



## Eye Movement Desensitization and Reprocessing (EMDR) treatment in the medical setting: a systematic review

Helen P.A. Driessen , Sid Morsink , Jan J.V. Busschbach , Witte J.G. Hoogendijk  and Leonieke W. Kranenburg 

Department of Psychiatry, Erasmus MC, University Medical Center Rotterdam, Rotterdam, the Netherlands

### ABSTRACT

**Background:** Literature points towards the potential benefits of the application of Eye Movement and Desensitization Processing (EMDR)-therapy for patients in the medical setting, with cancer and pain being among the domains it is applied to. The field of applying EMDR-therapy for patients treated in the medical setting has evolved to such an extent that it may be challenging to get a comprehensive overview.

**Objective:** This systematic literature review aims to evaluate the use and effectiveness of Eye Movement Desensitization and Reprocessing (EMDR) therapy in patients treated in the medical setting.

**Methods:** We performed a literature search following the PRISMA guidelines. Studies were included if the effectiveness of EMDR-therapy was assessed in adult patients treated in a medical setting. Excluded were patients exclusively suffering from a mental health disorder, without somatic comorbidity. A risk of bias analysis was performed. This review was registered on PROSPERO (CRD42022325238).

**Results:** Eighty-seven studies, of which 26 (pilot)-RCTs were included and categorized in 14 medical domains. Additionally, three studies focusing on persistent physical complaints were included. Most evidence exists for its application in the fields of oncology, pain, and neurology. The overall appraisal of these studies showed at least moderate to high risks of bias. EMDR demonstrated effectiveness in reducing symptoms in 85 out of 87 studies. Notably, the occurrence of adverse events was rarely mentioned.

**Conclusions:** Overall, outcomes seem to show beneficial effects of EMDR on reducing psychological and physical symptoms in patients treated in a medical setting. Due to the heterogeneity of reported outcomes, effect sizes could not be pooled. Due to the high risk of bias of the included studies, our results should be interpreted with caution and further controlled high-quality research is needed.

### Tratamiento de desensibilización y reprocesamiento por movimientos oculares (EMDR) en el ámbito médico: una revisión sistemática

**Antecedentes:** La literatura apunta a los beneficios potenciales de la aplicación de la terapia de Desensibilización y Reprocesamiento por Movimientos Oculares (EMDR) para pacientes en el ámbito médico, siendo el cáncer y el dolor algunos de los dominios a los que se aplica. El campo de la aplicación de la terapia EMDR para pacientes tratados en el ámbito médico ha evolucionado hasta tal punto que puede resultar complicado obtener una visión general completa.

**Objetivo:** Esta revisión sistemática de la literatura tiene como objetivo evaluar el uso y la eficacia de la terapia de Desensibilización y Reprocesamiento por Movimientos Oculares (EMDR) en pacientes tratados en el ámbito médico.

**Métodos:** Se realizó una búsqueda bibliográfica siguiendo las guías PRISMA. Se incluyeron los estudios que evaluaban la eficacia de la terapia EMDR en pacientes adultos tratados en un contexto médico. Se excluyeron los pacientes que padecían exclusivamente un trastorno de salud mental, sin comorbilidad somática. Se realizó un análisis de riesgo de sesgo. Esta revisión se registró en PROSPERO (CRD42022325238).

**Resultados:** Se incluyeron 87 estudios, de los cuales 26 ECA (piloto) y se clasificaron en 14 dominios médicos. Además, se incluyeron tres estudios centrados en quejas físicas persistentes. La mayoría de las evidencias existen para su aplicación en los campos de la oncología, el dolor y la neurología. La valoración global de estos estudios mostró al menos riesgos de sesgo de moderados a altos. La EMDR demostró eficacia en la reducción de los síntomas en 85 de 87 estudios. En particular, rara vez se mencionó la aparición de eventos adversos.

**Conclusiones:** En general, los resultados parecen mostrar efectos beneficiosos de la EMDR en la reducción de los síntomas psicológicos y físicos en pacientes tratados en un contexto médico.

### ARTICLE HISTORY

Received 6 December 2023

Revised 5 March 2024

Accepted 15 March 2024

### KEYWORDS

Systematic review; Eye Movement Desensitization and Reprocessing (EMDR); post-traumatic stress disorder; adaptive information processing (AIP); psychotherapy; general medicine

### PALABRAS CLAVE

Revisión sistemática; Desensibilización y Reprocesamiento por Movimientos Oculares (EMDR); trastorno de estrés postraumático; procesamiento adaptativo de la información (AIP); psicoterapia; medicina general

### HIGHLIGHTS

- First overview on the use of EMDR for adult patients treated in the medical setting.
- EMDR seems beneficial in improving psychological and physical symptoms.
- Given the heterogeneity of studies and high risk of bias, further controlled studies are needed in this field.

**CONTACT** Helen P.A. Driessen  h.driessen@erasmusmc.nl 

 Supplemental data for this article can be accessed online at <https://doi.org/10.1080/20008066.2024.2341577>.

© 2024 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group  
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

Debido a la heterogeneidad de los resultados informados, no fue posible agrupar los tamaños del efecto. Debido al alto riesgo de sesgo de los estudios incluidos, los resultados deben interpretarse con cautela y se necesita investigación adicional controlada de alta calidad.

## 1. Introduction

The medical setting is characterized by people who have experienced adverse health-related, and sometimes even life-threatening events, which may lead to the development of post-traumatic stress disorder (PTSD) or PTSD related symptoms. Eye Movement and Desensitization Processing (EMDR)-therapy has proven to be an effective psychological treatment and is recommended as treatment of choice in multiple international guidelines for post-traumatic stress disorder, such as the NICE and APA-guidelines (Association AP, 2017; Excellence NifHaC).

EMDR-therapy was developed in the eighties of the last century by Francine Shapiro (Shapiro, 1989). Latest meta-analyses on the effectiveness of EMDR-therapy in treating patients with PTSD, show that the therapy is equally effective as cognitive behavioural therapy (CBT) (Grubaugh et al., 2021; Hudays et al., 2022). The 2020 meta-analysis on the effects of EMDR-therapy for mental health problems of Cuijpers et al. included trials only, and found a large effect size of EMDR-therapy for PTSD ( $g = 0.93$ ) (Cuijpers et al., 2020). However, risk of bias was found to be high, which compromised the effects found. These results seem to contrast somewhat with the findings of the more recent network meta-analysis of Yunitri et al. (2023), that found that both cognitive processing therapy and EMDR-therapy were consistently in the upper quartile as the most effective therapies for reducing PTSD symptoms at immediate post-treatment, short-term and long-term follow-up (Yunitri et al., 2023). In addition, EMDR-therapy was also among the most effective therapies in terms of loss of PTSD diagnosis. Still, also these authors warn for conclusion too firm on EMDR (and the other therapies) and point towards the relevance of further study of factors such as the combination of various PTSD therapies and the therapist-patient relationship. Broadening the scope to mental health problems other than PTSD, Cuijpers et al. found that the amount and quality of studies was insufficient to pool outcomes. Scelles and Bulnes (2021), who also studied the effects of EMDR-therapy on conditions other than PTSD, did not limit their search to controlled trials, which led them to include 90 papers (Scelles & Bulnes, 2021). Although there was an overall positive outlook of EMDR as treatment option, they, like Cuijpers et al. also concluded that the methodology of many studies fell short. These recent analyses underline that currently sufficient evidence

exists for the application of EMDR for PTSD, but not for other, mental health conditions.

The study of Scelles and Bulnes (2021) already points towards the potential benefits of applying EMDR in the medical setting, as cancer and pain are among the domains of conditions included (next to for instance mood disorders, anxiety disorders, sexual disorders, addiction and eating disorders). So, the idea of the application of EMDR-therapy in the medical setting is not new. The standard EMDR-therapy protocol as developed by Francine Shapiro consists of 8 phases: 1. History and treatment plan; 2. Introduction to EMDR protocol, and development of coping strategies; 3. Evaluation of the treatment targets; 4. Desensitization and reprocessing; 5. Incorporation of positive cognitions; 6. Body scan; 7. Relaxation and 8. Re-evaluation (Shapiro, 2007). All of these phases are important, but within the context of EMDR-application in the medical setting, especially phases 1. and 3. referring to the conceptualization of the case are of major importance. Maybe more so than with EMDR-therapy for 'just' PTSD, the question is following which line of reasoning are specific memories (or images of future catastrophes) thought to be of influence on current complaints and symptoms. With this in mind, it may not be that surprising that specific EMDR protocols have developed in the more somatic-oriented context over time.

Luber has summarized treatment protocols for a variety of medical conditions such as cancer, multiple sclerosis, and pain (Luber, 2019). Also, Francine Shapiro herself wrote an article on the role EMDR-therapy could play in the medical setting, in which she described how both psychological and physical symptoms could stem from adverse life events (Shapiro, 2014). Indeed it was found that a history of adverse childhood experiences can result in complex clinical profiles with several co-occurring mental and somatic disorders (Herzog & Schmahl, 2018). Next to these etiology-related reasons for applying EMDR-therapy in the medical setting, there are also practical reasons. First, EMDR-therapy may result in more rapid effects compared to other types of trauma therapy (McPhail, 2016; Nijdam et al., 2012; Wammes et al., 2018), this makes EMDR-therapy especially suited for the medical setting. This is because medical psychological care is in essence related and often limited to the somatic care patients receive, which may make that psychological care has to be 'fitted in' in a particular time frame. Second, an advantage of

EMDR-therapy over other types of therapy, in particular trauma-focused cognitive behavioural therapy is that patients are not assigned homework exercises. This is an advantage, because often somatic complaints have such an impact on daily life that for many people it is too much of a burden to carry out all kinds of tasks in addition.

Over time, the field of applying EMDR-therapy for patients treated in the medical setting has further evolved, to such an extent that it may be difficult to get a comprehensive overview. Therefore, this study aims to provide a complete, contemporary and state-of-the-art overview of available applications and effectiveness of EMDR-therapy for patients treated throughout the medical setting.

## 2. Methods

### 2.1. Protocol and Registration

The protocol for this systematic review was specified in advance and registered on PROSPERO (CRD42022325238). The present study was performed according to the PRISMA guidelines for systematic reviews (Moher et al., 2010).

### 2.2. Inclusion and exclusion criteria

Articles were included if they focused on evaluating the effectiveness of EMDR treatment on adult patients with (1) somatic symptoms, including patients with psychological problems stemming from their somatic symptoms, and if patients were (2) treated in a medical setting (including hospitals, extramural specialized clinics and private clinics, in which the treatment can be extrapolated to hospitals), and (3) outcomes used to measure the effectiveness of the EMDR intervention were reported. No restrictions were made regarding the outcome measures study design. Protocols that included real-life cases of patients were also eligible for inclusion. Excluded were articles that focused on the effectiveness of EMDR (i) in patients exclusively suffering from psychological complaints, (ii) in patients with eating disorders, (iii) solely in the patients' relatives or caregivers, (iv) in children and adolescents, and (v) on healthcare providers. Also excluded were (vi) articles wherein patients were treated with Eye Movement (EM) or Eye Movement Desensitization (EMD), (vii) if EMDR-therapy was combined with, or was integrated into a treatment programme that included multiple types of psychotherapy and the effects of EMDR-therapy alone could not be evaluated. Studies were also excluded if (viii) the treatment was provided in military hospitals, if (ix) no outcome was reported, e.g. protocols without cases, and if (x) no full text could be retrieved, even after repeated effort. Further, (xi) poster abstracts

were excluded. There were no restrictions regarding the date of publication, nor were there restrictions on the language the articles were written.

### 2.3. Search terms and databases

The main search terms were 'Eye Movement Desensitization Reprocessing', 'Post Traumatic Stress Disorders', 'Depression', and 'Anxiety'. This search was applied to Embase.com (1971-present), Medline ALL Ovid (1946-present), Web of Science Core Collection (1975-present), Cochrane Central Register of Controlled Trials (1992-present), and PsycINFO Ovid (1806-present). The final search was run on 18 April 2023. The full search strategy is reported in Supplementary Table 1. Furthermore, the reference lists of all relevant studies were checked to find additional studies.

### 2.4. Procedures

Two reviewers (HD, SM) screened all article titles and abstracts for relevance. If the title and abstract were considered relevant regarding the aim of our study, the article was included for the assessment of the full text. In case of disagreement, the two reviewers aimed to reach a consensus. In case this turned out to be difficult, a third reviewer was involved to come to a conclusion (LK). All included papers were read by two reviewers (HD, SM) to assess whether the studies were eligible for inclusion, based on the above-mentioned criteria. Again, in case of disagreement, the two reviewers aimed to reach a consensus. A third reviewer (LK) was involved to come to a conclusion, in case consensus proved difficult. Included reviews were screened for relevant articles. Relevant articles found in the reviews were included and assessed individually in the current study. The risk of bias of the studies was assessed with appropriate instruments according to their study design: the Cochrane risk-of-bias tool for randomized trials, version 2 (ROB-II) (Sterne et al., 2019), the Risk Of Bias In Non-randomized Studies of Interventions (ROBINS-I) tool (Sterne et al., 2016), the IHE (Institute of Health Economics) Quality Appraisal Checklist for Case Series Studies ((IHE) IoHE, 2014), and the Johnna Briggs Institute (JBI) Critical Appraisal Checklist for Case Reports (Moola et al., 2024).

### 2.5. Data extraction

Two authors (HD, SM) evaluated and extracted the data of all included studies. The information was discussed by three authors (HD, SM, LK). Information was extracted regarding the (1) type of study design, (2) involved medical domain and illness, (3) medical setting in which patients were treated, (4) whether patients were inpatients or outpatients, (5) additional

diagnoses, (6) treatment and treatment schedules, (7) outcomes and outcome measures to assess the effectiveness of the intervention, and (8) reported results for every outcome.

### 3. Results

#### 3.1. Study selection

A total of 5538 studies were retrieved from databases, and ten additional articles were identified through cross-referencing. A total of 3135 studies were eligible for screening after duplicates were removed and eventually 368 studies were assessed for eligibility for inclusion. One hundred three studies were considered eligible of which 87 studies were included. Sixteen studies were reviews and are not discussed as these reviews have a different focus of attention compared to our review, except for one review in which a case study is described (Baas et al., 2020). Details of these reviews are described in Supplementary Table 2 for the sake of completeness (Cope et al., 2018; Dimitrov et al., 2019; Faretta, 2018; Haerizadeh et al., 2020; Luyten, van Rompaey, et al., 2020; Miller et al., 2021; Portigliatti Pomeri et al., 2020; Ruisch et al., 2023; Ryan et al., 2022; Sato-Perry, 2004; Staton et al., 2022; Tesarz et al., 2014, 2019; van Rood & de Roos, 2009; Wicking et al., 2017). If the full text of the studies was not

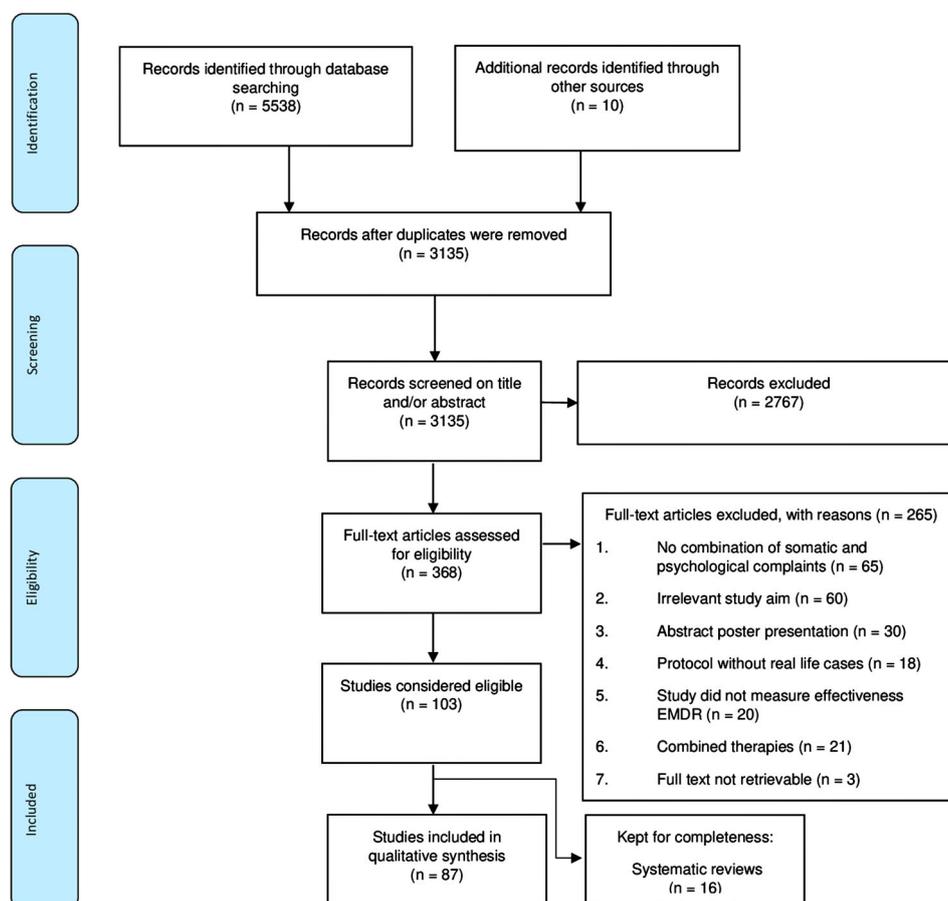
retrievable via standard electronic subscriptions of the Erasmus Medical Center academic library, we sent an international request to other libraries. If that also failed, we approached the authors by email. Procedures and search results are described in Figure 1 and Supplementary Table 2.

#### 3.2. Study characteristics

An overview of the characteristics of the 87 articles included is given in Supplementary Table 3. The result section of this review consists of general results and results categorized per medical domain. All studies reported pre- and post-treatment measurements. The study designs and the reported outcomes were found to be heterogeneous and, consequently, a meta-analysis was not performed.

#### 3.3. General results

Twenty-six (pilot-)RCTs, 22 case reports, 20 non-randomized clinical studies, and 19 case series are included and are categorized into 14 medical domains: see Supplementary Tables 4A-4O. Eighty-five of 87 studies found favourable effects of EMDR-therapy within multiple domains and outcomes. Only two studies, within the field of gynaecology, reported either no beneficial



**Figure 1.** Flowchart of literature search and study selection.

effects or that the beneficial effects did not remain over time (Jebelli et al., 2018; Valedi et al., 2022). All but one of the RCTs found significant favourable effects of EMDR-therapy pre- and post-treatment. Ten RCTs compared EMDR to no treatment/waiting list: seven studies found significant differences between EMDR-therapy and waiting list controls in favour of EMDR-therapy, two studies reported significant beneficial effects in both EMDR and waiting list control groups, and one study did not find significant differences in both groups (Valedi et al., 2022). Additionally, 18 studies compared the use of EMDR to other treatments. Eleven studies described significant effects of both interventions of which nine studies reported differences between groups in favour of EMDR-therapy. The remaining six studies reported only significant favourable effects of EMDR-therapy (Abdi et al., 2021; Arias Suarez et al., 2020; Borji et al., 2019; Gerhardt et al., 2016; Rostaminejad et al., 2017; Zolghadr et al., 2019). Half of all studies described providing EMDR-therapy exclusively at a (university) hospital (45/87), nine studies exclusively provided treatment at specialized clinics, 17 studies described providing treatment at locations categorized as 'Other', e.g. private practices or online, and five studies described providing treatment at two different settings. The remaining 11 studies did not describe where the treatment was provided. In most cases (53/87), treatment was provided to patients visiting outpatient centres, private practices, and hospital departments, 18 studies described providing care to inpatients, two studies described providing care in both inpatient and outpatient settings, and 14 studies did not describe whether patients were treated as inpatients or whether patients visited outpatient locations. Within the majority of the studies in which the EMDR protocol type was specified, the standard protocol for EMDR was used during treatment. For a few medical conditions such as pain or tinnitus, a specialized EMDR protocol was described. The most frequently described outcome was anxiety, followed by depression, PTSD, and pain and there was overlap in the outcome measures used: anxiety was measured using the HADS-A, STAI-Y and BAI; depression was measured using HADS-D and BDI(-II); and symptoms of PTSD were measured using PCL-5, IES-R, and SCID. Further information regarding additional diagnoses, treatment details, outcomes and outcome measures to assess the effectiveness of the intervention, and the reported results for every outcome are categorized by medical domain and summarized in Supplementary Tables 4A-4O.

### 3.4. Risk of bias

Most case reports described pre- and post-intervention clinical condition (22/22), assessment methods (20/22), and treatment procedure (22/22), only a minority reported whether there were adverse events (6/

22) (Supplementary Table 5A). Most case series clearly described patient characteristics (18/19), intervention (17/19), pre- and post-intervention clinical condition (17/19), and used appropriate outcome methods (17/19). The studies did not (fully) report eligibility criteria (13/19), co-interventions (13/19), statistical analysis (14/19), and adverse events (11/19) (Supplementary Table 5B). Most RCTs showed a high risk of bias (16/26), the minority showed some concerns (10/26). Areas of concern included adherence to the intervention, the randomization process, and outcome measurements, mainly due to the subjective measures used. The non-randomized clinical studies showed moderate (17/20) or serious (3/20) bias mainly because of the measurements of outcomes used (Supplementary Table 5C).

## 3.5. Main findings per medical domain

### 3.5.1. Pain

The domain of pain includes 16 studies, divided into nine studies focusing on phantom pain and seven studies focusing on chronic pain (Supplementary Table 4A). The efficacy of EMDR-therapy on phantom pain was evaluated on pain, including intensity and disability in all nine studies (Brennstuhl et al., 2015; 2017b; de Roos et al., 2010; Flik & de Roos, 2010; Rostaminejad et al., 2017; Schneider et al., 2008; 2007; Sinici, 2016; Wilensky, 2006), the use of pain medication (Schneider et al., 2007; Schneider et al., 2008), intensity of sensation (Brennstuhl et al., 2015; 2017b), Quality of Life (QoL) (de Roos et al., 2010), fatigue (de Roos et al., 2010), psychological problems and symptoms of psychopathology (de Roos et al., 2010; Sinici, 2016), emotional distress (Rostaminejad et al., 2017; Wilensky, 2006), and symptoms of anxiety (Brennstuhl et al., 2015; Brennstuhl et al., 2017b; Sinici, 2016), depression (Brennstuhl et al., 2015; Brennstuhl et al., 2017b; Sinici, 2016; Wilensky, 2006), and PTSD (de Roos et al., 2010; Schneider et al., 2008; Wilensky, 2006). All studies reported beneficial effects of EMDR-therapy when comparing measurements before and after treatment. The majority (8/9) reported a follow-up up to 40 months and reported that the beneficial effects remained over time. Only one study focusing on phantom pain was a RCT. The study showed significant reductions of pain intensity and emotional distress in the EMDR group, whereas the control group showed significant worsened symptoms (Rostaminejad et al., 2017).

The efficacy of EMDR-therapy in patients suffering from chronic pain was evaluated on pain intensity in all studies (Arias Suarez et al., 2020; Brennstuhl et al., 2016; 2017a; Gerhardt et al., 2016; Grant, 2000; Grant & Threlfo, 2002; Mazzola et al., 2010), on QoL (Arias Suarez et al., 2020; Mazzola et al.,

2010), disability (Gerhardt et al., 2016), patients' perspective of change (Gerhardt et al., 2016), coping (Grant & Threlfo, 2002), and symptoms of anxiety (Arias Suarez et al., 2020; Mazzola et al., 2010), depression (Arias Suarez et al., 2020; Mazzola et al., 2010), and PTSD (Brennstuhl et al., 2016; 2017a) (Supplementary Table 4A). All studies reported beneficial effects of EMDR-therapy when comparing measurements before and after treatment. The majority (6/7) reported a follow-up of up to three months and reported that the beneficial effects remained over time. Three out of seven studies that focused on the efficacy of EMDR-therapy on chronic pain were pilot RCTs. Two out of three pilot RCTs reported beneficial effects of EMDR-therapy over TAU (Arias Suarez et al., 2020; Gerhardt et al., 2016). The remaining pilot RCT compared an EMDR standard protocol to an EMDR pain protocol and control psychotherapy and found beneficial effects of both EMDR protocols over control therapy, in favour of the standard protocol which was found to be significantly better compared to the pain protocol (Brennstuhl et al., 2016).

### 3.5.2. Neurology

Fourteen studies described the efficacy of EMDR-therapy in neurological disorders and focused on patients suffering from: dementia (Ahmed, 2018; Amano & Toichi, 2017; van der Wielen et al., 2019), multiple sclerosis (MS) (Carletto et al., 2016; Wallis & de Vries, 2020), stroke (Guina & Guina, 2018; Janssen & van Donzel, 2023; Smart, 2022), spinal cord injury (Hatefi et al., 2019; Olędzka et al., 2016), migraine (Konuk et al., 2011), psychogenic seizures (Chemali & Meadows, 2004), and concussion-like symptoms (Gil-Jardine et al., 2018). One study did not specify which neurological condition the patients suffered from (Gattinara, 2009). See Supplementary Table 4B. The efficacy of EMDR-therapy was evaluated on emotional distress (Gattinara, 2009; Olędzka et al., 2016; van der Wielen et al., 2019), QoL (Carletto et al., 2016; Wallis & de Vries, 2020), and symptoms of depression (Ahmed, 2018; Arabia et al., 2011; Carletto et al., 2016; Guina & Guina, 2018; Hatefi et al., 2019; Olędzka et al., 2016; Smart, 2022; van der Wielen et al., 2019; Wallis & de Vries, 2020), anxiety (Ahmed, 2018; Carletto et al., 2016; Hatefi et al., 2019; Smart, 2022; van der Wielen et al., 2019; Wallis & de Vries, 2020), worry (Wallis & de Vries, 2020), cognitive avoidance (Wallis & de Vries, 2020), and PTSD (Carletto et al., 2016; Gil-Jardine et al., 2018; Janssen & van Donzel, 2023; Smart, 2022), self-esteem (Janssen & van Donzel, 2023), and post-traumatic growth (Smart, 2022). Additionally, multiple studies focused on treating symptoms of specific disorders (Amano & Toichi, 2017; Carletto et al., 2016; Chemali & Meadows, 2004; Gil-Jardine et al., 2018; Konuk et al., 2011; Olędzka et al., 2016), e.g. fatigue in

patients with MS. All studies reported beneficial effects of EMDR when comparing measurements before and after treatment, except for one case study: the study reported that the symptoms of anxiety and depression remained consistent although the patient, suffering from Alzheimer's disease, subjectively reported less distress (van der Wielen et al., 2019). The majority (11/14) reported a follow-up up to 13 months and reported that the beneficial effects remained over time. Moreover, two out of three (pilot) RCTs included reported beneficial effects of EMDR-therapy over controls (Gil-Jardine et al., 2018; Hatefi et al., 2019), and reassurance (Gil-Jardine et al., 2018), the remaining RCT found beneficial effects of both interventions: EMDR-therapy and relaxation therapy (RT) (Carletto et al., 2016).

### 3.5.3. Oncology

Fourteen studies described the use of EMDR-therapy in cancer patients: see Supplementary Table 4C. Most studies studied EMDR-therapy in patients with several types of cancer in different cancer stages (Abdi et al., 2021; Capezzani et al., 2013; Faretta, 2018; Jarero et al., 2015; 2016; 2018; Mélin et al., 2018; Roberts, 2018), three studies specifically in breast cancer patients (Carletto et al., 2019; Lantheaume, 2018; Trznadel & Grzybek, 2017), one study in patients with glioblastoma (Szpringer et al., 2018), one study in patients with gastrointestinal cancer (Borji et al., 2019), and one case study describes the efficacy of EMDR-therapy in a patient with larynx carcinoma undergoing radiotherapy (Dinapoli et al., 2019). Main outcome measures were: PTSD symptoms (Capezzani et al., 2013; Carletto et al., 2019; Faretta et al., 2016; Jarero et al., 2015; Jarero et al., 2016; Jarero et al., 2018; Lantheaume, 2018; Roberts, 2018), anxiety (Capezzani et al., 2013; Carletto et al., 2019; Dinapoli et al., 2019; Jarero et al., 2018; Lantheaume, 2018; Mélin et al., 2018; Roberts, 2018; Szpringer et al., 2018), depression (Capezzani et al., 2013; Carletto et al., 2019; Jarero et al., 2018; Lantheaume, 2018; Roberts, 2018; Szpringer et al., 2018), pain (Abdi et al., 2021; Mélin et al., 2018), distress (Borji et al., 2019; Trznadel & Grzybek, 2017), sleeping disturbances (Mélin et al., 2018), QoL (Lantheaume, 2018), and sense of coherence level (Szpringer et al., 2018). All studies reported a beneficial effect of EMDR-therapy on the mentioned outcome measures. The effect remained during the follow-up periods up to six months (Abdi et al., 2021; Jarero et al., 2015; 2016; 2018; Lantheaume, 2018; Roberts, 2018). Within performed RCTs, the effect of EMDR-therapy seemed superior to the effects of TAU (Abdi et al., 2021; Borji et al., 2019; Carletto et al., 2019; Jarero et al., 2018; Szpringer et al., 2018), and CBT (Capezzani et al., 2013; Faretta,

2018), whereas CBT came out as an effective intervention too.

#### 3.5.4. Obstetrics

Within the domain of obstetrics eight studies reported on the efficacy of EMDR-therapy, mostly after traumatic childbirth (6/8): See Supplementary Table 4D (Chiorino et al., 2020; Kranenburg et al., 2021; Madrid et al., 2006; Sandström et al., 2008; Stramrood et al., 2012; Zolghadr et al., 2019). The other two studies described the use of EMDR-therapy in women with hyperemesis gravidarum (Kavakci & Yenicesu, 2014) and anxiety during pregnancy (Baas et al., 2020). All studies described the effect of EMDR directly post intervention. Five studies followed the studied women from weeks up to years after EMDR-therapy (Baas et al., 2020; Chiorino et al., 2020; Kavakci & Yenicesu, 2014; Madrid et al., 2006; Sandström et al., 2008). All studies that evaluated on PTSD symptoms reported a (significant) positive effect of EMDR after treatment (Baas et al., 2020; Chiorino et al., 2020; Kranenburg et al., 2021; Sandström et al., 2008; Stramrood et al., 2012). Further, one RCT reported no significant effect of one EMDR session on maternal bonding (Chiorino et al., 2020), where a case study described a positive effect with six EMDR sessions (Madrid et al., 2006). Two studies described a positive effect of EMDR-therapy on pregnancy-related anxiety (Baas et al., 2020; Zolghadr et al., 2019), of which one was a RCT (Zolghadr et al., 2019). One RCT evaluated on post-partum depressive symptoms, in which no significant effect of one EMDR session was seen compared to one supportive psychological consultation (Chiorino et al., 2020). In one case series study, EMDR-therapy seemed effective in reducing nausea and vomiting in four women with hyperemesis gravidarum (Kavakci & Yenicesu, 2014).

#### 3.5.5. Otorhinolaryngology

Six studies evaluated the use of EMDR-therapy in tinnitus patients: see Supplementary Table 4E. In two studies, EMDR-therapy was performed after tinnitus retraining therapy (TRT) (Luyten, Jacquemin, et al., 2020; Van Der Wal et al., 2020). Tinnitus-related outcome measures were: tinnitus-related disability (D'Andréa et al., 2022; Moore et al., 2020; Phillips et al., 2019), discomfort and distress (D'Andréa et al., 2022; Luyten, Jacquemin, et al., 2020; Rikkert et al., 2018; Van Der Wal et al., 2020), and loudness (Luyten, Jacquemin, et al., 2020). Additionally, the effect on depression and anxiety was studied (Luyten, Jacquemin, et al., 2020; Moore et al., 2020; Phillips et al., 2019). Overall, EMDR treatment was shown to have a positive effect on tinnitus-related outcomes in all studies. The effect remained during follow-up up to six months (Luyten, Jacquemin, et al., 2020; Moore et al., 2020; Phillips et al., 2019; Rikkert et al.,

2018; Van Der Wal et al., 2020). In one RCT, the effect of EMDR-therapy was not superior to the effect of CBT (Luyten, Jacquemin, et al., 2020). One interventional study described no significant effect on depression and anxiety (Moore et al., 2020), whereas one RCT measured a reduction of anxiety and depression (Luyten, Jacquemin, et al., 2020), and one interventional study described only a reduction of depressive symptoms (Phillips et al., 2019). Further, one case study described a positive effect of EMDR-therapy on vision, anxiety and distress in a patient with daytime blindness (Dilara Altunbaş, 2018).

#### 3.5.6. Rheumatology

Two studies described the efficacy of EMDR-therapy in rheumatoid arthritis (RA) patients (Nia et al., 2018; 2019), and three studies in fibromyalgia patients (Kavakci et al., 2010; 2012; Teneycke, 2015): see Supplementary Table 4F. In two RCT studies, the effect of EMDR-therapy was compared to guided imagery in RA patients (Nia et al., 2018; 2019). Pain and insomnia were measured before and two weeks after treatment without follow-up. For both measurements, there was a significant beneficial effect of EMDR-therapy, superior to guided imagery. Two multiple case studies and one case study described the effect of EMDR-therapy on fibromyalgia patients (Kavakci et al., 2010; 2012; Teneycke, 2015). EMDR-therapy was evaluated on physical symptoms (fibromyalgia symptoms and pain) and psychological symptoms (PTSD symptoms, depression, sleep and anger control). Overall, there was a reduction in physical as well as psychological symptoms after EMDR treatment in those three studies.

#### 3.5.7. Pulmonary medicine

Five studies focused on the efficacy of EMDR-therapy in pulmonary disorders: four studies focused on COVID-19 and one study on COPD (Supplementary Table 4G). The efficacy of EMDR-therapy was evaluated on symptoms of distress (Brennstuhl et al., 2022; Dinapoli et al., 2023; Mooren et al., 2022), anxiety (Bates et al., 2022; Brennstuhl et al., 2022; Mooren et al., 2022), depression (Bates et al., 2022; Brennstuhl et al., 2022; Mooren et al., 2022), PTSD (Bates et al., 2022; Yurtsever et al., 2022), fear (Brennstuhl et al., 2022), dissociative disorders (Dinapoli et al., 2023), dyspnoea, fatigue, emotional function and mastery (Mooren et al., 2022), QoL (Bates et al., 2022; Mooren et al., 2022), resilience (Bates et al., 2022), and appetite and predicted weight (Bates et al., 2022). Additionally, one study conducted interviews (Mooren et al., 2022) and one study evaluated the feasibility of delivering online therapy (Bates et al., 2022). All studies found significant beneficial effects of EMDR-therapy when comparing measurements before and directly after treatment, although

not on every outcome measure, and these effects remained at follow-up (Bates et al., 2022; Brennstuhl et al., 2022; Yurtsever et al., 2022). One RCT study compared EMDR + TAU to TAU and found significant improvements in the EMDR + TAU group but did not find a significant difference between groups (Bates et al., 2022).

### 3.5.8. Cardiology

Four studies described the use of EMDR-therapy in cardiac events and all studies were (pilot-)RCTs: see Supplementary Table 4H. One study focused on the efficacy of EMDR-therapy in cardiac events and the remaining three studies specifically focused on patients who have suffered a myocardial infarction (MI). The efficacy of EMDR-therapy was evaluated on symptoms of anxiety (Arabia et al., 2011; Moradi et al., 2016; Zeighami et al., 2018), depression (Arabia et al., 2011; Behnamoghdam et al., 2015), and PTSD (Arabia et al., 2011). All studies reported significant beneficial effects of EMDR-therapy when comparing measurements before and after treatment. Moreover, significantly greater effects of EMDR-therapy were found compared to other treatments, including Imaginal Exposure (Arabia et al., 2011), CBT (Zeighami et al., 2018), and control groups (Behnamoghdam et al., 2015; Moradi et al., 2016; Zeighami et al., 2018), which remained during follow-up. Some studies reported that other treatments (Arabia et al., 2011; Zeighami et al., 2018) and control groups (Moradi et al., 2016) also showed significant beneficial effects. Conversely, one study reported a significant increase of symptoms in the control group compared to pre-treatment measurements (Behnamoghdam et al., 2015).

### 3.5.9. Gynaecology

Three studies described the efficacy of EMDR-therapy on gynaecologic conditions: see Supplementary Table 4I. Two studies focused on sexual functionality and specifically concentrated on women with vaginismus (Jebelli et al., 2018; Torun, 2010). The third study focused on participants suffering from dysmenorrhoea (Valedi et al., 2022). All studies described a follow-up period. The efficacy of EMDR was evaluated on symptoms of anxiety (Jebelli et al., 2018; Torun, 2010; Valedi et al., 2022), sexual functioning (Jebelli et al., 2018), emotional distress (Torun, 2010), dysfunctional beliefs (Torun, 2010), QoL (Jebelli et al., 2018), and sexual satisfaction (Jebelli et al., 2018). Two studies found beneficial effects of EMDR-therapy when comparing measurements before and directly after treatment (Jebelli et al., 2018; Torun, 2010), of which one study reported that the results did not remain at follow-up (Jebelli et al., 2018). One RCT study that focused on dysmenorrhoea compared EMDR-therapy to no interventions did not find a statistically and

clinically significant effect of EMDR (Valedi et al., 2022).

### 3.5.10. Dentistry

Three studies focused on the efficacy of EMDR-therapy on dental problems of which one study focused on psychological problems caused by idiopathic pain and two focused on dental phobia: see Supplementary Table 4J. The efficacy of EMDR-therapy was evaluated on dental anxiety and fear (de Jongh et al., 2002; Doering et al., 2013), psychological problems (de Jongh et al., 2002; Gorisse et al., 2010), psychological trauma (de Jongh et al., 2002), severity of dental phobia (de Jongh et al., 2002), and symptoms of anxiety, depression, and PTSD (Doering et al., 2013). All studies found significant beneficial effects of EMDR-therapy when comparing measurements before and after treatment, and during follow-up. A RCT focused on dental phobia and compared EMDR-therapy to waitlist and found that EMDR-therapy showed significant reductions in dental anxiety.

### 3.5.11. Dermatology

Two studies focused on the efficacy of EMDR-therapy in dermatologic disorders, of which one study specifically focused on atopic dermatitis: see Supplementary Table 4K. Both studies reported beneficial effects of EMDR-therapy which remained over time at follow-up. The case study reported improvements of the patient's symptoms of PTSD, depression, and anxiety, and itching behaviour (Yasar et al., 2022). A multiple case study reported improvements in all patients with dermatological disorders in terms of dermatologic symptoms and emotional distress (Gupta & Gupta, 2002).

### 3.5.12. Persistent physical complaints

In three studies, the effect of EMDR-therapy was described in patients with persistent physical complaints without a somatic substrate, namely body dysmorphic disorder (BDD) (Brown et al., 1997), somatic symptom disorder (Demirci et al., 2017), and chronic fatigue syndrome (Royle, 2008): see Supplementary Table 4L. A multiple case study showed a positive effect of EMDR-therapy on BDD symptomatology in six out of seven included patients. The positive effect remained during follow-up (one year) (Brown et al., 1997). One RCT compared EMDR-therapy to pharmacological treatment with duloxetine in patients with somatic symptom disorder. Both interventions showed a statistically significant reduction of somatization, anxiety and depression, with a superior effect of EMDR-therapy (Demirci et al., 2017). A case study found favourable effects of EMDR-therapy in a patient with chronic fatigue syndrome: there was a



reduced need for sleep and energy levels were higher, which remained at follow-up (Royle, 2008).

### 3.5.13. Internal medicine

A RCT focused on the efficacy of EMDR-therapy compared to control on the fear of hypoglycaemia among patients with type II diabetes mellitus (Sheikhi et al., 2020). They found a significant reduction of fear of hypoglycaemia in the EMDR group compared to the pre-intervention levels and to the control group, which remained at follow-up: see Supplementary Table 4M.

### 3.5.14. Nephrology

One RCT evaluated the effectiveness of EMDR-therapy compared to a control group on anxiety and depression in patients that received haemodialysis (Rahimi et al., 2019). The study found a significant reduction of the symptoms of anxiety and depression in the EMDR group compared to the pre-intervention levels and to the control group, two weeks post-intervention: see Supplementary Table 4N.

### 3.5.15. Intensive care unit

One case study described a positive effect, lasting up to four months after treatment, of online performed EMDR-therapy on depression, anxiety and QoL in a patient who survived ICU admission and suffered from PTSD afterwards (Clarke, 2022): see Supplementary Table 4O.

## 4. Discussion

To our knowledge, this is the first systematic literature review that evaluated the use and effectiveness of EMDR-therapy for adult patients treated in the medical setting, including hospitals, extramural specialized clinics and private clinics, in which the treatment can be extrapolated to hospitals, across various medical domains. The vast majority of studies found favourable effects of EMDR-therapy within multiple domains and outcomes. Moreover, the treatment appeared to be applicable in both inpatients and outpatients in the medical setting. Due to a high heterogeneity among the study designs, the reported outcomes and outcome measures combined with different treatment protocols, a meta-analysis could not be performed.

The studies included varied in terms of risk of bias: the overall appraisal of these studies showed at least moderate to high risks of bias. It should be noted that concerns regarding measurement of the outcome are inevitable as, like many practice-based research in psychology, it is impossible to blind patients to the type of therapy they receive. Risk of bias is further increased by the initial choice to include a broad variety of study designs to aim for a broad understanding

of the application of EMDR-therapy in the medical setting. This resulted in the inclusion of many uncontrolled studies. Moreover, a vast majority of the included studies did not mention whether there were any adverse events during EMDR treatment (Klatte et al., 2023). Although this could be interpreted as an affirmation of the feasibility of EMDR-therapy in the medical setting, supported by low chance of adverse events, reporting biases are not unthinkable. Therefore, future research should aim for randomized controlled studies, in which adverse events, and treatment adherence are explicitly mentioned.

Many different outcome measures were used in the included studies, ranging from disease-related (e.g. pain, skin condition), to relatively generic outcome measures for mental health (e.g. anxiety, depression), and specifically PTSD. The use of disease-related outcome measures leads to the question of how it is possible that a therapy developed to treat PTSD also affects physical symptoms, in 'somatically ill' patients not per se diagnosed with PTSD. In this respect, it is key to realize that people with physical illness can also suffer from psychological trauma, where their own body is perceived to be the perpetrator (Shapiro, 1995). Medical trauma then, is defined as 'extremely stressful experiences caused by the somatic disorder itself or by subsequent medical treatment' (Hase, 2019). For that reason, it would have been of interest to also include information about the hospitalization history of patients, but these data were not consequently reported. Such data could have helped to provide more insight into the possible effects of illness course (e.g. number and length of hospitalizations) on treatment response.

Shapiro's adaptive information processing (AIP) model (Solomon & Shapiro, 2008), offers a solution in explaining how the lasting effect of extremely stressful illness-related experiences – which take the form of physical symptoms – can be reversed by EMDR-therapy. The premise of the AIP model is that many kinds of psychopathology can be seen as the result of disruptive experiences (in the form of images, emotions, cognitions, bodily sensations) that are stored in the nervous system at the time of the event. EMDR-therapy makes the stored traumatic experience accessible while at the same time activating the natural processing system. It is hypothesized that symptoms diminish because a new connection is established in the neural network between stored dysfunctional information, and other existing, more healthy information and perceptions. Focusing on memories of disease-related traumatic experiences then provides a good entry point for treatment.

Limitations of our study include the choices made in our search and inclusion process. First, by including 'psychological' outcome measures such as anxiety and depression in our search strings, it cannot be ruled out

that we may have missed studies that exclusively included ‘somatic’ outcome measures such as ‘pain’ or ‘dizziness’. Even though anxiety, depression and stress can co-occur with both somatic symptoms and with PTSD, for which EMDR-therapy is an evidence-based treatment, this does not guarantee that some relevant manuscripts have not been missed. Second, studies on patients with somatic symptom disorder were included, whereas studies on patients with eating disorders were excluded. It can be debated whether these studies on patients with somatic symptom disorder fit in the scope of this review, as we aim to evaluate EMDR-therapy in the medical setting in patients with somatic morbidity. However, since persistent physical complaints account for a large part of healthcare consumption in primary and secondary healthcare (Wortman et al., 2018), and form an important part of daily hospital practice, we also included these three studies. Patients with eating disorders on the other hand may be less likely to present for treatment in the medical setting.

Implementing EMDR-therapy in the medical setting comes with several practical advantages and disadvantages. An advantage can be that, since therapies can be relatively short, they can easily go alongside medical treatment for the time period patients are being treated. For inpatients, it may be an advantage to receive therapy whilst being admitted anyway, meaning that patients do not have to spend time on extra travel or search for mental health care after discharge, which can be quite difficult given the long waiting list for mental health care in many countries. Disadvantages include the taxability of patients, who because of their condition may be tired sooner. This does not necessarily mean that application of EMDR-therapy is not possible, it rather asks for a certain creativity and flexibility in applying therapy. Also, the interrelatedness of somatic and psychological symptomatology can make working with these patients quite challenging and requires that for each patient a thorough case-conceptualization is being made, with a clear hypothesis on how particular complaints are related to memories of previous experience or imagined future catastrophe. So, sufficient general and sometimes additional specific EMDR-training is warranted for therapists.

Surprisingly, no studies were performed within the domains of surgery and preoperative anaesthesiology. In a medical setting, high incidence of anxiety is found in patients expecting an operation (Matthias & Samarasekera, 2012). Moreover, psychiatric disorders increase the risk for preoperative anxiety (Caumo et al., 2001). Though a lot of interest has gone out on psychological interventions to decrease preoperative anxiety (Stamenkovic et al., 2018), no studies on the efficacy of EMDR-therapy have been performed.

In the light of this review’s results, EMDR-therapy might be a fast and beneficial intervention to reduce preoperative anxiety in a medical setting.

## 5. Conclusions

Overall, outcomes seem to show beneficial effects of EMDR-therapy on reducing psychological and physical symptoms in patients treated in a medical setting. Due to the heterogeneity of reported outcomes, effect sizes could not be pooled. Due to the high risk of bias of the included studies, our results should be interpreted with caution and further controlled high-quality research is needed.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## ORCID

Helen P.A. Driessen  <http://orcid.org/0000-0001-8521-5980>

Sid Morsink  <http://orcid.org/0009-0005-4903-1793>

Jan J.V. Busschbach  <http://orcid.org/0000-0002-8602-0381>

Witte J.G. Hoogendijk  <http://orcid.org/0000-0002-0225-4966>

Leonieke W. Kranenburg  <http://orcid.org/0000-0001-5941-1056>

## References

- Abdi, N., Malekzadeh, M., Fereidouni, Z., Behnamoghdam, M., Zaj, P., Mozaffari, M. A., Rostaminejad, A., & Salehi, Z. (2021). Efficacy of EMDR therapy on the pain intensity and subjective distress of cancer patients. *Journal of Emdr Practice and Research*, 15(1), 18–28. <https://doi.org/10.1891/EMDR-D-20-00036>
- Ahmed, A. (2018). EMDR therapy for an elderly woman with depression, traumatic memories, and Parkinson’s disease dementia: A case study. *Journal of Emdr Practice and Research*, 12(1), 16–23. <https://doi.org/10.1891/1933-3196.12.1.16>
- Amano, T., & Toichi, M. (2017). Effectiveness of the on-the-spot-EMDR method for the treatment of behavioral symptoms in patients with severe dementia. *Journal of Emdr Practice and Research*, 11(1), 27–44. <https://doi.org/10.1891/1933-3196.11.1.E27>
- D’Andréa, G., Giacchero, R., Roger, C., Vandersteen, C., & Guevara, N. (2022). Evaluation of eye movement desensitization and reprocessing in the management of tinnitus. An observational study. *European Annals of Otorhinolaryngology, Head and Neck Diseases*, 139(2), 65–71. <https://doi.org/10.1016/j.anorl.2021.06.002>
- Arabia, E., Manca, M. L., & Solomon, R. M. (2011). EMDR for survivors of life-threatening cardiac events: Results of a pilot study. *Journal of EMDR Practice and Research*, 5(1), 2–13. <https://doi.org/10.1891/1933-3196.5.1.2>
- Arias Suarez, N., Perez, J. M., Redolar-Ripoll, D., Hogg, B. M., Gardoki-Souto, I., Guerrero, F. G., Cabrera, S. J., Bernal, D. S., Amann, B. L., & Moreno-Alcázar, A.

- (2020). EMDR versus treatment-as-usual in patients with chronic non-malignant pain: A randomized controlled pilot study. *Journal of EMDR Practice and Research*, 14(4), 190–205. <https://doi.org/10.1891/EMDR-D-20-00004>
- Association AP. (2017). *Clinical practice guideline for the treatment of posttraumatic stress disorder*. American Psychological Association. [updated 31-07-2017. Available from: <https://www.apa.org/ptsd-guideline/treatments/eye-movement-reprocessing>.
- Baas, M. A. M., van Pampus, M. G., Braam, L., Stramrood, C. A. I., & de Jongh, A. (2020). The effects of PTSD treatment during pregnancy: Systematic review and case study. *European Journal of Psychotraumatology*, 11(1), 1762310. <https://doi.org/10.1080/20008198.2020.1762310>
- Bates, A., Golding, H., Rushbrook, S., Shapiro, E., Pattison, N., Baldwin, D. S., Grocott, M. P. W., & Cusack, R. (2022). A randomised pilot feasibility study of eye movement desensitisation and reprocessing recent traumatic episode protocol, to improve psychological recovery following intensive care admission for COVID-19. *Journal of the Intensive Care Society*, 24(3), 309–319.
- Behnammoghadam, M., Alamdari, A. K., Behnammoghadam, A., & Darban, F. (2015). Effect of eye movement desensitization and reprocessing (EMDR) on depression in patients with myocardial infarction (MI). *Global Journal of Health Science*, 7(6), 258–262. <https://doi.org/10.5539/gjhs.v7n6p258>
- Borji, M., Tarjoman, A., Abdi, A., & Otaghi, M. (2019). Efficacy of implementing home care using eye movement desensitization and reprocessing in reducing stress of patients with gastrointestinal cancer. *Asian Pacific Journal of Cancer Prevention*, 20(7), 1967–1971. <https://doi.org/10.31557/APJCP.2019.20.7.1967>
- Brennstuhl, M. J., Bassan, F., & Tarquinio, C. (2017a). Use of an eye movement desensitization and reprocessing (EMDR) therapy in chronic pain management: Case study. *Douleurs*, 18(1), 24–33.
- Brennstuhl, M. J., Pascale, T., Ann, R. J., Louise, T. C., Lydia, P., Christine, R., & Cyril, T. (2022). Treating COVID-19 patients with EMDR: A pilot study. *European Journal of Trauma & Dissociation*, 6(3), 1–6. <https://doi.org/10.1016/j.ejtd.2022.100276>
- Brennstuhl, M. J., Tarquinio, C., & Bassan, F. (2016). Use of an eye movement desensitization and reprocessing (EMDR) therapy in chronic pain management: A pilot study. *Pratiques Psychologiques*, 22(1), 17–29. <https://doi.org/10.1016/j.prps.2015.11.002>
- Brennstuhl, M. J., Tarquinio, C., Montel, S., Masson, J., Bassan, F., & Tarquinio, P. (2017b). Utilisation de la thérapie eye movement desensitization and reprocessing (EMDR) pour le traitement du syndrome du sein fantôme : étude pilote. *Psychologie Française*, 62(1), 107–119. <https://doi.org/10.1016/j.psf.2015.09.001>
- Brennstuhl, M., Tarquinio, C., Montel, S., Masson, J., Bassan, F., & Tarquinio, P. (2015). Using Eye Movement Desensitization and Reprocessing (EMDR) as a treatment for phantom breast syndrome: Case study. *Sexologies: European Journal of Sexuality and Sexual Health / Revue Européenne de Sexologie et de Santé Sexuelle*, 24(2), e29–e36.
- Brown, K. W., McGoldrick, T., & Buchanan, R. (1997). Body dysmorphic disorder: Seven cases treated with Eye Movement Desensitization and Reprocessing. *Behavioural and Cognitive Psychotherapy*, 25(2), 203–207. <https://doi.org/10.1017/S1352465800018403>
- Capezzani, L., Ostacoli, L., Cavallo, M., Carletto, S., Fernandez, I., Solomon, R., Pagani, M., & Cantelmi, T. (2013). EMDR and CBT for cancer patients: Comparative study of effects on PTSD, anxiety, and depression. *Journal of EMDR Practice and Research*, 7(3), 134–143. <https://doi.org/10.1891/1933-3196.7.3.134>
- Carletto, S., Borghi, M., Bertino, G., Oliva, F., Cavallo, M., Hofmann, A., Zennaro, A., Malucchi, S., & Ostacoli, L. (2016). Treating post-traumatic stress disorder in patients with multiple sclerosis: A randomized controlled trial comparing the efficacy of eye movement desensitization and reprocessing and relaxation therapy. *Frontiers in Psychology*, 7, Article 526, 1–9. <https://doi.org/10.3389/fpsyg.2016.00526>
- Carletto, S., Porcaro, C., Settanta, C., Vizzari, V., Stanizzo, M. R., Oliva, F., Torta, R., Fernandez, I., Moja, M. C., Pagani, M., & Ostacoli, L. (2019). Neurobiological features and response to Eye Movement Desensitization and Reprocessing treatment of posttraumatic stress disorder in patients with breast cancer. *European Journal of Psychotraumatology*, 10(1), 1600832. <https://doi.org/10.1080/20008198.2019.1600832>
- Caumo, W., Schmidt, A. P., Schneider, C. N., Bergmann, J., Iwamoto, C. W., Bandeira, D., & Ferreira M. B. C. (2001). Risk factors for preoperative anxiety in adults. *Acta Anaesthesiologica Scandinavica*, 45(3), 298–307. <https://doi.org/10.1034/j.1399-6576.2001.045003298.x>
- Chemali, Z., & Meadows, M. E. (2004). The use of Eye Movement Desensitization and Reprocessing in the treatment of psychogenic seizures. *Epilepsy & Behavior*, 5(5), 784–787. <https://doi.org/10.1016/j.yebeh.2004.06.003>
- Chiorino, V., Cattaneo, M. C., Macchi, E. A., Salerno, R., Roveraro, S., Bertolucci, G. G., Mosca, F., Fumagalli, M., Cortinovis, I., Carletto, S., & Fernandez, I. (2020). The EMDR recent birth trauma protocol: A pilot randomised clinical trial after traumatic childbirth. *Psychology & Health*, 35(7), 795–810. <https://doi.org/10.1080/08870446.2019.1699088>
- Clarke, R. (2022). The EMDR recent traumatic episode protocol with an intensive care survivor: A case study. *Journal of Emdr Practice and Research*, 16(2), 50–60. <https://doi.org/10.1891/EMDR-2021-0028>
- Cope, S. R., Mountford, L., Smith, J. G., & Agrawal, N. (2018). EMDR to treat functional neurological disorder: A review. *Journal of EMDR Practice and Research*, 12(3), 118–132. <https://doi.org/10.1891/1933-3196.12.3.118>
- Cuijpers, P., Veen, S., Sijbrandij, M., Yoder, W., & Cristea, I. A. (2020). Eye Movement Desensitization and Reprocessing for mental health problems: A systematic review and meta-analysis. *Cognitive Behaviour Therapy*, 49(3), 165–180. <https://doi.org/10.1080/16506073.2019.1703801>
- Demirci, O. O., Sagaltici, E., Yildirim, A., & Boysan, M. (2017). Comparison of Eye Movement Desensitization and Reprocessing (EMDR) and duloxetine treatment outcomes in women patients with somatic symptom disorder. *Sleep and Hypnosis - International Journal*, 19(3), 70–77. <https://doi.org/10.5350/Sleep.Hypn.2017.19.0146>
- Dilara Altunbaş, F. (2018). Treating daytime blindness with eye movement desensitization and reprocessing: A case report. *The European Research Journal*, 4(4), 421–424. <https://doi.org/10.18621/eurj.372040>
- Dimitrov, L., Moschopoulou, E., & Korszun, A. (2019). Interventions for the treatment of cancer-related traumatic stress symptoms: A systematic review of the literature. *Psychooncology*, 28(5), 970–979. <https://doi.org/10.1002/pon.5055>
- Dinapoli, L., Ferrarese, D., Beella, D., Carnevale, S., Camardese, G., Sani, G., & Chieffo, D. P. R. (2023).

- Psychological treatment of traumatic memories in COVID-19 survivors. *Clinical Psychology & Psychotherapy*, 30(1), 225–233. <https://doi.org/10.1002/cpp.2771>
- Dinapoli, L., Massaccesi, M., Colloca, G., Tenore, A., Dinapoli, N., & Valentini, V. (2019). Efficacy of an Eye Movement Desensitization and Reprocessing (EMDR) intervention for a head and neck cancer patient with intolerable anxiety undergoing radiotherapy. *Psycho-Oncology*, 28(3), 647–649. <https://doi.org/10.1002/pon.5000>
- Doering, S., Ohlmeier, M. C., de Jongh, A., Hofmann, A., & Bisping, V. (2013). Efficacy of a trauma-focused treatment approach for dental phobia: A randomized clinical trial. *European Journal of Oral Sciences*, 121(6), 584–593. <https://doi.org/10.1111/eos.12090>
- Excellence NifHaC. Post-traumatic stress disorder: NICE guideline: NICE; 2018 [updated 05-12-2018]. <https://www.nice.org.uk/guidance/ng116>.
- Faretta, E. (2018). EMDR in psychoncology. *Clinical Neuropsychiatry: Journal of Treatment Evaluation*, 15(3), 206–221.
- Faretta, E., Borsato, T., Civilotti, C., Fernandez, I., & Pagani, M. (2016). EMDR and CBT: A comparative clinical study with oncological patients. *Journal of EMDR Practice and Research*, 10(3), 215–227. <https://doi.org/10.1891/1933-3196.10.3.215>
- Flik, C. E., & de Roos, C. (2010). Eye movement desensitization and reprocessing (EMDR) as a treatment for phantom limb pain. *Tijdschr Psychiatr*, 52(8), 589–593.
- Gattinara, P. C. (2009). Working with EMDR in chronic incapacitating diseases: The experience of a neuromuscular diseases center. *Journal of EMDR Practice and Research*, 3(3), 169–177. <https://doi.org/10.1891/1933-3196.3.3.169>
- Gerhardt, A., Leisner, S., Hartmann, M., Janke, S., Seidler, G. H., Eich, W., & Tesarz, J. (2016). Eye movement desensitization and reprocessing vs. treatment-as-usual for non-specific chronic back pain patients with psychological trauma: A randomized controlled pilot study. *Frontiers in Psychiatry*, 7, Article 201, 1–10 <https://doi.org/10.3389/fpsy.2016.00201>
- Gil-Jardine, C., Evrard, G., Al Joboory, S., Tortes Saint Jammes, J., Masson, F., Ribereau-Gayon, R., Galinski, M., Salmi, L.-R., Revel, P., Régis, C. A., Valdenaire, G., & Lagarde, E. (2018). Emergency room intervention to prevent post concussion-like symptoms and post-traumatic stress disorder. A pilot randomized controlled study of a brief Eye Movement Desensitization and Reprocessing intervention versus reassurance or usual care. *Journal of Psychiatric Research*, 103, 229–236. <https://doi.org/10.1016/j.jpsychires.2018.05.024>
- Gorisse, E., de Jongh, A., & Hassan, B. (2010). Treatment of idiopathic facial pain following implant placement. *Nederlands Tijdschrift Voor Tandheelkunde*, 117(2), 075–078. <https://doi.org/10.5177/ntvt2010.02.08163>
- Grant, M. (2000). EMDR: A new treatment for trauma and chronic pain. *Complementary Therapies in Nursing and Midwifery*, 6(2), 91–94. <https://doi.org/10.1054/ctnm.2000.0459>
- Grant, M., & Threlfo, C. (2002). EMDR in the treatment of chronic pain. *Journal of Clinical Psychology*, 58(12), 1505–1520. <https://doi.org/10.1002/jclp.10101>
- Grubaugh, A. L., Brown, W. J., Wojtalik, J. A., Myers, U. S., & Eack, S. M. (2021). Meta-Analysis of the treatment of posttraumatic stress disorder in adults with comorbid severe mental illness. *The Journal of Clinical Psychiatry*, 82(3), 1–11. <https://doi.org/10.4088/JCP.20r13584>
- Guina, J., & Guina, C. (2018). Wants talk psychotherapy but cannot talk: EMDR for post-stroke depression with expressive aphasia. *Innov Clin Neurosci*, 15(1-2), 45–48.
- Gupta, M. A., & Gupta, A. K. (2002). Use of Eye Movement Desensitization and Reprocessing (EMDR) in the treatment of dermatologic disorders. *Journal of Cutaneous Medicine and Surgery*, 6(5), 415–421. <https://doi.org/10.1177/120347540200600501>
- Haerizadeh, M., Sumner, J. A., Birk, J. L., Gonzalez, C., Heyman-Kantor, R., Falzon, L., Gershengoren, L., Shapiro, P., & Kronish, I. M. (2020). Interventions for posttraumatic stress disorder symptoms induced by medical events: A systematic review. *Journal of Psychosomatic Research*, 129, Article 109908, 1–7. <https://doi.org/10.1016/j.jpsychores.2019.109908>
- Hase, M. (2019). *Medical trauma: EMDR therapy to treat the sequelae of somatic illness and medical treatment. Eye Movement Desensitization and Reprocessing (EMDR) therapy scripted protocols and summary sheets: Treating trauma in somatic and medical related conditions* (pp. 111–150). Springer Publishing Company.
- Hatefi, M., Tarjoman, A., Moradi, S., & Borji, M. (2019). The effect of eye movement desensitization and reprocessing on depression and anxiety in patients with spinal cord injuries. *Trauma Monthly*, 24(5), 1–6.
- Herzog, J. I., & Schmahl, C. (2018). Adverse childhood experiences and the consequences on neurobiological, psychosocial, and somatic conditions across the lifespan. *Frontiers in Psychiatry*, 9, Article 420, 1–8. <https://doi.org/10.3389/fpsy.2018.00420>
- Hudays, A., Gallagher, R., Hazazi, A., Arishi, A., & Bahari, G. (2022). Eye movement desensitization and reprocessing versus cognitive behavior therapy for treating post-traumatic stress disorder: A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, 19(24), 16836. <https://doi.org/10.3390/ijerph192416836>
- (IHE) IoHE. (2014). *Quality appraisal of case series studies checklist*. Institute of Health Economics.
- Janssen, E. P. J., & van Donzel, L. (2023). Treatment of post-traumatic stress symptoms with EMDR in a patient with aphasia. *Tijdschrift Psychiatrie*, 65(3), 186–189.
- Jarero, I., Artigas, L., Uribe, S., & Garcia, L. E. (2016). The EMDR integrative group treatment protocol for patients with cancer. *Journal of EMDR Practice and Research*, 10(3), 199–207. <https://doi.org/10.1891/1933-3196.10.3.199>
- Jarero, I., Artigas, L., Uribe, S., Garcia, L. E., Cavazos, M. A., & Givaudan, M. (2015). Pilot research study on the provision of the Eye Movement Desensitization and Reprocessing integrative group treatment protocol with female cancer patients. *Journal of EMDR Practice and Research*, 9(2), 98–105. <https://doi.org/10.1891/1933-3196.9.2.98>
- Jarero, I., Givaudan, M., & Osorio, A. (2018). Randomized controlled trial on the provision of the EMDR integrative group treatment protocol adapted for ongoing traumatic stress to female patients with cancer-related posttraumatic stress disorder symptoms. *Journal of EMDR Practice and Research*, 12(3), 94–104. <https://doi.org/10.1891/1933-3196.12.3.94>
- Jebelli, F., Maaroufi, M., Maracy, M. R., & Molaeinezhad, M. (2018). Effectiveness of Eye Movement Desensitization and Reprocessing (EMDR) on the sexual function of Iranian women with lifelong vaginismus. *Sexual and Relationship Therapy*, 33(3), 325–338. <https://doi.org/10.1080/14681994.2017.1323075>

- de Jongh, A., van den Oord, H., & ten Broeke, E. (2002). Efficacy of Eye Movement Desensitization and Reprocessing in the treatment of specific phobia: Four single-case studies on dental phobia. *Journal of Clinical Psychology, 58*(12), 1489–1503. <https://doi.org/10.1002/jclp.10100>
- Kavakci, O., Kaptanoglu, E., Kugu, N., & Dogan, O. (2010). EMDR: A new choice of treatment in fibromyalgia? A review and report of a case presentation EMDR fibromiyalji tedavisinde yeni bir secenek olabilir mi? Olgu sunumu ve gozden gecirme. *Klinik Psikiyatri Dergisi: The Journal of Clinical Psychiatry, 13*(3), 143–151.
- Kavakci, O., Semiz, M., Kaptanoglu, E., & Ozer, Z. (2012). EMDR treatment of fibromyalgia, a study of seven cases. *Anadolu Psikiyatri Dergisi-Anatolian Journal of Psychiatry, 13*(1), 75–81.
- Kavakci, O., & Yenicesu, G. I. (2014). Eye movement desensitization and reprocessing (EMDR) for hyperemesis gravidarum: A case series. *Dusunen Adam: The Journal of Psychiatry and Neurological Sciences, 27*(4), 335–341. <https://doi.org/10.5350/DAJPN2014270408>
- Klatte, R., Strauss, B., Flückiger, C., & Rosendahl, J. (2023). Adverse events in psychotherapy randomized controlled trials: A systematic review. *Psychotherapy Research, 1–16*. <https://doi.org/10.1080/10503307.2023.2286992>
- Konuk, E., Epozdemir, H., Atceken, S. H., Aydin, Y. E., & Yurtsever, A. (2011). EMDR treatment of migraine. *Journal of EMDR Practice and Research, 5*(4), 166–176. <https://doi.org/10.1891/1933-3196.5.4.166>
- Kranenburg, L. W., Bijma, H. H., Eggink, A. J., Knijff, E. M., & Lambregtse-van den Berg, M. P. (2021). Implementing an eye movement and desensitization reprocessing treatment-program for women with posttraumatic stress disorder after childbirth. *Frontiers in Psychology, 12*, Article 797901, 1–7. <https://doi.org/10.3389/fpsyg.2021.797901>
- Lantheaume, S. (2018). Use of EMDR therapy in the treatment of PTSD after breast cancer utilisation de la therapie EMDR dans le traitement d'un ESPT apres cancer du sein. *Journal de Thérapie Comportementale et Cognitive, 28*(1), 3–16. <https://doi.org/10.1016/j.jtcc.2017.07.001>
- Luber, M. (2019). *Eye movement desensitization and reprocessing (EMDR) therapy scripted protocols and summary sheets: Treating trauma in somatic and medical related conditions*. (p. 494). Springer Publishing Company.
- Luyten, T., van Rompaey, V., van de Heyning, P., van Looveren, N., Jacquemin, L., Cardon, E., Declau, F., Fransen, E., de Bodt, M., & Gilles, A. (2020). EMDR in the treatment of chronic subjective tinnitus: A systematic review. *Journal of EMDR Practice and Research, 14*(3), 135–149.
- Luyten, T. R., Jacquemin, L., Van Looveren, N., Declau, F., Fransen, E., Cardon, E., De Bodt, M., Topsakal, V., Van de Heyning, P., Van Rompaey, V., & Gilles, A. (2020). Bimodal therapy for chronic subjective tinnitus: A randomized controlled trial of EMDR and TRT versus CBT and TRT. *Frontiers in Psychology, 11*, Article 2048, 1–16.
- Madrid, A., Skolek, S., & Shapiro, F. (2006). Repairing failures in bonding through EMDR. *Clinical Case Studies, 5* (4), 271–286. <https://doi.org/10.1177/1534650104267403>
- Matthias, A. T., & Samarasekera, D. N. (2012). Preoperative anxiety in surgical patients - experience of a single unit. *Acta Anaesthesiologica Taiwanica, 50*(1), 3–6. <https://doi.org/10.1016/j.aat.2012.02.004>
- Mazzola, A., Calcagno, M. L., Goicochea, M. T., Pueyrredon, H., Leston, J., & Salvat, F. (2010). L'EMDR dans le traitement de la douleur chronique. *Journal of Emdr Practice and Research, 4*(3), 31–44. <https://doi.org/10.1891/1933-3196.4.3.E31>
- McPhail, S. M. (2016). Multimorbidity in chronic disease: Impact on health care resources and costs. *Risk Management and Healthcare Policy, Volume 9*, 143–156. <https://doi.org/10.2147/RMHP.S97248>
- Mélin, M., Boussard, V., & Stadelmaier, N. (2018). Contribution of EMDR in the psychologist's practice at the hospital with patients in a palliative situation. *Psycho-Oncologie, 12*(4), 267–275. <https://doi.org/10.3166/psop-2019-0071>
- Miller, P. T., Sinclair, M., Gillen, P., McCullough, J. E. M., Miller, P. W., Farrell, D. P., Slater, P. F., Shapiro, E., & Klaus, P. (2021). Early psychological interventions for prevention and treatment of post-traumatic stress disorder (PTSD) and post-traumatic stress symptoms in post-partum women: A systematic review and meta-analysis. *PLoS ONE, 16*, Article e0258170, 1–25.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Prisma, G. (2010). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *International Journal of Surgery, 8*(5), 336–341. <https://doi.org/10.1016/j.ijsu.2010.02.007>
- Moola, S., Munn, Z., Tufanaru, C., Aromataris, E., Sears, K., Sfetcu, R., Currie, M., Lisy, K., Qureshi, R., Mattis, P., & Mu, P.-F. (2024). Systematic reviews of etiology and risk (2020). In E. Aromataris, C. Lockwood, K. Porritt, B. Pilla, & Z. Jordan (Eds.), *JBI manual for evidence synthesis*. JBI. <https://doi.org/10.46658/JBIMES-24-06>
- Moore, T., Phillips, J. S., Erskine, S. E., & Nunney, I. (2020). What has EMDR taught us about the psychological characteristics of tinnitus patients? *Journal of EMDR Practice and Research, 14*(4), 229–240. <https://doi.org/10.1891/EMDR-D-19-00055>
- Mooren, K., Smit, K., Engels, Y., Janssen, D., & Godschalx, J. (2022). “When I am breathless now, I don't have the fear that's linked to it”: A case series on the potential of EMDR to break the dyspnea-anxiety cycle in COPD. *BMC Pulmonary Medicine, 22*(1), 456. <https://doi.org/10.1186/s12890-022-02250-1>
- Moradi, M., Zeighami, R., Moghadam, M. B., Javadi, H. R., & Alipor, M. (2016). Anxiety treatment by eye movement desensitization and reprocessing in patients with myocardial infarction. *Iranian Red Crescent Medical Journal, 18*(12), 1–5. <https://doi.org/10.5812/ircmj.27368>
- Nia, N. G., Afrasiabifar, A., & Behnammoghadam, M. (2018). Comparing the effect of Eye Movement Desensitization and Reprocessing (EMDR) with guided imagery on pain severity in patients with rheumatoid arthritis. *Journal of Pain Research, Volume 11*, 2107–2113. <https://doi.org/10.2147/JPR.S158981>
- Nia, N. G., Afrasiabifar, A., Behnammoghadam, M., & Cooper, R. Z. (2019). The effect of EMDR versus guided imagery on insomnia severity in patients with rheumatoid arthritis. *Journal of Emdr Practice and Research, 13* (1), 2–9. <https://doi.org/10.1891/1933-3196.13.1.2>
- Nijdam, M. J., Gersons, B. P. R., Reitsma, J. B., de Jongh, A., & Olff, M. (2012). Brief eclectic psychotherapy v. Eye movement desensitisation and reprocessing therapy for post-traumatic stress disorder: Randomised controlled trial. *British Journal of Psychiatry, 200*(3), 224–231. <https://doi.org/10.1192/bjp.bp.111.099234>
- Olędzka, M., Gryglewicz, A., Zaborowska-Sapeta, K., Grzybek, P., & Kiezbak, W. (2016). The Eye Movement Desensitization and Reprocessing approach in pain management - A case report of a patient with paraparesis.

- Polish Annals of Medicine*, 23(1), 30–33. <https://doi.org/10.1016/j.poamed.2015.11.001>
- Phillips, J. S., Erskine, S., Moore, T., Nunney, I., & Wright, C. (2019). Eye Movement Desensitization and Reprocessing as a treatment for tinnitus. *The Laryngoscope*, 129(10), 2384–2390. <https://doi.org/10.1002/lary.27841>
- Portigliatti Pomeri, A., La Salvia, A., Carletto, S., Oliva, F., & Ostacoli, L. (2020). EMDR in cancer patients: A systematic review. *Frontiers in Psychology*, 11, Article 590204, 1–9. <https://doi.org/10.3389/fpsyg.2020.590204>
- Rahimi, F., Rejeh, N., Bahrami, T., Heravi-Karimooi, M., Tadrissi, S. D., Griffiths, P., & Vaismoradi, M. (2019). The effect of the Eye Movement Desensitization and Reprocessing intervention on anxiety and depression among patients undergoing hemodialysis: A randomized controlled trial. *Perspectives in Psychiatric Care*, 55(4), 652–660. <https://doi.org/10.1111/ppc.12389>
- Rikkert, M., van Rood, Y., de Roos, C., Ratter, J., & van den Hout, M. (2018). A trauma-focused approach for patients with tinnitus: The effectiveness of Eye Movement Desensitization and Reprocessing - a multicentre pilot trial. *European Journal of Psychotraumatology*, 9(1), 1512248. <https://doi.org/10.1080/20008198.2018.1512248>
- Roberts, A. K. P. (2018). The effects of the EMDR group traumatic episode protocol with cancer survivors. *Journal of EMDR Practice and Research*, 12(3), 105–117. <https://doi.org/10.1891/1933-3196.12.3.105>
- de Roos, C., Veenstra, A. C., de Jongh, A., den Hollander-Gijsman, M. E., van der Wee, N. J. A., Zitman, F. G., & van Rood, YR. (2010). Treatment of chronic phantom limb pain using a trauma-focused psychological approach. *Pain Research and Management*, 15(2), 65–71. <https://doi.org/10.1155/2010/981634>
- Rostaminejad, A., Behnammoghdam, M., Rostaminejad, M., Behnammoghdam, Z., & Bashti, S. (2017). Efficacy of Eye Movement Desensitization and Reprocessing on the phantom limb pain of patients with amputations within a 24-month follow-up. *International Journal of Rehabilitation Research*, 40(3), 209–214. <https://doi.org/10.1097/MRR.0000000000000227>
- Royle, L. (2008). EMDR as a therapeutic treatment for chronic fatigue syndrome (CFS). *Journal of EMDR Practice and Research*, 2(3), 226–232. <https://doi.org/10.1891/1933-3196.2.3.226>
- Ruisch, J. E., Nederstigt, A. H. M., van der Vorst, A., Boersma, S. N., Vink, M. T., Hoeboer, C. M., Olf, M., & Sobczak, S. (2023). Treatment of post-traumatic stress disorder in people with dementia: A structured literature review. *Psychogeriatrics*, 23(3), 523–534.
- Ryan, E. M., Creaven, A. M., Ni Neill, E., & O'Suilleabhain, P. S. (2022). Anxiety following myocardial infarction: A systematic review of psychological interventions. *Health Psychology*, 41(9), 599–610. <https://doi.org/10.1037/hea0001216>
- Sandström, M., Wiberg, B., Wikman, M., Willman, A. K., & Högberg, U. (2008). A pilot study of eye movement desensitization and reprocessing treatment (EMDR) for post-traumatic stress after childbirth. *Midwifery*, 24(1), 62–73. <https://doi.org/10.1016/j.midw.2006.07.008>
- Sato-Perry C. (2004). An integrative literature review concerning the treatment of breast cancer patients through eye movement desensitization and reprocessing: Sato-Perry, Christopher: Alliant International U, San Francisco Bay, US.
- Scelles, C., & Bulnes, L. C. (2021). EMDR as treatment option for conditions other than PTSD: A systematic review. *Frontiers in Psychology*, 12, Article 644369, 1–22. <https://doi.org/10.3389/fpsyg.2021.644369>
- Schneider, J., Hofmann, A., Rost, C., & Shapiro, F. (2007). EMDR and phantom limb pain: Theoretical implications, case study, and treatment guidelines. *Journal of Emdr Practice and Research*, 1(1), 31–45. <https://doi.org/10.1891/1933-3196.1.1.31>
- Schneider, J., Hofmann, A., Rost, C., & Shapiro, F. (2008). EMDR in the treatment of chronic phantom limb pain. *Pain Medicine*, 9(1), 76–82. <https://doi.org/10.1111/j.1526-4637.2007.00299.x>
- Shapiro, F. (1989). Efficacy of the eye movement desensitization procedure in the treatment of traumatic memories. *Journal of Traumatic Stress*, 2(2), 199–223. <https://doi.org/10.1002/jts.2490020207>
- Shapiro, F. (1995). *Eye Movement Desensitization and Reprocessing: Basic principles, protocols, and procedures*. (pp. 398–xviii). Guilford Press.
- Shapiro, F. (2007). EMDR, adaptive information processing, and case conceptualization. *Journal of EMDR Practice and Research*, 1(2), 68–87. <https://doi.org/10.1891/1933-3196.1.2.68>
- Shapiro, F. (2014). The role of Eye Movement Desensitization and Reprocessing (EMDR) therapy in medicine: Addressing the psychological and physical symptoms stemming from adverse life experiences. *The Permanente Journal*, 18(1), 71–77. <https://doi.org/10.7812/TPP/13-098>
- Sheikhi, M., Moradi, M., Shahsavary, S., Alimoradi, Z., & Salimi, H. R. (2020). The effect of eye movement desensitization and reprocessing on the fear of hypoglycemia in type 2 diabetic patients: A randomized clinical trial. *Bmc Psychology*, 8(1), 1–8. <https://doi.org/10.1186/s40359-020-00450-0>
- Sinici, E. (2016). Evaluation of EMDR therapy efficacy in treatment of phantom limb pain. *Dusunen Adam: The Journal of Psychiatry and Neurological Sciences*, 29(4), 349–358. <https://doi.org/10.5350/DAJPN2016290406>
- Smart, C. M. (2022). Eye Movement Desensitization and Reprocessing for post-stroke post-traumatic stress disorder: Case report using the three-phase approach. *Brain Injury*, 36(12-14), 1372–1381. <https://doi.org/10.1080/02699052.2022.2140833>
- Solomon, R. M., & Shapiro, F. (2008). EMDR and the adaptive information processing model: Potential mechanisms of change. *Journal of EMDR Practice and Research*, 2(4), 315–325. <https://doi.org/10.1891/1933-3196.2.4.315>
- Stamenkovic, D. M., Rancic, N. K., Latas, M. B., Neskovic, V., Rondovic, G. M., Wu, J. D., & Cattano, D. (2018). Preoperative anxiety and implications on postoperative recovery: What can we do to change our history. *Minerva Anestesiologica*, 84(11), 1307–1317. <https://doi.org/10.23736/S0375-9393.18.12520-X>
- Staton, A., Wilde, S., & Dawson, D. L. (2022). The effectiveness of EMDR for medically unexplained symptoms: A systematic literature review. *Journal of EMDR Practice and Research*, 16(4), 170–201. <https://doi.org/10.1891/EMDR-2022-0017>
- Sterne, J. A. C., Hernán, M. A., Reeves, B. C., Savović, J., Berkman, N. D., Viswanathan, M., Henry, D., Altman, D. G., Ansari, M. T., Boutron, I., Carpenter, J. R., Chan, A. W., Churchill, R., Deeks, J. J., Hróbjartsson, A., Kirkham, J., Jüni, P., Loke, Y. K., Pigott, T. D., ... Higgins, J. P. T. (2016). ROBINS-I: A tool for assessing risk of bias in non-randomized studies of interventions. *BMJ*, 355, Article i4919, 1–7. <https://doi.org/10.1136/bmj.i4919>

- Sterne, J. A. C., Savović, J., Page, M. J., Elbers, R. G. B., Boutron, I., Cates, C. J., Cheng, H.-Y., Corbett, M. S., Eldridge, S. M., Hernán, M. A., Hopewell, S., Hróbjartsson, A., Junqueira, D. R., Jüni, P., Kirkham, J. J., Lasserson, T., Li, T., McAleenan, A., Reeves, B. C., ... Higgins, J. P. T. (2019). RoB 2: A revised tool for assessing risk of bias in randomised trials. *BMJ*, 366, Article l4898, 1–8.
- Stramrood, C. A., van der Velde, J., Doornbos, B., Marieke Paarlberg, K., Weijmar Schultz, W. C., & van Pampus, M. G. (2012). The patient observer: Eye-movement desensitization and reprocessing for the treatment of posttraumatic stress following childbirth. *Birth*, 39(1), 70–76. <https://doi.org/10.1111/j.1523-536X.2011.00517.x>
- Szpringer, M., Oledzka, M., & Amann, B. L. (2018). A non-randomized controlled trial of EMDR on affective symptoms in patients With glioblastoma multiforme. *Frontiers in Psychology*, 9, Article 301696, 1–8.
- Teneycke, T. (2015). *Utilizing the standard trauma-focused emdr protocol in treatment of fibromyalgia: Teneycke*. Antioch U Seattle.
- Tesarz, J., Leisner, S., Gerhardt, A., Janke, S., Seidler, G. H., Eich, W., & Hartmann, M. (2014). Effects of eye movement desensitization and reprocessing (EMDR) treatment in chronic pain patients: A systematic review. *Pain Medicine*, 15(2), 247–263. <https://doi.org/10.1111/pme.12303>
- Tesarz, J., Wicking, M., Bernardy, K., & Seidler, G. H. (2019). EMDR therapy's efficacy in the treatment of pain. *Journal of EMDR Practice and Research*, 13(4), 337–344.
- Torun, F. (2010). Treatment of vaginismus with EMDR: A report of two cases. *Turk Psikiyatri Dergisi*, 21(3), 243–248.
- Trznadel, A., & Grzybek, P. (2017). Application of Eye Movement Desensitization and Reprocessing therapy for cancer patients: A case study. *Polish Annals of Medicine*, 24(2), 228–231. <https://doi.org/10.1016/j.poamed.2016.11.009>
- Valedi, S., MoradiBaglooei, M., Ranjbaran, M., Chegini, V., Griffiths, M. D., & Alimoradi, Z. (2022). The efficacy of Eye Movement Desensitization and Reprocessing in reducing anxiety among female university students with primary dysmenorrhea. *Bmc Psychology*, 10(1), 50. <https://doi.org/10.1186/s40359-022-00757-0>
- Van Der Wal, A., Luyten, T., Cardon, E., Jacquemin, L., Vanderveken, O. M., Topsakal, V., Van de Heyning, P., De Hertogh, W., Van Looveren, N., Van Rompaey, V., Michiels, S., & Gilles, A. (2020). Sex differences in the response to different tinnitus treatment. *Frontiers in Neuroscience*, 14, Article 526767, 1–9.
- van der Wielen, M., Robben, H., & Mark, R. E. (2019). The applicability and effect of EMDR in a patient with a mild stage of Alzheimer's disease. *Journal of EMDR Practice and Research*, 13(1), 51–60. <https://doi.org/10.1891/1933-3196.13.1.51>
- van Rood, Y. R., & de Roos, C. (2009). EMDR in the treatment of medically unexplained symptoms: A systematic review. *Journal of EMDR Practice and Research*, 3(4), 248–263. <https://doi.org/10.1891/1933-3196.3.4.248>
- Wallis, O. C., & de Vries, J. (2020). EMDR treatment for anxiety in MS patients: A pilot study. *Multiple Sclerosis Journal Experimental, Translational and Clinical*, 6(4), 1–8.
- Wammes, J. J. G., van der Wees, P. J., Tanke, M. A. C., Westert, G. P., & Jeurissen, P. P. T. (2018). Systematic review of high-cost patients' characteristics and health-care utilisation. *BMJ Open*, 8(9), e023113.
- Wicking, M., Maier, C., Tesarz, J., & Bernardy, K. (2017). EMDR as a psychotherapeutic approach in the treatment of chronic pain: Is eye movement desensitization and reprocessing an effective therapy for patients with chronic pain who do not suffer from posttraumatic stress disorder? *Der Schmerz*, 31(5), 456–462. <https://doi.org/10.1007/s00482-017-0231-0>
- Wilensky, M. (2006). Eye Movement Desensitization and Reprocessing (EMDR) as a treatment for phantom limb pain. *Journal of Brief Therapy*, 5(1), 31–44.
- Wortman, M. S. H., Lokkerbol, J., van der Wouden, J. C., Visser, B., van der Horst, H. E., & Olde Hartman, T. C. (2018). Cost-effectiveness of interventions for medically unexplained symptoms: A systematic review. *PLoS One*, 13(10), e0205278.
- Yasar, A. B., Yanartas, O., Cam, C. S., Budak, C., Topcuoglu, V., & Ergun, T. (2022). Use of therapist rotation model for eye movement desensitization and reprocessing (EMDR) in a patient with atopic dermatitis. *Psychiatry and Behavioral Sciences*, 12(1), 45–47. <https://doi.org/10.5455/PBS.20211215090126>
- Yunitri, N., Chu, H., Kang, X. L., Wiratama, B. S., Lee, T. Y., Chang, L. F., Liu, D., Kustanti, C. Y., Chiang, K.-J., Chen, R., Tseng, P., & Chou, K.-R. (2023). Comparative effectiveness of psychotherapies in adults with posttraumatic stress disorder: A network meta-analysis of randomised controlled trials. *Psychological Medicine*, 53(13), 6376–6388. <https://doi.org/10.1017/S0033291722003737>
- Yurtsever, A., Bakalim, O., Karaman, S., Kaya, S., & Konuk, E. (2022). The effect of the online eye movement desensitization and reprocessing early intervention protocol (EMDR R-TEP) for the risk groups with post-traumatic stress symptoms during the COVID-19 pandemic. *Frontiers in Psychology*, 13, Article 935782, 1–9. <https://doi.org/10.3389/fpsyg.2022.935782>
- Zeighami, R., Behnamoghdam, M., Moradi, M., & Bashti, S. (2018). Comparison of the effect of eye movement desensitization reprocessing and cognitive behavioral therapy on anxiety in patients with myocardial infarction. *The European Journal of Psychiatry*, 32(2), 72–76. <https://doi.org/10.1016/j.ejpsy.2017.09.001>
- Zolghadr, N., Khoshnazar, A., MoradiBaglooei, M., & Alimoradi, Z. (2019). The effect of EMDR on childbirth anxiety of women with previous stillbirth. *Journal of Emdr Practice and Research*, 13(1), 10–19. <https://doi.org/10.1891/1933-3196.13.1.10>