

# Eye movement desensitization and reprocessing in non-specific chronic back pain: A case series

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## Abstract

### Introduction

Non-specific chronic back pain (nsCBP) is common and of high socioeconomic relevance. In the context of chronification, psychosocial factors (e.g. depression, anxiety and psychological traumatic events) are known risk factors. Therefore psychotherapeutic interventions are recommended. Eye movement desensitization and reprocessing (EMDR) is an empirically validated psychotherapeutic intervention for mental disorders associated with exposure to psychological traumatic events. The objective of this case series was to develop and evaluate the usability of a pain-focused EMDR-treatment manual for nsCBP patients with experienced psychological traumatic events.

### Materials and Methods

This explorative case series was conducted as a pretest-posttest design. A treatment manual based on the EMDR standard procedure was developed and adapted for the specific needs of nsCBP patients. Six consecutively recruited nsCBP patients with exposure to psychological traumatic events received a standardized ten-session EMDR treatment. Outcome measures were pain intensity (numeric rating scale), interference with daily life (West Haven-Yale Multidimensional Pain Inventory) and the treatment satisfaction from the patients' perspective (Patient Global Impression of Change Scale). Assessments took place before the beginning and two weeks after completion of the intervention.

### Results

Four patients (67%) reported a clinically important reduction in pain intensity ranging from 50-75% and relevant improvements in their global impression of change with treatment. In two patients (33%), the pain intensity remained almost unchanged. All patients reported a decrease in pain-related life interference after treatment that was clinically relevant in four patients (67%). No severe adverse events were reported.

### Discussion and Conclusion

EMDR seems to be a safe and promising treatment for nsCBP. Further studies are necessary to replicate the

results in methodological more stringent research and to identify appropriate subgroups of patients that are prone to EMDR treatment.

### Introduction

Chronic pain conditions of the musculoskeletal system are common and of socioeconomic relevance<sup>1,2</sup>. This is especially true for pain conditions with widely unknown pathogenesis, such as non-specific chronic back pain (nsCBP). Unfortunately, most approaches used to treat nsCBP are characterized as cost-intensive, having long durations and only low to moderate effect sizes (e.g.<sup>3,4</sup>). This might be because treatment is complicated by the fact that nsCBP patients represent a heterogeneous group with also high comorbidity of mental disorders<sup>2,5</sup>.

A subgroup of nsCBP patients is characterized by exposure to psychological traumatic events<sup>6</sup>. It is known that psychological traumatic events and trauma-associated disorders can cause and modulate chronic pain, and multiple traumatic events have a cumulative effect on nsCBP<sup>7,8</sup>. For example cumulative exposure to traumatic events was an independent risk factor for the transition from acute to chronic pain<sup>7</sup>.

A psychotherapeutic treatment that specifically focuses on trauma-associated disorders and symptoms (e.g., pain sensations) is eye movement desensitization and reprocessing (EMDR)<sup>9</sup>. The EMDR intervention follows a standardized treatment protocol and aims to process dysfunctionally stored disturbing memories and associated cognitions, emotions and physical sensations (e.g., pain). EMDR has now become an empirically validated and recommended first-line treatment for posttraumatic stress disorder (PTSD) and other conditions specifically related to stress (e.g.<sup>10,11</sup>). The association of psychological trauma with an increased risk for the development and maintenance of nsCBP suggests that EMDR may be an effective treatment approach in nsCBP patients with exposure to psychological traumatic events. In addition, EMDR is capable of reducing affective distress and nsCBP is a disorder with a high affective component.

This is supported by case reports and case series<sup>12,13,14,15,16,17</sup>. These explorative studies indicate that EMDR is able to reduce pain intensity in patients with different pain disorders (e.g., phantom limb pain, fibromyalgia and headache)<sup>18</sup>. However, though nsCBP is one of the most frequent types of pain<sup>19</sup>, so far no study has examined the effectiveness of EMDR treatment on nsCBP.

The objective of this case series was thus to develop and evaluate the usability of a pain-focused EMDR-treatment approach for nsCBP patients with exposure to

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psychological traumatic events and to describe effects on pain intensity, pain-related life interference and the patient's global impression of change with treatment.

## Materials and Methods

### Study Design

This case series was funded by the German Federal Ministry of Education and Research (01EC1010A). It was conducted with an exploratory uncontrolled pretest-posttest-design. Ethics approval was received from the Ethics Committee Heidelberg (approval No. S-261/2010) and the study was conducted in accordance with the Declaration of Helsinki (1964) in its present form. All participants were required to provide written informed consent.

### Intervention

The participants received a manualised, ten-session outpatient psychotherapeutic intervention (every two weeks for 90 minutes). The treatment manual developed for this study was based on the principles of EMDR standard procedure<sup>9</sup> and incorporated established EMDR pain protocols focusing on the specific needs of chronic pain patients<sup>20,21</sup> (for structure and content of intervention see Table 1).

The EMDR procedure combines the use of well-established psychotherapeutic methods (including imaginal exposure, cognitive and self-control techniques) and the use of specific EMDR elements, such as bilateral sensory stimulation (e.g., eye movements and bilateral hand-tapping induced by the therapist's fingers) and the dual focus of attention principle<sup>22</sup>. The dual focus of attention principle means that simultaneously focusing on traumatic or pain-related memories and an external sensory stimulus (bilateral sensory stimulation).

This EMDR procedure is suggested to facilitate information processing of emotionally distressing memories (e.g.,

traumatic events or pain). The goal of EMDR is to greatly decrease or eliminate emotional distress related to a specific memory event. Additionally, these emotional and cognitive changes typically result in modifications of pain, trauma, behaviour and improved coping abilities.

The possible targets for EMDR processing were disturbing pain-related or traumatic memories, current pain perceptions and future painful situations together with the associated cognitions, emotions and bodily sensations. If the pain was associated with exposure to psychological traumatic events, EMDR therapy was started with these targets using the standard EMDR protocol<sup>9</sup>.

Based on the hypothesis that disturbing pain-related memories may intensify and maintain the emotional experience of pain, subsequent pain-related memories were processed. If the previously mentioned targets could not be pinpointed (e.g., the patients described no disturbance regarding the traumatic events), the pain itself was targeted directly using a specific protocol for current pain. The EMDR treatment was provided by EMDR-trained physicians (SJ and JT) and a psychologist (SL) who had participated in an EMDR International Association (EMDRIA) approved basic training program. The therapists were supervised regularly by an EMDRIA-approved consultant (GHS).

### Participants

Participants were consecutively recruited from a specialized outpatient clinic for chronic pain disorders at the Department of General Internal Medicine and Psychosomatics of the University of Heidelberg. All patients suffered from nsCBP and reported an exposure to psychological traumatic events. Patients with specific pathologies of nsCBP (e.g., spinal canal stenosis, disc hernia, spondylolisthesis, rheumatic or systematic inflammatory disorders), with specific contraindications for EMDR treatment (e.g., severe dissociative symptoms,

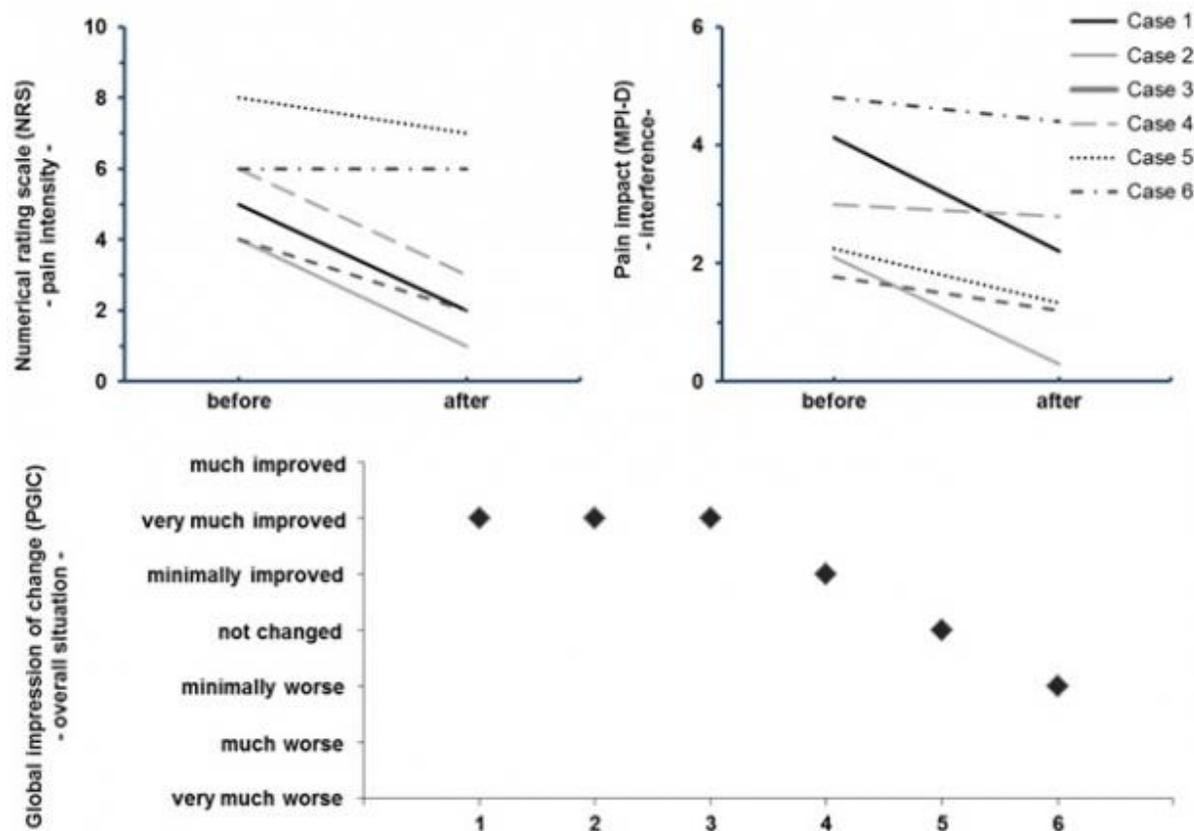
**Table 1: Structure and content of EMDR treatment. Note: EMDR = Eye Movement Desensitization and Reprocessing.**

Session	Content
Phase of treatment planning and preparation (Session 1-2)	Comprehensive assessment of the patient's history to identify relevant traumatic and pain-related memories causing distress and a dysfunctional emotional response. A detailed patient education was performed to develop a better understanding of the links between trauma, pain, emotional response and the principles of EMDR.
Phase of desensitization and reprocessing (Session 3-9)	Traumatic and pain-related memories were processed using the EMDR principles of dual focus of attention and bilateral stimulation until the disturbing experiences no longer felt burdensome. During each EMDR session, the patient attended to distressing traumatic or pain-related memories and related feelings/affects, cognitions and body sensations in brief sequential periods while simultaneously focusing on an external stimulus. Next, the patient was instructed to let new associations become the focus during the next set of dual attention practices. This sequence of dual attention and personal association was repeated many times during the session until the initial target (trauma, pain-related memories) becomes less disturbing. If the processing of the traumatic or pain-related distressing event was not completed in a single session, the therapist assisted the person in using a variety of self-calming and relaxation techniques that were designed to bring emotional stability and tranquility.
Final phase (Session 10)	Installation and reinforcement of EMDR-based skills to cope with future distressing or painful events.

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**Figure 1:** Participants outcome measures before and after intervention. Note. Pain intensity (NRS), pain-related life interference (MPI-D) and global impression of change (PGIC) were assessed before and two weeks after completion of the treatment. NRS: Numerical rating scale; MPI-D: Interference subscale of the West Haven-Yale Multidimensional Pain Inventory; PGIC: Patient global impression of change scale; Before: Before intervention; After: After intervention.

substance abuse, severe psychiatric comorbidity or cognitive impairment), with current psychotherapeutic treatment, legal process or application for a worker's compensation were not recruited. Traumatic events were assessed by Structured Clinical Interview (SCID) for the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV<sup>23</sup>) regardless of the presence of the whole symptomatology of a posttraumatic stress disorder (PTSD).

### Measures

Participants completed a questionnaire before the intervention started and two weeks after the completion of treatment.

**Pain intensity:** Mean pain intensity within the past four weeks was measured using the numeric rating scale (NRS) ranging from 0 "no pain" to 10 "worst pain imaginable".

**Interference with daily life:** The German version of the West Haven-Yale Multidimensional Pain Inventory (MPI-D) was used to assess pain-related life interference<sup>24,25</sup>. Ten questions regarding pain-related life interference were rated on a 7-point scale ranging from 0 "no interference" to 6 "extreme interference". The MPI-D is a reliable and valid instrument<sup>24,25</sup>.

**Treatment satisfaction from the patients' perspective:** Treatment satisfaction and global ratings of change of the overall situation with treatment were evaluated using the Patient Global Impression of Change (PGIC) scale, which is a single-item rating with a 7-point scale ranging from "very much improved" to "very much worse"<sup>26</sup>.

**Safety:** Adverse and serious adverse events were documented.

## Results

### Participants

All patients were Caucasian. Mean age was 61.5 years and mean pain duration 19.7 years. For description of the sample see Table 2.

### Case Presentations

In the following, we give an outline of the course of treatment of one case to illustrate the EMDR-based treatment approach.

#### Case 1

This patient was a 64-year-old, unmarried woman with a two-year history of nsCBP. The diagnostic assessment for traumatic events revealed sexual abuse at the age of

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**Table 2: Patient's characteristics. Note: \*Traumatic events were assessed using the Structured Clinical Interview for DSM-IV (SCID). The traumatic events refer to subjective burdensome life events regardless of the presence of a whole posttraumatic stress disorder (PTSD) symptomatology.**

Case	Sex	Age (Years)	Pain Duration (Years)	Traumatic Events*
1	female	64	2	Sexual abuse, life-threatening illness, visit of emergency ward
2	male	61	18	Witness of a bloody tramway accident
3	female	72	26	Victim of an accident, wartime experiences
4	female	69	10	Victim of rape, strict and violent upbringing by the father
5	female	59	50	Illness and death of one-year-old daughter, existential fear in childhood because of poverty
6	female	44	12	Repeated physical and sexual abuse in childhood, witnessed air show disaster with large number of deaths

twelve, a life-threatening illness two years ago (renal cell carcinoma) and a visit to the emergency ward because of a sudden onset of lower back pain shortly before the diagnosis of cancer. Despite a successful cancer management, the pain remained inadequately controlled. There were no signs of PTSD in the SCID. Previous treatments with acupuncture, physiotherapy, massage, osteopathy, medication and infiltration therapy did not sufficiently improve the pain. Two years before our intervention, the patient received psychotherapeutic treatment because of a depressive reaction after the cancer diagnosis. After gathering the relevant information and adequately preparing the patient for the EMDR process (e.g., completing the "inner safe-place exercise"), the visit to the emergency ward and the current stressful situations causing loneliness and sadness were chosen as targets. Subsequently, the treatment focused on the current pain in the back and the associated feelings of anger (caused by its permanent presence). Pain intensity was reduced by 75% to mild intensity, and a marked decrease of the interference due to pain was described. The global change following treatment was rated as "much improved".

## Measures

### Pain Intensity

Pain intensity over the past four weeks was reduced in four of the six patients by at least 50% (range 50–75%). In one patient, the pain intensity was reduced by 12.5% and another patient reported no change in pain intensity.

Interference With daily life: Pain-related life interference was improved in all the patients after treatment with a mean decrease of 0.97 points (range 0.2–1.93 points).

Patient Global Impression of Change: Three patients rated the global change with treatment of the overall situation as "much improved", one patient rated the overall situation as "minimally improved", one patient rated the overall situation as "unchanged" and one patient rated the overall situation as "minimally worsened". For more detailed treatment evaluations, see Figure 1.

Side effects: The most frequently reported side effects were intense pain during processing and short-term increases in pain and tiredness following the sessions. These symptoms disappeared after the treatment session.

No increases in medication or severe adverse events were reported during the course of treatment.

## Discussion

In this case series, we describe results of a manualised, ten-session EMDR intervention for the treatment of nsCBP in patients with exposure to psychological traumatic event. A substantial and clinically relevant reduction of pain intensity<sup>27,28</sup> was demonstrated in four out of the six patients despite preceding, long-standing histories of treatment-refractory pain. A decrease in pain-related life interference of more than 0.6 points, which can be considered "clinically important"<sup>27,28</sup>, was observed in four of the six patients. The ratings of global impression of improvement with treatment were clinically important ("much improved") in three patients. These results suggest that EMDR focusing on disturbing pain-related or traumatic memories, current pain perception or anticipated stressful situations in the future is a promising, safe and relatively brief treatment approach in a subgroup of nsCBP patients.

These findings are consistent with other case-series that identified EMDR as a safe and promising treatment for migraine pain<sup>14</sup> and phantom limb pain<sup>12,16,29-31</sup>. However, there are many potential flaws that might bias case series like missing control groups. Therefore, the first promising results have to be replicated within more stringent research designs. Nonetheless our study is important because we used EMDR for the first time in nsCBP patients. This gives rise to the question of what mechanisms are responsible for these effects of EMDR on nsCBP. Several possible explanations for the mechanism of pain reduction by EMDR are discussed<sup>18</sup>. These are the adaptive information processing (AIP) model<sup>16,22</sup>, the "lateralization hypothesis"<sup>32-34</sup>, psychophysiological de-arousal<sup>35,36</sup>, relaxation response<sup>33</sup> and increased coping ability<sup>21</sup>. However, more research on the involved mechanisms and their convertibility by treatment is necessary. Although most of the patients in this case series reported a decline in pain intensity, two patients did not (case 5 and 6) and were classified as "non-responders". Moreover, pain-related life interference decreased in both patients, but only the

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decrease in the patient of case 5 could be considered as clinically meaningful.

The patient of case 6 met the criteria for current PTSD diagnosis due to complex psychological trauma caused by childhood physical and sexual abuse. Because pain worsened as the patient became more aware of multiple traumatic events during treatment, we ceased attempts to confront pain-related traumatic memories and focused on stabilization and introduction of individual resources to cope with painful or distressing situations. The course of treatment in the patient of case 6 may indicate that ten sessions involving confrontation of pain-related memories in patients who report in addition complex psychological trauma may be insufficient to effectively reduce pain. Our results are consistent with studies treating complex PTSD, which emphasize that sufficient stabilization of patients with complex trauma is essential prior to confrontation with traumatic memories<sup>37,38</sup>.

Because EMDR is an emotionally arousing technique, unanticipated emotional or physiological reactions in the patients can be induced by EMDR. Accordingly, re-traumatization and deterioration of symptoms may occur in traumatized chronic pain patients with associated trauma and pain. However, no safety concerns were observed with the use of EMDR in this study.

It should be pointed out that this study focused on nsCBP patients who had experienced psychological traumatic events (regardless of the presence of any PTSD symptomatology) and did not focus on PTSD. Treatment focus in this study was mainly nsCBP. Because traumatic events are prevalent in chronic pain patients (up to 50%)<sup>39-42</sup>, this treatment approach seems to be appropriate for a large and relevant number of nsCBP patients. Although the improvement of pain intensity and pain-related interference by EMDR treatment observed in this case series is promising, the small sample size and the lack of an adequate control group limit the current findings. A larger sample size would allow for a more empirical research design and a quantifiable analysis. Given the absence of a control group in the present study, it is unclear whether the effects are due simply to the passage of time. However, the patients suffered from pain for a long time and thus passage of time will possibly not explain amelioration of pain complaints. It is also unclear how the patients would have fared with alternative treatments such as classical psychosocial treatments. Most of the psychosocial treatments for nsCBP exhibit longer durations and are only modestly effective. An EMDR-based treatment may offer sufficient pain relief within a relatively short period of time, at least in a subgroup of nsCBP patients.

### Conclusion

In conclusion, our study suggests that EMDR may be a safe and promising treatment option for a clinically important reduction of pain intensity and pain-related life interference in nsCBP patients with experienced

psychological traumatic events. Nevertheless, due to the explorative character of this study, these data must be considered as preliminary and future research with adequate control groups and appropriate sample sizes is necessary to confirm these findings. Moreover, subgroups of nsCBP patients should be identified that are prone to EMDR treatment.

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