that trauma survivors feel. Treatment is not scripted into a fixed number of sessions and no manual is available, reflecting the developers’ belief that this form of treatment should be principle-driven rather than manual-driven. A randomized trial involving this form of CBT indicated that 79% of participants were free of PTSD following treatment, which contrasts quite favorably with 24% who were free of PTSD following use of a self-help book and 30% who were free of PTSD following repeated assessment alone (Ehlers, Clark, Hackman, McManus, Fennell, & Herbert, 2003). The participants in this study had all experienced a serious MVA less than 6 months prior to entering the study and they were required to have sought medical attention following their MVA. It would be very important to test this form of CBT with individuals who have more chronic PTSD following a MVA, given its promise as an early intervention.

Supportive Psychotherapy

In addition to CBT, general supportive psychotherapy has been shown to be somewhat effective for MVA-related PTSD. Two treatment studies have included supportive psychotherapy as a comparison condition for CBT (Blanchard et al., 2003; R. A. Bryant, Moulds, Guthrie, Dang, & Nixon, 2003). In each case, supportive psychotherapy was helpful, with 40% of participants diagnosis-free in the Bryant et al. study (2003) and 48% diagnosis-free in the Blanchard et al. study (2003). Thus, supportive psychotherapy can be useful but not necessarily as efficacious as CBT. Blanchard et al. (2003) describe their supportive psychotherapy as focused on normalizing the trauma experience and processing the MVA in the context of other losses and traumas that the individual may have experienced. Bryant et al. (2003) focused their supportive psychotherapy on general problem-solving skills. Both forms of supportive therapy emphasized provision of unconditional support, with prohibition of CBT-related techniques (which is understandable in light of the goals of each of these studies). Clearly, when

considering chronic forms of MVA-related PTSD, supportive psychotherapy confers some treatment advantages, although it is not as helpful in eliminating PTSD as either form of CBT that has been studied.

Treatment process issues

Pain and the course of treatment

As cogently discussed by Sharp and Harvey (2001), pain and PTSD seem to create a synergy when present together. In the course of treatment, this synergy may manifest in several ways. First, individuals may have difficulty distinguishing between pain complaints and PTSD symptoms, given that both types of problems originated from the same event. Our clinical experience suggests that most patients regard their pain and PTSD symptoms as a common “lump” that was caused by the MVA. It is important for therapy to help the MVA survivor to differentiate between pain and PTSD, particularly since these two types of problems respond to different interventions. Additionally, there appears to be little generalization of treatment effects between these two problem areas (e.g., Shipherd, Beck, Hamblen, Lackner, & Freeman, 2003). Second, pain-related problems may be responsible for lifestyle changes that can occur to MVA survivors. These changes may include loss of physical mobility and strength, permanent disability from employment, and inability to perform everyday tasks. Changes in physical abilities often compound the person’s perception of the MVA, in particular the “awfulness” of the accident. Because CBT focuses on helping the MVA survivor to strengthen coping skills and re-interpret dysfunctional cognitions, it is critical to differentiate between the actual accident and its aftermath (e.g., disability, on-going pain complaints). As noted, Blanchard and Hickling’s CBT includes the option of discussing existential issues, which may include helping the individual come to terms with changes in their physical functioning, using cognitive therapy techniques.

Pain also can impact the process of treatment in other ways. Although early writers felt that pain may interfere with a patient’s ability to engage in CBT for PTSD (e.g., Koch & Taylor, 1995), this fortunately has not been the case in published studies. For example, 91% of the sample in Blanchard et al. (2003) had lingering physical problems related to injuries sustained during the MVA. An examination of variables that might predict treatment response did not highlight chronic pain as salient in the outcome of either CBT or supportive psychotherapy (Blanchard & Hickling, 2004). Shipherd et al. (2003) explicitly examined the influence of pain on CBT for MVA-related PTSD. In this multiple baseline report, five of six chronic pain patients did not meet criteria for PTSD after treatment. Four patients reported some decrease in pain, although continued to indicate discomfort. A notable decrease in time spent in bed was found, although this could have resulted from accompanying decreases in depression, PTSD, or general distress. Thus, the presence of pain complaints is not necessarily a sign that an individual will have a poor response to psychosocial treatment. However, pain-related problems require the therapist to carefully ascertain the reason(s) behind specific limitations. For example, some types of limitations may be functionally related to pain (e.g., back pain that prevents an individual from driving for long distances) whereas others may be related to PTSD (e.g., avoidance of driving on an interstate due to exposure to semi-trucks, a trigger for PTSD symptoms). As well, it is important for therapists to remember that chronic pain may necessitate adjustments such as allowing a patient to stand or lie down during treatment sessions.

Anxiety during the treatment session

MVA-related PTSD requires that the individual confront their trauma triggers in order to attend treatment. This makes treatment of this disorder particularly challenging, as individuals may arrive at treatment in a heightened state of anxiety or agitation. Our work in developing a Group CBT (Beck & Coffey, 2005) suggested the utility of adding training in mindfulness meditation

(e.g., Kabat-Zinn, 1990). Briefly, mindfulness meditation stresses the importance of focusing deliberate concentration on a chosen target (e.g., one's own breathing), in order to reduce acute distress and distraction. The goal is to direct attention to an event that is presently occurring, rather than attending to thoughts about past or future events. Although mindfulness meditation is not necessarily the only way to accomplish this goal, this skill also can be useful for improving focus in other arenas, such as when driving a car. In our clinical work, we have found that individuals with MVA-related PTSD need explicit assistance in re-directing their thoughts to be able to focus on treatment. In the absence of this assistance, it is difficult for many individuals to work effectively. When this occurs in group treatment, the group process can become chaotic and potentially harmful to patients.

When the MVA involved a fatality

When the individual was involved in a MVA that caused a fatality, additional issues may be present during treatment. Included among these issues are enhanced perceptions of responsibility, protracted feelings of guilt, and survivor guilt. Although this issue has not received extensive empirical study, Blanchard and Hickling (2004) suggest that individuals who are involved in a MVA that caused a fatality are at heightened risk of developing PTSD, even if the individual was not responsible for the accident (e.g., was not the driver). Intuitively, this is not surprising, although greater study of this issue is warranted before more solid conclusions can be made. When treating an individual who experienced a MVA that involved a fatality, the first step is to ascertain the specific role that perceptions of the fatality play within the individual's PTSD symptom picture. Clinically, we have observed individuals who are primarily focused on the existential facets of the fatality, including thoughts such as "it could have been me". These kinds of perceptions can be worked with using various aspects of cognitive therapy, including an examination of probabilities and in particular, over-estimation errors (see Ehlers et al., 2005). We also have observed individuals who are preoccupied with inflated notions of responsibility for the fatality, including perceptions that somehow they "should" have died instead of the individual(s) who did. Although poorly defined in the literature, these perceptions can be conceptualized as survivor guilt (e.g., Wayment, 2004). Gentle Socratic questioning can help the individual begin to question this type of belief, with particular emphasis on real versus imagined responsibility. Clinically, this is one of the more difficult issues for therapists in work with this population.

When conducting CBT within a group setting, the presence of a fatality is an extremely sensitive issue. In particular, this issue has the potential to increase other group member's anxiety, as it validates their worse fear, namely that they could have been killed. Although Group CBT for MVA-related PTSD does not emphasize sharing details of each group member's MVA (see Beck and Coffey, 2005), information about a fatality may be disclosed inadvertently. Such disclosure requires that the group therapists recognize the terrible nature of the individual's MVA and the associated emotions that it produces in the entire group. Handling this issue clinically takes precedence over the structured information for that session, particularly given the elevated anxiety that will consume the group atmosphere. Often, imaginal exposure (or exposure using an expanded version of the MVA description) can be helpful for the individual whose MVA included a fatality.

Practice outside of the treatment session

When using exposure therapy to treat MVA-related PTSD, we have observed a number of issues that may arise when individuals are asked to practice outside of the treatment session. Ideally, the individual should understand the principles behind exposure-based techniques and have some in-session experience with exposure prior to their practice outside of the treatment environment. Clinically, we have found it helpful to begin with therapist-assisted imaginal exposure during a session. Often, several practice exercises are necessary for anxiety reduction

to occur, particularly for items at the upper end of the hierarchy (see Foa & Rothbaum, 1998 for a step-by-step description of how to conduct ET).

Once the individual is ready for exposure practice outside of the treatment environment, handouts that illustrate the anticipated rise and fall of anxiety during exposure can remind the individual to stay with the exposure exercise until their anxiety has reduced by half. We have observed some patients who try to “push the envelope” when practicing exposure in-between treatment sessions. In essence, these individuals select a practice item that is fairly high up on their hierarchy, feeling that if they just “tough it out”, this will somehow facilitate their recovery. Typically, the opposite occurs, with the person feeling overwhelmed and perhaps a bit pessimistic about the outcome of treatment. Although appreciative of the motivation behind this approach to exposure, we actively discourage patients from taking on exposure items that are too far up their hierarchy, particularly during the beginning treatment sessions. It is essential for patients to remember to take exposure one step at a time, particularly when selecting items to practice outside of treatment. Because exposure can be difficult, particularly exposure that involves driving situations which are not always able to be planned or choreographed, careful selection of homework items can result in greater benefits from this important treatment ingredient. For a full discussion of the clinical issues involved in using exposure therapy to treat MVA-related PTSD, please see Beck and Coffey (2005) or Blanchard and Hickling (2004).

There are occasions when patients do not seem to be able to comply with homework and as such, do not derive a large measure of help from treatment. As discussed more thoroughly (Beck & Coffey, 2005), we cite the example of a woman who was inconsistent with her exposure-based homework throughout the course of Group CBT. While group was in-session, she was also experiencing a number of serious life stressors (e.g., her husband lost his job, one of her children left the home to attend college in another state, her disability claim was denied), which distracted her from exposure practice. At the post-treatment assessment, this woman showed some reduction in PTSD symptomatology yet was clearly reporting notable re-experiencing, avoidance, and hyperarousal symptoms. One month after this assessment, she completed a self-report battery and reported very low levels of these symptoms. When we contacted her by phone, she indicated that some of the life stressors had resolved and stated that she had begun to do her homework, with particular emphasis on exposure-based exercises. In considering this example, it is salient that this woman clearly had learned the principles of exposure, as she was applying these effectively in her own post-treatment homework. Although perhaps a bit unusual, we feel strongly that teaching the principles behind CBT is an important aspect of treatment, particularly given the possibility that an individual can be exposed to a serious MVA again in their life, which would necessitate use of these skills to prevent a relapse.

Summary and conclusions

As highlighted throughout this article, MVAs can have serious psychological consequences. We have focused on PTSD, with particular emphasis on the assessment and treatment of this disorder in this population. In our work with individuals diagnosed with MVA-related PTSD, we have noted that their mental health needs may not have been recognized by other health care providers. Certainly, given emerging evidence concerning the psychological consequences of MVAs, this lack of awareness is likely to change. Fortunately, the empirical literature on the treatment of PTSD after a collision provides some good information with respect to interventions that have proven efficacy, as well as those that may cause harm. The treatment of PTSD in MVA survivors can be a clinically rewarding experience, particularly given the extent of lifestyle restriction that these individuals experience as a result of this disorder. Although work in this area has made substantial progress, many issues remain, including determination of individual difference factors that may influence treatment response,

development of alternative modes for the delivery of exposure-based interventions and expanding available models of care for individuals who do not respond to the available treatments. We hope that this review can facilitate continued clinical research in this arena.

Acknowledgements

This work was supported in part by a grant from the National Institute of Mental Health (MH64777).

References

- American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4. Washington, DC: American Psychiatric Association; 2000. Text revision
- Beck JG, Coffey SF. Treating motor vehicle accident-related PTSD with a group based cognitive behavioral therapy. *Cognitive and Behavioral Practice* 2005;12:267–277. [PubMed: 16525513]
- Beck JG, Coffey SF, Foy DW, Keane TM, Blanchard EB. Group CBT for PTSD after a motor vehicle accident: Preliminary outcome. 2006Manuscript in preparation
- Blake DD, Weathers FW, Nagy LM, Kaloupek DG, Gusman FD, Charney DS, et al. The development of a Clinician-Administered PTSD Scale. *Journal of Traumatic Stress* 1995;8:75–90. [PubMed: 7712061]
- Blanchard, EB.; Hickling, EJ. *After the crash. 2.* Washington, DC: American Psychological Association; 2004.
- Blanchard EB, Hickling EJ, Devineni T, Veazey CH, Galovski TE, Mundy E, Malta LS, Buckley TC. A controlled evaluation of cognitive behavioral therapy for posttraumatic stress in motor vehicle accident survivors. *Behaviour Research and Therapy* 2003;41:79–96. [PubMed: 12488121]
- Blanchard EB, Hickling EJ, Mitnick N, Taylor AE, Loos WR, et al. The impact of physical injury and perception of life threat in the of post-traumatic stress disorder in motor vehicle accident victims. *Behaviour Research and Therapy* 1995;33:529–534. [PubMed: 7598673]
- Blanchard EB, Hickling EJ, Taylor AE, Loos WR. Psychiatric morbidity associated with motor vehicle accidents. *Journal of Nervous and Mental Diseases* 1995;183:495–504.
- Blanchard EB, Hickling EJ, Taylor AE, Loos WR, Fornere CA, Jaccard J. Who develops PTSD from motor vehicle accidents? *Behaviour Research and Therapy* 1996;34:1–10. [PubMed: 8561759]
- Blanchard EB, Jones-Alexander J, Buckley TC, Forneris CA. Psychometric properties of the PTSD Checklist (PCL). *Behaviour Research and Therapy* 1996;34:669–673. [PubMed: 8870294]
- Breslau N, Davis GC, Andreski P, Peterson E. Traumatic events and post - traumatic stress disorder in an urban population of young adults. *Archives of General Psychiatry* 1991;48:216–222. [PubMed: 1996917]
- Bryant B, Mayou R, Lloyd-Bostock S. Compensation claims following road accidents: A six-year follow-up study. *Medical Science and Law* 1997;37:326–336.
- Bryant RA, Harvey AG. The influence of litigation on maintenance of posttraumatic stress disorder. *Journal of Nervous and Mental Disease* 2003;191:191–193. [PubMed: 12637846]
- Bryant RA, Harvey AG, Dang ST, Sackville TM, Basten C. Treatment of Acute Stress Disorder: A comparison of Cognitive-Behavioral Therapy and Supportive Counseling. *Journal of Consulting and Clinical Psychology* 1998;66:862–866. [PubMed: 9803707]
- Bryant RA, Harvey AG, Guthrie RM, Moulds ML. A prospective study of psychophysiological arousal, acute stress disorder, and posttraumatic stress disorder. *Journal of Abnormal Psychology* 2000;109:341–344. [PubMed: 10895573]
- Bryant RA, Moulds ML, Guthrie RM, Dang ST, Nixon RDV. Imaginal exposure along and imaginal exposure with cognitive restructuring in treatment of Posttraumatic Stress Disorder. *Journal of Consulting and Clinical Psychology* 2003;71:706–712. [PubMed: 12924676]
- Bryant RA, Sackville TM, Dang ST, Moulds MM, Guthrie RM. Treating Acute Stress Disorder: An evaluation of cognitive behavior therapy and supportive counseling techniques. *American Journal of Psychiatry* 1999;156:1780–1786. [PubMed: 10553743]

- Coffey SF, Gudmundsdottir B, Beck JG, Palyo S, Miller L. Screening for PTSD in motor vehicle accident survivors: The use of the PSS-SR and IES-R. *Journal of Traumatic Stress* 2006;19:119–128. [PubMed: 16568464]
- Conlon L, Fahy TJ, Conroy R. PTSD in ambulant RTA victims: A randomized controlled trial of debriefing. *Journal of Psychosomatic Research* 1999;46:37–44. [PubMed: 10088980]
- Duckworth MP, Iezzi T. Chronic pain and posttraumatic stress symptoms in litigating motor vehicle accident victims. *Clinical Journal of Pain* 2005;21:251–261. [PubMed: 15818077]
- Ehlers A, Clark DM. A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy* 2000;38:319–345. [PubMed: 10761279]
- Ehlers A, Clark DM, Hackmann A, McManus F, Fennell M. Cognitive therapy for post-traumatic stress disorder: Development and evaluation. *Behaviour Research and Therapy* 2005;43:413–431. [PubMed: 15701354]
- Ehlers A, Clark DM, Hackmann A, McManus F, Fennell M, Herbert C. A randomized controlled trial of cognitive therapy, a self-help booklet, and repeated assessments as early interventions for posttraumatic stress disorder. *Archives of General Psychiatry* 2003;60:1024–1032. [PubMed: 14557148]
- Fecteau G, Nicki R. Cognitive behavioural treatment of posttraumatic stress disorder after motor vehicle accidents. *Behavioural and Cognitive Psychotherapy* 1999;27:201–214.
- Fedoroff, I.; Taylor, S.; Koch, W. Posttraumatic Stress Disorder due to motor vehicle accidents: Patterns and predictors of response to cognitive-behavior therapy; Paper presented at the annual meeting of the Association for the Advancement of Behavior Therapy; Toronto, ON. 1999 Nov.
- Foa, EB.; Keane, TM.; Friedman, MJ., editors. *Effective treatments for PTSD*. New York: Guilford Press; 2000.
- Foa EB, Kozak MJ. Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin* 1986;99:20–35. [PubMed: 2871574]
- Foa EB, Riggs DS, Dancu CV, Rothbaum BO. Reliability and validity of a brief instrument for assessing post-traumatic stress disorder. *Journal of Traumatic Stress* 1993;6:459–473.
- Foa, E.; Rothbaum, B. *Treating the trauma of rape: Cognitive-behavioral therapy for PTSD*. New York: Guilford Press; 1998.
- Harvey AG, Bryant RA. The relationship between acute stress disorder and posttraumatic stress disorder: A prospective evaluation of motor vehicle accident survivors. *Journal of Consulting and Clinical Psychology* 1998;66:507–512. [PubMed: 9642889]
- Helzer JE, Robins LN, McEvoy L. Post-traumatic stress disorder in the general population: Findings of the Epidemiologic Catchment Area survey. *New England Journal of Medicine* 1987;317:1630–1634. [PubMed: 3683502]
- Hickling EJ, Blanchard EB. Posttraumatic stress disorder and motor vehicle accidents. *Journal of Anxiety Disorders* 1992;6:285–291.
- Hickling, EJ.; Blanchard, EB. Psychological treatment of motor vehicle accident survivors with PTSD: Current knowledge and application to group treatment. In: Young, B.; Blake, D., editors. *Group treatments for Post-traumatic Stress Disorder*. Philadelphia, PA: Brunner/Mazel; 1999. p. 101-116.
- Hickling EJ, Blanchard EB, Kuhn E. Brief, early treatment for ASD/PTSD following motor vehicle accidents. *Cognitive and Behavioral Practice* 2005;12:461–467.
- Hickling EJ, Blanchard EB, Schwarz SP, Silverman DJ. Headaches and motor vehicle accidents: Results of psychological treatment of posttraumatic headache. *Headache Quarterly* 1992;3:285–289.
- Hobbs M, Mayou R, Harrison B, Worlock P. A randomized controlled trial of psychological debriefing for victims of road traffic accidents. *British Medical Journal* 1996;313:1438–1539. [PubMed: 8973231]
- Horne, DJ. Traumatic stress reactions to motor vehicle accidents. In: Wilson, JP.; Raphael, B., editors. *International handbook of traumatic stress syndromes*. New York: Plenum Press; 1993. p. 499-506.
- Horowitz MJ, Wilner N, Alvarez W. Impact of event scale: A measure of subjective stress. *Psychosomatic Medicine* 1979;41:209–218. [PubMed: 472086]
- Joseph S. Psychometric evaluation of Horowitz's Impact of Event Scale: A review. *Journal of Traumatic Stress* 2000;13:101–113. [PubMed: 10761177]

- Kabat-Zinn, J. Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness. New York: Delta; 1990.
- Kessel JB, Zimmerman M. Reporting errors in studies of the diagnostic performance of self-administered questionnaires: Extent of the problem, recommendations for standardized presentation of results, and implications for the peer review process. *Psychological Assessment* 1993;5:395–399.
- Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry* 1995;52:1048–1060. [PubMed: 7492257]
- Koch W, Taylor S. Assessment and treatment of victims of motor vehicle accidents. *Cognitive and Behavioral Practice* 1995;2:327–342.
- Kubany ES, Leisen MB, Kaplan AS, Watson SB, Haynes SN, Owens JA, Burns K. Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: The Traumatic Life Events Questionnaire. *Psychological Assessment* 2000;12:210–224. [PubMed: 10887767]
- Kuch K, Swinson RP, Kirby M. Post-traumatic stress disorder after car accidents. *Canadian Journal of Psychiatry* 1985;30:426–427.
- Litz BT, Gray MJ, Bryant RA, Adler AB. Early intervention for trauma: Current status and future directions. *Clinical Psychology: Science and Practice* 2002;9:112–134.
- Maercker, A.; Zöllner, T.; Menning, H.; Rabe, S.; Karl, A. Dresden PTSD treatment study: Randomized controlled trial of motor vehicle accident survivors; *BMC Psychiatry*. 2006. p. 29 Retrieved July, 2006 from <http://www.biomedcentral.com/1471-244X/6/29>
- Mayou R. Medico-legal aspects of road traffic accidents. *Journal of Psychosomatic Research* 1995;39:789–798. [PubMed: 8568736]
- Mayou RA. Psychiatric consequences of motor vehicle accidents. *Psychiatric Clinics of North America* 2002;25:27–41. [PubMed: 11912943]
- Mayou RA, Bryant B, Duthie R. Psychiatric consequences of road traffic accidents. *British Medical Journal* 1993;307:647–651. [PubMed: 8401049]
- Mayou RA, Ehlers A, Hobbs M. Psychological debriefing for road traffic accident victims. *British Journal of Psychiatry* 2000;174:589–593. [PubMed: 10974967]
- McCaffrey R, Fairbank JA. Behavioral assessment and treatment of accident-related post-traumatic stress disorder: Two case studies. *Behavior Therapy* 1985;16:406–416.
- Miller, N.; Magruder, K. Cost-effectiveness of psychotherapy: A guide for practitioners, researchers, and policy makers. New York: Oxford University Press; 1999.
- Norris FH. Epidemiology of trauma: Frequency and impact of different potentially traumatic events on different demographic groups. *Journal of Consulting and Clinical Psychology* 1992;60:409–418. [PubMed: 1619095]
- Resick, P.; Schnicke, M. *Cognitive processing therapy for rape victims*. Newbury Park, CA: Sage Publications; 1993.
- Rothbaum, BO.; Meadows, EA.; Resick, P.; Foy, DW. *Cognitive Behavior Therapy*. In: Foa, EB.; Keane, TM.; Friedman, MJ., editors. *Effective treatments for PTSD*. New York: Guilford Press; 2000. p. 60-83.
- Ruggiero KJ, Del Ben K, Scotti JR, Rabalais AE. Psychometric properties of the PTSD Checklist—Civilian Version. *Journal of Traumatic Stress* 2003;16:495–502. [PubMed: 14584634]
- Sharp T, Harvey A. Chronic pain and posttraumatic stress disorder: Mutual maintenance? *Clinical Psychology Review* 2001;21:857–877. [PubMed: 11497210]
- Shipherd JC, Beck JG, Hamblen JL, Lackner JM, Freeman JB. A preliminary examination of treatment for posttraumatic stress disorder in chronic pain patients: A case study. *Journal of Traumatic Stress* 2003;16:451–457. [PubMed: 14584629]
- Shrout, PE.; Skodol, AE.; Dohrenwend, BP. A two-stage approach for case identification and diagnosis, first stage instruments. In: Barrett, JE.; Rose, RM., editors. *Mental disorders in the community: Progress and challenge*. New York: Guilford Press; 1986. p. 286-303.
- Taylor S, Koch WJ. Anxiety disorders due to motor vehicle accidents: Nature and treatment. *Clinical Psychology Review* 1995;15:721–738.

- Ursano RJ, Fullerton CS, Epstein RS, Crowley B, Kao T, Vance K, Craig KJ, Dougall AL, Baum A. Acute and chronic posttraumatic stress disorder in motor vehicle accident victims. *American Journal of Psychiatry* 1999;156:589–595. [PubMed: 10200739]
- U.S. Department of Transportation. *Traffic Safety Facts 2004: A Compilation of Motor Vehicle Crash Data from the Fatality Analysis Reporting System and the General Estimates System*. Washington, DC: National Highway Traffic Safety Administration, U.S. Department of Transportation; 2004.
- Wayment HA. It could have been me: Vicarious victims and disaster-focused distress. *Personality and Social Psychology Bulletin* 2004;30:515–528. [PubMed: 15070479]
- Weathers F, Keane TW, Davidson JRT. Clinician-Administered PTSD scale: A review of the first ten years of research. *Depression and Anxiety* 2001;13:132–156. [PubMed: 11387733]
- Weathers, FW.; Litz, BT.; Huska, JA.; Keane, TM. *The PTSD Checklist – Civilian Version (PCL-C)*. Boston: National Center for PTSD; 1994.
- Wilson, JP.; Keane, TM., editors. *Assessing psychological trauma and PTSD. 2*. New York: Guilford Press; 2004.

Table 1

Session-by-session outline of Blanchard and Hickling's individual CBT

Session	Treatment components
1	<ul style="list-style-type: none"> ○ Review symptoms and diagnosis ○ Psychoeducation about PTSD
2	<ul style="list-style-type: none"> ○ Progressive Muscle Relaxation (PMR) training ○ Reading (aloud) written description of the MVA ○ Discussion of avoidance
3	<ul style="list-style-type: none"> ○ PMR ○ Coping self-statements ○ Creation of avoidance hierarchy – exposure instruction (<i>in-vivo</i> and imaginal) ○ Meeting with significant other
4	<ul style="list-style-type: none"> ○ PMR (8 muscle version) ○ Cognitive reappraisal ○ Discussion of avoidance hierarchy - exposure continued
5	<ul style="list-style-type: none"> ○ PMR (4 muscle version) ○ Discussion of avoidance hierarchy - exposure continued
6	<ul style="list-style-type: none"> ○ Relaxation by recall ○ Discussion of avoidance hierarchy - exposure continued
7 – 9	<ul style="list-style-type: none"> ○ Cue-controlled relaxation ○ Exploring existential issues (esp. concerning mortality) ○ Interventions to address estrangement and social isolation ○ Anger management
10	<ul style="list-style-type: none"> ○ Discussion of avoidance hierarchy - exposure continued ○ Review all treatment procedures