A Controlled Comparison of the Effectiveness and Efficiency of Two Psychological Therapies for Posttraumatic Stress Disorder

Eye Movement Desensitization and Reprocessing vs. Emotional Freedom Techniques

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Abstract: The present study reports on the first ever controlled comparison between eye movement desensitization and reprocessing (EMDR) and emotional freedom techniques (EFT) for posttraumatic stress disorder. A total of 46 participants were randomized to either EMDR ($n = 23$) or EFT ($n = 23$). The participants were assessed at baseline and then reassessed after an 8-week waiting period. Two further blind assessments were conducted at posttreatment and 3-months follow-up. Overall, the results indicated that both interventions produced significant therapeutic gains at posttreatment and follow-up in an equal number of sessions. Similar treatment effect sizes were observed in both treatment groups. Regarding clinical significant changes, a slightly higher proportion of patients in the EMDR group produced substantial clinical changes compared with the EFT group. Given the speculative nature of the theoretical basis of EFT, a dismantling study on the active ingredients of EFT should be subject to future research.

Key Words: Posttraumatic stress disorder, eye movement desensitization and reprocessing, emotional freedom techniques.

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Epidemiological studies on posttraumatic stress disorder (PTSD) have shown lifetime prevalence rates of up to 6.8% (Kessler et al., 2005). It has been estimated that, by 2020, psychological trauma will be among the leading causes of disability, alongside depression and heart disease (Michaud et al., 2001). PTSD symptoms include re-experiencing the traumatic event, avoidant behavior in relation to the reminders of the event, and hyperarousal.

To date, a number of psychological treatments have been shown to be effective in the treatment of PTSD. These include exposure (imaginal and in vivo), Eye Movement Desensitization Reprocessing (EMDR), stress inoculation therapy, trauma management therapy, and cognitive therapy (*e.g.*, Bisson and Andrew, 2005; Bisson et al., 2007; Bradley et al., 2005). However, there is still little consensus regarding the superiority of the previously mentioned treatments over others. Some argue, for example, that certain therapies are more effective than others for PTSD (*e.g.*, exposure therapy; Nemeroff et al., 2006), whereas some argue that all psychotherapies are equally effective (*e.g.*, Lee et al., 2006). In a recent meta-analysis, Bradley et al. (2005) found that more than half of patients who complete treatment with various forms of cognitive behavior therapy or EMDR improve largely from baseline. They also found that effect size estimates were lower for supportive therapy compared with active treatments such as EMDR. Furthermore, Bisson et al. (2007), in another meta-analytic study, also concluded that trauma-focused cognitive-behavioral therapy (TF-CBT), EMDR, stress management and group cognitive-behavioral therapy improved PTSD symptoms more than waiting-list or usual care. There was no evidence of a difference with regard to efficacy between TF-CBT and EMDR, but there was some evidence that TF-CBT and EMDR were superior to stress management.

Finally, Benish et al., (2008), in another meta-analytic study, also concluded that all bona fide treatments for PTSD are equally effective. In contrast, Ehlers et al. (2010), after reviewing relevant evidence, concluded that psychological interventions that do not directly involve work on traumatic memories or the meanings attached to them (*e.g.*, cognitive behavior therapy and EMDR) are either less effective or not yet sufficiently studied. Despite such disagreement in the literature, trauma-focused psychological treatments are recommended as first-line treatments for PTSD (American Psychiatric Association, 2004; National Institute of Clinical Excellence, 2005). Nevertheless, there is clearly a scope for further research on the effectiveness of psychological interventions for PTSD. Emotional Freedom Techniques (EFT) constitutes a new area of enquiry regarding trauma-focused interventions for PTSD.

EFT (Craig, 1999) is a meridian-based therapy that can be easily administered and self-applied. It assumes that emotional disturbance, including PTSD, is the by-product of disturbances in the body's energy field (meridian system) caused by an exposure to a traumatic event. EFT requires the light manual stimulation of the endpoints of traditional acupuncture meridians on the face, upper body and hands, whereas at the same time, patients are focusing on the traumatic event (Craig, 2009). There has been anecdotal evidence to suggest that EFT is effective in reducing anxiety disorders (Carrington and Craig, 2000; Craig, 1999; Hardistry, 1999; Hartman-Kent, 1999a, 1999b). Andrade and Feinstein (2004) conducted a preliminary clinical randomized double-blind trial with 5000 patients from 11 treatment centers in South America. Patients presenting with a range of diagnoses including panic, agrophobia, social phobias, specific phobias, obsessive-compulsive disorders, generalized anxiety disorders, acute stress disorders, somatoform disorders, eating disorders, attention deficit hyperactivity disorder, addictive disorders, and PTSD were allocated to EFT or CBT plus medication. Their results indicate that 90% in the EFT group compared with 63% in CBT plus medication group were judged as having clinically improved. Of those, 76% in the EFT group compared with 51% in the control group were judged as being symptom-free. At 1-year follow-up, patients receiving EFT were less prone to relapse than are those receiving CBT. The length of treatment was substantially shorter for the EFT group (mean, 3 sessions) compared with the CBT plus medication group (mean,

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15 sessions). Nevertheless, this was an in-house assessment of a new therapy that failed to make a distinction between the effectiveness of EFT for specific anxiety disorders such as PTSD and to use standardized measures to assess the effectiveness of treatments. There also appears to be a lack of rigor regarding study methodology. By the authors' own admission, not all variables that need to be controlled in robust research were tracked, not all criteria were defined with rigorous precision, the recordkeeping was relatively informal, and source data were not always maintained. In addition, given the nature of the treatment comparisons undertaken, it is difficult to see how double-blind status was maintained. Despite numerous anecdotal accounts of the effectiveness of EFT in alleviating psychological distress, there are very few controlled studies in the published literature. These are presented briefly as follows.

Wells et al. (2003) reported that EFT (n = 18) was superior to diaphragmatic breathing (n = 17) in reducing specific phobias of small animals in a single session of 30 minutes. The significantly greater improvement of the EFT group, as measured by a behavioral approach test, was maintained at a follow-up after 6 to 9 months. Furthermore, Waite and Holder (2003) randomly assigned 122 students with self-reported phobias to four groups namely EFT, placebo taping beside meridian points, modeling treatment—taping a doll, and no treatment. The first three groups displayed significant and similar improvement in posttreatment ratings of fear, whereas the no treatment group displayed no pretreatment to posttreatment differences. The authors concluded that the therapeutic gains observed in the EFT group are nonspecific to the "taping of meridians." Rather, given the effectiveness of placebo taping beside meridian points and the taping of a doll, these authors proposed that the reported effectiveness of EFT is attributable to the characteristics it shares with more traditional therapies such as desensitization and distraction. Finally, Brattberg (2008) investigated the effectiveness of self-administered EFT in individuals with fibromyalgia. A total of 86 women were randomized to either EFT or a waiting-list control group. Treatment was administered over 8 weeks via the Internet. Upon completion of the program, statistically significant benefits were observed in the EFT group for variables such as pain intensity and pain-catastrophizing measures, social function and stress, and anxiety and depression as measured using the Hospital Anxiety and Depression Scale (Zigmond and Snaith, 1983). ?up?>Unfortunately, there was a high dropout rate in the EFT group (40%). These authors attribute the effectiveness of EFT to a number of nonspecific psychological effects such as distraction, susceptibility, and acceptance.

Overall, there has been limited published research and inconsistent findings regarding the effectiveness of EFT for psychological distress. The present study reports on the first ever controlled comparison between EFT and EMDR for PTSD.

METHODS

Participants

All participants were selected from the waiting list of a National Health Service (NHS) Psychotherapy Service in Scotland, which receives referrals from general practitioners and consultant psychiatrists in the area. The entire waiting list of the Service was scrutinized for eligible participants. The eligible participants were invited to participate by letter, and if they agreed to participate, they were offered an appointment with a blind assessor. At this appointment, the aims of the study were outlined, and it was emphasized that participation was entirely voluntary. Inclusion criteria were being willing to participate voluntarily and give written consent; being able to satisfy DSM-IV criteria for PTSD; if on medication, having been on a stable dose for at least 6 weeks; and having an age between 18 and 65 years old. Exclusion criteria were the presence of suicidal ideation or intent as assessed at a clinical interview; a history of psychotic illness, concurrent severe depressive illness, or substance use disorder; or receiving psychotherapy out of the study.

Procedure

Ethics approval for the present study was obtained from the local NHS ethics committee. Initial diagnostic and inclusion/exclusion assessment plus waiting list entry assessment were conducted by a consultant psychiatrist (M. B.). While in the waiting list, the patients were provided with a contact telephone number in case of any deterioration or impairment in their overall condition, which necessitated urgent and/or immediate therapeutic intervention. After 8 weeks in the waiting list, the participants were reassessed to confirm inclusion criteria. At the end of the waiting-list period, the patients were randomly allocated to either the EMDR or EFT treatment groups using a computer program. Randomization into treatment groups was done using a computer-generated schedule unbeknown to the assessor, therapists, or patients. The patients were blindly assessed two more times, at the end of the treatment period and at a 3-month follow-up. Blind assessments were carried out by the same assessor (M. B.) in all assessment points (baseline, pretreatment, posttreatment, follow-up). Patients also completed a battery of self-report measures in all of these assessment points.

Treatment Groups

Treatments were conducted by three experienced psychotherapists (T. M., J. Y., P. L.) trained to deliver both interventions. Each therapist offered both treatments. The treatment sessions were conducted individually, and the therapists were supervised for the duration of the study by a consultant psychiatrist (K. B.). To comply with the NICE (2005) guidelines for the treatment of PTSD, up to eight sessions were offered as part of the study. A selection of treatment sessions in each treatment group was videotaped and assessed for treatment integrity and fidelity. No differences were found among the different therapists with regard to the delivery of treatments. Each therapy session lasted up to approximately 1 hour. Treatment protocols are described briefly as follows.

Eye Movement Desensitization and Reprocessing

EMDR is a psychotherapeutic approach, grounded in the adaptive information processing model, which hypothesizes that pathology is a consequence of unprocessed, distressing past experiences (Shapiro 2001, 2002). It has an eight-phase protocol that addresses past, present, and future contributors to current distress (Shapiro, 2002). The eight-phase treatment includes phase 1, history taking; phase 2, preparation, including affect management and psychoeducation; and phase 3, assessing the components of the distressing memory, including an image, a self-referencing negative belief associated with the memory, a desired positive belief, and the current emotional and physiological components of the image and belief. The desired positive belief is rated on a Validity of Cognition Scale (VOCS; Shapiro, 1989) and the emotion felt is rated on a Subjective Unit of Discomfort Scale (SUDS; Wolpe, 1990). Phases 4 to 6 involves utilizing a form of bilateral stimulation while the client's attention is directed toward the components of the assessment phase with a desired outcome of a SUDS score of 0 and a VOCS score of 7. Phase 7 is the closure phase, and phase 8 is the re-evaluation phase. The targets for processing include the initial sensitizing event and the present triggers and "templates" for appropriate future functioning. The bilateral stimulus used in this trial was a standard light bar with the option of added tactile and auditory stimulus.

EFT Treatment Protocol

The EFT treatment protocol, whatever unfamiliar elements it may encompass, is an exposure-based treatment. The exposure is achieved by eliciting the imagery, narrative, and in vivo arousal related

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to the distressing memory and then by taping on various meridian points on the face and body. The protocol used in this trial was the "Minimovie Technique" and was applied after history taking and psychoeducational sessions (phases 1 and 2 respectively). As outlined by its developer (Craig, 1999), the protocol consists of a further six phases outlined as follows: phase 3 involves asking the client, "if this (the index incident) was a movie (we used the word 'film'), how long would it last?" Phase 4 involves eliciting a title for the "movie" or film that has a specific meaning for the client, and phase 5 involves asking the client to think of the film and give a SUDS rating or, if it is too distressing, guessing a SUDS rating. Phase 6 involves doing a number of rounds of taping on "this…film" until SUDS has reduced. In phase 7, the client is asked to narrate the film, stopping when they feel any intensity whatsoever. This has to be closely observed because clients often try to "push through" the distress. Afterward, the client is asked what that scene would be called and to give a SUDS rating again. Rounds of taping are induced on each successive scene until the SUDS score is reduced. Phase 8 involves asking the client to run the film in mind and report any distress. The taping is repeated until distress subsides and SUDS has a 0 rating. The meridian points were those described by Craig (1999) and were located as follows: at the side of hand; at the beginning of eyebrow; side of eye; under the eye; under the nose; under the lip; in the collarbone; at the top of the ribcage; under the arm; and at the upper side edge of the thumb, index finger, middle finger, and little finger. The therapist applied the taping, having elicited the consent of the client, and 6 to 8 taps were used on each point.

Measures

Baseline, pretreatment and posttreatment, and follow-up assessments were conducted by the same assessor who was blind to treatment conditions. The assessments were made using a number of assessor- and self-rated measures described as briefly as follows:

Clinician-Administered PTSD Scale

The Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990) is an assessor-rated measure, comprised of 17 DSM-IV PTSD symptoms, each assessed according to frequency and intensity over the past week. Each symptom is rated on a scale of 0 to 4. The 17 symptoms were clustered into three subscales, each rated in regard to frequency and intensity: CAPS-B, re-experience; CAPS-C, avoidance; and CAPS-D, arousal.

PTSD Checklist

The PTSD Checklist (PCL-C; Blanchard et al., 1996) is a self-reported 17-item standardized questionnaire that assesses post-traumatic symptoms (*e.g.*, intrusive memories). Participants rate using a 5-point scale, ranging from "not at all" to "extremely," how much the specific symptom was a problem to them over the past month. An overall score and subscores for re-experience, avoidance, and hyperarousal subscales are provided.

The Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (Zigmond and Snaith, 1983) is a 14-item self-report measure that assesses the presence and frequency of symptoms each on a 4-point scale and provides two subscale scores for anxiety symptoms and depressive symptoms.

Satisfaction With Life Scale

The Satisfaction with Life Scale (Diener et al., 1985) is a five-item scale that assesses general life satisfaction. The respondents

TABLE 1. Demographic and Trauma Characteristics by Intervention Group

Factor	Level/Units	EMDR (n = 23), Mean (SD) or n (%)	EFT (n = 23), Mean (SD) or n (%)	Comparison (df)
Age		41.5 (10.8)	39.7 (10.9)	t (43) = 0.6, n.s.
Sex	Male	9 (39.1)	11 (47.8)	χ^2 (1) = 0.3, n.s.
	Female	14 (60.9)	12 (52.2)	
Education	Basic education	12 (54.5)	12 (52.2)	χ^2 (1) = 0.1, n.s.
	Higher education	10 (45.5)	11 (47.8)	
Employment	Full/part-time	15 (65.2)	14 (60.9)	χ^2 (1) = 0.1, n.s.
	Unemployed/retired/other	8 (34.8)	9 (39.1)	
Marital status	Married/cohabiting	10 (43.5)	16 (69.6)	χ^2 (1) = 3.2, n.s.
	Divorced/single	13 (56.5)	7 (30.4)	
Living arrangements	Alone	3 (13.0)	1 (4.3)	χ^2 (1) = 1.1, n.s.
	With others	20 (87.0)	22 (95.7)	
History of psychological intervention/counseling	Yes	5 (22.7)	8 (38.1)	χ^2 (1) = 1.2, n.s.
	No	17 (77.3)	13 (61.9)	
Currently on psychotropic medication	Yes	8 (34.8)	7 (30.4)	χ^2 (1) = 0.1, n.s.
	No	15 (65.2)	16 (69.6)	
Type of trauma	Accident	8 (34.8)	9 (39.1)	χ^2 (2) = 3.6, n.s.
	Assault/murder	8 (34.8)	12 (52.2)	
	Other	7 (30.4)	2 (8.7)	
Having being harmed/watched others being harmed	Self only	12 (52.2)	13 (59.1)	χ^2 (1) = 0.2, n.s.
	Others and self	11 (47.8)	9 (40.9)	
Time since trauma, yrs		6.5 (9.9)	9.7 (12.2)	Mann-Whitney U-test = 184, n.s.
Onset of symptoms following trauma, mos		1.7 (5.2)	2.4 (4.8)	Mann-Whitney U-test = 219, n.s.
Litigation	Yes	7 (30.4)	4 (17.4)	χ^2 (1) = 1.1, n.s.
	No	16 (69.6)	19 (82.6)	

EFT indicates emotional freedom techniques; EMDR, eye movement desensitization and reprocessing; n.s., not significant.

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rate their level of agreement with each item on a 7-point scale. The higher the score (range, 5 to 35), the higher the level of life satisfaction experienced by the individual.

Statistical Analysis

Means and standard deviations were calculated for all continuous variables, and frequencies and percentages were calculated for all categorical variables (Tables 1 and 2). Comparisons between treatment groups in demographic characteristics, trauma characteristics and pretreatment scores were made by means of *t*-tests, chi-square analysis, or the Mann-Whitney *U*-test for continuous variables with abnormal distributions. A series of 3 × 2 analyses of variance, Time (preintervention, postintervention and 3-month follow-up) × Group (EMDR, EFT), with time as the repeated measure, were conducted for all outcome measures to investigate the change over time, and the group and interaction effects. The results from this analysis are presented in Table 3. The treatment effect sizes for pretreatment versus posttreatment and pretreatment versus follow-up CAPS total and PCL total scores were calculated using Cohen d formula (Cohen, 1988). The proportion of patients achieving clinical significance was calculated in terms of whether a patient's outcome response falls outside the range of the dysfunctional population by two standard deviations from the pretreatment mean of that population in the direction of functionality (Jacobson and Truax, 1991). This analysis was conducted for main outcome measures including CAPS total and PCL total. An intention-to-treat analysis was performed. At posttreatment, missing values were replaced for 10 patients in the EMDR group and 9 in the EFT group, with pretreatment scores across all outcomes measures. At follow-up, missing values were replaced for 10 patients in the EMDR group and 9 in the EFT group with pretreatment scores and for two patients in EMDR group and two in the EFT group with posttreatment scores.

RESULTS

Attrition Rates

Of the 201 referrals, a total of 80 participants did not respond to invitation and 10 participants declined participation after receiving the participant information sheet. A total of 52 participants did not meet the eligibility criteria (*i.e.*, PTSD was not their primary cause of concern) and withdrew from the study. A total of 59 participants were eligible for the study, consented to participate, and entered the 8-week waiting-list period. A total of 13 individuals dropped out while on the waiting list, and 46 individuals were randomized to one of the two conditions (EMDR, EFT). Of the 23 participants allocated to EMDR, 10 withdrew before posttreatment assessment. Of the 23 participants allocated to EFT, nine individuals withdrew before posttreatment assessment.

Participants in the EMDR group received a mean (SD) of 3.7 (2.3) sessions, whereas in the EFT group, the participants received a mean (SD) 3.8 (2.6) sessions ($t[44] = -0.1$, not significant.). A proportion of 43.5% dropped out from the EMDR group, and 39.1% dropped out from the EFT group. Dropout rates between the two intervention groups were not found to be significantly different ($\chi^2(1) = 0.1$, not significant). In addition, there were no statistical differences between completers ($n = 27$) and noncompleters ($n = 19$) in any of the outcome measures at pretreatment. The participants were reassessed at a 3-month follow-up. Of the 13 (56.5%) completers in the EMDR group, 2 failed to respond and 11 were assessed. Of the 14 (60.9%)

TABLE 2. Baseline, Pretreatment, Posttreatment and Follow-Up Means (SDs) of Outcome Measures

Measure	Intervention	Baseline	Pretreatment	Posttreatment	Follow-Up
CAPS					
Re-experience	EMDR	18.3 (5.2)	18.0 (5.3)	10.3 (8.4)	10.8 (8.2)
	EFT	15.6 (5.1)	15.3 (4.6)	9.3 (7.4)	8.5 (7.2)
Avoidance	EMDR	24.1 (7.4)	22.2 (7.8)	14.7 (12.0)	14.1 (12.3)
	EFT	25.3 (7.1)	23.6 (6.8)	15.0 (11.4)	14.0 (12.3)
Arousal	EMDR	28.3 (5.8)	27.6 (6.1)	17.7 (12.8)	18.9 (12.6)
	EFT	25.2 (9.3)	23.6 (7.7)	16.1 (10.5)	16.2 (11.1)
Total	EMDR	70.7 (12.3)	67.8 (14.0)	42.7 (30.1)	43.8 (30.5)
	EFT	66.1 (16.7)	62.5 (14.4)	40.5 (26.3)	38.7 (28.6)
PCL-C					
Re-experience	EMDR	17.7 (3.0)	18.0 (4.0)	12.0 (6.9)	12.6 (6.7)
	EFT	16.2 (4.7)	16.0 (4.0)	11.1 (5.1)	11.1 (5.4)
Avoidance	EMDR	22.9 (4.7)	23.4 (6.1)	16.6 (8.8)	17.2 (8.8)
	EFT	20.6 (5.8)	23.4 (5.5)	17.5 (7.2)	17.2 (7.6)
Hyperarousal	EMDR	18.4 (3.5)	17.9 (3.4)	13.0 (7.0)	13.3 (6.8)
	EFT	18.3 (3.9)	18.3 (4.1)	13.3 (5.3)	12.7 (5.8)
Total	EMDR	58.9 (9.0)	59.3 (11.1)	41.6 (21.8)	43.1 (21.6)
	EFT	55.2 (12.5)	57.8 (12.0)	42.0 (16.9)	41.0 (18.1)
HADS					
Anxiety	EMDR	15.6 (4.8)	14.2 (3.3)	9.2 (7.3)	8.8 (6.9)
	EFT	14.1 (3.7)	13.4 (4.2)	8.2 (5.1)	8.4 (5.3)
Depression	EMDR	11.3 (5.2)	11.5 (4.0)	7.7 (6.4)	7.6 (6.3)
	EFT	10.8 (4.3)	10.2 (3.7)	7.3 (4.7)	7.0 (4.6)
SWLS	EMDR	12.3 (6.9)	12.4 (6.4)	16.0 (9.0)	17.9 (2.0)
	EFT	17.1 (7.3)	15.4 (5.5)	18.4 (7.8)	18.3 (7.6)

EFT indicates emotional freedom techniques; EMDR, eye movement desensitization and reprocessing; CAPS, Clinician-Administered Posttraumatic Stress Disorder Scale; PCL-C, Posttraumatic Stress Disorder Checklist; HADS, Hospital Anxiety and Depression Scale; SWLS, Satisfaction with Life Scale.

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TABLE 3. Analyses of Variance of Time (Pretreatment, Posttreatment, Follow-Up) × Group (EFT, EMDR) for Outcome Measures

	Time			Time × Group			Group		
Variable	$F_{2,43}$	$p \leq$	(η^2)	$F_{2,43}$	$p \leq$	(η^2)	$F_{1,43}$	$p \leq$	(η^2)
CAPS									
Re-experience	31.9	0.001	0.420	0.4	0.667	0.009	1.4	0.246	0.030
Avoidance	29.1	0.001	0.398	0.2	0.829	0.004	0.1	0.840	0.001
Arousal	28.8	0.001	0.395	0.4	0.634	0.010	1.1	0.307	0.024
Total	36.3	0.001	0.452	0.1	0.868	0.003	0.4	0.513	0.010
PCL-C									
Re-experience	35.4	0.001	0.446	0.3	0.755	0.006	0.1	0.333	0.021
Avoidance	31.7	0.001	0.419	0.2	0.812	0.005	0.1	0.916	0.001
Hyperarousal	32.0	0.001	0.421	0.5	0.630	0.010	0.1	0.984	0.001
Total	38.2	0.001	0.465	0.2	0.833	0.004	0.1	0.793	0.002
HADS									
Anxiety	34.4	0.001	0.439	0.1	0.909	0.002	0.3	0.603	0.006
Depression	21.4	0.001	0.327	0.2	0.779	0.006	0.3	0.560	0.008
SWLS	12.0	0.000	0.214	1.1	0.333	0.025	0.9	0.352	0.020

Cohen (1988) provides the following guidelines for interpreting the η^2 values: 0.01 to 0.059, small effect size; 0.06 to 0.139, medium effect size; >0.14, large effect size.
EFT indicates emotional freedom techniques; EMDR, eye movement desensitization and reprocessing; CAPS, Clinician-Administered Posttraumatic Stress Disorder Scale; PCL-C, Posttraumatic Stress Disorder Checklist; HADS, Hospital Anxiety and Depression Scale; SWLS, Satisfaction with Life Scale.

completers in the EFT group, 2 failed to respond and 12 were assessed (Fig. 1).

Pretreatment Comparisons

As illustrated in Table 1, there were no differences between treatment groups by age, sex, education, employment, marital status, living arrangements, history of psychological intervention and current use of psychotropic medication.

Furthermore, there were no differences between the treatment groups in trauma characteristics, including type of trauma, having being harmed/watched others being harmed, time since trauma, onset of symptoms after traumatic event and litigation.

Treatment Results

Table 3 illustrates the means and standard deviations for each intervention group at baseline, at preintervention and postintervention, and at follow-up in all outcome measures.

There were no statistically significant differences ($p \leq 0.05$) between baseline and pretreatment scores across all outcome measures with the exception of CAPS avoidance (t[45] = 2.9, $p \leq 0.005$) and CAPS total (t[45] = 2.2, $p \leq 0.035$), for which the scores significantly improved within the 8-week waiting period. For PCL avoidance subscale, the scores significantly worsened within the 8-week waiting period (t[45] = −2.1, $p \leq 0.040$).

As shown in Table 3, statistically significant ($p \leq 0.001$) time effects for all outcome measures were detected. Time effects were large across all outcome measures. No statistically significant ($p \leq 0.05$) group effects were apparent on all outcome measures. Group effects were small on all outcome measures. No statistically significant Time × Group ($p \leq 0.05$) interaction effects were detected in any of the outcome measures. Interaction effects were of small size across all outcome measures. The fact that no statistically significant interaction effects were found in any outcome measures indicates the lack of superiority of any of the two intervention groups regarding clinical improvement.

The treatment effect sizes were large ($d \geq 0.80$) for both treatments (Cohen, 1988) across outcome measures and assessment points. From pretreatment to posttreatment CAPS total scores, effect

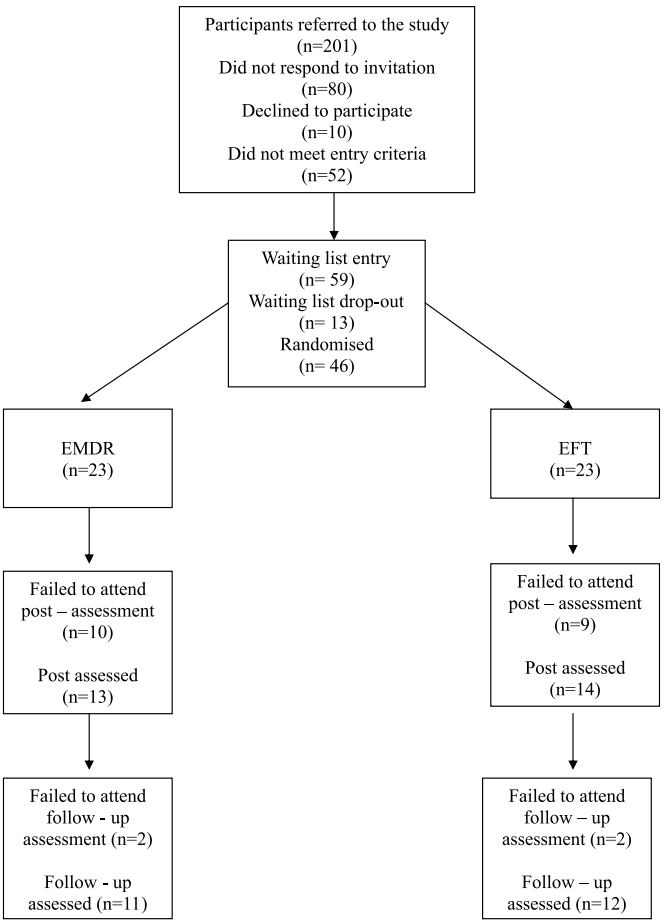

FIGURE 1. Recruitment and attrition rates. EMDR indicates eye movement desensitization and reprocessing.

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sizes were $d = 1.1$ for EMDR and $d = 1.0$ for EFT groups. For pretreatment to posttreatment PCL total scores, the effect sizes were $d = 1.0$ for EMDR and $d = 1.1$ for EFT groups. For pretreatment to follow-up CAPS total scores, the effect sizes were $d = 1.0$ for both treatment groups. Finally, for pretreatment to follow-up PCL total scores, the effect sizes were $d = 0.9$ for EMDR and $d = 1.1$ for EFT.

Overall, higher rates of clinical significant change were observed in the EMDR group than in the EFT group. For pretreatment to posttreatment CAPS total scores, clinical significant change was achieved by 10 patients (43.5%) in the EMDR and 9 patients (39.1%) in the EFT group. For pretreatment to posttreatment PCL total scores, clinical significant change was achieved by eight patients (34.8%) in the EMDR and two patients (8.7%) in the EFT group. For pretreatment to follow-up CAPS total scores, clinical significant change was achieved by eight patients (34.8%) in the EMDR and 9 (39.1%) patients in the EFT group. For pretreatment to follow-up PCL total scores, clinical significant change was observed in six patients (26.1%) in the EMDR and four (17.4%) patients in the EFT group.

Overall, the results indicated that both interventions produced significant therapeutic gains at posttreatment and at follow-up in equal number of sessions. Slightly larger treatment effect sizes were observed in the EMDR than in the EFT group. With regards to clinical significant changes, a slightly larger proportion of participants in the EMDR group produced substantial clinical changes compared with the EFT group.

DISCUSSION

The present study reports on the first ever controlled comparison of EFT versus EMDR for PTSD. Overall, the results indicated that the two interventions produced significant therapeutic gains at posttreatment and follow-up. Similar treatment effect sizes were observed in both treatment groups. Furthermore, a higher proportion of participants achieved clinically significant change in the EMDR compared with the EFT group. Therapeutic gains were produced in an equal number of sessions for both interventions. Differences in dropout rates between the two interventions were not statistically significant. Furthermore, although high dropout rates were found in the EMDR group (43.5%), these are quite similar to previous research in the area (*e.g.*, 43% in Power et al., 2002). The dropout rates in the EFT group (39.1%) were also very similar with those reported in the study by Brattberg (2008; *i.e.*, 40%). Despite that, it is important to mention that dropout rates were higher in both interventions in this study than in previous research on the effectiveness of psychological interventions for PTSD. Bradley et al. (2005), for example, have reported a mean dropout rate of 21.1% across studies and psychological interventions. Unfortunately, we failed to follow up those who dropped out to collect information regarding the reasons for discontinuing treatment. Nevertheless, the high dropout rates may question the validity of the present findings, which require replication in future research. In addition, the effect sizes observed in both interventions, although within the large range, were still smaller than those reported in previous controlled studies of the effectiveness of EMDR. Bradley et al. (2005) reported an average effect size of 1.43 across all psychotherapeutic treatments for PTSD for pretreatment versus posttreatment comparison. Overall, both interventions produced less favorable results than the results reported in previous research on the effectiveness of psychological treatments for PTSD. This may be caused by the large dropout rates in the present study, which have also resulted in a large number of missing data. This, coupled with the use of Last Observation Carried Forward method, might have led to less favorable outcomes for both treatments in the present study and, at the same time, might have compromised the validity of our findings.

Although significant improvements were observed over time for the EFT group, these findings require replication in adequately powered studies. Cell sizes were rather small in both treatment groups, although adequate measures of control (*i.e.*, randomization, blind assessments) were exercised. With regard to methodological limitations, the present study also lacked a control group. In treatment outcome studies, it is important to demonstrate that an intervention is better than no intervention (Stevens et al., 2000), especially in PTSD, which demonstrates high rates of natural recovery (Kessler et al., 1995). However, to compensate for this, a waiting period of 8 weeks was introduced before the commencement of treatment. There were no statistically significant differences between baseline and pretreatment scores in any of the outcome measures with the exception of CAPS avoidance and CAPS total, for which significant improvements were observed between baseline and pretreatment assessments. For PCL avoidance, the scores significantly worsened from baseline to pretreatment. The differences in findings observed between an assessor-rated measure such as CAPS avoidance and a self-rated measure such as PCL avoidance are notable. This issue has been raised in previous literature as well (Karatzias et al., 2007).

The effectiveness of EMDR has been well documented in previous literature (*e.g.*, Benish et al., 2008; Bisson and Andrew, 2005; Bisson et al., 2007; Bradley et al., 2005), whereas emerging evidence on the effectiveness of EFT also corroborates the present findings (*e.g.*, Brattberg, 2008; Wells et al., 2003). However, following the Western school of thought of the conceptualization and treatment of mental health problems, it is rather difficult to understand and explain how intervening at the meridians results in energy balance and symptom remission, simply because there is no means of understanding this conceptualization of energy and its distribution in the human body. It is important to highlight that Waite and Holder (2003) have concluded that the treatment gains in EFT for phobias are nonspecific to taping. Nevertheless, the fact that EFT has produced significant preposttreatment effects comparable with those of a well-established intervention such as EMDR indicates that certain processes and components within the EFT protocol facilitate recovery from trauma symptoms. A few biological and psychological hypotheses are presented as follows.

With regard to biological explanations, it has been proposed that the stimulation of the meridian points releases serotonin in the amygdala and the prefrontal cortex (Ruden, 2005) and therefore reduces hyperarousal quite rapidly (Feinstein, 2008). This hypothesis was not tested in our study; however, both interventions produced a reduction of the hyperarousal symptoms in a similar number of sessions.

Another study has shown that endomorphin-1, beta endorphin, enkephalin, and serotonin levels increase in plasma and brain tissue through the stimulation of the meridian points that cause sedation (Cabyoglou et al., 2006). Finally, Uvnäs-Moberg (1997) has shown that nonnoxious sensory stimulation coupled with interpersonal conduct induced by a therapist results in a psychophysiological response pattern that facilitates the release of oxytocin, a hormone that promotes relaxation and decreased sympathoadrenal activity.

Psychological mechanisms may also account for the benefits of EFT. During the taping process, patients concentrate on the traumatic event; therefore, they are exposed imaginally or through narrative to aspects of the traumatic event. Repeated exposure can have a desensitizing effect on the distress associated with traumatic memories (Taylor et al., 2001). It has also been hypothesized that the exposure to traumatic memories can facilitate the emotional processing of the traumatic event and modify associated cognitions that underlie PTSD and decrease hyperarousal (Foa and Rothbaum, 1998). If we accept the proposal that the active ingredient in EFT is exposure, then one would expect no benefit in physical health conditions. Brattberg (2008), who found self-administered EFT beneficial for pain in

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individuals with fibromyalgia, disconfirms this hypothesis. Finally, another explanation of the effectiveness of EFT may be that of possible hypnotic effects. The affirmations that are part of the EFT treatment protocol may have a meditative and destructive effect. There is evidence to suggest that, when in a trance state, individuals are more susceptible to suggestions (Brattberg, 2008).

Given the speculative nature of the theoretical basis of EFT, it is difficult to explain why it produces gains comparable with those of EMDR. Although a proper dismantling study on the active ingredients of EFT for PTSD should be subject to future research, it is also important to emphasize that both EFT and EMDR share similarities between them and perhaps with more traditional forms of therapy such as CBT (*e.g.*, Waite and Holder, 2003). It is notable, for example, that both EFT and EMDR protocols for PTSD incorporate distraction and desensitization coupled with exposure. As it was recently pointed out by Ehlers et al. (2010), a way forward for identifying effective treatments for PTSD may be to expand our understanding of the mechanisms involved in the development of PTSD that should be targeted for treatment. The study of such mechanisms has led to the refinement of trauma-focused cognitive-behavioral interventions (Öst, 2008). It may also be of interest to investigate the effectiveness of EFT in other traumatized populations that do not necessarily meet the diagnostic criteria for PTSD or those with complex trauma such as survivors of child sexual abuse.

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