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## Early Eye Movement Desensitisation and Reprocessing (EMDR) intervention in a disaster mental health care context

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### ABSTRACT

'Early psychological intervention' is defined as commencing treatment within three months of the traumatic event, with the aim to prevent or treat posttraumatic stress disorder, ongoing distress or acute stress disorder. In natural disaster situations, specific issues may limit the amount of time available for treatment and the possibility of interventions. Eye Movement Desensitisation and Reprocessing (EMDR) can be used without regard to these limits. The aim of the study is to evaluate the effects of EMDR, Recent Traumatic Episode Protocol (R-TEP) provided within three months of the traumatic event to a large sample of individuals exposed to the earthquake that hit Emilia Romagna Region (Northern Italy) in 2012. This study is based on a retrospective review of medical records collected during the activities of psychological and psychosocial unit in the immediate aftermath of earthquake. In total, 529 participants completed the Impact of Event Scale Revised (IES-R) (pre e post treatment). In order to provide a comparison similar to a waitlist-like control group, a method of cohort analysis was applied. In addition, possible time dependent effect was tested. ET (early-treated sample, participants treated within one month after the earthquake) and LT (late-treated sample, participants treated after the first month from the earthquake) reported at post-treatment an improvement to a level below the IES-R cutoff (65.8% of the ET sample and 64.02% of the LT sample). Control group analogue and time-outcome correlation suggest that positive changes in symptoms were likely due to the treatment provided and not merely to the time lapse from the traumatic event. The results of this study suggest that EMDR is a viable treatment option in response to a disaster crisis and in reducing psychological distress of acutely traumatized individuals within the context of a natural disaster.

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EMDR; PTSD; ASD; early interventions; earthquake

## Introduction

Traumatic experience, such as a natural disaster, can cause significant psychological difficulties (Goenjian, 1993; Kun, Han, Chen, & Yao, 2009; Kun, Tong, Liu, Pei, & Luo, 2013; McFarlane, 1988; Wang et al., 2000; Zhang & Ho, 2011; Zhang, Shi, Wang, & Liu, 2011). Individuals may show resilience facing such experiences manifesting sub-clinical short-lived

stress reactions (Bonanno, 2004) but a range of psychological problems may occur in exposed subjects including Post-Traumatic Stress Disorder (PTSD), depression (Norris et al., 2002; Wu, Xu, & He, 2014; Wu, Xu, & Sui, 2016; Xu & Song, 2011; Zhang et al., 2011), other forms of psychological distress (Oyama, Nakamura, Suda, & Someya, 2012; Toyabe et al., 2006), and poorer quality of life (Tsai et al., 2007; Wang et al., 2000).

Epidemiological research suggest that 60–80% of individuals with acute stress disorder (ASD) develop PTSD and a third of subjects with acute PTSD symptoms remain symptomatic for six years or longer (Andrews, Brewin, Philpott, & Stewart, 2007; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Moreover, over 80% of individuals diagnosed with PTSD meet diagnostic criteria for at least one other disorder (Creamer, Burgess, & McFarlane, 2001; Kessler et al., 1995). Major depressive disorder is one of the most common comorbid disorders with PTSD (Rytwinski, Scur, Feeny, & Youngstrom, 2013).

A large number of randomized controlled studies have demonstrated the effectiveness of specific psychological interventions in treating PTSD (Foa, Keane, Friedman, & Cohen, 2008). Trauma Focused Cognitive Behavioural Therapy (TF-CBT) and Eye Movement Desensitisation and Reprocessing (EMDR) gained the strongest evidence base (Bisson & Andrew, 2007; Bradley, Greene, Russ, Dutra, & Westen, 2005; National Collaborating Centre for Mental Health, 2005). EMDR therapy is included in many international practice guidelines (Australia, France, Israel, Northern Ireland, the Netherlands, Sweden, United Kingdom, and United States) (EMDR International Association, 2014). Two international guidelines endorsed the implementation of EMDR for ASD (American Psychiatric Association, 2003; Australian Centre for Posttraumatic Mental Health, 2007).

‘Early psychological intervention’ is defined as commencing treatment within three months of the traumatic event, with the aim to prevent or treat PTSD, ongoing distress, ASD, or other trauma-related disorders (Bisson & Andrew, 2007; Roberts, Kitchiner, Kenardy, & Bisson, 2009, 2010).

In a recent review, fifteen studies were identified including randomized controlled trials of any psychological intervention or treatment designed to reduce acute traumatic stress symptoms. Brief TF-CBT interventions were found to be more effective than a wait-list intervention and supportive counselling; however, the authors underline the need for additional high quality trials with longer follow up periods (Roberts et al., 2010).

Bearing these data in mind and considering the context of a natural disaster, EMDR may prove to be particularly helpful. Unlike CBT, EMDR does not involve extended exposure or homework, detailed descriptions of the event and direct challenging of beliefs (World Health Organization, 2013).

Several protocols have been developed in order to tailor EMDR techniques to individuals with acute traumatic stress, starting with Recent Events Protocol (Shapiro, 2001). A randomized controlled group field study found EMDR protocol for recent critical incidents (EMDR-PRECI) to be effective following the earthquake in North Baja California (Mexico). The study, which included 18 individuals, reported a significant decrease in post-traumatic symptoms after one EMDR session, which was maintained at 12-week follow-up (Jarero, Artigas, & Luber, 2011). Kutz, Resnik, and Dekel (2008) found that a single session of modified EMDR was effective in treating 86 patients with acute stress syndrome following accidents and terrorist bombing attacks.

In 2008, Shapiro and Laub developed the Recent Traumatic Episode Protocol (R-TEP) (Shapiro, 2012; Shapiro & Laub, 2008, 2009, 2014). In a waitlist/delayed treatment

parallel-group randomized controlled trial, 17 survivors with posttraumatic distress were treated reporting a significant decrease of symptoms, which was maintained at 3 months follow-up (Shapiro & Laub, 2015).

The present study aims to investigate the effects of the EMDR R-TEP applied in a disaster mental health care context in a large sample of survivors affected by ASD and acute PTSD.

## **Method**

### **Overview**

In 2012 (on 20th and 29th May), two earthquakes of 5.9 Richter scale magnitude hit the Emilia Romagna Region (Northern Italy) affecting 36% of the Region.

After the earthquake, many survivors were relocated in tents within the urban context. The local Mental Health Service continued to provide care in tents within a camp.

Immediately after the first event, psychological and psychosocial first aid was organized (Inter-Agency Standing Committee IASC, 2007). The unit aimed at bringing relief to the residents and to the emergency service personnel, providing active listening to victims, residents and rescuers. Activities were carried out during the first three months after the earthquake (from 1st of June 2012 until 29th of August 2012). During this period a Triage Form (socio-demographic data, previous psychological/psychiatric history, possible current psychopharmacological treatment, current mental state and degree of anxiety, depression or irritable/aggressive/disorganized behaviour) was administered by clinicians to provide individuals with appropriate assistance and, when needed, to refer survivors to clinical care.

### **Trained clinicians and treatment**

The Italian EMDR Association recruited 108 Italian therapists who volunteered to work 'pro bono' in day shifts, coordinated by the Clinical Psychology Unit (Department of Mental Health, AUSL Modena). Survivors were treated on consecutive days (sessions ranging from two to four) applying the R-TEP (Shapiro, 2012; Shapiro & Laub, 2008, 2009, 2014). The treatment program included the preparation phase, the 'installing the safe place' technique, and the R-TEP in all steps (eight-phase structure).

### **Participants**

All individuals reporting a Impact of Event Scale Revised (IES-R) total score  $\geq 33$  and acute and post-traumatic symptoms assessed by clinicians according to the DSM IV criteria were assigned to a EMDR therapist.

Survivors with pre-unresolved traumas, major mental disorders (including schizophrenia, obsessive-compulsive disorder, and borderline personality disorders) or the potential of danger to self or others were referred to psychiatric care.

### **Measures**

All patients attending EMDR were administered the IES-R (Craparo, Faraci, Rotondo, & Gori, 2013; Weiss & Marmar, 1997) at first and last session. The scale comprises 22 items

and generates three subscales (avoidance, intrusion and hyperarousal). Individuals with a total score  $\geq 33$  were classified as a 'probable case' (Creamer, Bell, & Failla, 2003).

### **Procedure**

The study is based on a retrospective review of medical records collected during the activities of psychological and psychosocial unit in the immediate aftermath of earthquake.

The sample attending EMDR was split into two groups: the early-treated (ET: participants treated within one month after the earthquake and evaluated as ASD according to DSM IV criteria) and the late-treated (LT: participants treated after the first month from the earthquake and evaluated as acute PTSD according to DSM IV criteria). The aims of this splitting were: to evaluate the effects of EMDR provided in acute and in post-traumatic clinical conditions and to perform a comparison similar to a wait-list-like control group applying a method of cohort analysis (comparing post-treatment IES-R scores of the early-treated group with the pre-treatment scores of the late-treated group) (Konuk et al., 2006; Silver, Rogers, Knipe, & Colelli, 2005). The comparison aimed to evaluate a natural improvement or a regression to the mean effect.

### **Statistical analysis**

Statistical analysis was performed by SAS Enterprise Guide Version 5.1. For all analyses, a  $p$  value less than 0.05 (two-tailed) was used to determine statistical significance.

Independent sample  $t$ -test and chi-square were performed to compare treated group and survivors who dropped-out, pretreatment IES-R score (early-treated ET and LT group) and post-treatment evaluations of the ET group with the pre-treatment scores of the LT group.

Paired  $t$ -test was applied to evaluate the effects of the EMDR R-TEP.

To control for a possible time dependent improvement effect, the number of days between the earthquake and the IES-R pretest was determined. Pearson's correlation was calculated between this variable and IES-R score at pretreatment (ET and LT groups).

Factors associated to the EMDR outcome (Triage Form variables) were investigated with multiple logistic regression analyses using the likelihood ratio test to evaluate the fit of the resulting model.

Linear Regression was applied to investigate factors associated to the number of EMDR sessions delivered (Triage Form variables and IES-R pretreatment total scores).

### **Results**

In total, 618 survivors were referred to EMDR clinicians; 1.29% of the IES-R scales were incomplete and 13% of the participants dropped out (caused by the displacement from the Region; mean of EMDR sessions 1.82 s.d. 0.87). In this group anxiety was less frequent in comparison with the treated group (Table 1).

Most participants attending EMDR sessions were female (ET 80.3%; LT 83.1%), displaced and temporarily living in tented camps (ET 69.%; LT 54.8%). Mean age was 45.7 years (s.d. 12.5) (ET sample) and 46.9 years (s.d. 13.) (LT sample). Past psychiatric and psychological treatments were found in 38.5% of the ET participants (37.9% of the LT sample); 13.4% of the ET were taking anxiolytic medications and a similar proportion was found in the LT

**Table 1.** Sociodemographic and clinical characteristics of treated and drop out sample.

Participants' characteristics	EMDR (n. 529)	Drop out (n. 81)	<i>p</i> -value
Age	46.4 (12.9)	43.6 (15.0)	0.07
Female	433 (81.8%)	58 (71.6%)	0.07
Accommodation (tented camps)	324 (61.2%)	54 (66.7%)	0.32
Anxiety	496 (93.8%)	70 (86.4%)	0.01
Depression	171 (32.3%)	34 (42.0%)	0.11
Irritable/aggressive and disorganized behavior	244 (46.1%)	41 (50.6%)	0.11
Past psychiatric/psychological treatments	202 (32.2%)	33 (40.7%)	0.62
Anxiety medications	73 (13.8%)	6 (7.4%)	0.15
Anti-depressant medications	38 (7.2%)	7 (8.6%)	0.65
IES-score	54.76 (12.1)	52.45 (11.1)	0.11
Hyperarousal	2.76 (0.74)	2.63 (0.72)	0.14
Avoidance	1.94 (0.80)	1.84 (0.70)	0.26
Intrusion	2.85 (0.65)	2.77 (0.67)	0.31

**Table 2.** Early and later treated samples. Participants' characteristics.

Participants' characteristics	Early (n. 239)	Later (n. 290)	$\chi^2 t$	<i>p</i> -value
Age	45.7 (12.5)	46.9 (13.2)	1.12	0.26
Female	192 (80.3%)	241 (83.1%)	0.68	0.41
Accommodation (tented camps)	165 (69.0%)	159 (54.8%)	11.88	0.00
Anxiety	218 (91.2%)	278 (95.8%)	4.29	0.12
Depression	70 (29.3%)	101 (34.8%)	1.07	0.58
Irritable/aggressive and disorganized behavior	82 (34.3%)	162 (55.9%)	28.82	0.00
Past psychiatric/psychological treatments	92 (38.5%)	110 (37.9%)	0.31	0.86
Anxiety medications	32 (13.4%)	41 (14.1%)	0.06	0.80
Anti-depressant medications	16 (6.7%)	22 (7.6%)	0.16	0.69
Number of EMDR sessions	2.28 (1.14)	2.51 (1.19)	2.23	0.02

group. Anxiety was the most frequent reaction detected by clinicians (ET 91.2%; LT 95.8%). The two groups were different regarding accommodation, irritable/aggressive/disorganized behaviour and number of EMDR sessions (16% of ET and 25% of LT attended 4 EMDR sessions) (Table 2) while IES-R scores reported at baseline and at post-treatment showed no statistical differences between the two groups (Table 3).

Post-treatment IES-R average scores were significantly lower than baseline both in the ET and in the LT sample (total score and subscales scores) (Table 4). Participants who reported a IES-R total score <33 represented the 65.8% in the ET and the 64.02% in the LT sample.

The comparison between post-treatment scores (total and subscales IES-R score) for the ET group with the pre-treatment scores of LT showed a significant difference in the direction of lower scores for the early-treated group ( $p < 0.0001$ ). Finally, Pearson's correlation between earthquake and IES-R first administration, and pre-treatment IES-R showed no statistically significant correlation both in ET and LT samples ( $p > 0.1$ ).

In the ET group, no variable was found to be associated with the EMDR outcome (IES-R score >33 or <33). In the LT group a negative relationship was found between displacement (OR 0.48, 95% CI 0.282; 0.826), number of sessions, one-unit increase (OR 0.748, 95% CI 0.597; 0.937) and EMDR outcome. 65.8% of LT reporting a IES-R total score <33 received 2.6 (1.2) R-TEP sessions. The number of EMDR sessions was associated in ET sample with past psychiatric/psychological treatments ( $t$  2.13  $p = 0.034$ ) and in the LT group with irritable/aggressive and disorganized behaviour ( $t$  2.81  $p = 0.005$ ).

**Table 3.** Early and later treated samples. Psychological variables (IES-R).

Participants' psychological variables	Early ( <i>n.</i> 239)	Later ( <i>n.</i> 290)	<i>t</i>	<i>p</i> -value
Avoidance-pre	1.85 (0.80)	1.95 (0.88)	1.35	0.17
Avoidance-post	1.27 (0.76)	1.30 (0.85)	0.38	0.70
Intrusion-pre	2.87 (0.96)	2.83 (0.95)	-0.85	0.39
Intrusion-post	1.37 (0.87)	1.39 (0.92)	0.31	0.75
Hyperarousal-pre	2.78 (0.73)	2.75 (0.75)	-0.45	0.65
Hyperarousal-post	1.20 (0.95)	1.22 (0.96)	0.47	0.64
IES-R Total-pre	54.31 (11.94)	55.13 (12.28)	0.77	0.44
IES-R Total-post	27.91 (16.16)	28.57 (17.94)	0.44	0.66

**Table 4.** Comparison pre and post treatment IES-R scores (early and later treated).

	Early	<i>t</i>	<i>p</i> -value	Later	<i>t</i>	<i>p</i> -value
Avoidance-pre	1.85 (0.80)			1.95 (0.88)		
Avoidance-post	1.27 (0.76)	9.67	0.00	1.30 (0.85)	12.87	0.00
Intrusion-pre	2.87 (0.96)			2.83 (0.95)		
Intrusion-post	1.37 (0.87)	24.47	0.00	1.39 (0.92)	24.05	0.00
Hyperarousal-pre	2.78 (0.73)			2.75 (0.75)		
Hyperarousal-post	1.20 (0.95)	25.15	0.00	1.22 (0.96)	25.38	0.00
IES-R Total-pre	54.31 (11.94)			55.13 (12.28)		
IES-R Total-post	27.91 (16.16)	24.33	0.00	28.57 (17.94)	24.38	0.00

## Discussion

This study evaluated the effects of EMDR provided to a large sample of individuals exposed to the earthquake that hit Emilia Romagna Region in 2012. EMDR treatment was administered in the acute phase while tremors were still occurring, with severe aftershocks that went on for many months, preventing people from feeling safe at home or indoor.

The treatment was provided to all survivors evaluated by clinicians as requiring an EMDR intervention. In particular, R-TEP was applied as it was reported to be suitable for volunteer field teams with limited resources and time. Psychological interventions in natural disaster situations are often hampered by brevity of therapist contact with survivors; the movement of survivors out of the area, the number of subjects, and other issues may limit the amount of time available for treatment. EMDR can be used without regard to these limits.

Conditions in the tent cities, ethical and organizational constraints precluded to enrol individuals in a research trial. Several factors affect the possibility of conducting such studies in a natural disaster context such as the lack of resources, the need of specific care providers training and the nature of the situation. Furthermore, to respond rapidly and effectively, prior preparations, plans, and guidelines are needed. For this reason, recently the EMDR Research Foundation has created the EMDR Early Intervention Researcher's Toolkit to promote a standardized approach and appropriate data collection in the treatment of trauma in disaster situations, individual trauma, or events that impact larger communities (EMDR Research Foundation, 2014).

This study is based on a retrospective review of medical records. In order to provide a comparison similar to a waitlist-like control group, a method of cohort analysis was applied comparing the post-treatment IES-R scores of the ET group with the pre-treatment scores of the LT group. In addition, a possible time dependent effect was tested.

ET and LT survivors reported an improvement at post-treatment as measured by IES-R (65.8% of the ET and 64.02% of the LT). These findings are consistent with previous

controlled-group studies of EMDR. Considering the EMDR Recent Event Protocols, the results of this study are similar to those obtained by Jarero et al. (2011) who applied the Protocol for Recent Critical Incidents (EMDR-PRECI) and by Shapiro and Laub (2015) applying R-TEP protocol.

In our study, participants evaluated by clinicians as suffering from acute post traumatic stress disorders appear to report improvement particularly when they have the possibility to access to home and when they received higher number of R-TEP sessions, in any case ranged from two to four sessions as expected by the protocol. The factors associated with a higher number of R-TEP sessions appear based on clinical/behavioural aspects of ASD and PTSD; EMDR therapists seem to deliver a higher number of sessions to survivors who report the presence of previous psychological and/or psychiatric treatment and when irritable/aggressive or disorganized behaviour was observed.

The use in this study of a control group analogue and time-outcome correlation suggest that positive changes in symptoms were likely due to the treatment provided and not merely to the time lapse from the traumatic event. According to the Adaptive Information Processing Model (Shapiro, 2001; Solomon & Shapiro, 2008; Van Rood & de Roos, 2009), the basis of current symptoms is represented by the emotions and physical sensations related to the unprocessed traumatic event and their inappropriate storage within the memory system. The R-TEP incorporates and extends the existing EEI protocols (Early EMDR Intervention) by providing a new comprehensive, integrative protocol focusing on a progressive desensitization of the target memory.

The effectiveness of transforming an image of stress without extensive verbalization is common in many therapeutic interventions. Working with compositional features of a memory/image represents, as well known, a way to alter emotional meaning. Within therapeutic interventions as guided imagery and art therapy, altering the compositional features of a memory/image its emotional content is transformed into a more enabling meaning re-integrating the overwhelming and fragmenting experience of trauma (Huss & Sarid, 2014, 2010, 2011).

## Conclusions

To our knowledge this is the first study evaluating the effects of EMDR R-TEP protocol in a large survivors sample in the immediate aftermath of a seismic event. Results suggest that EMDR is a viable treatment option in response to a disaster crisis and in reducing psychological distress within the context of a natural disaster; moreover, EMDR represents an acceptable answer regarding the need of early interventions with acutely traumatized individuals.

The study has some limitations which have to be pointed out. First, the retrospective nature of the study and the lack of a randomized control group do not allow us to draw any conclusion about the effectiveness of the R-TEP protocol. Furthermore, assessment tools were administered by the same therapists who carried out the treatment, and diagnosis was defined on the basis of clinical judgement; standardized measures would strengthen the generalizability of the results. Finally, the lack of a follow-up period tracking treatment effects and resilience protection.

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## Disclosure statement

The authors report no proprietary or commercial interest in any product mentioned or concept discussed in this article.

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