

## Early Psychological Preventive Intervention For Workplace Violence: A Randomized Controlled Explorative and Comparative Study Between EMDR-Recent Event and Critical Incident Stress Debriefing

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# Early Psychological Preventive Intervention For Workplace Violence: A Randomized Controlled Explorative and Comparative Study Between EMDR-Recent Event and Critical Incident Stress Debriefing

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**This randomized controlled trial study aims to investigate the efficacy of an early psychological intervention called EMDR-RE compared to Critical Incident Stress Debriefing on 60 victims of workplace violence, which were divided into three groups: ‘EMDR-RE’ (n = 19), ‘CISD’ (n = 23), and ‘delayed EMDR-RE’ (n = 18). EMDR-RE and CISD took place 48 hours after the event, whilst third intervention was delayed by an additional 48 hours. Results showed that after 3 months PCLS and SUDS scores were significantly lower with EMDR-RE and delayed EMDR-RE compared to CISD. After 48 hours and 3 months, none of the EMDR-RE-treated victims showed PTSD symptoms.**

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**Keywords** psychotherapy, trauma, PTSD, violence, randomized controlled trials

## INTRODUCTION

Workplace violence (physical assault, robbery, etc.) can lead victims to develop several types of disorder, such as Acute Stress Disorder (ASD) or Post-Traumatic Stress Disorder (PTSD). An

acute stress reaction can trigger the onset of PTSD (Brewin, Andrews, & Rose, 2003; Meiser-Stedman, Yule, Smith, Glucksman, & Dalgleish, 2005). PTSD, the first symptoms of which may manifest themselves immediately (American Psychiatric Association, 2013), can, in some cases, persist for several years (North, Oliver & Pandya, 2012). Regarding PTSD prevalence following workplace violence, Tarquinio, Tarquinio, and Costantini (2003) demonstrated that 40% of a group of 27 employees who had been victims of a hold-up presented PTSD symptoms six months after the event. Bobic, Pavicevic, and Gomzi (2007) demonstrated that 38.9% of a group of 72 workplace victims of armed robbery showed symptoms of PTSD, 19 of which had experienced two or three robberies. Another study (Belleville, Marchand, St-Hilaire, Martin & Silva, 2010), which focused on 86 employees who had been victims of armed robbery, demonstrated that 2% of these workers presented a complete clinical picture of PTSD, that 6% had experienced a major depressive episode, and that 8% presented both. A “standard” form of emergency intervention used to treat victims of traumatic events in France is psychological debriefing. Moreover, this form of intervention is used and encouraged by emergency medical-psychological units, and is a national institutionalized form of psychological care used in any emergency situation (Doucet, Joubrel, & Cremniter, 2013). Many French researchers, mostly psychiatrists, continue to underline the therapeutic and preventive values of debriefing (Crocq, 2004; Lebigot, 2001, 2009). Psychological group debriefing can be defined as a supportive and educational semi-structured single-session intervention, applied shortly after exposure to a potentially traumatic event (PTE), during which facts, thoughts, and impressions are explored, and victims are

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educated on how to cope with possible stress reactions. Several group debriefing methods have been proposed, most notably by Mitchell (Mitchell 1983; Mitchell & Everly 2000, 2001) who introduced the “Critical Incident Stress Debriefing” (CISD). Following occupational exposure to a PTE, the objectives of CISD are to prevent and mitigate traumatic stress symptoms and to encourage and accelerate the recovery of normal functions (Mitchell & Everly, 1997). Despite the initial enthusiasm for this intervention, recent meta-analysis underlines the lack of effects of CISD on PTSD symptoms (Van Emmerik, Kamphuis, Hulsbosch, & Emmelkamp, 2002). Furthermore, researchers allege that CISD inhibits natural recovery from trauma. Adler et al. (2008) published a randomized controlled trial (RCT) of group CISD for occupational stress exposure with US peacekeepers. Results were consistent with the meta-analysis of Van Emmerik et al. (2002), in that there were no positive effects induced by CISD. A more recent group CISD randomized controlled trial was conducted by Tuckey & Scott (2014) with emergency services personnel. As demonstrated by other studies, group CISD had no significant effects on psychological distress or PTSD. Based on these negative results, the majority of guidelines for managing PTSD already advise against the use of debriefing, which is considered to be ineffective and even harmful (National Institute for Clinical Excellence, 2005; World Health Organisation, 2013). Eye Movement Desensitization and Reprocessing (EMDR) lies within the field of curative treatment. Several meta-analyses emphasize that EMDR is the most effective form of trauma treatment (Bisson et al., 2007; Bradley, Greene, Russ, Dutra, & Westen, 2005; Seidler & Wagner, 2006). Over the last few years, the positive effects of this form of psychotherapy has led researchers to endeavor to clarify “how EMDR works” (Van den Hout & Engelhard, 2012). Many hypotheses that have been put forward, offering explanations for the effectiveness of EMDR, have been tested. Lee & Cuijpers (2013) alleges that recalling trauma during an EMDR session only, does not have the same effects produced when recalling the event with eye movements, which decreases negative emotions. Another potential explanation is linked to the working memory (Van den Hout & Engelhard, 2012), based on the notion that when we simultaneously carry out two tasks that mobilize the working memory, cognitive capacities reach their limits. Recalling experiences and making eye movements are two tasks that necessitate the working memory. Carrying out these two tasks simultaneously results in the disturbing memory being consolidated less vividly, and the emotional tone of the event being reduced. The standard EMDR protocol (Shapiro, 1995, 2001) should enable assimilation and integration of the aspects of a traumatic experience on somatic, sensory, cognitive, behavioral, and emotional levels. These non-integrated experiences, or rather memories that remain unprocessed and are dysfunctional (Shapiro, 2002b), are the basis for a number of symptoms and psychological disorders (PTSD, anxiety, depressive states...). EMDR reactivates the natural information processing system and facilitates the adaptive resolution of the previously distorted material (Bergmann,

1998, 2010, 2012; Shapiro, 2002a; Stickgold, 2002). EMDR Recent Events Protocol – EMDR-RE (Shapiro, 2001) can either be employed as emergency protocols in the first few post-incident hours, or as recent event protocols between 2 days and 3 months after the critical incident. Shapiro (2001) suggests that the memory becomes fragmented following a traumatic event. An approach other than the standard protocol is therefore required to facilitate processing, integration, and consolidation. Rather than viewing the event as a single memory, there may be discrete moments within the event that can be considered as unique targets. Kutz et al. (2008) report that a single session of modified EMDR is effective for treating individuals’ acute stress symptoms within 2 weeks of the terrorist attack or accident, with a complete disappearance of symptoms for 50% of victims and notable effectiveness for another 27% of patients. A case study of civilians post-9/11 further illustrates the usefulness of the EMDR (Colelli & Patterson, 2008). The EMDR protocol for recent traumatic events has also been used to treat 7 individuals presenting ASD symptoms in order to prevent the development of PTSD in a study by Buydens, Wilensky, & Hensley (2014). Results demonstrated a reduction in the scores obtained on the Impact of Event Scale-Revised (IES-R) between pre-treatment and post-treatment methods. The use of EMDR as a psychological treatment for PTSD is therefore strongly recommended by the European Network for Traumatic Stress (TENTS, 2009) and the Australian Centre for Posttraumatic Mental Health (2013).

The aim of this study was to evaluate the efficacy of early intervention for employees who had been subject to workplace violence, comparing three groups. The first group was treated using Shapiro’s EMDR-RE (1995, 2001), the second group received Mitchell’s CISD (1983a, 1983b), and the third group was treated identically to the first group (RE), however the intervention was delayed for a further 48 hours (delayed EMDR-RE treatment). The study tested four hypotheses. The first hypothesis was that during the 48-hour post-test follow-up, treatment conducted using the EMDR protocol would lead to lower scores on the Posttraumatic Stress Disorder Checklist Scale (Weathers, Litz, Herman, Huska, & Keane, 1993; Ventureyra, Yao, Cottraux, Note, & Mey-Guillard, 2002; Yao et al., 2003), and on the Subjective Units of Distress scale (Wolpe, 1969, 1990), than for those in the CISD and the delayed EMDR-RE groups. It was also predicted that the CISD group would have significantly lower PCLS and SUDS scores during the 48-hour follow-up post-test period than the delayed EMDR-RE group, which at this stage, would not have received any treatment. Thirdly, it was predicted that at the 3-month follow-up, the EMDR-RE and delayed EMDR-RE groups would have significantly lower PCLS and SUDS scores than the CISD group. Finally, it was predicted that this reduction in scores for the two EMDR-RE groups would remain stable over three months. This was the first randomized controlled study to be carried out in relation to harmful implementation of the EMDR-RE protocol amongst individuals who have been confronted with a PTE,

in order to prevent the development of PTSD. Furthermore, this study must be considered within the context of care provided to trauma victims in France, notably company employees, based on the model of French emergency medical-psychological units that favor the systematic use of psychological debriefing. This research provided an opportunity to reflect deeply on the crucial role of nurses in providing early treatment for individuals following a potentially traumatic event using therapeutic techniques, having demonstrated their effectiveness within this context.

## METHOD

### Trial Design

This is a randomized controlled individual trial evaluating the efficacy of EMDR-RE psychotherapy in comparison to CISD, carried out over a period of 30 months (with 27 months of inclusion, from June 2012 to January 2015).

### Participants

Participants were employees of a retail company, who had been subject to workplace violence. 60 stores (two brands) located across France took part in the study. In order to be included in the study, the following criteria had to be fulfilled: (1) the incident was the first time violence at work had occurred (hold-up, armed robbery, physical assault); (2) the incident did not involve more than two employees at the same time; (3) the first consultation took place within 48 hours following the incident at work; (4) to have an email address and be familiar with internet; (5) to give consent after being fully informed about the framework and the procedure surrounding the research protocol; (6) to reside in France and have no need for an interpreter to enable communication in French; (7) > 18 years old; (8) clinical manifestations observed could be attributed to the recent incident of workplace violence; (9) employees agreed to participate in the study for a period of three months by answering researchers' questions before the single session of EMDR-RE or CISD, 48 hours after the session, and 3 months later; (10) not suffering from mental-health disorders; (11) not abusing drugs and/or alcohol. An external psychologist led the clinical assessment interviews with the aim of verifying that the individuals put forward by the companies were able to participate in the study, in relation to the inclusion criteria.

### Psychological Interventions

All treatment was carried out within the context of an intervention agreement between retail companies and a group of psychologists from the *Centre Pierre Janet* at the University of Lorraine. As soon as one or two employees experienced violence in the workplace, and upon agreement with the employee(s), the company's management department would contact the psychologists' group leader. This leader would then contact the employees involved within four hours following the store manager's call. He/she would meet with the employee,

obtain a description of the PTE, and explain what could be done to help him/her. This is a standard procedure, which psychologists from the *Centre Pierre Janet* have followed for more than 15 years, within the context of the agreement established with the retail companies. The trial included 3 phases: pre-test phase (before treatment), post-test phase (48 hours after treatment) and follow-up phase three months later (post-test 3-month follow-up). Within 48 hours of the incident, the participants were invited to respond to an online questionnaire during the pre-test phase (PCLS and SUDS questionnaires). 48 hours after the interventions, all participants in the first two groups (EMDR-RE and CISD) were asked to go online following a telephone call to complete a second questionnaire (post-test 48-hour follow-up phase). Although the delayed EMDR-RE group had not received any treatment, participants were asked to respond to the same questionnaire 48 hours after the pre-test, just as the other subjects had done. After this post-test phase, the delayed EMDR-RE group received the same treatment provided to the EMDR-RE group. After 3 months, all subjects across all groups were contacted by telephone and asked to respond to the online questionnaires for a final time. All psychologists involved in treating the 3 groups had at least 5 years' experience in psychotherapy and were accredited psychotherapists after spending 5 years studying at university, including a masters in clinical psychology and health psychology at the University of Lorraine, France, and work placement. All demonstrated extensive knowledge of and experience with EMDR and most notably with the Recent Events Protocol (accredited EMDR Europe practitioners) and CISD.

### EMDR-RE Group

The psychologist provided the treatment 48 hours after the potentially traumatic event. EMDR-RE treatment began with noting down the events constituting the incident and preparing for trauma work (Shapiro, 2001). Once participants had identified the traumatic scene that they found most disturbing, they were asked to focus on this image and to identify a negative cognition currently held about themselves, a desired positive cognition, and their current emotion and any accompanying bodily sensations. They were also asked to rate their current level of distress and the validity of the desired positive cognition, and to focus on their memory and their disturbance for brief periods, whilst the psychologist stimulated eye movements. Any new free associations that arose were targeted according to structured protocols until the client reported minimal or no distress in association with the targeted trauma scene, along with maximal validity of the positive cognition. Any residual body sensations were focused on until no further change could be reported. A single EMDR session would last between 1.5 and 2 hours.

### CISD Group

The psychologist provided psychological intervention 48 hours after the PTE for the CISD group. CISD sessions followed the Mitchell (1983) and Mitchell & Everly (1993)

TABLE 1  
 “Critical Incident Stress Debriefing” (CISD) phases by  
 Mitchell (1983)

| Debriefing phases | Description  |
|-------------------|--|
| 1. Introduction   | The individual in charge of the CISD introduces himself/herself, reports on the debriefing process, its aims and gets the group started.   |
| 2. Facts          | Each member of the group gives a brief presentation of their potentially traumatic experience.   |
| 3. Thoughts       | Transition phase prior to dealing with each member’s emotions.<br>Each individual relates his or her automatic thought process during the moment of trauma.                        |
| 4. Reactions      | CISD central phase.<br>Each individual’s reactions and consequently the impact of the event on each individual are dealt with.   |
| 5. Symptoms       | A recap of the symptoms that could emerge in the short, medium and long term, aside from the symptoms already developed.   |
| 6. Education      | Standardization of symptoms experienced by the participants.<br>Explanations are given relating to behavioral, cognitive and emotional reactions inherent to psychological trauma. |
| 7. Re-entry       | The participants ask any final questions.<br>Recap of everything covered during the CISD.<br>Final instructions, information and explanations are given,                           |

seven-phase protocol (see Table 1). Sessions were led by a professional mental health consultant. A peer supporter also attended and led the introduction and education phases. A single CISD session lasted between 1.5 and 2 hours.

### Delayed EMDR-RE Group

For the delayed EMDR-RE group, treatment was administered 96 hours after the PTE, that is to say, 48 hours after the first two groups. The victims in this group were then treated using the same RE protocol as was used for the EMDR-RE group. This group could therefore be considered as a control group during this additional 48-hour period. The idea was to treat the victims more than 48 hours (3 to 7 days) after treating the other groups, so that this group could fulfill its role as the control. However,

organizational conventions and constraints of the companies in which the research was being carried out prevented this measure from being implemented.

### Randomization

Participants were randomly assigned to one of three groups: EMDR-RE, CISD, or delayed EMDR-RE. The randomization sequence was determined prior to the recruitment process through a computer-generated random number sequence.

### Main Outcome Measures

During the pre-test, post-test, and 3-month follow-up phases, all participants were asked to complete the same questionnaires: the Post-traumatic Stress Disorder Checklist Scale and the Subjective Units of Distress.

### Posttraumatic Stress Disorder Checklist Scale (PCLS)

The PCLS is a brief self-report inventory that assesses the 17 symptoms of PTSD. It was developed in 1993 by a research team from the National Center of Post-traumatic Stress Disorder (Weathers, Litz, Herman, Huska, & Keane, 1993). Initial psychometric data shows that the PCLS correlates well with the Clinician-Administered PTSD Scale (Blake et al., 1990; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996), a test-retest reliability of 0.96, a kappa of 0.64 for the PTSD diagnosis from the Structured Clinical Interview for DSM-IV (SCID) (Forbes, Creamer, & Biddle, 2001) for the validity, and good homogeneity with internal consistency amongst the 3 sub-symptoms ( $\alpha = 0.82$  to  $0.94$ ) (Blanchard et al., 1996). A diagnosis of PTSD requires assessment of these symptoms, their severity, and other circumstances (McFall, Smith, Roszell, Tarver, & Malas, 1990). A score is obtained by totaling the 17 items, which are grouped into three sub-scores, corresponding to three types of PTSD symptoms: intrusion (items 1 to 5), avoidance (items 6 to 12), and arousal (items 13 to 17). A score of 50 (extended from 17 to 85) strongly suggests the presence of PTSD, based on the SCID PTSD module (Forbes, Creamer, & Biddle, 2001). We used the French translation by Yao and colleagues (2003) translation of the PCLS, which showed a test-retest total score of 0.75.

### Subjective Units of Distress Scale (SUDS)

The SUDS (Wolpe, 1969, 1990) is a Likert scale ranging from 0 to 10, which evaluates the degree of distress caused by a mental image, a target, or a critical point activated and treated during the psychotherapeutic process. This is a hugely subjective assessment of a patient’s negative feelings during treatment and is an integral part of the EMDR protocol. All participants were asked the following SUDS question: “on a scale of 0 to 10, where 0 is no disturbance at all, and 10 is the highest level of disturbance you can imagine, how would you describe the feelings of disturbance that you are currently experiencing?” In

this study, the primary global SUDS score was measured during the pre-test phase, and the global final SUDS score during the 3-month follow-up phase, for all participants across the three groups.

### Statistical Analyses

The researchers in charge of leading the EMDR-RE and CISD sessions were different from those in charge of collecting and analyzing data. Participants' characteristics were presented by group as means and standard deviation for continuous variables, and as absolute and relative frequencies for categorical variables. The researchers used several nonparametric tests, none of the groups were distributed normally. A comparison of their characteristics was performed using Kruskal–Wallis, Chi-squared, or Fisher exact tests as appropriate. PCLS and SUDS scores at each measure were expressed as mean and standard deviation by group and compared by applying one-way analysis of variance followed by Bonferroni's test for multiple comparisons. A homoscedasticity check was performed with the Bartlett test. For each group, the evolution of PCLS and SUDS scores was compared using one-way analysis of variance or Kruskal–Wallis tests as appropriate. In addition, the total PCLS score was recoded. A score greater than 50 is described in the literature as a strong indicator for PTSD (Monson et al., 2008). Thus, individuals who were at risk for PTSD were identified, based on the three phases of pre-test, post-test, and 3-month follow-up. A chi-squared test was performed for each of the groups, showing the distribution of potential PTSD and non-PTSD individuals according to the treatment phases and groups. Finally, a mixed model of analysis of variance (ANOVA) for repeated measures was used to determine the group effect on the variable of interest (PCLS and SUDS scores) in the period leading up to the 3-month follow-up. The model for each score incorporated a group effect, a time effect, and a time by group interaction. Moreover, some random effects on participants (reflecting individual deviance from the average intercept) and time (individual deviance from the average time effect) were added to the model. Using the Akaike Information Criteria, an unstructured covariance matrix was chosen. All analyses were performed on an intent-to-treat basis. For all tests, statistical significance was determined at the .05 level. All statistical analyses were performed using SAS software (version 9.2, SAS Institute, Cary, NC, USA).

### Participant Flow

Participants were chosen for the study based on clinical interviews and medical advice. For the 117 participants treated (see Figure 1), five were excluded because the violent events at work involved more than two employees, and seven did not want to take part in the research. Amongst the 105 employees who were eligible for inclusion, 14 were excluded because they had already been victims of violence in their personal lives. For 16 of them, it was impossible for us to meet the treatment deadline of 48 hours, for either functional or organizational reasons related to the psychologist's intervention on-site, or because the

employees were unavailable for treatment. Ten employees who were diagnosed as depressed were unable to be included in the trial, as the first symptoms of depression appeared before the violent incident occurred. Finally, five employees were subject to alcohol dependence and were not included in the trial. Therefore, 60 employees were included and randomly assigned by the network manager (first author) to the three groups. All had experienced a robbery ( $n = 20$ ), a knife-threat ( $n = 10$ ), or a physical assault ( $n = 30$ ). Following the results of the randomization, 19 participants were assigned to the EMDR-RE group, 23 to the CISD group, and 18 to the delayed EMDR-RE group. Individuals who were not able to be included in the study were nevertheless subject to a psychological follow-up. EMDR treatment and a 12-month follow-up were proposed to them, within the framework of the existing conventions established between the Pierre Janet Centre (Metz, France) and the company in which the event occurred. In more specific cases of depression and alcohol dependence, the psychologists directed the individuals towards specialist care services, which are better equipped to take them in, with the individual's approval, and monitor them on a daily basis.

### Description of the Participants

The description of the sociodemographic data in the total sample and their comparison by group are shown in Table 2. The mean age was 34 amongst the 60 participants. 60% were men, 63.3% were married or living as a couple, and 51.7% had a diploma below a bachelor's degree. No statistically significant difference was found between the three groups.

## RESULTS

### Evolution and Comparison of Scores for Each Measure, and Clinical Remarks

Some individuals across the 3 groups (6 individuals from the EMD-RE group; 7 individuals from the CISD group; 7 individuals from the delayed EMDR-RE group) presented significant emotional distress during the sessions, which meant that the relevant psychological intervention had to be temporarily stopped to allow the psychologist to emotionally stabilise the individual using different techniques (breathing and relaxation exercises, etc.) This psychological stabilisation allowed the psychologist to reduce the individual's emotional burden, reassure the individual and therefore allow the individual to release their emotions once again. It is important to note that there was no missing data within the analysis. The online system for collecting data actually has an alert system, which prevents the participant from going onto the next question if the previous one has not been completed.

### PCLS Scores

The scores for each group and at each phase are shown in Table 3. At the pre-test measure, there is no significant difference in PCLS total between the 3 groups (EMDR-RE:  $M = 50.1$ ,

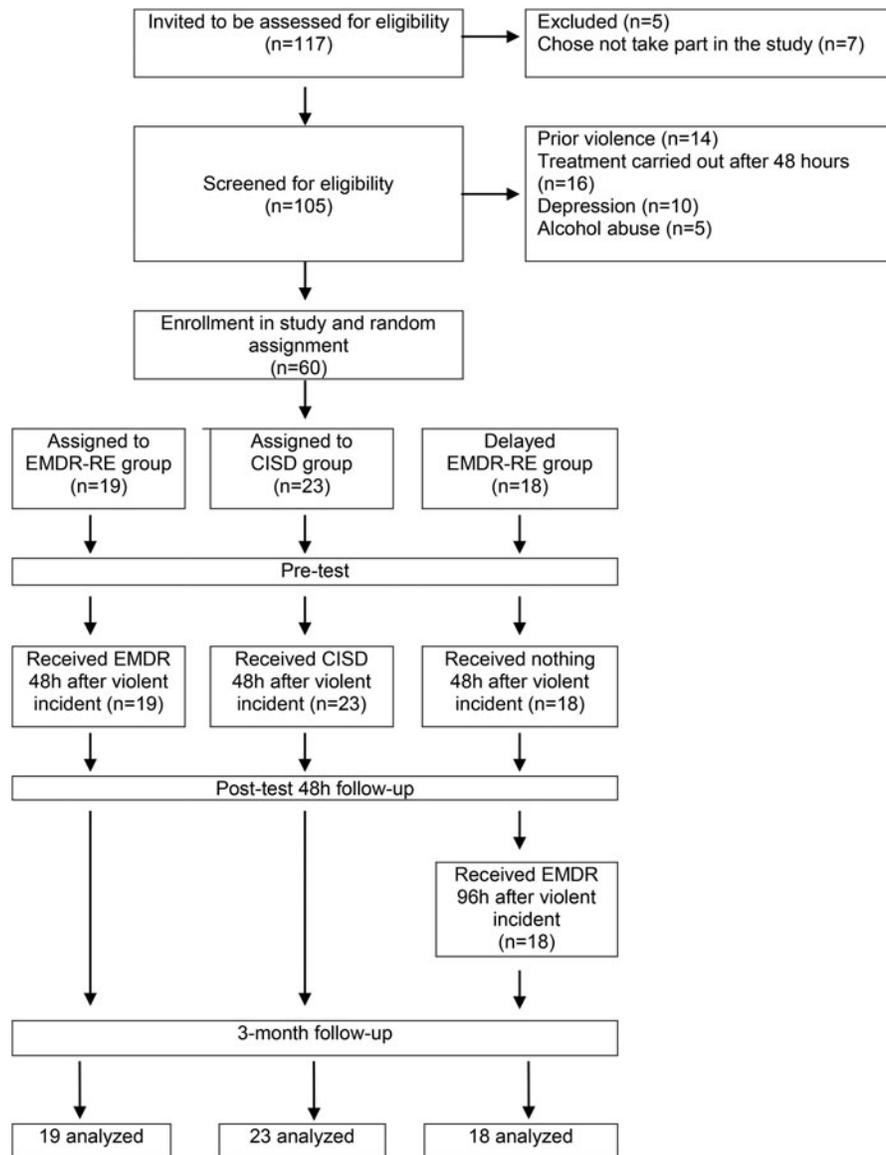


FIGURE 1. Participant flow throughout the study.

SD = 4.2; CISD:  $M = 51.6$ ,  $SD = 4.1$ ; delayed EMDR-RE:  $M = 50.8$ ,  $SD = 3.8$ ). PCLS scores obtained from the 48-hour follow-up were significantly lower in the EMDR-RE group ( $M = 33.7$ ,  $SD = 3.8$ ) than in the other two groups. There was no significant difference between the scores obtained in the CISD group ( $M = 52.04$ ,  $SD = 2.7$ ) and the delayed EMDR-RE group ( $M = 50.1$ ,  $SD = 5.4$ ) from the 48-hour follow-up. Scores obtained after 3-month in the EMDR-RE group ( $M = 31.5$ ,  $SD = 4.1$ ) and delayed EMDR-RE group ( $M = 36.6$ ,  $SD = 3.6$ ) were significantly lower than in the CISD group ( $M = 52.7$ ,  $SD = 5.1$ ).

**SUDS scores.** There was no significant difference in SUDS scores between the 3 groups at the pre-test (EMDR-RE:  $M = 8.6$ ,  $SD = 0.6$ ; CISD:  $M = 8.5$ ,

$SD = 0.7$ ; delayed EMDR-RE:  $8.9$ ,  $SD = 0.4$ ). SUDS scores from the 48-hour follow-up were significantly lower in the EMDR-RE group ( $M = 2.6$ ,  $SD = 0.8$ ), compared with the other two groups. There was no significant difference between scores for the CISD group ( $M = 8.1$ ,  $SD = 0.6$ ) and delayed EMDR-RE group ( $M = 7.8$ ,  $SD = 0.6$ ) obtained from the 48-hour follow-up. Scores obtained after 3-month for the EMDR-RE group ( $M = 2.4$ ,  $SD = 0.7$ ) and delayed EMDR-RE group ( $M = 3.1$ ,  $SD = 0.9$ ) were significantly lower than for the CISD group ( $M = 8.1$ ,  $SD = 0.8$ ).

#### Total PCLS Scores and PTSD Description and Comparison

According to the DSM-V, for PTSD to be diagnosed, criteria B, C, D and E from the clinical table must be present for more

TABLE 2  
Demographic characteristics

| Variables                | EMDR-RE group (n = 19) | CISD group (n = 23) | Control group (n = 18) | <i>p</i> |
|--------------------------|------------------------|---------------------|------------------------|----------|
| Type of trauma           |                        |                     |                        | 0.18     |
| Armed robbery            | 8(42.1%)               | 4(17.4%)            | 8(44.4%)               |          |
| Knife threat             | 4(21.1%)               | 5(21.7%)            | 1(5.6%)                |          |
| Physical assault         | 7(36.8%)               | 14(60.9%)           | 9(5%)                  |          |
| Age (SD)                 | 35.3(6.7)              | 34.7(5.5)           | 33.4(5.6)              | 0.75     |
| Gender                   |                        |                     |                        | 0.89     |
| Male                     | 12(63.2%)              | 14(60.9%)           | 10(55.6%)              |          |
| Female                   | 7(36.8%)               | 9(36.8%)            | 8(44.4%)               |          |
| Nationality              |                        |                     |                        | 0.26     |
| French                   | 16(84.2%)              | 21(91.3%)           | 18(100%)               |          |
| EEC                      | 3(15.8%)               | 2(8.7%)             | 0(0%)                  |          |
| Marital status           |                        |                     |                        | 0.21     |
| Married                  | 8(42.1%)               | 12(52.2%)           | 9(50%)                 |          |
| In a relationship        | 1(5.3%)                | 3(13%)              | 5(27.8%)               |          |
| Single                   | 10(52.3%)              | 8(34.8%)            | 4(22.2%)               |          |
| Education                |                        |                     |                        | 0.38     |
| French 1st level diploma | 3(15.8%)               | 3(13.1%)            | 1(5.6%)                |          |
| Vocational training      | 8(42.1%)               | 10(43.5%)           | 6(33.3%)               |          |
| High school              | 5(26.3%)               | 5(21.7%)            | 10(55.5%)              |          |
| College/university       | 3(15.8%)               | 5(21.7%)            | 1(5.6%)                |          |
| Professional career      |                        |                     |                        | 0.13     |
| M (years)                | 9.1                    | 7.01                | 8.2                    |          |
| SD                       | 2.7                    | 2.3                 | 4.6                    |          |

*Note.* EMDR-RE: Eye Movement Desensitization and Reprocessing Recent Events Protocol (Shapiro, 1995, 2001); CISD: Critical Incident Stress Debriefing (Mitchell & Everly, 1993); EEC: European Economic Community. Data analysis: Kruskal–Wallis for quantitative variables, chi-squared or Fisher exact tests for qualitative variables.

than one month (American Psychiatric Association, 2013). For this reason, only the total PCLS scores obtained from the pre-test and 48-hour follow-up shall be used below, and no clinical interpretation shall be provided. Furthermore, there was no difference between groups during the pre-test phase (43% with a total score of PCLS >50) (see Table 4). 63.1% (n = 12) of participants in the EMDR-RE group, 78% (n = 18) of subjects in the CISD group and 66.7% (n = 12) of subjects in the delayed EMDR-RE group had pre-test scores of greater than 50. The 48-hour follow-up showed that no EMDR-RE group members (n = 19, 100%) had total PCLS scores of greater than 50, and that there was no notable change for the CISD group (total PCLS scores <50: n = 4, 17.4%) or the delayed EMDR-RE group (total PCLS scores <50: n = 7, 38.9%). After 3 months, none of the participants across the two EMDR-RE groups had PTSD (EMDR-RE: n = 19, 100%; delayed EMDR-RE: n = 18, 100%), and the number in the CISD group remained unchanged (no PTSD: n = 5, 21.7%).

### Longitudinal Analysis

The results of each mixed model of analysis of variance are summarized in Table 5. For all five outcome measures, a signif-

icant global time effect was observed for all participants with a statistically significant decrease of scores at the 3-month follow-up compared to pre-test measures. Nevertheless, the results of significant time by group interaction ( $p < .0001$ ) showed that the effect of time on scores varied according to the group. CISD group scores tended to increase or to remain stable over time, whilst the EMDR-RE and delayed EMDR-RE groups scores tended to decrease over the follow-up. In addition, this decrease was more significant for the first 48 hours for the EMDR-RE group, in comparison to the delayed EMDR-RE group (e.g., a negative beta estimate = -15.65 for the PCLS total score), whereas the difference in decrease after 3 months compared to pre-test measures was similar between the two EMDR-RE groups.

### DISCUSSION

The main aim of this study was to demonstrate that EMDR-RE is more effective than CISD in Early Psychological Intervention (EPI) for employees who are victims of workplace violence, in order to prevent PTSD symptoms within the context of a randomized controlled study. The study was carried out as part of a partnership between the research psychologists

TABLE 3

Means and (SDs) of self-report measures by the EMDR-RE group (n = 19), CISD group (n = 23) and delayed EMDR-RE (n = 18) for the pre-test, after 48 hours and after 3 months

| Variable Group        | Pre-test   | 48-hour follow-up        | 3-month follow-up       | <i>p</i> * |
|-----------------------|------------|--------------------------|-------------------------|------------|
| <b>PCLS Total</b>     |            |                          |                         |            |
| EMDR-RE               | 50.1(4.2)  | 33.7 <sup>a</sup> (3.8)  | 31.5 <sup>a</sup> (4.1) | <.0001     |
| CISD                  | 51.6(4.1)  | 52.04 <sup>b</sup> (2.7) | 52.7 <sup>b</sup> (5.1) | .64        |
| Delayed EMDR-RE       | 50.8(3.8)  | 50.1 <sup>b</sup> (5.4)  | 36.6 <sup>a</sup> (3.6) | <.0001     |
| <b>PCLS Intrusion</b> |            |                          |                         |            |
| EMDR-RE               | 15.4(2.4)  | 11.1 <sup>a</sup> (1.6)  | 10.1 <sup>a</sup> (1.9) | <.0001     |
| CISD                  | 16.2(2.7)  | 16.9 <sup>b</sup> (1.5)  | 18.3 <sup>b</sup> (2.9) | .014       |
| Delayed EMDR-RE       | 15.4(2.7)  | 15.3 <sup>b</sup> (2.1)  | 11.3 <sup>a</sup> (2.2) | <.0001     |
| <b>PCLS Avoidance</b> |            |                          |                         |            |
| EMDR-RE               | 18.2(2.2)  | 11.6 <sup>a</sup> (2.5)  | 11.3 <sup>a</sup> (2.4) | <.0001     |
| CISD                  | 19.04(1.9) | 17.1 <sup>b</sup> (1.8)  | 17.1 <sup>b</sup> (2.1) | .0012      |
| Delayed EMDR-RE       | 19.2(2.1)  | 16.8 <sup>b</sup> (3.1)  | 12.6 <sup>a</sup> (1.8) | <.0001     |
| <b>PCLS Arousal</b>   |            |                          |                         |            |
| EMDR-RE               | 16.4(2.2)  | 10.9 <sup>a</sup> (2.02) | 10.6 <sup>a</sup> (3.1) | <.0001     |
| CISD                  | 16.3(2.3)  | 18.1 <sup>b</sup> (1.4)  | 17.9 <sup>b</sup> (2.7) | .065       |
| Delayed EMDR-RE       | 16.1(2.2)  | 18.0 <sup>b</sup> (2.1)  | 12.6 <sup>a</sup> (1.8) | <.0001     |
| <b>SUDS</b>           |            |                          |                         |            |
| EMDR-RE               | 8.6(0.6)   | 2.6 <sup>a</sup> (0.8)   | 2.4 <sup>a</sup> (0.69) | <.0001     |
| CISD                  | 8.5(0.7)   | 8.1 <sup>b</sup> (0.6)   | 8.1 <sup>b</sup> (0.79) | .028       |
| Delayed EMDR-RE       | 8.9(0.4)   | 7.8 <sup>b</sup> (0.5)   | 3.1 <sup>a</sup> (0.9)  | <.0001     |

*Note.* EMDR-RE: Eye Movement Desensitization and Reprocessing Recent Events Protocol (Shapiro, 1995, 2001); CISD: Critical Incident Stress Debriefing (Mitchell & Everly, 1993); PCLS: Post-Traumatic Checklist Scale; SUDS: Subjective Units of Distress Scale. The PCLS is from Weathers, Litz, Herman, Huska, and Keane (1993); and the SUDS is from Wolpe (1990).

\* *p* results of the comparison of the evolution of PCLS and SUDS scores using one-way analysis of variance or Kruskal-Wallis tests. Means in the same column that do not share the same subscript differ at a Bonferroni corrected alpha level of  $p < .05$ .

and various companies for the care of employees who suffer violence at work. Care provided by companies in France mainly focuses on psychological debriefing, which is an approach prescribed by French emergency medical-psychological units. Intervention within 48 hours using EMDR Recent Events Protocol (EMDR-RE) led to a significant reduction of all PCLS scores, as well as of perceived distress (SUDS), supporting the first hypothesis. Such a reduction is particularly clear when comparing the results of the CISD and delayed EMDR-RE groups. During the 48-hour follow-up, subjects benefitting with CISD

showed no differences to those treated under delayed EMDR, demonstrating that there was no benefit at this stage, regardless of the treatment. After 3 months, the delayed EMDR-RE and EMDR-RE groups did not differ in regards to their PCLS or SUDS scores. Therefore, the later treatment of the delayed EMDR-RE group produced effects that were comparable to the EMDR-RE group with a significant reduction in scores, reflecting the different aspects of PTSD, as well as in participants' subjective distress, supporting the third hypothesis. A reduction in the various scores obtained after treatment for the two

TABLE 4

Score obtained as a total score of PCLS according to the groups treated and the three study phases, and PTSD symptoms (scores >50) at 3 months follow-up

| Variable Group  | Pre-test   |            | 48-hour follow-up |            | 3-month follow-up |         |
|-----------------|------------|------------|-------------------|------------|-------------------|---------|
|                 | Score > 50 | Score < 50 | Score > 50        | Score < 50 | PTSD              | No PTSD |
| EMDR-RE         | 12         | 7          | 0                 | 19         | 0                 | 19      |
| CISD            | 18         | 5          | 19                | 4          | 18                | 5       |
| Delayed EMDR-RE | 12         | 6          | 11                | 7          | 0                 | 18      |

$p = .53$   $p < .001$   $p < .001$

TABLE 5

Longitudinal analysis of each score according to a mixed model of analysis of variance for repeated measures including the 3 phases (n = 60)

|            | PCLS Total |          | PCLS Intrusion |          | PCLS Avoidance |          | PCLS Arousal |          | SUDS     |          |
|------------|------------|----------|----------------|----------|----------------|----------|--------------|----------|----------|----------|
|            | Estimate   | <i>p</i> | Estimate       | <i>p</i> | Estimate       | <i>p</i> | Estimate     | <i>p</i> | Estimate | <i>p</i> |
| Intercept  | 50.83      |          | 15.44          |          | 19.28          |          | 16.11        |          | 8.94     |          |
| Time       |            | .0001    |                | .0001    |                | .0001    |              | .0001    |          | .0001    |
| pre-test   | ref        |          | ref            |          | ref            |          | ref          |          | ref      |          |
| measure    |            |          |                |          |                |          |              |          |          |          |
| 48h        | -.67       |          | -.11           |          | -2.44          |          | 1.89         |          | -1.05    |          |
| follow-up  |            |          |                |          |                |          |              |          |          |          |
| 3-month    | -16.94     |          | -4.61          |          | -7.61          |          | -4.72        |          | -6.22    |          |
| follow-up  |            |          |                |          |                |          |              |          |          |          |
| Group      |            | .0001    |                | .0001    |                | .0001    |              | .0001    |          | .0001    |
| EMDR-RE    | ref        |          | ref            |          | ref            |          | ref          |          | ref      |          |
| 48h        |            |          |                |          |                |          |              |          |          |          |
| CISD       | .82        |          | .77            |          | -.23           |          | .28          |          | -.38     |          |
| EMDR-RE    | -.78       |          | -.02           |          | -1.07          |          | .31          |          | -.26     |          |
| Time*group |            | .0001    |                | .0001    |                | .0001    |              | .0001    |          | .0001    |
| CISD       |            |          |                |          |                |          |              |          |          |          |
| pre-test   | ref        |          | ref            |          | ref            |          |              |          | ref**    |          |
| measure    |            |          |                |          |                |          |              |          |          |          |
| 48h        | 1.06       |          | .81            |          | .48            |          | -.27         |          | .62      |          |
| follow-up  |            |          |                |          |                |          |              |          |          |          |
| 3-month    | 18.10      |          | 6.78           |          | 5.65           |          | 5.63         |          | 5.74     |          |
| follow-up  |            |          |                |          |                |          |              |          |          |          |
| EMDR-RE    |            |          |                |          |                |          |              |          |          |          |
| pre-test   | ref        |          | ref            |          | ref            |          | ref          |          | ref      |          |
| measure    |            |          |                |          |                |          |              |          |          |          |
| 48h        | -15.65     |          | -4.20          |          | -4.08          |          | -7.36        |          | -5.00    |          |
| follow-up  |            |          |                |          |                |          |              |          |          |          |
| 3-month    | -1.58      |          | -.70           |          | .72            |          | -1.59        |          | .01      |          |
| follow-up  |            |          |                |          |                |          |              |          |          |          |
| EMDR-RE    | ref        |          | ref            |          | ref            |          | ref          |          | ref      |          |
| 48h        |            |          |                |          |                |          |              |          |          |          |
| pre-test   | —          |          | —              |          | —              |          | —            |          | —        |          |
| measure    |            |          |                |          |                |          |              |          |          |          |
| 48h        | —          |          | —              |          | —              |          | —            |          | —        |          |
| follow-up  |            |          |                |          |                |          |              |          |          |          |
| 3-month    | —          |          | —              |          | —              |          | —            |          | —        |          |
| follow-up  |            |          |                |          |                |          |              |          |          |          |

*Note.* EMDR-RE: Eye Movement Desensitization and Reprocessing Recent Events Protocol (Shapiro, 1995, 2001); CISD: Critical Incident Stress Debriefing (Mitchell & Everly, 1993); PCLS: Post-Traumatic Checklist Scale; SUDS: Subjective Units of Distress. The PCLS is from Weathers, Litz, Herman, Huska, and Keane (1993); and the SUDS is from Wolpe (1990).

EMDR-RE groups was maintained over this period. All these results were confirmed by recoding the variables using the total PCLS score. Although Monson et al. (2008) state that a PCLS total score greater than 50 strongly suggests the presence of a PTSD, they have agreed to consider that such results must, in any case, be interpreted with a degree of caution. Therefore, a

score greater or less than 50 does not allow for a precise and indisputable diagnosis. Nevertheless, it should be noted that after treating the EMDR-RE and delayed EMDR-RE groups, 100% of participants had a PCLS score lower than 50 at 3 months follow-up, suggesting an absence of PTSD. In the case of the CISD intervention, the number of employees with scores higher

( $n = 18$ ) or lower ( $n = 5$ ) than 50 was unchanged (with the exception of one participant who had a total PCLS score below 50 during the 48-hour follow-up phase, yet during the three-month follow-up phase was again over this threshold). Early treatment based on an EMDR protocol therefore seems to be an interesting approach for improving survivors' psychological well-being. It is critical to consider EPI, especially when an acute stress disorder (or acute PTSD) is diagnosed. ASD is shown to be a high risk factor for PTSD. Even when there is no ASD, the sensitization and kindling phenomena described by McFarlane (2010) still exist. It seems that early psychological intervention can contribute to preventing late onset PTSD, even in the absence of ASD or PTSD after three months. This approach can contribute to reducing survivors' suffering, which is known to be considerable from the very beginning of the traumatization process. Even though there was so significant difference between EMDR-RE and delayed EMDR-RE groups at the 3 month-follow-up, the results obtained through our research enabled us to gain a better understanding of the time periods prescribed for treating patients in order to prevent the emergence of PTSD. EMDR-RE can therefore be proposed to patients up to 96 hours after the event, without increasing the patient's risk of developing PTSD 3 months later. There are several arguments for looking into and taking preventive therapeutic actions. For CISD, this approach failed to reduce PTSD symptoms in comparison to the other two groups. The results of this study are consistent with prior debriefing RCTs, in that there were no clear positive effects associated with CISD, compared with no intervention. However, there were no strong negative effects either. CISD was neither more distressing nor arousing than an intervention designed to teach individuals how to manage stress. As demonstrated by Van Emmerik, Kamphuis, Hulsbosch, and Emmelkamp (2002) and despite the technique's intuitive appeal, the results of this study show that CISD has no efficacy in reducing post-traumatic stress disorder symptoms, which brings into question the increasingly frequent use of this practice within the French health sector. The results of the meta-analysis performed by Rose, Bisson, Churchill, and Wessely (2012), in relation to the efficacy of brief psychological debriefing for the management of psychological distress and the prevention of PTSD that may be experienced following a traumatic event must also be considered. The authors could not conclude that a single psychological debriefing session was useful in preventing the PTSD presented after a traumatic event. Psychological debriefing appears to be equivalent or worse than control treatment (e.g., waiting-list) or education in preventing or reducing the severity of PTSD, depression, anxiety, or general psychological morbidity. Some studies included in this meta-analysis suggest that psychological debriefing may increase the risk of developing PTSD or depression. One of the limits of CISD that is not truly taken into account is the level of survivors' exposure, whilst, by its nature, EMDR involves a constant adjustment to the subject's clinical situation, before and during sessions. In addition, the psychotherapist's job when carrying out EMDR, unlike CISD, is to target the source of trauma

in its subjective and experiential nature. With CISD, the event is, in a way, reconstructed. Several explanations can be argued to enlighten the lack of effects or even negative consequences of CISD. Sijbrandij, Olff, Reitsma, Carlier, & Gersons (2006) highlight the potential role of hyperarousal in this outcome. For these researchers, there is a significant link between a high degree of arousal after a traumatic experience and the development of PTSD. Therefore, CISD participants are encouraged to talk about their experience, and to express and share their feelings and emotions, which also "may activate the sympathetic nervous system to such a degree that successful encoding of the traumatic memory is disrupted" (Sijbrandij et al., 2006, p.154). At the end of each session, the victim is hyper-reactive, presents a high degree of arousal and can develop PTSD symptoms. Moreover, an individual's subjective experience is put into perspective by other group members. This implies that not everything can be said, and when it is, the subject is confronted with another person's lived experience, which could contribute to reinforcing the traumatic perspective of the event. Despite being difficult to implement, this research responded to the authors' aspirations in demonstrating the value of EMDR therapy for preventing victims from developing PTSD. Such research took a long time to implement due to the difficulty of recruiting victims, which depended both on the frequency of workplace violence and on the willingness of employees to be included in this research. As a field study of preventive intervention for participants who are at risk of developing PTSD, this study appears to have excellent external validity, given that it is a reflection of real-world clinical work with this type of experience. Initial scores on the PCLS and the SUDS indicate that subjects were struggling with significant distress, whether they met diagnostic criteria for PTSD or not. Previous research has shown that clients undergoing trauma treatment, whether they met the diagnosis of PTSD or not, received equal benefit from EMDR treatment (Scheck, Schaeffer, & Gillette, 1998; Wilson, Becker, & Tinker, 1995, 1997). It underlines for policy planning and clinical intervention purposes, the key point is whether people are in sufficient distress to require treatment; the focus should not be on a tabulation of diagnoses exhibited. The positive results obtained through this study, such as reduced PTSD occurrences and suffering, are corroborated by a controlled, randomised study conducted by Shapiro & Laub (2016), intended to investigate the effectiveness of an EMDR protocol adapted to treat individuals who have experienced a recent traumatic experience, following a missile explosion that occurred in the heart of a community, killing 3 individuals. This research was also limited in some ways. Firstly, there was no intervention control group and results did not take into account the natural disappearance of PTSD symptoms over time. The sample size was also relatively small, due to recruitment problems. Usually, far larger sizes are needed to detect any differences between samples, even at 3 months. The research was also limited due to bias in recruitment. Those most eligible to participate in the study were those who had the most symptoms following a traumatic

event, and consequently, those who presented the highest total PCLS scores. Numerous victims refused to receive psychological care and therefore to participate in the study, consequently allowing their symptoms to be alleviated naturally. The difference between the results from the CISD and EMDR-RE groups could also be explained by effects of therapy. Finding subjects to include in the study was particularly difficult, firstly because violent events that were eligible to be included in the study were fairly infrequent, and secondly because employees of these companies were not used to being asked to participate in studies, no matter how close the study was to real circumstances and no matter how similar the conditions were to current care offered in hospitals. The results of the study are not representative of the whole population, as the sample is composed of employees within the mass distribution sector. The sustainability of the EMDR-RE could also be doubted, given that there is no true indicator of the effects being maintained. An evaluation of the effects of treatment after 6 and 12 months, for example, could confirm the results obtained in this study. This is an important aspect, given that the EMDR-RE should be completed with an (additional) standard EMDR protocol that would deal with the clinical subtleties of treatment, which the Recent Events Protocol does not permit. It must be noted that the Recent Events Protocol is still an emergency protocol. It should be rapidly implemented, and its level of clinical granularity is less than that of the standard protocol. Therefore, unstable results after 3 months would not be a limitation. PCLS scores are not sufficient to diagnose PTSD. Indeed, clinical presentation of PTSD has numerous clinical signs that are not addressed by the PCLS, the exploration of which requires an additional qualitative clinical approach. For this reason, the study is also limited in its lack of diagnostic measures, which left it unclear as to how many of the subjects met diagnostic criteria for PTSD and other conditions. Inclusion of such measures would strengthen the generalizability of the results for PTSD prevention or treatment studies. As well as analyzing the efficacy of EMDR-RE in preventing PTSD following workplace violence in retail companies, and confirming the harmful effects of CISD within this same context, this study also reflects more generally on harmful psychological care issued to victims of violence and the use of EMDR-RE, notably in nursing establishments. Workplace violence in nursing establishments is a common phenomenon that takes various forms - verbal violence, both verbal and behavioral violence, and physical violence (Chen, Ku, & Yang, 2012). Although this form of violence affects emergency nurses in particular (Crilly, Chaboyer, & Creedy, 2004; Gillespie, 2008), it also occurs in other hospital departments, such as intensive care units, outpatient units (Hahn et al., 2013), or even psychiatric units, with psychological consequences for mental health nurses such as PTSD, generated by patient assaults (Baby, Glue, & Carlyle, 2014). The most common form of workplace violence amongst nurses concerns violent acts committed by patients, members of their family or their friends (Anderson, FitzGerald, & Luck, 2010). These acts of violence have both physical and psycho-

logical consequences. As well as high levels of anxiety (Ergün & Karadakovan, 2002), or guilt (Gillespie, 2008), PTSDs are seen to develop (Jacobowitz, 2013; Kerasiotis & Motta, 2004), which leads Gillespie (2008) to question whether we must systematize interventions aimed at reducing the negative effects of being exposed to potentially traumatic events, and whether we must develop new intervention techniques. Forms of early intervention must be capable of responding to the numerous institutional constraints, and must be able to be implemented quickly following a traumatic event, whilst taking the victim's individual circumstances into consideration. For these reasons, EMDR-RE, as a form of individual psychotherapeutic early intervention, deserves to be widely promoted across hospitals. Future studies with larger sample sizes are needed to establish the efficacy of this technique. The interest of this research for nurses in general, and mental health nurses in particular is a better psychological care of psychiatric nurses' victims of violence, with use of EMDR-RE or EMDR at the expense of CISD preferred currently. This study allows us to raise nurses' awareness about the existence of this psychotherapy and its efficiency for an optimal care among patients presenting ASD or PTSD, or in prevention of the emergence of psychiatric disorders following a potential traumatic event. Indeed, mental health nurses could play a major role in psychological care among trauma victims in the first hours after the event, with an EMDR training provided in many countries, according to specific inscription criteria. A major problem rises when we approach the issue of early psychological interventions, in terms of how quickly interventions can be implemented and how many trained professionals there are available, notably in places where there are very few or a complete lack of mental health professionals. This led Shapiro to develop an individual EMDR protocol for health professionals, who are neither psychiatrists or psychologists, treating individuals who have suffered a recent traumatic event, called EMDR-PROPARGA (Jarero, Amaya, Givaudan & Miranda, 2015). According to researchers, this protocol seeks to "reduce the severity of symptoms of posttraumatic stress as well as symptoms of somatic distress, stress coping, and work, family and social impairment" (p.5). For the latter this psychotherapeutic practise provided by EMDR-PROPARGA trained professionals was demonstrated to be significantly effective in treating individuals who have suffered traumatic experiences in their place of work, immediately following the intervention and at the 4-month follow-up (Jarero et al., 2015). It therefore seems essential to promote this effective form of early psychological intervention amongst nurses, and more specifically amongst psychiatric nurses, who can easily be trained, and to confirm the central role of these health professionals within the scope of early psychological intervention. This research aims to raise awareness amongst nurses regarding the use of EMDR and its variants within the context of early treatment of patients suffering from psychological trauma in order to prevent PTSD, and the sometimes detrimental effects of using CISD for survivors, even though it is currently encouraged in France. The nurses

can be trained in EMDR or EMDR-PROPARGA without having previously undertaken initial psychological or psychotherapeutic training. They can also use the technique of their choice in their daily life following a related traumatic workplace violence incident in the psychiatric department, or more generally in the event of individual or collective traumatic exposure. These EMDR protocols, adapted from the initial protocol, work within an approach to prevent psychological and psychiatric problems. This preventative approach can be used by nurses within different structures (universities, hospitals, businesses, schools, etc.) It should also be noted that these protocols are not a substitute for EMDR psychotherapeutic treatment in the event that symptoms present themselves in the weeks following the initial psychological intervention.

## CONCLUSION

It appears that EMDR-RE is an extremely interesting form of psychotherapy that should now be tested in a randomized controlled trial with a larger sample size, as part of a preventive approach to treating those confronted with potentially traumatic events. However, it will certainly take time to ensure that this approach gains genuine recognition and is fully adopted in this field, particularly given the degree to which CISD has developed around the world, despite the longstanding doubts expressed through scientific literature on its current suitability.

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