

Treatment of PTSD by Eye Movement Desensitization Reprocessing (EMDR) Improves Sleep Quality, Quality of life, and Perception of Stress

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ABSTRACT: The impact of posttraumatic stress disorder (PTSD) on the sleep of patients is widely reported. However, the parameters that can be altered are not the same for all patients. Some studies report an impairment of sleep maintenance and recurrent nightmares, while others failed to find such alterations. Among the many treatments, the eye movement desensitization reprocessing (EMDR) is a therapy used specifically to treat PTSD and general trauma. The purpose of this study was to examine whether EMDR treatment can improve PTSD symptoms, such as sleep, depression, anxiety, and poor quality of life.

KEYWORDS: PTSD; sleep; anxiety; depression; quality of life

INTRODUCTION

The highest the tension, the hardest to promote behaviors that are socially organized and adjusted. Nowadays violence-related tension is a frequent occurrence in which physical and psychological integrity is threatened. People are subjected to numerous traumas and acquire inadequate behaviors, which may not be adaptive for survival. Posttraumatic stress disorder (PTSD) may be an example of incapacity of adaptation.

Among the negative symptoms of PTSD, such as arousal, flashbacks, and excessive fear, sleep disturbances are considered secondary symptoms.¹⁻⁴ This is particularly interesting because of the regulatory influence of sleep on the processing of traumatic memories. Rapid eye movement REM sleep, specifically, plays a major role in the integration of traumatic and stressful memories.²

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Thus, the length of REM sleep appears not to be affected, since it is during this sleep phase that brain and mind work memories transference and integration at their best.⁵

Despite the scarce literature, the findings suggest that sleep symptoms of PTSD are manifested mainly during REM sleep,⁶⁻⁸ when most of the information, learning, and memories are processed, including stress- and surviving-related emotional material. Studies have shown an increase in REM density (ratio between rapid eye movements during REM sleep) on days of intense learning or when one lives strong emotional events. Sleep parameters commonly altered in PTSD patients include increased REM density, increased reactivity to sound stimuli, reduced mean time of REM episodes, insomnia, vivid and disturbing dreams, and recurrent nightmares (usually related to the trauma).⁷⁻¹¹ Sleep fragmentation and increased arousal may be explained by increased adrenergic and noradrenergic transmission, as if the brain was incapable to inhibit noradrenergic and serotonergic activity during sleep.¹²

In the present study, eye movement desensitization reprocessing[®] (EMDR) was used to treat patients with PTSD. This technique was developed by Francine Shapiro, which major proposition is to induce the processing of disturbing memories and experiences, by stimulating neural mechanisms that are similar to those activated during REM sleep.⁶ The technique consists of eye movements following side-to-side movements of the index and middle fingers, or the alternate tapping of the hands on the knees. This procedure triggers the processing of information, thus facilitating the connection of neural networks so that insight and integration are established.

Few hypothesis have tried to explain the mechanisms by which EMDR work. One of the most important ones, put forward so far, states that this technique triggers a physiological mechanism that activates memory and information processing systems, stimulating the connection among diverse neuronal networks, thus allowing the occurrence of the insight.^{6,9} Similarly, the author believes that these movements may stimulate cortical functions leading to cognitive processes and desensitization of disturbing events. EMDR produces emotional and physiological alterations, clearly suggesting a relaxing response,¹⁰ including respiratory synchronization, significant reduction of heart rate, increased systolic pressure in the beginning of the session, followed by a subsequent decline during abreactions and at the end of the session, consistent increase of skin temperature and decrease of skin galvanic response.¹³ Meta-analysis studies show that both EMDR and pharmacological therapy are effective to treat PTSD, but the association of both fastens the improvement. Moreover, the follow-up of PTSD patients treated by EMDR reveals that improvement of the symptoms persists for, at least, 15 months.¹⁴ Therefore, the restless search for alternative trauma treatments is primordial.

The purpose of this study was to examine whether EMDR treatment can improve PTSD symptoms, such as sleep disturbances, depression, anxiety, and poor quality of life.

METHODS

Seven patients (two males and five females; aged 24–36 years; BMI < 30 kg/mg²), who were assaulted or kidnapped, for at least 3 months, but no more than 5 years, underwent psychiatric evaluation, according to SCID–DSM-IV to confirm the diagnosis of PTSD and to determine possible comorbidities. All patients had finished high school and presented sleep complaints, a score ≥ 26 at the impact event scale (IES).

They were submitted to a psychological evaluation and polysomnography at the time of inclusion. The psychological evaluation included the IES¹⁵; Beck Depression Inventory¹⁶; SF-36 Inventory¹⁷; State-Trait Anxiety Inventory¹⁸; REST-48 for evaluation of general stress¹⁹; and the Coping Strategy Inventory.²⁰

The sessions took place once a week, lasting from 30 to 90 min each. The average number of EMDR therapy sessions was five. Treatment ended when the patient reported not having the typical PTSD symptoms on his/her daily life.

Polysomnograms were performed before the beginning of the treatment (PSG 1), after the third EMDR session (PSG 2), and the week following discharge from the treatment (PSG 3).

After the end of treatment the patients were again evaluated exactly in the same way as in the first time.

Statistical Analysis

Sleep data were analyzed by a one-way ANOVA for repeated measures, considering PSG 1, PSG 2, and PSG 3. The data of psychological evaluation were analyzed by the paired Student's *t*-test. The level of significance was set at $P \leq 0.05$.

RESULTS

The results of the sleep evaluation are shown in TABLE 1. According to the analysis, patients showed an increase in sleep efficiency and reduced time of waking after sleep onset at discharge. TABLE 2 shows that EMDR resulted in reduction of depression, anxiety, fatigue, impact of the event, and stress symptoms scores, and an improvement of quality of life, of sleep quality, and general well-being.

DISCUSSION

The present results indicate that the treatment of traumatic memories with EMDR technique promotes improvement of the negative symptoms of PTSD,

TABLE 1. Significant alterations in sleep parameters sleep efficiency (SE) and waking after sleep onset (WASO), measured before (PSG 1), during (PSG 2), and after (PSG 3) EMDR treatment of PTSD patients ($N = 7$). Values are presented as mean \pm SD

	PSG 1	PSG 2	PSG 3	Statistics
SE (%)	85.77 \pm 6.00	88.13 \pm 6.55	91.90 \pm 5.66*	$F(2, 12) = 4.21$; $P = 0.04$
WASO (min)	62.86 \pm 26.41	58.20 \pm 37.96	32.93 \pm 22.15*	$F(2, 12) = 4.77$; $P = 0.03$

* – Different from PSG 1.

particularly arousal, flashbacks, sleep disturbances, and fear. These results are in accordance with previous reports.^{21–23}

Among the sleep disorders, insomnia and recurrent nightmares are of particular interest, as recall of the traumatic event takes place generating emotional revival and hyperactivity response. The main aspect dealt with by this technique refers to the desensitization of the traumatic memories, so much so that the patient processes the perturbing content incorporating the traumatic event to his/her autobiography. Studies have revealed that the subjective interpretation of the trauma has a critical effect on the development of the disorder and the subjective resignification may be the key for symptom improvement.^{24,25}

When the traumatic memory loses its negative emotional valence, there is a decrease in arousal and, consequently, an improvement of the harmful PTSD symptoms. The increased sleep efficiency and reduction of general, social, and emotional stress are determining factors for the patients to perceive the improvement in their quality of life and well-being. Our preliminary results indicate that this type of therapy is effective to treat many of the PTSD symptoms that can impair people's daily life activities.

TABLE 2. Scores of several inventories used to assess the patients' mood and anxiety states, quality of life, perception of stress, and subjective sleep quality. Values are presented as mean \pm SD of 7 patients

Inventory	Before treatment	After treatment	Paired t -test
SF-36 (Life quality)	49.59 \pm 12.57	84.37 \pm 8.8*	$t = -4.88$; $P = 0.003$
BECK (Depression score)	17.71 \pm 7.80	4.00 \pm 4.24*	$t = 3.51$; $P = 0.012$
STAI (Anxiety state)	47.86 \pm 10.14	34.43 \pm 4.86*	$t = 3.00$; $P = 0.024$
STAI (Anxiety trait)	57.57 \pm 10.50	38.00 \pm 5.03*	$t = 5.57$; $P = 0.001$
IES (Impact event scale)	39.71 \pm 9.20	23.57 \pm 7.39*	$t = 4.75$; $P = 0.003$
General stress	3.14 \pm 1.30	1.00 \pm 0.69*	$t = 3.29$; $P = 0.017$
Emotional stress	3.68 \pm 1.43	1.36 \pm 0.59*	$t = 3.35$; $P = 0.015$
Social stress	2.64 \pm 0.80	1.03 \pm 0.86*	$t = 3.74$; $P = 0.009$
Fatigue	3.23 \pm 1.42	1.39 \pm 1.14*	$t = 2.67$; $P = 0.037$
General well-being	1.96 \pm 1.05	4.14 \pm 0.85*	$t = -4.56$; $P = 0.004$
Sleep quality	1.89 \pm 1.12	4.39 \pm 0.70*	$t = -4.68$; $P = 0.003$

* – Different from before treatment.

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