EMDR FOR DEPRESSION: A SYSTEMATIC REVIEW OF CONTROLLED STUDIES

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Abstract

Objective: Depression is one of the most common mental disorder, with huge societal costs. Although psychotherapy and medication can improve remission rates, the success rates of current treatments are limited. Given the recent research indicating that trauma and other adverse life experiences can be potential risk factors for depression, Eye Movement Desensitization and Reprocessing (EMDR) has been considered effective also in the treatment of depression.

The aim of the present systematic review was to summarize current literature on EMDR efficacy in patients with depression.

Method: A literature search was undertaken using PubMed, Cochrane Central Register of Controlled Trials, EMBASE, PsycINFO, and CINAHL. Further research was performed on the specialized Francine Shapiro Library collection. Controlled studies with depression as a primary outcome published up to March 2017 were included.

Results: Seven studies were included, of which 6 were published. They cover years from 2001 to 2016. Three studies used a controlled design and four were randomized clinical trials. Studies differed greatly for population and intervention characteristics, with a scarce methodological quality.

Conclusions: Controlled studies evaluating the efficacy of EMDR in treating depression as a primary outcome are few and with various methodological flaws. Despite further, better designed research is needed, current evidence suggests that EMDR could be a promising therapy to treat depression.

Key words: depression, EMDR, CBT, adverse childhood experience, systematic review

Declaration of interest: Dr. Luca Ostacoli is an EMDR Supervisor. Dr. Isabel Fernandez is president of European EMDR Association and of Italian EMDR Association. Dr. Arne Hofmann is head of the EMDR Institute Germany providing training in EMDR. The other authors have no relevant competing interests to declare.

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Introduction

Depression is one of the most common mental disorders, with more than 300 million people affected. The consequences of this disorder in terms of health loss are huge. Depression is ranked by World Health Organization as the single largest contributor to global disability, with 7.5% of all years lived with disability in 2015 (WHO 2017).

Although options for the treatment of depression have expanded significantly in the last 20 years, the early optimism accompanying new antidepressant medications such as selective serotonin reuptake inhibitors (SSRIs) has rapidly faded (Pampallona et al. 2002). In fact, a recent meta-analysis has concluded that antidepressants have only a modest advantage over placebo, with the magnitude of benefit increasing with the severity of depression (Fournier et al. 2010). Psychotherapeutic interventions have a long tradition in the treatment of depression. Several reports show that psychotherapeutic interventions can be helpful, not only in mild and moderate depression but also in cases of severe chronic depression (Nemeroff et al. 2003). Guidelines indicated that for people with moderate or severe depression the most effective treatment was a combination of antidepressant medication and a high-intensity psychological intervention (National Collaborating Centre for Mental Health, UK 2010). At the same time NICE guidelines also reported that studies comparing a combination treatment (i.e. medication plus psychotherapy) with psychotherapy alone showed that it was not possible to identify a benefit from adding antidepressants to psychotherapy (National Collaborating Centre for Mental Health, UK, 2010). This might suggest that, although combined treatment is

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considered the best option by several guidelines, clinical benefit could still be derived from psychotherapy alone. However, relapse rates, even in patients who responded to psychotherapeutic treatment, were still high (Vittengl et al. 2007).

Some authors have already remarked that current approaches to depression do not give sufficient consideration to the relationship between depressive and stress related/traumatic disorders (Horwitz and Wakefield 2012, Maj 2012).

Stress and its neurobiological correlates are significant factors in both the occurrence and development of depressive episodes. The exposure to significant traumatic stressors, especially in childhood, is a well recognized precipitant of depression (Kendler et al. 1995, American Psychiatric Association 2013, Khan et al. 2015, Infurna et al. 2016, Kendler and Gardner 2016). Compared with individuals who have not experienced adverse events in childhood, those with history of such experiences are at a greater risk of having a depressive episode in lifetime (Kessler 1997). Chronic and acute stressors may even trigger the onset of depressive symptoms (Heim and Nemeroff 2001 McFarlane 2010, Nanni et al. 2012). Moreover, adverse childhood experiences seem to predict unfavourable course of depression and treatment outcome (Nanni et al. 2012, Williams et al. 2016). Traumatic life events, which do not necessarily meet diagnostic criteria for criterion A of Post-traumatic Stress Disorder (PTSD), seemed to have both a close dose response and a time relationship with the occurrence of depressive episodes (Wise et al. 2001, Kendler et al. 2003, Teicher et al. 2009). First episodes of depression are often more closely related to a specific psychosocial stressor than later episodes, while later episodes of depression can be triggered by far smaller events, or even occur without any noticeable stressor (Post 1992, Kendler and Gardner 2016).

Eye Movement Desensitization and Reprocessing (EMDR) is a psychotherapeutic intervention widely recognized as an empirically supported treatment for PTSD (National Collaborating Centre for Mental Health (UK), 2005, Bisson and Andrew 2007, Chen et al. 2014), that is driven by the Adaptive Information Processing (AIP) model (Shapiro 2001), which claims that dysfunctionally stored and not fully processed memories are the basis of the onset of a number of mental disorders, including PTSD, adjustment disorders, some forms of depression, and anxiety disorders (Shapiro 2014). EMDR is currently used to address a range of complaints that follow distressing life experiences (Shapiro and Maxfield 2002) and several books, conference presentations and case reports suggest its applicability also in treating depression (Wood and Ricketts 2013, Luber 2016). In 2013 Wood and Ricketts reviewed the literature concerning EMDR and depression and found 37 suitable references (18 references reported interventions for depression as a primary diagnosis, while 19 described interventions for PTSD with comorbid depressive symptoms) concluding that "EMDR has the potential to be an evidence-based treatment for depression", although further research is required (Wood and Ricketts, 2013). More recently, other studies reported some evidences about EMDR efficacy in patients with depression (Hofmann et al. 2014, Hase et al. 2015) and a specific EMDR therapy protocol for the treatment of depressive disorders was released (Hofmann et al. 2016), turning on enthusiasm in clinicians in applying EMDR also in depressed patients.

The aim of the present paper was to update the previous review by Wood and Ricketts (2013), focusing on controlled studies that evaluated EMDR efficacy in treating depression as a primary diagnosis, in order to evaluate whether the evidences are strong enough to support the clinical application of EMDR in the treatment of depression.

Methods

Search methods for identification of studies

A comprehensive research strategy was chosen in order to retrieve both published and unpublished studies. Electronic searches were performed on March 2, 2017 on 5 bibliographic databases (PubMed, Cochrane Central Register of Controlled Trials, EMBASE, PsycINFO, and CINAHL) to identify potentially eligible studies and review articles. No restrictions in language, gender, age or publication date were applied. The search strategy was developed for PubMed and then adapted for the other databases, in order to suit their specific characteristics (controlled vocabulary, use of wildcards, syntax rules, and any other peculiar search features). See Appendix 1 for details of search strategies. Moreover, we performed a search with the keywords "depression" OR "depressive" OR "depressed" into The Francine Shapiro Library (FSL), that is an online compendium of conference presentations, scholarly articles, and other important papers related to EMDR.

Study selection criteria

Design

All controlled clinical trials were considered for inclusion: randomized controlled studies (RCTs), controlled studies (CTs) or cross-sectional studies with controls.

Reasons for exclusion were: (1) qualitative reports and (2) the absence of a control group.

Studies were included if published in any form and language. Unpublished studies, and studies published in abstract form could be included if sufficient information was available for the assessment of whether inclusion criteria were fulfilled.

Population

Trials included patients of any age with depression as primary diagnosis and as primary outcome of the study. Depression is defined as either major depression disorder (MDD) or depressive symptomatology (above or below a predefined cut-off on the questionnaires employed in each study). There was no restriction by concurrent organic disease.

Intervention

We included studies that evaluated EMDR intervention alone or in addition to another treatment in comparison with no intervention, Waiting List (WL), Treatment As Usual (TAU) or other types of intervention (antidepressant medication, Cognitive Behavioral Therapy, Psychodynamic Therapy). Concomitant medication was allowed, if applied to both groups.

Outcome

We included studies that provided quantitative data supported by statistical methodology about the following primary outcomes:

- Reduction in depression, defined as the number of participants whose depression score, following the

intervention, was below that defined as indicating depression in each study.

- Reduction in depression, defined as a reduction in depression scores (mean difference between pre- and post- intervention).

Depression scores derive from questionnaires administered to patients and mainly used for research purposes, to confirm a diagnosis of depression and to assess its severity (e.g. Beck Depression Inventory, Symptom Checklist 90, and others). Each questionnaire uses a numerical scale indicating the severity of depression.

Data collection and analysis

Study selection and appraisal

Two review authors (SC, LO) independently selected suitable studies for inclusion/exclusion, and then retrieved the full-text papers for all remaining titles and abstract deemed relevant. If no agreement was found about the inclusion of a study, a third review author (FO) was involved in order to resolve the disagreement.

The quality of randomized controlled studies was assessed using the Jadad scale (Jadad et al. 1996). For this measure a score ≥ 3 was considered to be indicative of an high-quality study.

The quality of controlled studies was assessed using the MINORS Scale (Slim et al. 2003, Zeng et al. 2015).

Data extraction and management

The data were extracted independently by two reviewers (SC, LO).

Extracted data covered: study design, information about sample characteristics and type of depression, type of intervention and comparison, type of assessment tools used to assess depression, principal results reported by authors.

Results

Search results

In **figure 1**, the study selection process is visualized in a PRISMA flow diagram (Moher et al. 2009).

The initial search retrieved 536 papers after duplicates removing. Of these, 414 records were excluded after title screening because they were not focused on EMDR efficacy in patients with depression. One hundred and fourteen records were excluded after title and abstract screening, mostly because they were theoretical and conceptual reports or case studies. Eight manuscripts were considered eligible for inclusion in the review after further screening of full-texts. Then only one paper (Behnam Moghadam et al. 2015) was excluded because it reported scarce follow-up data of an already included study (Behnammoghadam et al. 2015).

General study characteristics

Characteristics of the studies are shown as a summary in **table 1**.

Of the seven studies that have been located, six were published in journals, and one was an unpublished PhD dissertation thesis.

The earliest study was written by Hogan in 2001 but it has not yet been published (Hogan 2001), whereas the first published study dates back to 2007. The latest was published in 2016 (Mauna Gauhar 2016). As regards language, six studies were in English and one study was in Chinese (Lei and Zhen-Ying 2007). Four studies were carried out in Asia (i.e., China, Iran, Pakistan and Taiwan), two in Europe (both in Germany) and one in North America.

Only one study included adolescents (Tang et al. 2015), all others included adult patients.

Overall, 148 patients were treated with EMDR, and 146 served as the comparison group. The sample sizes of studies varied between 26 and 64. Studies differed greatly for population and intervention characteristics.

Six studies enrolled participants in an outpatients setting, whereas one study was conducted in an inpatients setting (Hase et al. 2015).

In six studies, depression was diagnosed according to diagnostic manuals: DSM-IV-TR (American Psychiatric Association 2000), ICD-10 (World Health Organization 2011) and CCMD-3 (Chen 2002). In one study (Behnammoghadam et al. 2015) depression was defined by a BDI score greater than 17.

In five studies, depression was a stand-alone diagnosis, whereas in one study (Behnammoghadam et al. 2015) patients had a concurrent general medical condition (myocardial infarction). In another study (Tang et al. 2015), depression was explicitly considered as a consequence of having experienced a natural disaster. The use of antidepressant medication was declared in five studies, whereas in the others it was not specified.

As regards the type of intervention, in three studies EMDR was an adjunctive treatment to an usual intervention (Sertraline, Cognitive Behavioral Therapy, Psychodynamic Psychotherapy), whereas in the other four studies EMDR was implemented as a stand-alone treatment.

The number of EMDR sessions ranged from one to 16, though one study did not include any information on this issue (Lei and Zhen-Ying 2007).

Control groups also varied between studies: Cognitive Behavioral Therapy was used as comparison in two studies, Sertraline in one study, Psychodynamic Psychotherapy in one study, Psycho-education in one study. Two studies compared EMDR with no intervention using a Waiting List and a Treatment As Usual group, respectively.

A variety of measures were applied to investigate the primary outcome: four studies used the Beck Depression Inventory, one study employed the Hamilton Depression Scale, one study used the Center for Epidemiologic Studies Depression Scale and another study employed the Symptom Checklist 90 Items – revised version.

Main findings of the studies

Two studies compared EMDR with no intervention.

Behnammoghadam et al. (2015) evaluated EMDR in treating depression in patients with myocardial infarction. The control group received no intervention. There was a significant reduction of depressive symptoms in experimental group compared to control group, resulting in post-treatment depression levels under the clinical threshold (i.e., a BDI score < 17).

Mauna Gauhar (2016) compared EMDR with a waiting list control group in patients with Major Depressive Disorder (MDD). The experimental group showed a significant greater improvement in depression compared to control group, which was still appreciable at three-months follow-up.

Two studies evaluated EMDR in comparison with another active intervention.

In his unpublished dissertation, Hogan (2001)

Table 1. *Summary of studies characteristics*

Author	Year	Type of publication	Language	Study design	Population (diagnostic criteria)	Use of antidepressant medication	Comparison	Measures	Improvement in depression reported
Hogan	2001	Unpublished thesis	English	RCT	Patients meeting the diagnostic criteria for MDD, or another depressive disorder such as dysthymia or adjustment disorder with depressed mood (DSM-IV-TR)	Yes, prior medication maintained in some patients	EMDR (15) vs. CBT (15)	BDI-II	Yes, EMDR = CBT
Lei and Zhen-Yin	2007	Published article	Chinese	RCT	Patients with depression (CCMD-3; HDS score ≥17)	Yes	Sertraline + EMDR (32) vs. Sertraline (32)	HDS	Yes, Sertraline+EMDR = Sertraline
Hofmann et al.	2014	Published article	English	Controlled study	Patients with unipolar primary depression (DSM-IV-TR)	Yes, only for some patients (9 EMDR+ CBT; 6 CBT)	CBT + EMDR (21) vs. CBT (21)	BDI-II	Yes, CBT+EMDR > CBT
Behnam-mogha-dam et al.	2015	Published article	English	RCT	Patients with myocardial infarction and depression (BDI sore >17)	Not reported	EMDR (30) vs. TAU (no intervention) (30)	BDI	Yes, EMDR > TAU
Hase et al.	2015	Published article	English	Matched Controlled study	Adult inpatients with mild-to-moderate depressive Episode (ICD-10)	Yes, only for some patients (9 EMDR+ TAU; 10 TAU)	TAU (Psycho-dynamic Psy-chotherapy) + EMDR (16) vs. TAU (16)	SCL-90-R BDI	Yes, TAU+EMDR > TAU
Tang et al.	2015	Published article	English	Controlled study	Taiwanese adolescents who experienced Typhoon Morakot diagnosed with MDD (DSM-IV-TR)	Not reported	EMDR (21) vs. TAU (Psycho-education) (19)	CES-D	Yes, EMDR > TAU
Mauna Gauhar	2016	Published article	English	RCT	Patients with MDD (DSM-IV-TR)	No, exclusion criteria	EMDR (13) vs. WL (13)	BDI-II	Yes, EMDR > WL

RCT: Randomized Clinical Trial; MDD: Major Depressive Disorder; DSM-IV-TR: Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition-Text Revision; CCMD-3: Chinese classification of mental disorders; ICD-10: International Statistical Classification of Diseases and Related Health Problems-10th revision; EMDR: Eye Movement Desensitization and Reprocessing; CBT: Cognitive Behavioral Therapy; TAU: Treatment As Usual; WL: Waiting List; BDI: Beck Depression Inventory; BDI-II: Beck Depression Inventory II; HDS: Hamilton Depression Scale; SCL-90-R: Symptom Checklist 90 Items revised version; CES-D: Center for Epidemiologic Studies Depression Scale.

evaluated the efficacy of either a session of EMDR or CBT. Both treatments proved to be effective in reducing depressive symptoms but he did not find any significant differences between treatments. However, four participants in the EMDR group reported an almost complete remission of depressive symptoms whereas no patients in the CBT group exhibited this pattern of symptom reduction. Moreover, Hogan stated that EMDR was perceived by patients to be less negative than CBT "primarily due to the increased awareness of negative thoughts common to CBT but not experienced in EMDR treatment".

Tang and colleagues (2015) evaluated the efficacy of EMDR compared with Psycho-education for adolescents who experienced the Morakot Typhoon in Taiwan. The sample of this study included both patients with Post-traumatic Stress Disorder and patients with MDD and unfortunately results were not presented separately. Therefore it's not possible to deduce specific data concerning MDD patients only. Despite this limitation, their results showed that EMDR demonstrated significantly higher effects in reducing the severity of depressive symptoms compared to the control intervention.

Finally, EMDR was evaluated as an adjunctive treatment in three studies.

Lei and Zhen-Ying (2007) compared EMDR + Sertraline with Sertraline alone in adult patients with depression, showing that there was no statistically difference in the responses of the two groups, although it is reported that EMDR + Sertraline gave a faster effect with an higher safety and a better compliance.

Hofmann et al. (2014) compared EMDR + CBT with CBT alone in patients with unipolar primary depression. Both treatments resulted in significant improvement, and there was a larger decrease in BDI-II scores for EMDR + CBT compared to CBT treatment alone. Moreover the number of remissions of depression was significantly higher in patients that received adjunctive EMDR.

Hase et al. (2015) compared the efficacy of EMDR + Psychodynamic treatment versus Psychodynamic treatment alone in an inpatients setting. They found that 68% of the patients treated with adjunctive EMDR showed full remission at the end of treatment. Moreover the EMDR group showed a greater reduction in depressive symptoms, also maintained at 1 year follow-up.

Study quality assessment

As it can be seen in **table 1**, four studies were Randomized Controlled Trials (RCTs) and three studies were Controlled Trials (CTs).

The quality of studies was assessed with the Jadad Scale for RCTs (**table 2**) and with the MINORS Scale for CTs (**table 3**).

As regards RCTs, a correct randomization procedure was ensured in only one study (Mauna Gauhar 2016). Two studies (Lei and Zhen-Ying 2007, Behnammoghadam et al. 2015) didn't report sufficient data to establish the exact mode of sequence generation. One study (Hogan, 2001) was quasi-randomized, using for allocation the order in which patients presented for treatment.

None of the studies applied blinding of the patients. Blinding of investigators was not described in three studies (Hogan 2001, Lei and Zhen-Ying 2007, Behnammoghadam et al. 2015), and in one study (Mauna Gauhar 2016) was explicitly reported that follow-up assessments were conducted by the therapist.

Only one study reported a description of drop-outs (Mauna Gauhar 2016).

As regards CTs, an adequate control group was present in all studies, but one study did not evaluate groups at the same time (Hofmann et al. 2014).

Overall endpoints were appropriate to the aim of the studies, but only one study (Hase et al. 2015) guaranteed an unbiased assessment of the study endpoint applying blinding of post-treatment evaluators. In all studies a baseline equivalence of groups was reported, and adequate statistical analyses were performed.

None studies reported either a prospective calculation of sample size or a post-hoc power calculation.

Discussion

The aim of the present work was to systematically review current evidence about EMDR efficacy on depression as a primary diagnosis. Although controlled studies conducted so far to evaluate the efficacy of EMDR in treating depression as a primary outcome are few and with a low methodological quality, they suggest that EMDR may be applied in this disorder with good results. When compared with an inactive control group (i.e. waiting list or no intervention) EMDR appears to be a viable and effective intervention in reducing depressive symptoms. When added as an adjunctive treatment to TAU (such as Sertraline, Psychodynamic Therapy or CBT), EMDR seems to boost and strengthen the effects achieved with standard treatments, showing a greater improvement of depressive symptoms. When compared with active intervention, EMDR demonstrates its superiority against Psycho-education and to be comparable to CBT, that is considered as the gold standard intervention to treat depression, according to clinical guidelines (National Collaborating Centre for Mental Health, UK, 2010). Moreover, according to studies that included a follow-up, improvements achieved with EMDR seem to be stable and maintained over time.

The studies in this field have three main limitations. First, current evidences are heavily influenced by methodological flaws, including non-randomization or randomization details not reported and small sample size. This is not surprising, given the exploratory nature of the field. It means, however, that the findings are tentative and need to be supported by larger and more robust evaluations.

Secondly, principal outcomes were assessed through self-reported measures, leading to a potential overestimation of the effectiveness of the intervention. Further studies involving also clinical interviews conducted by an independent evaluator are needed. Thirdly, no study evaluated the treatments in a double blind condition. This limit could be partially overcome through the use of at least a single-blind design, where the evaluator but not the patient is blind to the treatment allocation, a strategy already applied only by one study.

Given the limits described above, the results obtained by controlled studies included in the present review can only have an orienting function. More research, especially larger randomized studies, is needed. Moreover, longer follow-up measures would be appropriate. Besides, attrition rates, including reasons for dropout, should be reported, because relevant information regarding implementation strategies, feasibility, and contraindications might be extracted. There is also an important need to further explore the link between depression and previous traumas, in order to link the EMDR AIP model to the treatment of depression. Future studies should include a baseline assessment of adverse childhood experiences or other traumatic events that can contribute to the development or maintenance of depression and also represent possible target memories to be reprocessed through EMDR treatment (Hofmann et al. 2016).

Conclusions

In conclusion, research in this area is still in its infancy. EMDR can be considered a potential effective intervention to treat depression, although it cannot be currently supported by strong evidences. Further, better designed research is needed to confirm the available findings and determine the specificity and generalizability of EMDR intervention.

A step forward in the future of the research about EMDR and depression can be represented by a RCT currently under way. The European Depression EMDR

Table 2. *Quality assessment of randomized controlled trial with Jadad scale*

Study	Randomization	Appropriate randomization	Drop outs and withdrawals	Blinding	Jadad score (range: 0 – 5)
Hogan, 2001	Yes	No	Not reported	No double blind, single blind not reported	0
Lei and Zhen-Yin, 2007	Yes	Not described	Not reported	Not reported	1
Behnammoghadam et al., 2015	Yes	Not described	Not reported	Not reported	1
Mauna Gauhar, 2016	Yes	Yes	Yes	No	2

Table 3. *Quality assessment of controlled studies with the MINORS scale*

Study	Clearly stated aim	Inclusion of consecutive patients	Prospective collection of data	End-points appropriate to the aim of the study	Unbiased assessment of the study end-point	Follow-up period appropriate to the aim of the study	Loss to follow up less than 5%	Prospective calculation of the study size	Adequate control group	Contemporary groups	Baseline equivalence of groups	Adequate statistical analyses	MINORS score (range: 0 -24)
Hofmann et al., 2014	Yes (2)	? (0)	Yes (1)	Yes (2)	No (0)	Yes (1)	Yes (2)	No (0)	Yes (2)	No (0)	Yes (2)	Yes (1)	13
Hase et al., 2015	Yes (2)	? (0)	Yes, matched control group (1)	Yes, but not BDI in control group (1)	Yes, single blind (1)	Yes (2)	Yes (2)	No (0)	Yes (2)	Yes (2)	Yes (2)	Yes (1)	16
Tang et al., 2015	Yes (2)	Yes (1)	Yes (1)	Yes (2)	No (0)	Yes (1)	Yes (2)	No (0)	Yes (2)	Yes (2)	Yes (1)	Yes (1)	15

MINORS score: scored 0 (not reported), 1 (reported but inadequate) or 2 (reported and adequate).

Network (EDEN) study aims to evaluate the comparative efficacy of EMDR, CBT and antidepressant medication for the treatment of patients with recurrent depression (ISRCTN09958202). Some of the authors of the present review are also involved in that study.

Another important project is currently undergoing in United Kingdom. The Sheffield EMDR and Depression Investigation (SEDI) (Wood and Ricketts 2013) is an intensive clinical replication series where patients with long-term depression will be treated with EMDR therapy. Measures will be used to chart the effects of the intervention on the following items: depressive symptoms, social functioning, memory narrative, heart rate variability, and skin conductance response. Finally, an interview will be conducted with the participants in order to collect also qualitative data about the experience of receiving EMDR.

We hope that the EDEN study and the SEDI project will contribute to produce firm conclusions regarding the efficacy of EMDR as an evidence based treatment for depression.

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