



VOLUME 1 · NUMBER 1 · 2007

JOURNAL OF  
EMDR  
PRACTICE  
AND RESEARCH

 SPRINGER PUBLISHING COMPANY

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# Journal of EMDR Practice and Research

The Official Publication of the EMDR International Association

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Business Office: All business correspondence, including subscriptions, renewals, and address changes, should be addressed to Springer Publishing Company, LLC, 11 West 42nd Street, 15th Fl., New York, NY 10036. [www.springerpub.com](http://www.springerpub.com)

Editorial Office: Manuscripts for publication should be submitted in MS Word format by email to the Editor, Dr. Louise Maxfield at [maxfield@rogers.com](mailto:maxfield@rogers.com).

Subscription Rates (per Year): For institutions: Print, \$325; Online, \$305; Print & Online, \$345. For individuals: Print, \$75; Online, \$70; Print & Online, \$95. Outside the United States—for institutions: Print, \$355; Online, \$335; Print & Online, \$375. For individuals: Print, \$85; Online, \$80; Print & Online, \$105.

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Postmaster: Send address changes to *Journal of EMDR Practice and Research* / Springer Publishing Company, LLC, 11 West 42nd Street, New York, NY 10036.

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ISSN 1933-3196

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# WELCOME

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**Scott A. Blech**

*EMDR International Association, Austin, TX*

**T**he Eye Movement Desensitization and Reprocessing International Association (EMDRIA) is proud to introduce this first issue of the *Journal of EMDR Practice and Research*. We think that you will be pleased with this quarterly, peer-reviewed publication devoted to integrative, state-of-the-art papers about EMDR. It is a broadly conceived interdisciplinary journal that stimulates and communicates research and theory about EMDR, and their application to clinical practice. Dr. Louise Maxfield, a distinguished EMDR researcher and author, is the editor and is supported by an outstanding group of international professionals who serve as the editorial board.

This publication marks an important milestone in the development of EMDR as an important psychotherapy. It has been 20 years since psychologist Dr. Francine Shapiro made the chance observation that eye movements can reduce the intensity of disturbing thoughts, under certain conditions. Dr. Shapiro studied this effect scientifically, and in a 1989 issue of the *Journal of Traumatic Stress*, she reported success using EMDR to treat victims of trauma. Since then, EMDR has developed and evolved through the contributions of therapists and researchers all over the world. Today, EMDR is a set of standardized protocols that incorporates elements from many different treatment approaches.

EMDRIA was originally formed in 1995 to provide professional support for clinicians trained in EMDR. EMDRIA was charged with setting standards for training, providing ongoing professional education, encouraging quality research, and providing support for EMDR clinicians. The organization began with 473 charter members and a very dedicated core of volunteers. EMDRIA introduced the publication of its quarterly newsletter in 1996. The idea of a journal was discussed a few years later. In an effort to move toward that goal, special clinical editions of the newsletter were published in 1999, 2000, and 2001. Support for a professional journal was confirmed by the results of a comprehensive survey of EMDRIA members in 2005. And last year, Springer Publishing was selected as the publisher. EMDRIA now maintains a membership of more than 4,000 EMDR clinicians, including more than 1,600 Certified Therapists in EMDR, and 500 Approved Consultants in EMDR.

Our goals for this professional journal are the following: to advance EMDR research, clinical practice, and theory; and to provide high-quality information about EMDR research and clinical developments to our members, other mental health professionals, and the academic community.

We welcome you as a reader of the *Journal of EMDR Practice and Research*.

## EDITORIAL

Louise Maxfield

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**E**MDR has come a long way in the 20 years since Francine Shapiro's 1987 walk in the park. At that time, she noticed that rapid eye movements decreased the emotionality of some intrusive memories, and she intuitively recognized that this phenomenon had great clinical utility. Shapiro went on to develop a treatment approach (Shapiro, 1989) that has been taught to more than one hundred thousand clinicians worldwide and that has eliminated the distress of many millions of clients. Eye movement desensitization and reprocessing (EMDR; Shapiro, 2001) is a structured psychotherapy approach and was designed to facilitate the processing of distressing memories. Its efficacy in the treatment of posttraumatic stress disorder (PTSD) has been widely acknowledged, and EMDR is a recommended therapy in numerous international guidelines.

In the review article following this editorial, I have documented the current status of EMDR research and outlined new directions in current and future research. Scientists are encouraged to investigate EMDR effectiveness with other disorders, client factors that may influence treatment response, physiological and neurobiological changes with treatment, and the role of dual-attention stimulation. Future empirical evaluations of EMDR's unique treatment process will promote better understanding of memory networks; brain function; and cognitive, affective, and somatic processes during treatment. We eagerly anticipate the future publication of such projects in the *Journal of EMDR Practice and Research*.

This inaugural issue of the *Journal of EMDR Practice and Research* is indicative of the maturity achieved by EMDR and of the recognition, by scientists, researchers, and clinicians worldwide, that the study of EMDR is a valuable pursuit. The mandate of the journal is to stimulate and communicate research and theory about EMDR, and their application to clinical practice. One goal for the journal is to provide a professional forum for the sharing of cutting-edge ideas and information about EMDR to stimulate thoughtful investigations, identify challenges, and spark future directions. A second goal is to provide a bridge between science and

professional practice. I anticipate that many clinicians will appreciate the value of having ready access to new research about EMDR, so that they can remain current and informed and incorporate relevant ideas into their own practices. It is my hope that the journal will also inspire therapists to recognize the value of taking a more scientific approach to their work, evaluating their outcomes, and publishing their findings. Similarly, I hope that researchers will consider therapeutic implications when designing studies, so that clinical practice can be enhanced.

Because of the diversity of the agenda, the journal welcomes manuscripts that express diverse viewpoints, including neurobiological, cognitive, behavioral, psychodynamic, interpersonal, and family systems perspectives. It strives to include articles that are clinically relevant, as well as material that will foster knowledge and encourage research. The journal publishes research studies, field studies, brief reports, case studies, theoretical articles, and review papers.

The articles in this premiere issue represent a range of topics, settings, and populations. Settings include private practice, universities, hospital inpatient units, and outpatient clinics. Populations discussed include individuals with phobias, phantom limb pain, and PTSD, as well as children. The international focus is evident in this first issue: One of the articles is the translation of a study that was first published in Korea. Other authors include two research teams from Germany, one team from the Netherlands, a clinician from Israel, plus this Canadian editor. Future issues will contain the translation of other important articles originally published in languages other than English. In addition, the publisher has agreed that some future articles will be published online in both English and the authors' original language.

To foster the development of efficacious clinical practice, the journal also includes a Clinical Practice section, with the publication of vignettes and a column answering clinical questions. The vignettes are brief case reports that make a contribution to the literature, but which have used only the standard protocol measures (the subjective units of distress scale [SUDS] and

validity of cognition scale [VOC]). The Clinical Q&A column poses questions asked by therapists, with practical answers provided by EMDR consultants.

I appreciate the vision of EMDRIA's leadership in developing and fostering this new venture. I want to thank the members of the editorial board for their advice and support, and their excellent reviews and assistance to authors. I especially want to express my appreciation to the authors who have taken a risk in

submitting their work to a new journal. My goal as editor is to ensure that the scientific quality of the manuscripts published in the *Journal of EMDR Practice and Research* is equivalent to those published in other well-established journals, so that it can become the premiere journal publishing the best articles about EMDR. Feedback, comments, and suggestions from readers are welcomed. Letters to the editor can be e-mailed to [journal@emdria.org](mailto:journal@emdria.org)

# Current Status and Future Directions for EMDR Research

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This review provides the groundwork for a basic understanding of articles written about eye movement desensitization and reprocessing (EMDR), including a brief overview of theory and practice. It documents EMDR's established efficacy in the treatment of posttraumatic stress disorder and specifies specific subsets of this population in need of further investigation. The article also provides a review of recent studies evaluating a range of EMDR's clinical applications and outlines new directions for research investigations and for developments in clinical practice. It concludes with an overview of current research evaluating pre- and post-neurobiological changes, and mechanisms of action. Specific recommendations for future areas of investigations are outlined, and rigorous evaluation is strongly encouraged.

**Keywords:** EMDR; information processing; review; efficacy; mechanisms of action

The purpose of this review is to provide the groundwork for a basic understanding of articles written about eye movement desensitization and reprocessing (EMDR). Beginning with a brief description of EMDR theory and practice, the article proceeds to describe the current status of EMDR's known efficacy with various disorders and populations. New directions for related research are highlighted, and recent studies regarding its application in these domains are reviewed.

## EMDR Theory and Practice

EMDR is a psychotherapeutic approach that was developed by Shapiro (1989, 2001) to resolve symptoms resulting from disturbing and unresolved life experiences. It is based on a theoretical information processing model, which posits that symptoms arise when events are inadequately processed and may be eradicated when the memories are fully processed and integrated. Shapiro further maintains that a negative sense of self, inappropriate emotional responses, and self-destructive behaviors are also manifestations of inadequately processed material, and that processing the etiological experiences underlying these current dysfunctions will transform them, allowing new

self-perceptions, emotions, and behaviors to emerge. In addition, new experiences are targeted, processed, and incorporated into memory in order to overcome developmental and skills deficits. EMDR is an integrative therapy, synthesizing elements of many traditional psychological orientations, such as psychodynamic, cognitive behavioral, experiential, physiological, and interpersonal therapies (Shapiro, 2001, 2002; Shapiro & Maxfield, 2002).

EMDR uses a structured eight-phase approach and addresses the past, present, and future ramifications of the dysfunctionally stored memories (Shapiro, 2001). The processing phases of EMDR guide the client's focus of attention through the relevant memory networks associated with the targeted clinical issue. The protocols incorporate elements that are distinctive in a variety of ways. For instance, the client may be asked to attend to a disturbing memory in multiple brief sets of about 15–30 seconds while simultaneously focusing on the dual-attention stimulus (e.g., therapist-directed lateral eye movements, alternate hand-tapping, or bilateral auditory tones). Following each set of such dual attention, the client is asked what comes to mind. At times, the memory itself may alter; at other times, additional associative information may be elicited during the procedure. Depending upon the response, the



new material may become the focus of the next set, or some other aspect of the memory network may be elicited. This process of alternating dual attention and personal reflection is repeated many times during the session. Typically, as treatment progresses, associations to the targeted memory become positive, the patient's distress is relieved, and related cognitions become realistic and adaptive. Guided by the structured protocols, this transformation is often accompanied by global changes in the client's sense of self, others, and the world, and in behavior and lifestyle.

## EMDR Treatment of Posttraumatic Stress Disorder

**Current Status.** EMDR's efficacy in the treatment of posttraumatic stress disorder (PTSD) has been established by the publication of approximately 16 randomized controlled studies documenting its successful treatment of PTSD, with comparisons to antidepressant medication (van der Kolk et al., 2007), exposure therapy (e.g., Ironson, Freund, Strauss, & Williams, 2002; Rothbaum, Astin, & Marsteller, 2005; Taylor et al., 2003; Vaughan et al., 1994), cognitive behavioral therapies (e.g., Jaberghaderi, Greenwald, Rubin, Dolatabadim, & Zand, 2004; Lee, Gavriel, Drummond, Richards, & Greenwald, 2002; Power et al., 2002), and other psychotherapies (e.g., Carlson, Chemtob, Rusnak, Hedlund, & Muraoka, 1998; Edmond, Rubin, & Wambach, 1999; Marcus, Marquis, & Sakai, 1997, 2004). (For summaries of the literature, see Seidler & Wagner, 2006; Shapiro, 2007a).

Currently, EMDR is rated in the highest category of effectiveness and research support in the PTSD practice guidelines of both the American Psychiatric Association (2004) and the U.S. Department of Veterans Affairs and Department of Defense (2004). Its efficacy has also been recognized in many international guidelines, in which it is a recommended intervention for the treatment of PTSD (e.g., Bleich, Kotler, Kutz, & Shalev, 2002; Dutch National Steering Committee, 2003; National Institute for Clinical Excellence, 2005). Several meta-analyses of PTSD treatment have been conducted; these have all concluded that EMDR achieves the same level of outcome as other efficacious treatments, such as exposure therapy (Bradley, Greene, Russ, Dutra, & Westen, 2005; Davidson & Parker, 2001; Seidler & Wagner, 2006; van Etten & Taylor, 1998). It should be noted that although outcomes may be similar, EMDR achieves these effects without the use of homework, and that there are many other distinct differences in the treatment process (see Rogers & Silver, 2002; Rothbaum et al., 2005).

**New Directions.** Although most of the EMDR studies that evaluated PTSD treatment have used adult civilian participants, recent studies have documented its effectiveness with specific populations. These include military combatants (e.g., Carlson et al., 1998; Russell, 2006; Zimmermann, Güse, Barre, & Biesold, 2005), disaster survivors (e.g., Fernandez, Gallinari, & Lorenzetti, 2004; Jarero, Artigas, & Hartung 2006; Konuk et al., 2006), traumatized children (e.g., Chemtob, Nakashima, & Carlson, 2002; Jaberghaderi et al., 2004; Soberman, Greenwald, & Rule, 2002; Tufnell, 2005), and adult survivors of childhood trauma (Edmond et al., 1999; van der Kolk et al., 2007). More studies are needed to thoroughly establish its efficacy with these populations and to evaluate any recommended treatment modifications.

In their recent randomized trial, van der Kolk et al. (2007) found that 8 sessions of EMDR was probably insufficient for those adult participants with childhood abuse because their response was less robust than those with adult-onset trauma. Although 89% lost their PTSD diagnosis at 6-month follow-up, only 33% were asymptomatic, compared to 75% of the participants with adult-onset trauma. Similarly, another study, in which adult survivors of childhood sexual abuse showed significant improvement, concluded that the 6 sessions of EMDR "were too few to adequately address all of the troubling issues the survivors in the study were confronting" (Edmond et al., 1999, p. 114). Research is needed to better determine the appropriate length of EMDR treatment for childhood trauma survivors and whether these patients would also benefit from a longer preparation phase, or a combination of treatments.

Although more controlled studies with traumatized children are needed to evaluate EMDR's efficacy with this population, preliminary results support its effectiveness. For example, Chemtob et al. (2002) found that EMDR effectively reduced PTSD symptoms in children who had not responded to previous treatment, and that EMDR-related changes were maintained at 6-month follow-up. In a randomized study, Jaberghaderi et al. (2004) determined that both EMDR and cognitive behavior therapy produced significant reductions in PTSD and behavior problems in sexually abused Iranian girls, although the EMDR treatment appeared to be more efficient, necessitating fewer sessions and no homework.

**In This Issue.** In the current issue, a vignette by Wizansky recommends a simple procedure for building resources with children prior to and during the trauma work. Wizansky's vignette describes how resources can be identified in all phases of treatment and installed with dual-attention stimulation, strengthening the

positive memory networks so that these are available for the child to access when processing his/her traumatic material. More research is needed to evaluate EMDR treatment with children to determine the value, if any, of proposed modifications.

## EMDR Treatment of Other Anxiety Disorders

**Current Status.** While the research that investigated EMDR treatment of phobias has failed to find strong empirical support for such applications, it is possible that these results are due in part to methodological limitations in the various studies (see De Jongh, Ten Broeke, & Renssen, 1999; Shapiro, 1999). Nevertheless, as De Jongh and Ten Broeke argue (this issue), it is also possible that EMDR may not be consistently effective with these disorders, and that it may be most effective in treating anxiety disorders that follow a traumatic experience (e.g., dog phobia after a dog bite) and less effective for those of unknown onset (e.g., spider phobia). More research is needed to further evaluate EMDR's efficacy with various anxiety-disordered populations, to determine the value of preparation sessions and the development of affect tolerance, and to compare EMDR outcome and maintenance of effects with those of cognitive behavioral and pharmaceutical therapies.

**New Directions.** When an earlier study by Goldstein, de Beurs, Chambless, and Wilson (2000) failed to provide solid evidence for EMDR treatment of panic disorder with agoraphobia, Goldstein (quoted in Shapiro, 2001, p. 363) stated that the participants were not able to tolerate anxiety, and that the single session used in the study, for history taking and preparation, had been insufficient to develop affect regulation. A recent case study by Fernandez and Faretta (2007) described the EMDR treatment of a woman who had panic disorder with agoraphobia for 12 years. They provided a lengthier preparation phase (6 sessions) followed by a full course of treatment (15 sessions) and reported complete remission of symptoms and maintenance of positive behavioral changes at 1-year follow-up. Future research should investigate the length of preparation time needed for those diagnoses that indicate highly anxious participants.

**In This Issue.** In their current article, De Jongh and Ten Broeke (this issue) review effective strategies for identifying etiological events that have contributed to the onset of specific fears and phobias and which should be responsive to EMDR processing. The paper provides a theoretical understanding of the acquisition and treatment of phobias from both the behavioral conceptualization of fear acquisition and the

perspective of Shapiro's (2001) Adaptive Information Processing (AIP) model. The authors also provide practical case examples, illustrating how to use these two perspectives to facilitate the selection of EMDR treatment targets.

## EMDR Treatment of Other Disorders

**New Directions.** EMDR's efficacy in the treatment of disorders other than PTSD has yet to be strongly established. Nevertheless, EMDR is often used by clinicians to treat various types of presenting problems, especially those that have a clear etiological origin, such as complicated grief after the death of a loved one or depression after a marital dissolution. Research is needed to investigate its effectiveness with these applications. While EMDR treatment has successfully eliminated secondary depressive symptoms in many PTSD studies (e.g., van der Kolk et al., 2007), there has not yet been a single study evaluating EMDR treatment of major depressive disorder. Clinicians are encouraged to develop and publish case studies that would illustrate the challenges posed and outcomes achieved with such patients.

Many therapists also use EMDR to help individuals deal with life stressors, family problems, and attachment issues. While there are many anecdotal reports, and conference presentations, recommending various strategies for EMDR work with these issues, very few of these have research support. One interesting EMDR intervention was developed by Madrid to assist mothers who failed to bond with their infants (Madrid, 2007). Two clinical studies determined that his work with these mothers resulted in the cessation or reduction of asthma in their children (Madrid, Ames, Horner, Brown, & Navarrette, 2004; Madrid, Ames, Skolek, & Brown, 2000).

## EMDR Treatment Resulting in Physiological Changes

Shapiro's AIP model (2001) considers that the somatic symptoms that follow unresolved traumatic events may be a manifestation of the dysfunctionally stored memory. The model predicts that effective processing of the etiological event may result in remission of the somatic complaints. Recent research appears to be supporting these predictions. For a summary of the EMDR studies evaluating somatic outcomes, see Schneider, Hofmann, Rost, and Shapiro (this issue). A study conducted by Raboni, Tufik, and Suchecki (2006) found that EMDR treatment of PTSD improved sleep quality, quality of life, and perception of stress. Marcus

et al. (submitted) have reported positive effects in the treatment of migraine headaches with a combination of EMDR, diaphragmatic breathing, and cranial pressure.

**In This Issue.** A single case study by Schneider et al. in this issue describes the treatment of an individual with severe phantom limb pain, 3 years after the traumatic amputation of his leg and part of his pelvis in an accident. After 9 EMDR treatment sessions, his phantom limb pain was completely eliminated, and he was taken off pain medication, with effects maintained at 18-month follow-up. This individual is one in a series of patients studied by Schneider, Hofmann, Rost, and Shapiro (in press), who have been investigating the effects of EMDR on phantom limb pain, where processing of the traumatic event has been found to reduce or eliminate debilitating phantom pain.

Also in this issue is a case series by Sack, Lempa, and Lamprecht. They evaluated the physiological arousal of 12 adults, pre- and post-EMDR treatment for PTSD. At posttreatment and follow-up, there was a significant decrease in stress-related heart rate when participants listened to an audio-taped description of their trauma. Additionally, measures of heart rate variability indicated an overall positive increase in parasympathetic tone.

### EMDR Treatment Resulting in Neurobiological Changes

**New Directions.** Recent studies with PTSD patients have provided further evidence of the post-EMDR changes in brain activation patterns, originally found by Levin, Lazrove, and van der Kolk (1999). For example, Lamprecht et al. (2004) used an electroencephalogram (EEG) to measure event-related brain potentials (ERPs) when participants responded to auditory stimuli. In the post-EMDR recording, the PTSD patients' ERPs showed a significant reduction of the P3a component, indicating that following EMDR they were less prone to distractions and intrusions from irrelevant stimuli. A single case study (representative of a case series now in progress) by Bossini, Fagiolini, and Castrogiovanni (in press) described EMDR treatment of a 27-year-old man with chronic PTSD. After 8 sessions of EMDR, there was an increase in hippocampal volume of about 10%. Lansing, Amen, Hanks, and Rudy (2005) used SPECT scans with six police officers to measure and compare levels of brain activation before and after EMDR treatment for PTSD. Results showed a decrease in limbic, anterior cingulate, and basal ganglia activity. Research is needed in all of these areas to provide better understanding of the mechanisms

of action, the experience of treatment process, and changes that occur before and after treatment.

**In This Issue.** This issue contains the translation of a study using photon emission computerized tomography (SPECT) conducted by Korean researchers Oh and Choi. After EMDR, cerebral perfusion increased in the bilateral dorsolateral prefrontal cortex and decreased in the temporal association cortex. These findings indicate a decrease in limbic activity, reflected in decreased emotionality, and an increase in areas of the brain devoted to memory, speech, and cognition. The authors interpret the results as demonstrating "a reversal of the prefrontal and limbic abnormality, which was evident at pretreatment and which is a frequent neuroimaging finding for patients with PTSD" (p. 28).

### EMDR Treatment of Personality Disorders and Personality Characteristics

**New Directions.** Shapiro's (2007b) AIP model predicts that the effective processing of critical early events can result in a "comprehensive reorganization that may be reflected in changes in . . . personality characteristics" (p. 5). A single case study by Brown and Shapiro (2006) documented the treatment of a woman with borderline personality disorder. After a comprehensive stabilization (preparation) phase, she received 20 EMDR processing sessions. This resulted in clinically significant changes on standardized measures of identity disturbance, affect control, and interpersonal relatedness and many positive changes in the woman's life and relationships. Future research is needed to further explore the treatment of this and other populations with personality disorder.

Research is also recommended to evaluate whether any health and personality changes occur with EMDR treatment. In his study of children with PTSD, Chemtob et al. (2002) documented that there was a decrease in visits to medical personnel subsequent to EMDR treatment. However, additional research is needed in this area. Further, clinicians have often noted that patients report, "I feel like a new person" after EMDR therapy. However, standardized treatment outcome measures are primarily symptom focused, and studies have not commonly assessed whether there are changes in personality characteristics with effective treatment. For example, a qualitative study by Edmond, Sloan, and McCarty (2004) indicated that EMDR participants frequently described EMDR as transforming their perception of self and others, and as experiencing changes on a "deeper, more profound level" than the comparison treatment (pp. 267-268).

Future research is needed to identify and quantify these types of outcomes using personality inventories and trait measures (Maxfield, 2003). It is recommended that such measures be included in studies evaluating the treatment of any diagnoses in order to investigate the potentially far-reaching effects of processing key memory networks. This would assist in fostering a greater understanding of not only EMDR's treatment effects but also the underlying configuration of associative memory processes.

## Treatment Process

Although many studies have compared treatment outcomes, there has only been one study comparing the treatment process in EMDR with that of exposure therapy (Rogers et al., 1999). This study found that EMDR rapidly decreased ratings of subjective distress within the session, while exposure therapy maintained a high level of arousal throughout the session. A meta-analysis that analyzed these in-session changes in EMDR treatment stated that "within-subject comparisons on process measures (SUD and VoC) do show a spectacular effect size ( $r = .81$ ,  $d = 2.71$ , based on 12 comparisons)" (Davidson & Parker, 2001, p. 313).

EMDR is sometimes described as a variant of behavioral exposure therapy, and, indeed, EMDR's procedural component of having the client focus on the distressing memory has some similarities to exposure therapy. However, during EMDR, the client engages in a dual-attention task, which results in the client "distancing" from the memory—that is, maintaining present-day attention while simultaneously focusing on the memory. This process differs from the high level of emotional engagement, or "reliving," that is encouraged in exposure therapy (Jaycox, Foa, & Morral, 1998). A study by Lee, Taylor, and Drummond (2006) coded clients' responses during an EMDR session according to whether the responses were consistent with reliving, distancing, or focusing on other associated material. They found that distancing was associated with the greatest improvement on a measure of PTSD symptoms, demonstrating support for this EMDR treatment component and supporting the concept that EMDR is distinct from exposure therapy. They also suggested that "distancing may be partly facilitated by the distraction of the eye movement task" (p. 105). More research is needed to evaluate these and other differences in process and to assess whether they are related to any differences in outcome.

As noted by Rothbaum et al. (2005), the finding that EMDR treatment does not necessitate the 30–60 hours of homework used in exposure therapies and

does not utilize the same amount of exposure within session is an important area for future investigation. Also of clinical importance are studies that evaluate 1–3 consecutive days of EMDR treatment for postdisaster or battlefield response. Since EMDR does not need an intervening week to incorporate exposure homework to achieve its effects, it may afford a great flexibility in emergency services (see Fernandez et al., 2004; Jarero et al., 2006; Russell, 2006).

## Eye Movements in EMDR

**Current Status.** The clinical research on eye movements (EMs) in EMDR has been fraught with methodological problems, including use of analogue nonclinical participants, participants with disorders other than PTSD, and insufficient sample size. In the Davidson and Parker (2001) meta-analysis, when all types of studies were included no significant differences were found between EMDR-with-EMs and EMDR-without-EMs. However, when the results of only clinical studies with diagnosed populations were examined, EMDR-with-EMs was superior to EMDR-without-EMs, at a marginal level of significance. It should be noted that an examination of even this group is problematic since these studies included combat veterans who were given only 2 EMDR sessions and treated only one memory, which is considered an insufficient treatment dose to achieve effects (see Chemtob, Tolin, van der Kolk, & Pitman 2000; U.S. Department of Veterans Affairs and Department of Defense, 2004). The possible contribution of EMs remains a contentious issue, with critics (e.g., Lohr, Lilienfeld, Tolin, & Herbert, 1999; Lohr, Tolin, & Lilienfeld, 1998; McNally, 1999) arguing that there is no compelling evidence that eye movements contribute to outcome in EMDR. Other reviewers (e.g., Chemtob et al., 2000; Feske, 1998; Perkins & Rouanzoin, 2002) have posited that the lack of evidence is a result of methodological failings (e.g., lack of statistical power, floor effects) and have called for more rigorous study. To date, there has not yet been a randomized study comparing EMDR-with-EMs and EMDR-without-EMs that used a large sample of adult single-trauma participants with PTSD.

**New Directions.** Meanwhile, a separate body of research has examined the effects of EMs on physiology and memory and cognitive processes. Barrowcliff et al. demonstrated that EMs produce relaxation effects (Barrowcliff, Gray, Freeman, & MacCulloch, 2004; Barrowcliff, Gray, MacCulloch, Freeman, & MacCulloch, 2003). The finding that EMs decrease

the vividness and/or emotionality of autobiographical memories is very robust and has been reported by numerous research teams (Andrade, Kavanagh, & Baddeley, 1997; Kavanagh, Freese, Andrade, & May, 2001; Maxfield, 2004; Sharpley, Montgomery, & Scalzo, 1996; Van den Hout, Muris, Salemink, & Kindt, 2001). Other studies found that EMs tend to enhance retrieval of episodic memories (Christman, Garvey, Propper, & Phaneuf, 2003) and increase cognitive flexibility (Kuiken, Bears, Miall, & Smith, 2001–2002). Although a diversity of researchers have proposed various models to explain these effects, and the possible role of EMs in EMDR, to date, no single model has been exclusively supported. Future research investigating mechanisms of action should be driven by hypotheses, with outcomes evaluated in relation to the hypothesis being tested.

### Integration With Other Treatments

**New Directions.** Recent publications have described the integration of EMDR with other therapies in the treatment of various disorders and presenting problems. Typically, there are two types of integration. The first involves the use of EMDR in multimodal approaches, such as are used in the treatment of individuals with substance abuse problems (Amundsen & Kårstad, 2006; Zweben & Yeary, 2006), young offenders (Soberman et al., 2002), and sex offenders (Ricci, Clayton, & Shapiro, 2006). The second type of integration is the combination of EMDR with another therapy to provide more comprehensive treatment, such as that provided to couples and families (e.g., Shapiro, Kaslow, & Maxfield, 2007) or to individuals (e.g., Shapiro, 2002).

Some preliminary research has provided support for the use of EMDR in multimodal approaches, where it is typically used to process early traumas that have contributed to the presenting problem. For example, 20 individuals with substance abuse showed substantial benefits with EMDR treatment (Amundsen & Kårstad, 2006). Similarly, conduct-disordered adolescents evidenced a significant reduction in problem behaviors following 3 sessions of EMDR (Soberman et al., 2002). Adult sex offenders, who had been themselves been abused as children, received EMDR to resolve their childhood trauma, resulting in a significant and sustained decrease in deviant sexual arousal, as measured by penile plethysmography (Ricci et al., 2006).

EMDR has been integrated with many other psychotherapies (e.g., psychoanalytic, cognitive behavioral, experiential) and with family systems approaches (e.g., imago therapy, contextual therapy, structural therapy) to provide comprehensive treatment to individuals,

couples, and families (Shapiro, 2002; Shapiro et al., 2007). Typically, treatments are combined to provide a synergistic effect, with each treatment providing a unique benefit. For example, Errebo and Sommers-Flanagan stated that blending EMDR and emotionally focused couples therapy (Johnson, 2004) “increases the comprehensiveness of therapy by reducing the reactivity of both partners to current triggers of past traumas while simultaneously increasing the emotional safety and stability of the relationship itself” (2007, p. 220). EMDR has been integrated with many other therapies. However, research investigating the efficacy of the integrated approach has been very sparse.

### Summary

A large number of randomized clinical trials have established EMDR’s efficacy in the treatment of adults with PTSD. EMDR appears to produce the same level of outcome in regard to the reduction of overt symptoms as other efficacious PTSD treatments, and it achieves these effects without homework. Additional studies are needed with more diverse outcome measures to assess potential differential effects in regard to personality changes and increases in physical health. Research is currently being conducted with specific traumatized populations to further evaluate EMDR’s suitability, to determine if any individual factors influence treatment response, and to assess any modifications to the standard protocol. Although EMDR is used by clinicians to treat a range of disorders, with anecdotal reports supporting such applications, research has lagged far behind clinical practice. Shapiro’s AIP model posits that EMDR should successfully resolve disorders that stem from distressing past events. Research is needed to determine if EMDR is indeed effective with such disorders as complicated grief, adjustment disorder, traumatic phobias, various personality disorders, and major depressive disorders.

Although there has been some research investigating EMDR’s mechanisms of action, no clear conclusions are evident, and various theories abound. Methodologically rigorous research is needed to compare EMDR-with-EMs and EMDR-without-EMs, using a large sample of adult-single-trauma participants with PTSD. Research is also needed to compare the effects of the alternate dual-attention stimulation used in EMDR—the bilateral tapping and tones—and to assess whether it produces the same level of outcomes as EMs and whether clients using it experience a similar type of treatment process. Brain scans and other neurobiological and physiological tests should help to clarify our understanding of what occurs

during and after EMDR treatment. All studies should attempt to utilize as many of the “gold standards” as possible (see Maxfield & Hyer, 2002). While randomized studies are ultimately needed to definitively assess treatment outcomes with various populations and resolve issues of underlying mechanisms, individual cases and case series that incorporate standardized measures are needed to set the groundwork in investigating clinical parameters and recommendations for current practices and future developments.

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# Assessment of Psychophysiological Stress Reactions During a Traumatic Reminder in Patients Treated With EMDR

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This study investigates changes of stress-related psychophysiological reactions after treatment with EMDR. Sixteen patients with posttraumatic stress disorder (PTSD) following type I trauma underwent psychometric and psychophysiological assessment during exposure to script-driven imagery before and after EMDR and at 6-month follow-up. Psychophysiological assessment included heart rate (HR) and heart rate variability (HRV) during a neutral task and during trauma script listening. PTSD symptoms as assessed by questionnaire decreased significantly after treatment and during follow-up in comparison to pretreatment. After EMDR, stress-related HR reactions during trauma script were significantly reduced, while HRV indicating parasympathetic tone increased both during neutral script and during trauma script. These results were maintained during the follow-up assessment. Successful EMDR treatment may be associated with reduced psychophysiological stress reactions and heightened parasympathetic tone.

**Keywords:** PTSD; EMDR; psychophysiology; heart rate; parasympathetic nervous system

Exaggerated psychophysiological arousal and increased startle reactions are constituent symptoms for the diagnosis of posttraumatic stress disorder (PTSD). Empirical data actually demonstrate elevated psychophysiological baseline parameters and excessive psychophysiological reactivity in patients who have PTSD (Orr & Roth, 2000). In this vein, several studies report elevated baseline HR in Vietnam veterans with PTSD (Gerardi, Keane, Cahoon, & Klauminzer, 1994; Keane et al., 1998) as well as in victims of motor vehicle accidents (Blanchard et al., 1996) when compared with normal controls. In addition, exaggerated startle reactions to loud tones or other distressing stimuli (Metzger et al., 1999; Shalev et al., 2000) and diminished habituation to repeated stimuli presentation (Shalev, Orr, Peri, Schreiber, & Pitman, 1992) have been found consistently. However, the most intense psychophysiological reactions are known to be elicited by reminders of individual traumatic memories (e.g., audiotaped trauma scripts), which therefore have been suggested

to act as a specific diagnostic indicator of PTSD (Keane et al., 1998; Pitman, Orr, Forgue, de Jong, & Claiborn, 1987). From this perspective, there is strong supporting evidence for including psychophysiological measures into the outcome assessment for psychotherapeutic treatment in patients with PTSD.

## Psychophysiological Outcome

Studies investigating the effects of cognitive-behavioral exposure treatment for Vietnam veterans with PTSD (Boudewyns & Hyer, 1990; Pitman et al., 1996) and civilian participants with PTSD (Shalev, Orr, & Pitman, 1992) have found decreased psychophysiological arousal during exposure to the traumatic memory after successful treatment. In addition, a series of treatment studies administering EMDR included psychophysiological measures. Three EMDR studies found treatment-related reductions of psychophysiological arousal in response to script-driven imagery (Carlson, Chemtob, Rusnak, Hedlund, & Muraoka,

1998; Renfrey & Spates, 1994; Rogers et al., 1999). These studies had small sample sizes ranging from 6 to 8 patients treated with EMDR. Two studies found evidence for a pre- to posttreatment habituation of heart rate and electromyogram (Boudewyns, Stwertka, Hyer, Albrecht, & Sperr, 1993; Forbes, Creamer, & Rycroft, 1994), but these reductions in autonomic activity could not be attributed to treatment effects. Again, both studies employed relatively small sample sizes of 9 and 8 patients, respectively, in the treatment group. Finally, in a single-session design with continuous monitoring of autonomic variables, Wilson, Silver, Covi, and Foster (1996) reported a pre- to posttreatment reduction of HR and galvanic skin reactions in 17 patients treated with EMDR.

## Measurement of Parasympathetic Tone

Autonomic regulation has recently become a focus of interest in psychophysiology since newer methods allow a quantification of the influence of both branches (parasympathetic and sympathetic) of the autonomic nervous system (Cacioppo et al., 1994). HR fluctuations related to inspiration and expiration, which are known as respiratory sinus arrhythmia (RSA), are highly correlated with the parasympathetic activity on the sinoatrial node of the heart. Studies administering pharmacological blockades demonstrate that cardiac parasympathetic tone is closely related to RSA (Akselrod et al., 1981; Cacioppo et al., 1994). Low parasympathetic tone has been identified not only as a risk factor for cardiovascular disease (Bonaduce et al., 1999) but also as a concomitant of affect-dysregulation and stress-related psychiatric diseases, such as depressive disorders and anxiety disorders (Gorman & Sloan, 2000). There is increasing evidence that low parasympathetic tone is an indicator for prefrontal cortex hypofunction associated with disinhibited defensive circuits and a dominance of amygdala-generated affect and distress (Thayer & Brosschot, 2005).

Initial studies in patients with PTSD found reduced parasympathetic tone when compared to controls (Cohen et al., 1997; Rothbaum, Kozak, Foa, & Whitaker, 2001). Low parasympathetic tone was also found to be associated with prolonged psychophysiological arousal in patients with PTSD during script-driven trauma imagery (Sack, Hopper, & Lamprecht, 2004). One study reported a normalization of parasympathetic tone during pharmacological treatment of PTSD by selective serotonin reuptake inhibitor-antidepressants (Cohen, Kotler, Matar, & Kaplan, 2000). The only study investigating the effects of psychotherapeutic treatment for PTSD on autonomic regulation (Nishith et al., 2003)

found a pattern of enhanced parasympathetic tone during REM sleep after successful cognitive behavioral therapy.

The primary aim of the present study was to assess the feasibility of measuring autonomic stress reactivity during the course of treatment. We hypothesized that successful EMDR treatment would be associated with diminished HR reactions during a traumatic reminder, and that a posttreatment increase in parasympathetic tone would be observed.

## Method

### Participants

Sixteen outpatients (10 women, 6 men) who inquired about possible treatment for trauma-related psychological problems at a specialized trauma clinic participated in the study. All patients experienced Type I traumatizations in adulthood and fulfilled diagnostic criteria for PTSD as assessed by the PTSD module of the structured clinical interview for the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV*; First, Spitzer, Gibbon, & Williams, 1996). Five patients were victims of assault violence, 3 patients had motor vehicle accidents, 3 patients experienced sudden death of a relative, 3 female patients were victims of rape, and 2 patients reported work accidents. Exclusion criteria for participation in the study were severe dissociative symptoms, represented by a score greater than 30 on the Dissociative Experiences Scale (Bernstein & Putnam, 1986), as well as serious traumatizations during childhood. After a detailed clinical interview (which often took several sessions) the application of EMDR was proposed.

Participants ranged in age from 26 to 56 years, with a mean age of 40.5 years ( $SD$  8.4); 9 were married, 6 single, and 1 divorced. Seven participants reported 13 years of formal scholarly education, 5 participants reported 10 years, and 4 participants reported 9 years. The ethnic background of all patients was White. When assessed with a diagnostic checklist (Hiller, Zaudig, & Mombour, 1995), 1 patient endorsed symptoms consistent with a diagnosis of agoraphobia and undifferentiated somatoform disorder; the other patients had no comorbid diagnosis.

### Treatment

Trauma therapy with EMDR was carried out by the authors of the study strictly following the manualized standard protocol (Shapiro, 1995), although treatment adherence was not assessed. All therapists had completed EMDR Level II training and had several

years of experience in applying EMDR. Duration of the therapy followed patients' individual needs and was terminated when the participant rated the level of distress associated with the traumatic memory at a 0 or 1 on the Subjective Units of Distress (SUD) scale (Wolpe, 1969). Treatment focused on past trauma only. A mean number of 4.7 EMDR-treatment sessions (range 1 to 8 sessions) was administered.

EMDR is an information processing therapy (Shapiro, 2001; Shapiro & Maxfield, 2002) combining multiple brief exposures to traumatic memories with eye movements or other forms of bilateral stimulation (e.g., alternating tapping on hands or alternating clicking tones). The patient attends to past and present experiences in brief sequential doses while simultaneously focusing on an external stimulus (e.g., following the therapists moving fingers with the eyes). Then the patient is instructed to let new material become the focus during the next set of stimulation. This procedure is repeated until the trauma-associated distress is reduced to a minimum.

### Assessment Procedures

The first author of the study conducted all diagnostic assessment including Structured Clinical Interview for DSM-IV Disorders–PTSD ratings. Psychophysiological testing was carried out before the first treatment session, 1 week after treatment, and during a 6-month follow-up. Trauma related symptoms were assessed with the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) and the Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1995) on each testing occasion. The IES is a standardized 15-item questionnaire asking for symptoms of reexperiencing and avoiding related to traumatic experiences. The IES is a well-validated and widely used questionnaire for assessing symptom severity in trauma-related disorders. The validated German version was used (Ferring & Fillipp, 1994). The PDS asks participants to rate the extent to which they experience each PTSD symptom specified in *DSM-IV*, ranging from 0 (never) to 3 (5 times per week or more/nearly always), and yields scores for total symptom severity and intrusions, avoidance, and hyperarousal subscales. Unpublished data from previous studies of our research group have shown acceptable psychometric properties of the German translation of the PDS.

### Instruments and Script-Driven Imagery

An individual trauma script was prepared for each patient. The procedure initially described by Pitman, Orr, Fogue, de Jong, and Claiborn (1987) was modified

using script-reading periods of 2-min duration instead of the typical 30 s, since pilot work indicated that some patients needed more than 30 s to get access of their traumatic memory. All trauma scripts were prepared by the first author (M. S.) and were described in the present tense and first person, sequentially unfolding details of the most disturbing traumatic event. Scripts were then read to the patient to check for any inconsistencies with his/her memories. A 2-min recording of the script was made on audiotape. Psychophysiological assessment was conducted in a second session, approximately 1 week after script preparation, which took place in the therapeutic environment familiar to the patients. Participants were seated in a comfortable chair and asked to sit still during the recording procedure. After electrocardiogram (ECG) electrode placement and a 5-min adaptation period, a sequence of five scripts was played back via tape recorder in a fixed order: (1) 2-min scripted relaxation exercise followed by a 1-min break; (2) 2-min neutral script of imagining washing dishes followed by 1-min break; (3) 2-min trauma script followed by a 5-min break; (4) repeat of relaxation script/exercise and 1-min break; and (5) repeat of neutral script. Levels of subjective discomfort (SUD) on a scale ranging from 0 (no distress at all) to 10 (the highest possible distress) were immediately assessed at the end of the trauma script. The ethics committee of Hanover Medical School, Germany, approved the design of the study. All participants gave their informed consent.

ECG signals were obtained via three commercial disposable Ag-AgCl electrodes placed on the chest; they were recorded in a miniaturized amplifier (Par-Port, Par-Elektronik, Berlin, Germany). Sampling rate of ECG data for acquisition of interbeat intervals (IBIs) was 1000 Hz. Data were transferred to a PC, and a time series of interbeat intervals was generated. Time series analysis was conducted to calculate RSA according to the procedure developed by Porges and Bohrer (1990). According to published recommendations (Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, 1996), RSA was defined as variations of interbeat intervals of HR in the frequency band between 0.12 and 0.40 Hz. This frequency band selectively reflects the activity of efferent fibers from the parasympathetic system originating in the nucleus ambiguus and is characterized by a respiratory rhythm. Mxedit software (Delta-Biometrics, Bethesda, MD, USA) was used to visually display the heart period data, to edit outliers, and to quantify the heart period and the vagal tone index. Processing included resampling of HR period data every 500 ms and a detrending procedure with moving polynomial filter (3rd order 21-point).

Finally, a band pass filter was administered to restrict data to the frequency range of respiratory associated arrhythmia. The analysis represents the variance of the residual series output from the detrending algorithm and is reported in units of  $\ln(\text{ms})^2$ . Except for frequently premature heartbeats in one case, which therefore had to be excluded, all ECG data were free from artifacts, and no further corrections were required.

### Data Reduction and Statistical Analyses

Mean values of HR were calculated for the first 60 s of each script. RSA was computed for 2-min periods during both neutral scripts and trauma script. Mean HR and mean RSA from both neutral scripts served as comparison. After testing for normal distribution, analyses of variance over time were carried out for all variables with paired *t* tests (two tailed). Significance levels were set at .05 for all statistical analyses, which were performed using the SPSS 10 statistical package (SPSS Inc., Chicago, IL, USA).

## Results

### Dropouts

Two of the 16 participants (13%) dropped out during treatment phase. The (male) patient with comorbid anxiety disorder reported an intolerable increase of anxiety symptoms following the first EMDR session; therefore, trauma exposure had to be stopped and replaced by stabilization. The second (female) patient noted no subjective improvement during the first 2 therapy sessions and terminated thereafter. One patient had to be excluded from psychophysiological data analysis due to frequent premature heartbeats.

Due to organizational shortcomings, one patient did not complete the posttreatment assessment but did finish follow-up, and another patient did not complete follow-up. One patient completed psychophysiological data at follow-up, but questionnaire data were lost. There were no significant differences in pretreatment questionnaire measures or in levels of psychophysiological response between dropouts or participants with data loss ( $N = 5$ ) and participants completing posttreatment as well as follow-up assessment ( $N = 11$ ).

### Questionnaires

Pre- versus posttreatment and pretreatment versus follow-up comparisons revealed highly significant decreases in posttraumatic symptoms as measured by IES and by PDS. While pretreatment scores of IES and PDS indicated pathological symptom severity (cutoff IES: 27, PDS: 1.2) posttreatment and follow-up mean scores of both questionnaires in our sample reached subclinical levels. Comparison of posttreatment versus 6-month follow-up showed no significant differences in all questionnaires (see Table 1 for details).

Effect sizes for comparison of treatment effects were computed as standardized mean differences by dividing the difference of pre- and posttreatment mean values by the square root of pooled squared standard deviations. For the comparison of pre- versus posttreatment and pretreatment versus follow-up, the following effect sizes resulted: Impact of Event Scale: 1.80 and 1.74, respectively; Posttraumatic Diagnostic Scale: 1.21 and 1.31, respectively. The highest treatment effects were found for IES-intrusion, with effect sizes of 2.01 and 1.73, respectively, and PDS-intrusion, with 1.30 and 1.58, respectively.

**TABLE 1. Psychometric Variables**

	Pre ( $N = 16$ )	Post ( $N = 12$ )	Follow-Up ( $N = 11$ )	Comparison Pre/Post		Comparison Pre/Follow-Up	
	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )	<i>t</i> ( <i>df</i> )	Significance	<i>t</i> ( <i>df</i> )	Significance
IES total score	47.3 (13.9)	19.6 (17.3)	22.6 (14.7)	5.1 (11)	$p < .001$	5.3 (10)	$p < .001$
IES intrusions	25.3 (5.7)	9.9 (9.7)	11.7 (10.3)	6.1 (11)	$p < .001$	4.5 (10)	$p = .001$
IES avoidance	22.0 (11.5)	9.7 (9.6)	10.8 (7.1)	2.9 (11)	$p = .015$	4.2 (10)	$p = .002$
PDS total score	1.75 (0.51)	1.00 (0.74)	0.95 (0.74)	5.5 (11)	$p < .001$	6.0 (10)	$p < .001$
PDS intrusions	1.92 (0.52)	1.05 (0.83)	0.95 (0.73)	5.1 (11)	$p < .001$	4.9 (10)	$p = .001$
PDS avoidance	1.77 (0.68)	0.89 (0.72)	0.96 (0.90)	5.0 (11)	$p < .001$	5.3 (10)	$p < .001$
PDS arousal	1.51 (0.58)	1.10 (0.79)	0.93 (0.73)	2.7 (11)	$p = .021$	3.4 (10)	$p = .007$

Note. *SD* = standard deviation; IES = Impact of Event Scale; PDS = Posttraumatic Diagnostic Scale. Statistical comparison: paired *t* test (two tailed).

## Subjective Distress During Trauma Script

Subjective distress during presentation of the individualized trauma script decreased significantly in pre- and posttreatment comparison as well as in pretreatment and follow-up comparison. Please note, that these

SUD values reflect subjective reactions during the experimental condition, and that during treatment, SUDs are not reported. Mean values are described in Table 2 for all patients who started treatment (intent-to-treat), and in Table 3 for patients who completed postassessment as well as follow-up.

**TABLE 2. Subjective Distress and Psychophysiological Measures**

Measures	Pre ( <i>N</i> = 15) Mean ( <i>SD</i> )	Post ( <i>N</i> = 12) Mean ( <i>SD</i> )	Follow-Up ( <i>N</i> = 12) Mean ( <i>SD</i> )	Comparison Pre/Post		Comparison Pre/Follow-Up	
				<i>t</i> ( <i>df</i> )	Significance	<i>t</i> ( <i>df</i> )	Significance
HR neutral (bpm)	79.0 (10.9)	74.5 (10.2)	75.4 (9.2)	0.44 (11)	<i>ns</i>	0.58 (11)	<i>ns</i>
HR trauma script (bpm)	89.9 (15.8)	78.6 (8.9)	80.5 (8.8)	2.2 (11)	<i>p</i> = .053	2.5 (11)	<i>p</i> = .031
HR difference (bpm)	10.9 (10.3)	4.2 (4.8)	5.1 (5.7)	3.3 (11)	<i>p</i> = .007	2.4 (11)	<i>p</i> = .030
RSA neutral [ln(ms) <sup>2</sup> ]	5.0 (1.0)	5.3 (1.1)	5.9 (1.2)	-1.7 (11)	<i>p</i> = <i>ns</i>	-3.7 (11)	<i>p</i> = .004
RSA trauma script [ln(ms) <sup>2</sup> ]	4.5 (1.4)	5.4 (1.4)	5.6 (1.2)	-2.8 (11)	<i>p</i> = .018	-2.8 (11)	<i>p</i> = .018
RSA difference [ln(ms) <sup>2</sup> ]	-.49 (0.92)	0.12 (0.82)	-.31 (0.67)	2.0 (11)	<i>p</i> = .071	0.59 (11)	<i>ns</i>
SUD (0-10)	6.4 (2.0)	3.5 (1.9)	3.5 (2.2)	4.8 (11)	<i>p</i> < .001	4.2 (11)	<i>p</i> = .002

*Note.* *SD* = standard deviation; SUD = subjective units of distress during trauma script; HR = heart rate; RSA = respiratory sinus arrhythmia; HR difference = HR trauma script - HR neutral; RSA difference = RSA trauma script - RSA neutral. Statistical comparison: paired *t* test (two tailed).

**TABLE 3. Subjective Distress and Psychophysiological Measures (Completers Only)**

Measure	Pre ( <i>N</i> = 11) Mean ( <i>SD</i> )	Post ( <i>N</i> = 11) Mean ( <i>SD</i> )	Follow-Up ( <i>N</i> = 11) Mean ( <i>SD</i> )	Comparison Pre/Post		Comparison Pre/Follow-Up	
				<i>t</i> ( <i>df</i> )	Significance	<i>t</i> ( <i>df</i> )	Significance
HR neutral (bpm)	74.5 (8.6)	74.4 (10.7)	74.1 (8.4)	0.07 (10)	<i>ns</i>	0.25 (10)	<i>ns</i>
HR trauma script (bpm)	86.6 (16.9)	78.9 (9.3)	79.6 (8.7)	1.8 (10)	<i>p</i> = .110	2.2 (10)	<i>p</i> = .051
HR difference (bpm)	12.1 (10.9)	4.5 (4.9)	5.5 (5.8)	2.9 (10)	<i>p</i> = .015	2.4 (10)	<i>p</i> = .037
RSA neutral [ln(ms) <sup>2</sup> ]	5.0 (1.0)	5.4 (1.1)	5.8 (1.2)	1.6 (10)	<i>p</i> = <i>ns</i>	3.4 (10)	<i>p</i> = .007
RSA trauma script [ln(ms) <sup>2</sup> ]	4.5 (1.3)	5.5 (1.4)	5.5 (1.3)	2.4 (10)	<i>p</i> = .040	2.6 (10)	<i>p</i> = .027
RSA difference [ln(ms) <sup>2</sup> ]	-.52 (0.97)	0.06 (0.82)	-.32 (0.71)	1.6 (10)	<i>p</i> = .143	0.58 (10)	<i>ns</i>
SUD (0-10)	6.8 (2.10)	3.6 (2.0)	3.6 (2.3)	4.3 (10)	<i>p</i> < .001	4.0 (10)	<i>p</i> = .003

*Note.* *SD* = standard deviation; SUD = subjective units of distress during trauma script; HR = heart rate; RSA = respiratory sinus arrhythmia; HR difference = HR trauma script - HR neutral; RSA difference = RSA trauma script - RSA neutral. Statistical comparison: paired *t* test (two tailed).

## Psychophysiological Measures

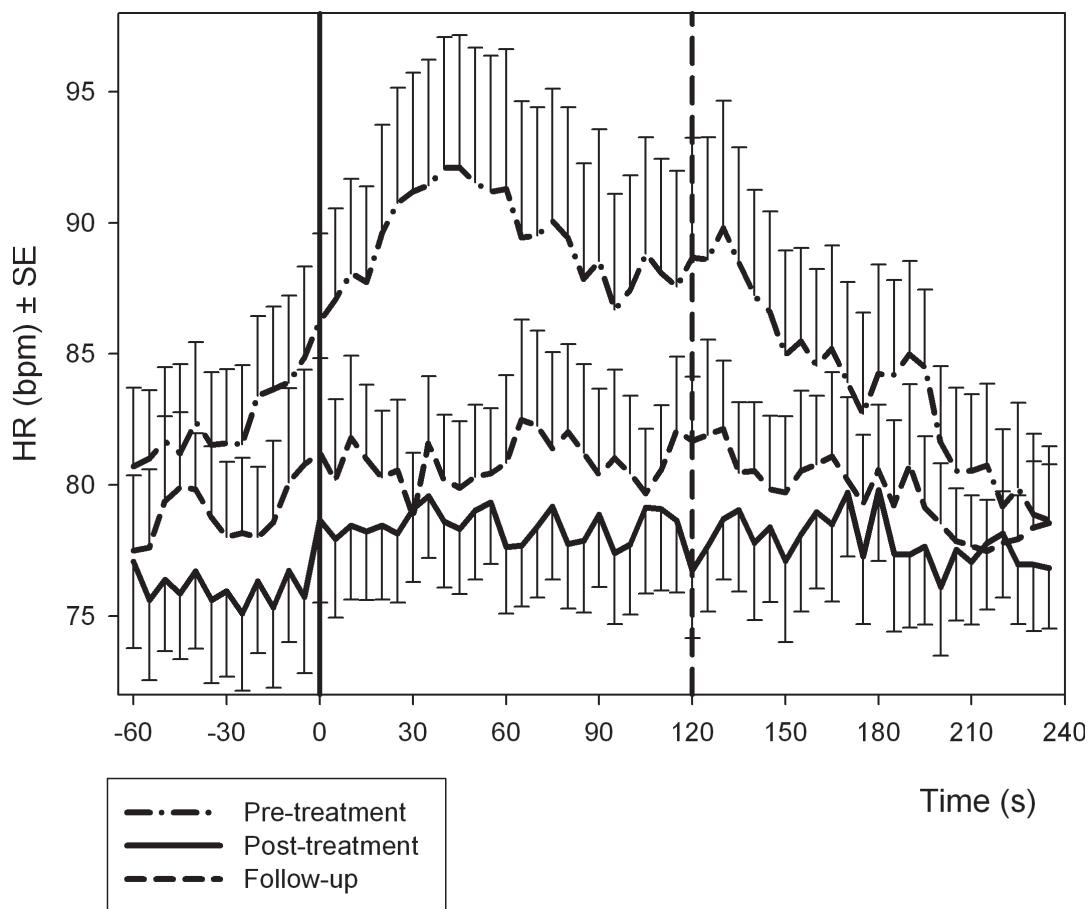
At all assessment points, HR increased significantly during trauma-script exposure when compared with the neutral condition (see Table 2). Pre- versus post-treatment comparison showed a significant reduction of trauma-script-induced HR reactions, which was also found in pretreatment versus follow-up comparison. RSA scores showed significant improvement—indicating higher parasympathetic tone—at posttreatment for the trauma-script condition and during follow-up for both the neutral condition and trauma script. There were no significant correlations between the reported changes in psychophysiological reactivity and treatment outcome as indicated by reduction of IES or PDS at posttreatment or follow-up.

A graphical display of the time course of HR immediately before and during listening to the individual trauma script confirmed the statistical finding of heightened psychophysiological reactivity at pretreatment assessment as compared to posttreatment and follow-up (see Figure 1).

## Discussion

In our sample of patients with PTSD after adulthood single trauma, EMDR treatment was followed by a significant reduction of trauma-related symptoms, which was maintained in a 6-month follow-up. Psychophysiological arousal during presentation of an individualized trauma script, one of the main characteristics of PTSD, was significantly reduced in pre- versus post-treatment comparison as well as in pretreatment follow-up comparison. Following treatment with EMDR, HR acceleration to trauma script was significantly reduced at posttreatment and at follow-up. Subsequently, patients reported a significant decrease of their subjective distress during trauma-script presentation. RSA indicating parasympathetic tone increased significantly over the course of treatment both during the neutral condition script and during trauma script.

Observed effect sizes in terms of symptom reduction (IES pre- versus posttreatment and pretreatment versus follow-up: 1.75 and 1.69, respectively) were relatively high also when compared with results of other PTSD treatment studies (Van Etten & Taylor,



**FIGURE 1.** Time course of heart rate ( $\pm$  SE) immediately before and during trauma script (0 to 120 s).

1998). The largest treatment effects were found for intrusive symptoms. Particular efficacy of the EMDR treatment in improving intrusive symptoms has also been previously reported (Lee, Gavriel, Drummond, Richards, & Greenwald, 2002).

The validity of our results has certain underlying methodological restrictions. First, our study had a relatively small sample size of only 16 patients with PTSD, which was further reduced by 2 dropouts and partially missing data from 3 participants. Second, because no control group was assessed, effects of repeated measurement of psychophysiological reactions could not be controlled. Although the question of whether repeated presentation of an individual trauma script would per se be associated with psychophysiological habituation has not been sufficiently examined empirically, the reproduction of cardiovascular reactions to stressors seems to be generally high, as studies in patients with panic disorders and generalized anxiety disorders demonstrate (Allen, Sherwood, Obrist, Crowell, & Grange, 1987; Eckman & Shean, 1997). Third, since our equipment did not allow the recording of breathing rates, RSA analyses did not control for possible respiratory influences as recommended in recent guidelines (Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, 1996). The generalizability of this study is further limited because no reassessment with diagnostic interview at post-treatment or follow-up was included. However, reduction of PTSD symptom levels below norms as measured by standardized questionnaires indicates that EMDR treatment in our study was an effective intervention.

Even after consideration of the above-discussed limitations, especially concerning the lack of an appropriate control group, the results of our study demonstrate the feasibility of measuring psychophysiological stress reactions during the course of treatment sessions. As our results indicate, a reduction of trauma symptoms and of subjective distress during a traumatic reminder might be accompanied by a normalization of psychophysiological reactivity during trauma script. Memories that were previously trauma triggering seem—at least in part—to have lost their pathological impact, according to our patients' reports. In fact, some patients were surprised when the audiotaped presentation of their traumatic memory failed to evoke any distressing reaction. We did not find a significant association between changes in psychophysiological reactivity and treatment outcome. However, due to the small sample size, the statistical power of our study is probably insufficient to reliably answer this question.

This is the first study showing a relation between RSA and EMDR treatment. The results of our study have to be considered as preliminary and should be interpreted with caution. However, they indicate that successful resolution of traumatic memory may be associated with an increase in parasympathetic tone, not only during confrontation with a reminder of the traumatic memory but also during a baseline control condition. The observed increase of RSA both during the control condition and during trauma script indicate higher levels of parasympathetic tone after therapy, which may be associated with better capacities to regulate psychophysiological stress reactions.

The adaptive information processing model (Shapiro, 2002), predicts that successful processing of implicit traumatic memory, with EMDR treatment, will result in integration of the memory's somatic component, resulting in a reduction of physiological reactivity. Some support for this hypothesis was found in our study, with treatment leading to enhanced psychophysiological regulation capacities—during confrontation with a trigger of the traumatic memory—as well as to a reduction of psychobiological markers of chronic stress. Furthermore, these findings fit with the idea that trauma integration might lead to a restoration of inhibitory circuits responsible for regulation of limbic-generated arousal and anxiety (Thayer & Brosschot, 2005).

Although this study relied on trauma treatment with EMDR, we do not expect the resulting psychophysiological treatment effects to be specifically related to this therapy. We anticipate that equivalent outcomes would result from any successful treatment of PTSD that produced traumatic memory integration and an extinction of the traumatic fear structure and associated dysfunctional cognitions (Foa & Kozak, 1986). Our results, therefore, supplement the findings from Nishith et al. (2003) reporting significant decreased sympathetic predominance during REM sleep in cognitive behavioral therapy treatment responders. We are convinced that the assessment of parameters of autonomic regulation during the course of psychotherapeutic treatment provides a promising field of research at the interface between body and psyche, and that further research will offer new insights into possible neurobiological mechanisms underlying trauma-related disorders.

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# Changes in the Regional Cerebral Perfusion After Eye Movement Desensitization and Reprocessing

## A SPECT Study of Two Cases

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Eye movement desensitization and reprocessing (EMDR) has emerged as a promising new treatment for trauma and other anxiety-based disorders. However, the neurobiological mechanism of EMDR has not been well understood. This study reports changes in the resting regional cerebral blood flow after successful EMDR treatment in two patients with posttraumatic stress disorder (PTSD). Brain 99mTc-ECD-SPECT (Technetium 99m-ethyl cysteinate dimer–single photon emission computerized tomography) was performed before and after EMDR, and, in addition, a pre- and posttreatment comparison was made with 10 non-PTSD participants as a control group. After EMDR, cerebral perfusion increased in bilateral dorsolateral prefrontal cortex and decreased in the temporal association cortex. The differences between participants and normal controls also decreased. Changes appeared mainly in the limbic area and the prefrontal cortex. These results are in line with current understanding of neurobiology of PTSD. EMDR treatment appears to reverse the functional imbalance between the limbic area and the prefrontal cortex.

**Keywords:** eye movement desensitization and reprocessing; single photon emission computerized tomography; posttraumatic stress disorder; neuroimaging; regional cerebral blood flow (rCBF)

Since its introduction in 1989, EMDR has evolved from a promising novel treatment to one of the few established psychotherapies for trauma-related disorders (Shapiro, 1989, 2002). EMDR is a structured, integrative psychotherapy combining a variety of psychotherapeutic orientations, and its application is guided by an information-processing model (Shapiro, 1995).

Currently, evidence supporting EMDR treatment of PTSD has been demonstrated by a large number of controlled studies (see meta-analytic reviews by Davidson & Parker, 2001; Van Etten & Taylor, 1998). Compared to other established psychotherapies for PTSD (e.g., exposure or cognitive therapy), EMDR has equivalent efficacy (American Psychiatric Association, 2004; Davidson & Parker, 2001). Van Etten and Taylor noted that EMDR was more efficient, requiring fewer sessions to achieve therapeutic effectiveness, without any homework.

Some authors have argued that EMDR is another form of exposure therapy (e.g., Lohr, Tolin, &

Lilienfeld, 1998). However, others have pointed out that EMDR is distinct from exposure therapy in that physiological habituation is lacking and spontaneous association occurs during processing (e.g., Rogers & Silver, 2002).

Taken together, the literature suggests that EMDR is unique in that it works faster, requires no outside-session activity, and uses the bilateral stimulation. These distinctions have encouraged scientists to hypothesize about the underlying mechanism of treatment, and, in fact, several hypotheses have been proposed: accelerated information processing (Shapiro, 1995), traumatic memory conditioning with positive visceral investigatory reflex of orienting response (MacCulloch & Feldman, 1996), and induction of a REM sleep-like neurobiological state (Stickgold, 2002). Experimental studies showed evidence for psychophysiological de-arousal (Barrowcliff, Gray, MacCulloch, Freeman, & MacCulloch, 2003) and decreased orienting response and de-arousal (Lamprecht et al., 2004). However, controversies exist regarding

the treatment mechanism of EMDR, and experimental studies are scarce at this writing.

One area that can shed light on the neurobiological mechanism of EMDR is functional neuroimaging: SPECT, positron emission tomography (PET), and functional magnetic resonance imaging (fMRI). Advances in this technology have enabled researchers to integrate both the functional and the structural aspects of the brain, and, thus, to better understand the pathophysiology of PTSD (Hull, 2002). To our knowledge, only one published case report using SPECT has assessed the effects of EMDR treatment (Levin, Lazrove, & van der Kolk, 1999). This study assessed four participants with PTSD and found that activity of the anterior cingulate gyrus and left prefrontal cortex increased after EMDR. It was thought that these structures may play a role in discerning between real and imagined fear, and that changes in these structures were related to improvement of PTSD symptoms. The finding of this study was neither generalized nor replicated; however, one recent SPECT study found correlation between symptom reduction and activation in the left medial prefrontal cortex after antidepressant (citalopram) treatment with PTSD (Seedat et al., 2004).

While Levin et al. (1999) provoked symptoms using script-driven imagery, the current authors chose to investigate whether SPECT scanning of resting cerebral blood flow, without the provocation paradigm, would show similar findings after EMDR treatment. Two women with PTSD were scanned with SPECT before and after treatment.

## Method

### Participants

Two women patients with PTSD received six sessions of EMDR during their inpatient admission at the Inpatient Unit of Neuropsychiatry, Hanyang University Medical Center in Seoul. Each participant was scanned with Brain 99mTc-ECD-SPECT before and after EMDR treatment.

**Case 1.** Participant A was a 52-year-old, right-handed woman from a rural area. She worked for a fishing business until she had a traffic accident 3 years previously, which resulted in multiple fractures of her lower extremities. After the incident, she became anxious about being in a car and was easily startled by metallic sounds. She also complained of insomnia, nightmares, and even persecutory ideas that insurance employees were watching her. She was diagnosed with PTSD according to the criteria of the *Diagnostic*

*and Statistical Manual of Mental Disorders (DSM-IV;* American Psychiatric Association, 1994). She had received 16 months of outpatient treatment, which failed to improve her condition, and finally, she was admitted to the inpatient unit where she received six sessions of EMDR. She remained on her outpatient medication of prooxetine, 40 mg daily, and alprazolam, 0.75 mg daily.

**Case 2.** Participant B was a 34-year-old, right-handed housewife with a high school education, who had been married for 10 years. She reported that she was often separated from her parents in her childhood and was raped once before marriage. She had had chronic depressed mood since her late adolescence, and after marriage she was only able to do household chores and child rearing. One month before admission, she had witnessed her husband speaking with other women and developed obsessions of her husband having extramarital affairs. She complained of anxiety and insomnia. One day before admission she developed bizarre behaviors and reported a hallucination of her deceased boyfriend. This resulted in an admission to the psychiatric inpatient unit. Her *DSM-IV* diagnoses were brief psychotic disorder and PTSD. The psychotic state soon disappeared, and during her 4 weeks at the hospital, she received six sessions of EMDR and a small amount (2 mg daily) of an antipsychotic medication, risperidone.

**Normal Controls.** Ten women volunteers, without a history of psychiatric treatment, were recruited for a control group. They underwent the SPECT procedure to construct a control template of brain images. These participants were all right-handed, and they did not have any preexisting neurological or psychiatric conditions, such as head trauma, epilepsy, or substance abuse. They also underwent an MRI for possible structural brain abnormality. One of authors (D.-H. O.) obtained written informed consent from all of the participants. The procedure of study and informed consent were approved by the institutional ethics review board.

### Treatment

EMDR was provided to Participants A and B by a psychiatric resident (D.-H. O.) who was trained in a Part 1 workshop and who had practiced EMDR for several months. A total of six sessions was delivered for each patient, and the average EMDR session lasted 90 min. Both patients remained at fixed dose of psychotropic medication during the study period.

## Psychometric Assessment

The first author administered the Clinician-Administered PTSD Scale (CAPS; Blake, et al., 1995) to Participants A and B on two occasions, 1 week before and 1 week after EMDR treatment. A diagnosis of PTSD was made when both *DSM-IV* (American Psychiatric Association, 1994) criteria were satisfied and the total score on the CAPS was greater than 50. Also administered was the severity of illness subscale of the Clinical Global Impression Scale (CGI; Guy, 1976), where 7 is extremely ill and 1 is not at all ill.

## SPECT Imaging

Patients were placed on supine position in a quiet room for several minutes and given intravenous  $^{99m}\text{Tc}$ -ECD). Scanning was performed by high-resolution double-headed gamma camera with low energy and with high-resolution and low energy fan beam collimators.

A total count of 128 frames was obtained at 25-s acquisition time per projection taken at every  $3^\circ$  while rotating  $360^\circ$ . The thickness of slices was 1.67 mm. The data were then recorded in an  $128 \times 128 \times 64$  image matrix. The images were reconstructed by filtered back projection after checking the quality of the images and checking for movement.

## Statistical Parametric Mapping (SPM) Analysis

The raw SPECT images were converted into the Analyze (ver. 7.5, Mayo Foundation, Baltimore, MD, USA) format and relocated through spatial normalization on the identical standard map using SPM99 software (Institute of Neurology, University College of London, UK), which was based on Matlab 5.2 (Mathworks Inc., Natick, MA, USA). Normalized data were in turn smoothed using a Gaussian kernel with a full width at half maximum of  $20 \text{ mm}^3$ .

Two separate analyses were conducted: a comparison (paired *t* test) of Participant A and B's pre- and posttreatment scans, and comparisons (two-sample *t* test) between the normal controls and Participant A and B's scans at pre- and posttreatment. The threshold *p* value was set at 0.01. Extent threshold voxels were set at 100; local maximum cluster above this value was indicated in Talairach coordinates. To organize findings anatomically, Talairach Daemon (The Research Imaging Center, San Antonio, TX, USA) was used, and specific anatomical nomenclatures and Brodmann area (BA) were obtained. Option *search nearest gray matter* was chosen to locate nearest cortical structure.

## Results

### Change of Symptoms After EMDR

**Case 1.** After EMDR, Participant A still met the diagnostic criteria of PTSD, but the overall level of symptoms decreased. On the CGI, her pretreatment score was 7 (extremely ill), and after treatment, the CGI went down to 4 (moderately ill). On the CAPS, her pretreatment score was 96 (reexperiencing, 28; avoidance, 42; hyperarousal, 26), and after treatment, her CAPS score was 60 (reexperiencing, 19; avoidance, 25; hyperarousal, 16).

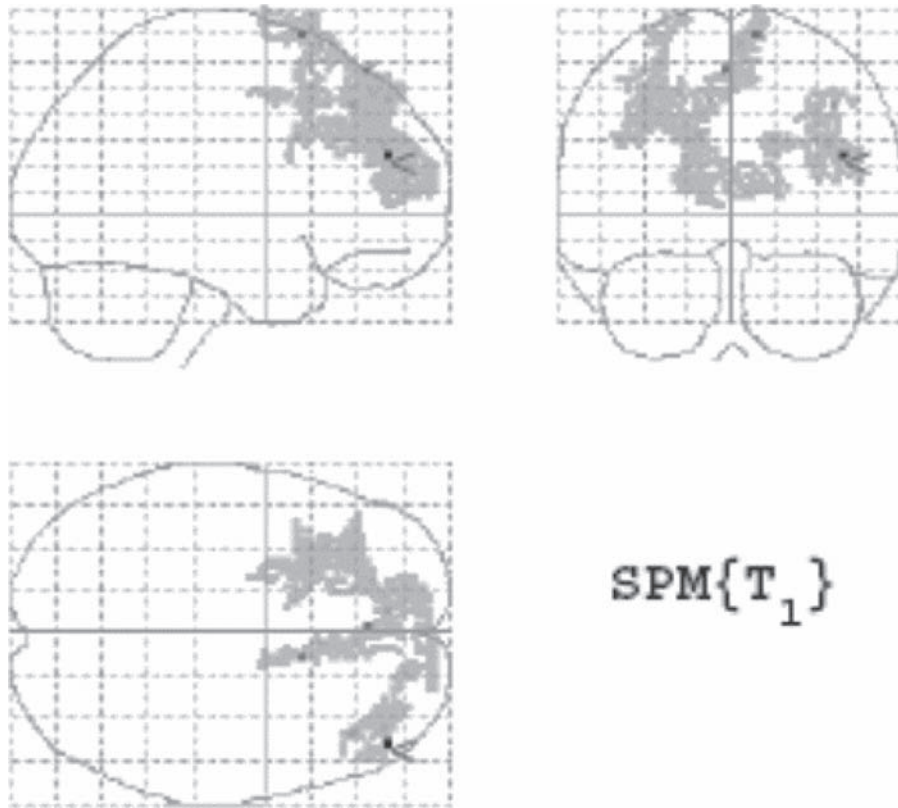
**Case 2.** As a result of EMDR, Participant B's symptoms no longer met diagnostic criteria for PTSD. Before treatment, her CGI score was 6 (severely ill), and after treatment, it was 3 (mildly ill). Her pretreatment CAPS score was 71 (reexperiencing, 23; avoidance, 24; hyperarousal, 24), and after treatment, it was 31 (reexperience, 10; avoidance, 14; hyperarousal, 7), which is below the clinical cutoff level.

### Comparison of SPECT Scans Before and After EMDR

In the analysis of comparing pre- and post-EMDR scans, significant activations were observed for the right middle frontal gyrus and the right superior frontal gyrus (BA 6, 8, 9, 10, and 46). Significant increases were also observed in the left medial frontal and the right superior frontal gyrus (BA 8 and 10). From a functional neuroanatomy perspective, BA 8, 9, and 46 correspond to the dorsolateral prefrontal cortex, and BA 10 to the medial prefrontal cortex. See Table 1 and Figure 1. Significant deactivation was noted in the right middle temporal and the right subgyral gyrus (BA 20 and 21). See Table 2 and Figure 2.

**TABLE 1. Significantly Activated Regions in the Cerebral Perfusion after EMDR**

Coordinate	Z Value	Region	Brodmann Area
44, 48, 24	4.46	Right middle frontal gyrus	46
40, 34, 44	4.06	Right middle frontal gyrus	8
40, 44, 30	3.69	Right superior frontal gyrus	9
10, 14, 72	4.30	Right superior frontal gyrus	6
-8, 48, 58	3.95	Left superior frontal gyrus	8
8, 66, 14	3.44	Right superior frontal gyrus	10
-6, 64, 14	3.39	Left medial frontal gyrus	10
-14, 52, 10	3.38	Left medial frontal gyrus	10



**FIGURE 1.** Regions of increased cerebral blood flow after EMDR treatment. Significant activations in the right middle frontal gyrus and the right superior frontal gyrus (BA 6, 8, 9, 10, and 46) and also in the left medial frontal and right superior frontal gyrus (BA 8 and 10). The arrow indicates the right middle frontal gyrus, the most significantly activated area. BA = Brodmann area; SPM = statistical parametric mapping.

**TABLE 2. Significantly Deactivated Regions in the Cerebral Perfusion After EMDR**

Coordinate	Z Value	Region	Brodmann Area
60, 12, -10	3.81	Right middle temporal gyrus	21
58, 6, 20	3.73	Right middle temporal gyrus	21
44, 10, -20	3.69	Right subgyral	20

#### Comparison Between Normal Controls and Participants A and B Pre-EMDR

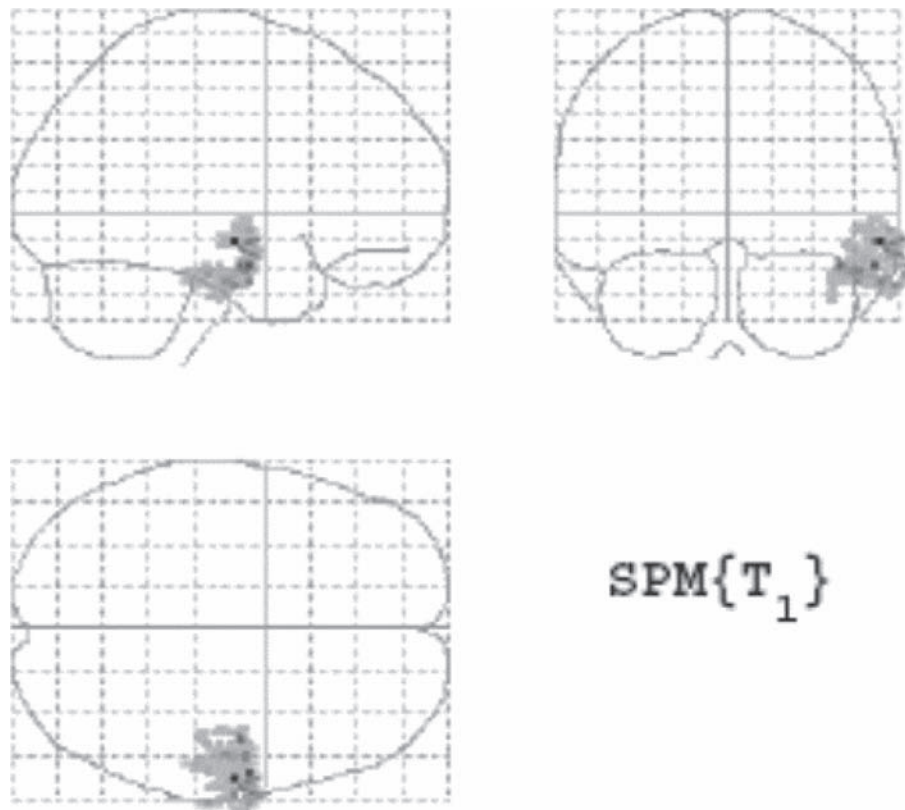
The pretreatment SPECT scans of each PTSD case were compared with normal controls. They showed relatively greater cerebral blood flow mainly in the limbic area: the left parahippocampal gyrus (BA 34), the right parahippocampal gyrus (BA 19), the left precentral gyrus (BA 6), the left middle frontal gyrus (BA 6), the right cingulate gyrus (BA 31), and the right subgyral (BA 40). The comparison also indicated

lower cerebral blood flow mainly in the prefrontal area: the left superior frontal gyrus (BA 10), the right middle frontal gyrus (BA 10), the left postcentral gyrus (BA 40), the left inferior parietal lobule (BA 40), the right postcentral gyrus (BA 3), the right precentral gyrus (BA 4), the left middle frontal gyrus (BA 46), and the left superior frontal gyrus (BA 9).

#### Comparison Between Normal Controls and Participants A and B Post-EMDR

After treatment, the SPECT scans of Participants A and B were compared to those of the normal controls. Findings showed that they still had relatively greater cerebral blood flow in the right hippocampal gyrus (BA 19), the left precentral gyrus (BA 6), the left cingulate gyrus (BA 32), and the right cingulate gyrus (BA 31). However, compared to the pretreatment scan, the difference with the controls decreased, as shown by decreased number of voxels and fewer areas of clusters with increased blood flow.

In addition, compared to normal controls, the participants still had relatively lower cerebral blood flow in the right middle temporal gyrus (BA 21), the right



**FIGURE 2.** Regions of decreased cerebral blood flow after EMDR treatment. Significant deactivation was in the right middle temporal and the right subgyral gyrus (BA 20 and 21). The arrow indicates the right middle temporal gyrus, the most significantly deactivated area. BA = Broadmann area; SPM = statistical parametric mapping.

inferior temporal gyrus (BA 20), and the right superior frontal gyrus (BA 10). Overall, these findings suggest that even after EMDR, Participants A and B showed lower cerebral blood flow in the areas mentioned above when compared to controls. However, compared to the pretreatment scan, the difference with the controls decreased, as shown by decreased number of voxels and fewer areas of clusters with lower blood flow.

## Discussion

Two participants with chronic PTSD showed notable symptomatic improvement with six sessions of EMDR and demonstrated a meaningful changed pattern of cerebral blood flow. After EMDR treatment, both participants showed prefrontal activation, especially in the right dorsolateral prefrontal cortex, but also activation in areas of the left medial frontal cortex and deactivation in the right middle temporal gyrus and inferior temporal gyrus.

Overall, this finding indicates a reversal of the prefrontal and limbic abnormality, which was evident at pretreatment and is a frequent neuroimaging finding

for patients with PTSD (Hull, 2002). The dorsolateral prefrontal cortex is believed to be involved in memory, speech, and cognition and to belong to the neural circuitry of traumatic stress (Bremner, 2003). More specifically, the structure is involved in executive function and working memory (Tranel, 2002). Interestingly enough, this area has been recently suggested as a successful target area in transcranial magnetic stimulation, and activating this region significantly reduced PTSD symptoms (Cohen et al., 2004).

A comparison of pre- and posttreatment scans showed increased blood flow in the bilateral frontal lobes. These findings partly supported the study by Levin et al. (1999), which reported an increase in the left frontal lobe and anterior cingulate gyrus. However, in the current study, the brain images were scanned using a resting paradigm, whereas Levin et al. used a symptom provocation method. This methodological difference may explain the discrepancy.

Decreased blood flow at posttreatment in the right middle and inferior temporal gyrus may reflect decreased stimulation of the amygdala and, in turn, stabilization of the brain stem, resulting in a reduction of anxiety somatosensory symptoms. The temporal

cortex is an association cortex where visual, auditory, and somatosensory information is received from a primary sensory cortex and interpreted in association with emotion, motivation, and memory (Saper, Iversen, & Frackowiak, 2000).

Signals from this association cortex reach the central nucleus through the basolateral nuclei of the amygdalae. The central nucleus is connected to the brain stem, which regulates emotional responses. Also, superior and middle temporal gyri are involved in the integration of memory process (Bremner, 2003). In addition, the anterior and lateral region of the right temporal lobe is thought to be a center for retrograde memory and retrieval of past events (Tranel, 2002).

The clinical improvement seen in Participants A and B confirms the effectiveness of EMDR in reducing and eliminating PTSD symptoms. The neuroimaging findings suggest that EMDR may achieve therapeutic effectiveness by processing traumatic memories.

In addition, the comparison of the participants' pretreatment brain scans with those of normal controls revealed greater blood flow in the limbic system and lesser flow in the prefrontal cortex. This is consistent with previous neuroimaging literature for PTSD, which showed hyperexcitation in the amygdala and decreased function of the anterior cingulate and the prefrontal cortex (Hull, 2002). After EMDR, these abnormalities tended to decrease and showed a pattern close to that of normal controls. Thus, EMDR may work by reversing a functional imbalance between the limbic system and the prefrontal lobe.

Taken all together, this study suggests that the mechanism of therapeutic effectiveness in EMDR may be as follows: (a) emotional regulation by increased activity of the prefrontal lobe, (b) inhibition of overstimulation in the amygdalae by regulating the association cortex, (c) transformation of past traumatic memory, and (d) induction of functional balance between the limbic system and the prefrontal lobe.

There are limitations of this study. First, data from 2 participants and 10 normal controls were analyzed. This may cause the findings to have no statistical significance at corrected  $p$  value  $<0.05$  from SPM analysis. We were able to get statistical significance at uncorrected  $p$  value  $<0.01$ . Second, age and education were not matched between participants and controls. Controls were younger, approximately 20 years old, and were college graduates. Second, the effect of medication was not controlled. Participant A had been on 40 mg of paroxetine per day and 0.75 mg of alprazolam daily for 6 months before EMDR, and Participant B received a small dose of risperidone for her psychotic symptoms. However, doses and types

of medication were consistent during 2 weeks before and after scans. Third, quality and processing of brain imaging should be mentioned. SPECT as used in this study has lower spatial resolution compared to MRI. Also, a standard template in SPM analysis has not been developed for Koreans, who may show subtle differences in brain morphology.

Future studies may benefit from having a larger sample size, with participants with homogenous clinical backgrounds, and a matched control group.

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*Acknowledgments.* This article was originally published in the Korean language; Oh, D.-H., & Choi, J. (2004). [Changes in the regional cerebral perfusion after eye movement desensitization and reprocessing: A SPECT study of two cases.]. *Korean Journal of Biological Psychiatry, 11*, 173–180. Editors of both journals approved of the second publication in English. The English translation was done by Daeho Kim, Hanyang University, Seoul, Korea.

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# EMDR and Phantom Limb Pain

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## Theoretical Implications, Case Study, and Treatment Guidelines

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This article reviews the literature on EMDR treatment of somatic complaints and describes the application of Shapiro's Adaptive Information Processing (AIP) model in the treatment of phantom limb pain. The case study explores the use of EMDR with a 38-year-old man experiencing severe phantom limb pain 3 years after the loss of his leg and part of his pelvis in an accident. Despite treatment at several rehabilitation and pain centers during the 3 years, and the use of opiate medication, he continued to experience persistent pain. After 9 EMDR treatment sessions, the patient's phantom limb pain was completely ablated, and he was taken off medication. Effects were maintained at 18-month follow-up. The clinical implications of this application of EMDR are explored.

**Keywords:** phantom limb; pain; EMDR; adaptive information processing

**A**ccording to the Amputee Coalition of America, there are approximately 1.6 million Americans in the United States currently living with limb loss. While figures are hard to come by internationally, this frequency is probably representative of other developed countries. Added to this are reports from the World Health Organization indicating that 15,000–25,000 persons are killed or maimed annually by land mines in developing nations; 80% of these victims are civilians, the majority children, and one third of the survivors require amputation (Walsh, 2003). As with all amputees, chronic pain is often a factor in any attempts at rehabilitation (De Smet, Charlton, & Meynadier, 2000).

According to some estimates, phantom limb sensations are experienced by as many as 80% of amputees (Melzack, 1992). Although the illusion that the limb is present may have beneficial effects, such

as facilitating the use of new leg prostheses, it is reported to be accompanied, in more than half of the cases, by excruciating and chronic pain (Flor, 2002a; Koojiman, Dijkstra, Geertzen, Elzinger, & van der Shan, 2000).

### The Treatment of Phantom Limb Pain

Unfortunately, the ability of clinicians to effectively treat phantom limb pain is thwarted by a dearth of controlled research (Halbert, Crotty, & Cameron, 2002). For the most part, they must rely on the results of individual case studies, which have reported some positive effects for relaxation therapy (McKechnie, 1975), biofeedback (Tsushima, 1982), and hypnosis (Wain, 1986). Additional refinements of biofeedback treatment involving limb temperature appear to have some salutary effects with subsets of

patients experiencing certain types of pain (Sherman, Arena, Griffin, Bruno, & Cocilovo, 1991). However, none of the treatments have been widely supported by systematic, controlled research.

Traditional treatments for phantom limb pain have concentrated on the presumed transmission of pain stimuli from peripheral loci to the brain, for example, by severing certain spinal cord nerves (e.g., Flor, 2002a). Unfortunately, even the best effects of these interventions were typically reported by patients to be both inadequate and short lived. Indeed, in some cases, they did not even exceed those of the placebo control condition (Sherman, 1997; Sherman, Ernst, Barja, & Bruno, 1988). In contrast to earlier treatments, recent models of phantom limb pain have emphasized events taking place in the brain, such as cortical reorganization (Bierbaumer, Lutzenberger, Montoya, & Larbig, 1997; Flor 2002b, 2004; Karl, Muehlhnickel, Kurth, & Flor, 2004). This conceptualization of the concomitants of the malady has led to an array of new interventions, which include electrical prostheses (Lotze, Flor, Grodd, Larbig, & Birbaumer, 2001), mirror boxes (McCabe et al., 2003; Ramachandran, & Rogers-Ramachandran, 1996), sensory stimulation (Flor, Denke, Schaefer, & Grusser, 2001), and visuomotor training (Giroux & Sirigu, 2003). These procedures, while promising, have not been systematically tested by controlled, replicable research.

Another conceptualization of chronic pain emphasizes the role of emotion as a central factor in the production and maintenance of pain (e.g., Melzack, 1996; Price, 1999; Rome & Rome, 1999). As elaborated by Ray and Zbik (2001), previous models of the management of pain (phantom or real) do not sufficiently take into account the affective element of the pain sensation. They argue that chronic pain can perhaps best be understood as an interaction of physical and psychological factors and recommend that treatment should address the emotional components of pain. According to these authors, while cognitive behavioral therapy (CBT) is effective in reducing pain, eye movement desensitization and reprocessing (EMDR) is superior. Specifically, CBT introduces techniques to allow the patients to alter their thoughts or physical reactions to the pain sensations, while EMDR treatment “not only works through cognitions, but also seems to have a direct effect on desensitizing the limbically augmented portion of the pain experience. . . In this way, EMDR adds a dimension to the treatment of pain that is quite different from cognitive and/or behavioral interventions, including hypnosis (Ray and Zbik, 2001, pp. 205–206).”

## Phantom Limb Pain From an Adaptive Information Processing Model Perspective

EMDR is informed by the AIP (Shapiro, 2001, 2002) model, which posits that when distressing memories are stored in isolation and inadequately processed, the dysfunctional emotions, perspectives, and sensations of the initial event are essentially unchanged. The model views chronic pain as involving not only the automatic emotional response to the pain sensation, but also the somatic component of the stored memories. Accordingly, EMDR treatment of chronic pain, including phantom limb pain, includes the processing of both the associated disturbing affective responses and the memories of pain-related etiological events (Shapiro, 1995, 2001, 2002; Shapiro & Forrest, 1997; see also Christman, Garvey, Propper, & Phaneuf, 2003; Siegel, 2002; Stickgold, 2002; van der Kolk, 2002). As noted by Ray and Zbik (2001), recent brain research demonstrates that “there are now neurochemical explanations, i.e., kindling, neuroplasticity, limbically augmented pain syndrome, etc., that can properly account for the patient’s degree of suffering” (p. 203); these explanations, they state, are congruent with Shapiro’s AIP model.

## Description of EMDR Treatment

The primary goal of EMDR treatment is to gain access and process stored memories by means of a set of standardized procedures, which include repetitive eye movements, auditory signals, or tactile stimulation. Eye movements have been shown in controlled studies to reduce affect and to increase attentional flexibility and the retrieval of episodic memory (e.g., Andrade, Kavanagh, & Baddeley, 1997; Barrowcliff, Gray, Freeman, & MacCulloch, 2004; Christman, Garvey, Propper, & Phaneuf, 2004; Kuiken, Bears, Miall, & Smith, 2001–2002; Van den Hout, Muris, Salemink, & Kindt, 2001). EMDR includes an association process that may further serve to facilitate transformation of the target memory (see Rogers & Silver, 2002; Shapiro, 1995, 2001, 2002; Stickgold, 2002) and its integration within relevant contextual memory networks.

EMDR is an integrative psychotherapy approach consisting of eight phases and specific protocols used to address the presenting complaints (for details, see Shapiro, 2001). The first phase is Client History, evaluating the entire clinical picture to identify the experiences that will need to be processed to both eliminate the dysfunctional cognitive, emotional, somatic, and behavioral elements and incorporate the positive experiences necessary for a successful future.

The Preparation Phase educates the client about the symptom picture and teaches a range of metaphors and self-control techniques to assist stabilization and facilitate processing. The Assessment Phase accesses the target memory and identifies the image, currently held negative belief, emotion, and physical sensations attendant to the disturbing experience. It also specifies the current rating of distress, using the 0–10 (0 = neutral to 10 = the worst disturbance imaginable) Subjective Units of Disturbance (SUD) scale (Shapiro, 1989; Wolpe 1958), and strength of the desired positive belief, using the 1–7 (1 = completely false to 7 = completely true) Validity of Cognition scale (VOC; Shapiro, 1989, 2001). The reprocessing phases (Desensitization, Installation, and Body Scan) utilize standardized procedures, which include bilateral stimulation (e.g., eye movement, taps, tones) to process the target. During the reprocessing phases, an association process is encouraged, which elicits other experiences contributing to the dysfunction, along with insights and shifts in affective and somatic manifestation. The Closure and Reevaluation phases return the client to equilibrium, self-monitor mid-session distress, and ensure that positive treatment effects have been maintained. The standardized protocols for addressing posttraumatic stress disorder (PTSD) and chronic pain both include the targeting of past events that set the groundwork for the pathology, present triggers that elicit disturbance, and positive templates for appropriate future action.

## **EMDR: An Efficacious Treatment for PTSD**

EMDR was originated by Shapiro (1989, 1995, 2001, 2002) for use with individuals who had experienced severe traumatic stress (e.g., PTSD). Subsequent to numerous controlled studies (e.g., Ironson, Freund, Strauss, & Williams, 2002; Lee, Gavriel, Drummond, Richards, & Greenwald, 2002; Power et al., 2002; see Bradley, Greene, Russ, Dutra, & Westen, 2005; Maxfield & Hyer, 2002), EMDR has become a widely accepted treatment for psychological trauma. In the United States, EMDR has been recommended as a preferred treatment, with the highest level of empirical support and clinical effectiveness, by the American Psychiatric Association (2004) and Department of Veterans Affairs/Department of Defense (2004) practice guidelines. The same is true throughout Europe (e.g., CREST, 2003; Dutch National Steering Committee, 2003; INSERM, 2004; National Institute of Clinical Excellence, 2005) and Israel (Bleich, Kotler, Kutz, & Shalev, 2002), where EMDR has been recommended as a treatment for terrorist victims.

Neurobiological studies have shown EMDR to have significant effects on brain activation patterns subsequent to treatment (Lamprecht et al., 2004; Lansing, Amen, Hanks, & Rudy, in press; Levin, Lazrove, & van der Kolk, 1999; Oh & Choi, 2004), including an increase in hippocampal volume (Bossini, Fagiolini, & Castrogiovanni, in press).

## **EMDR Treatment of Somatic Complaints**

Although there have been no controlled studies investigating EMDR treatment of somatic complaints, there have been a number of published case studies. Additionally, some controlled studies of EMDR treatment of PTSD have reported changes in somatosensory domains (e.g., Carlson, Chemtob, Rusnak, Hedlund, & Muraoka, 1998; Chemtob, Nakashima, & Carlson, 2002; Marcus, Marquis, & Sakai, 1997, 2004; Shapiro, 1989; Wilson, Becker, & Tinker, 1995, 1997; van der Kolk et al., 2007).

One of the participants in the first controlled study (Shapiro, 1989) experienced the complete elimination of what appeared to be the stored somatic memory of oral rape and its debilitating effects. The participant indicated at follow-up that the gagging sensations that had occurred several times a week for 40 years had ceased subsequent to treatment. Another participant in the same study reported that daily headaches had ceased immediately following treatment.

One of the first independent case reports treating a PTSD patient with a persistent somatic component (McCann, 1992) emphasized the multidimensional changes resulting from EMDR. Independent observation corroborated the return to active functioning of a double amputee, including the complete elimination of burning sensations that had been caused by an industrial explosion 8 years previously. Due to emotional and physical disability, he had required 24-hr nursing care since the accident. The EMDR treatment targeted the memory of the accident, with a reliving of the somatic experience of the explosion. Processing elicited associations regarding another near-death experience and a spontaneous expression of spiritual and personal values. Subsequently, the patient reported “that he had heard enough of ‘you’ll never be able to function normally’ and expressed the idea that there was now no limit on what he would be able to do for himself” (p. 322). This case illustrates how the patient’s own cognitive, emotional, and somatic associations during EMDR can lead to an accelerated learning experience that results in both a remediation of symptoms and an enhanced sense of self-efficacy (for detailed transcripts see Shapiro & Forrest, 1997).

## EMDR Studies on Phantom Limb Pain

The first published case of phantom pain eliminated through EMDR involved a Colombian child treated in 1996 for a limb amputation subsequent to a cancer diagnosis (Shapiro & Forrest, 1997). The processing of the pain sensations, together with associated feelings of fear and abandonment at having been left in an agency's care by her family, and dread of "never running and jumping with children again," resulted in a complete elimination of the phantom leg pain, which was maintained at 2 year follow-up. Inspired by these results, other investigators evaluated sequential cases of EMDR application reporting a decrease or remission of phantom pain in 7 of 10 patients (Tinker, Wilson, & Becker, 1997). The current case report is one of a series of patient evaluations presently being conducted in Germany. It is one of the most complex of those reported in published case series (Schneider, Hofmann, Rost, & Shapiro, in press) and has been chosen for this article to explore the range of treatment options and theoretical implications.

### Case Report

This case study details the comprehensive EMDR treatment regime inaugurated with a 38-year-old man (referred to here as "Tom") who was experiencing severe and chronic phantom limb pain since losing his leg and part of his pelvis in a motorcycle accident 3 years previously. Despite a series of pain and rehabilitation treatments, including various medications, over a 3-year period subsequent to the accident, the patient continued to experience persistent phantom limb pain. The patient's physical debilitation from the phantom limb pain and posttraumatic stress consequent to the accident proved to be only part of the clinical picture necessitating treatment. Also of note is the assault on his sense of self-worth and self-efficacy caused by the loss of the leg, compounded by feelings of guilt and sorrow because of the miscarriage his wife suffered due to her own traumatization subsequent to his accident. EMDR was used to address all aspects of the clinical picture.

### Presenting Complaints

Tom experienced severe, unremitting phantom limb pain from his lost right leg, despite taking 600 mg of morphine sulfate (plus 12 other medications) daily. To identify pain level, a standard Visual Analog Scale (VAS; "pain slider"/FACES scale) was used. The patient designates the level of pain along a continuum anchored by a smiling face (no pain) to a crying face (unbearable pain). The clinician can then identify the

numeric equivalent as it is translated on the reverse side from 0 (no pain) to 10 (unbearable pain) in increments of 0.5. Using the scale, Tom indicated that his pain during the day was 6 and rose to 10 at night. Tom's reports of his pain sensations at the time of admission included "it feels like a crushing blow," and "my leg is torn to pieces." These descriptions also articulated key elements of the accident. Additional portrayals of his pain in isolation included "dull," "burning," and "pressing."

### History

Tom is a 38-year-old chemical worker who is married, with two children. In 1999, at the age of 32, he had a severe motorcycle accident in which he collided with a car. His right leg was disarticulated at the pelvis, and he suffered severe injuries to his rectum, genitals, bladder, hands, and forearms. During his lengthy hospital stay, he lost his right leg, received an anus praeter (an artificial exit of his bowel), and underwent several surgical interventions for his injured bladder and rectum. An attempt to give Tom a prosthetic leg failed because of extensive pain experienced by the patient. Efforts were finally ceased with the conclusion that it would be impossible for anatomical reasons. Tom was subsequently treated for persistent and severe phantom limb pain at several rehabilitation and pain centers, without major success.

### Assessment

At the time treatment was inaugurated, Tom was assessed with the Structured Clinical Interview (SCID) for the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV*; Wittchen, Zauderk, & Fydich, 1997) and it was determined that his symptom profile met diagnostic criteria for PTSD and major depressive disorder. Figures 1–3 indicate the pain levels and scores on the standardized self-report measures that were used to assess Tom's clinical progress during and following treatment. His score (61 out of 75) on the Impact of Event Scale (IES; Horowitz, Wilmer, & Alvarez, 1979) indicated a severe level of trauma symptoms (a score below 20 is considered mild/subclinical). On the Beck Depression Scale (BDI; Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961; Hautzinger, Bailer, Worall, & Keller, 1992), Tom's score (17 out of 63) was indicative of mild depression (a score below 12 is considered normal). His phantom limb pain level was tracked by means of the VAS.

In summary, Tom's life-threatening motorcycle accident left him with an anus praeter; a right leg amputated to the pelvis; a high level of various ongoing medications; severe, resistant phantom limb

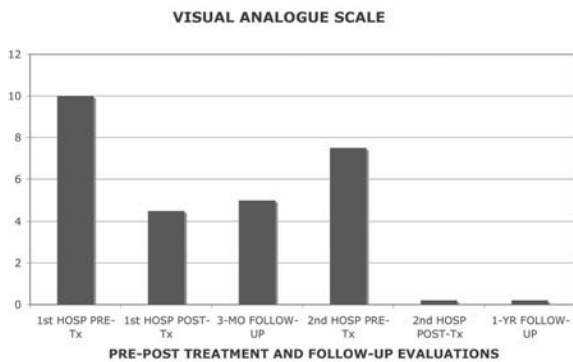


FIGURE 1. Pre-post and follow-up visual analogue scale.

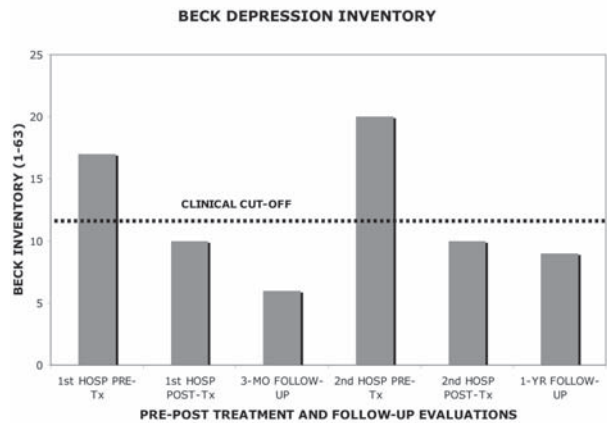


FIGURE 3. Pre-post and follow-up BDI Scores.

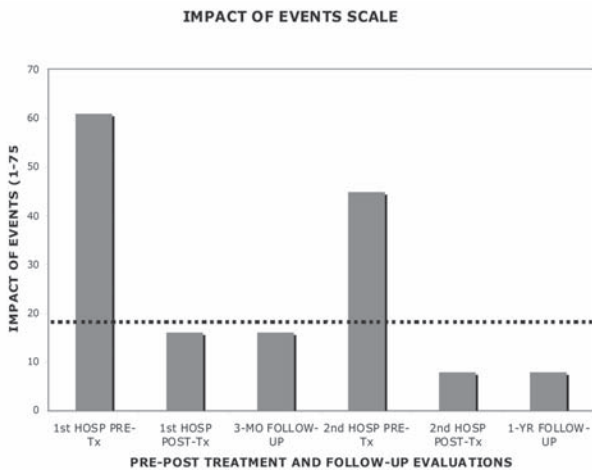


FIGURE 2. Pre-post and follow-up impact of events scale scores.

pain; depressive symptoms; and serious symptoms of PTSD. Finally, his high levels of medication resulted in lack of concentration and chronic fatigue.

### Case Conceptualization

EMDR treatment is conceptualized according to the AIP model (Shapiro, 2001, 2002). The model posits that while a Criterion A (major trauma) event is necessary for the diagnosis of PTSD, most pathological disorders involve experiential concomitants as well. Their persistent negative effects are attributable, at least in part, to inappropriate storage in memory. It has been conjectured that this dysfunctional storage involves both implicit (Siegel, 2002; van der Kolk, 2002) and episodic memories (Stickgold, 2002). The AIP model assumes that the processing of these events has the effect of integrating the problematic memory with the larger, nondysfunctional memory networks, thereby facilitating the patient's sense of

self-efficacy and ameliorating the overt symptoms. These applications of EMDR have been evaluated by many clinical case studies (see Shapiro 1995, 2001, 2002), which cite reports of the rapid relief from physical problems and somatoform disorders including chronic pain (Brown, McGoldrick, & Buchanan, 1997; Dziegielewski & Wolfe, 2000; Grant, 2000; Grant & Threlfo, 2002; Gupta & Gupta, 2002; Ray & Zbik, 2001; Schneider et al., in press). Most recently, a decrease of deviant arousal and change in attribution in child molesters also has been reported subsequent to the processing of the memory of the offenders' own victimization (Ricci, Clayton, & Shapiro, 2006). The shift in both the perceptual and somatic elements in these clinical populations following EMDR treatment is consistent with the AIP model, which posits that both these elements are inherent within the unprocessed stored etiological memory.

The comprehensive EMDR treatment of Tom's clinical complaints included processing memories and current triggers that contributed to the PTSD, depression, and phantom limb pain, as well as strengthening the positive resources he would need to adjust to life with permanent physical disabilities. It should be emphasized that clinical treatments addressing patients with chronic pain must address both the somatic elements and the sense of identity and self-efficacy that may be undercut by the physical limitation.

### Course of Treatment and Assessment of Progress

**First Hospital Stay (EMDR Sessions 1–7).** Tom participated in 7 weekly EMDR sessions during his inpatient treatment at a specialized hospital. The first session included the Preparation Phase and started with the strengthening of some important emotional resources

through a combination of imagery and bilateral stimulation. The first resource was his physical strength, and the second was the love, security, and understanding of his wife and his children. Tom thought of memories associated with these resources and focused on them while engaging in bilateral stimulation. The emphasis on positive states is consistent with the use of EMDR for the activation of resources in patients with compromised affect tolerance (Korn & Leeds, 2002). The Preparation Phase increases the patient's access to positive memories and affects if needed during subsequent processing.

At the next meeting, the first author initiated the EMDR standard protocol for treating traumatic memories (Shapiro 1995, 2001). This was the first of 6 processing sessions directed at various memories associated with Tom's condition, as well as the phantom limb pain itself. Table 1 charts the session-by-session course of Tom's progress, including changes in medication levels, beginning with the initial intake.

The worst part of the memory for Tom was the moment of the impact, especially his sensory impression of the crash. His somatic memories were of incredible pain, with all of the symptoms of physical stress. He thought, "I am going to die." His positive cognition was "I survived," with a VOC score of 2-3 (relative low validity). As he thought about the accident, he identified emotions of fear, anxiety, and helplessness. His SUD score was a 10 plus. Tom's initial treatment target was the image of the moment of the crash and the intense pain that felt like his leg was being pulled off. Over the course of 10 sets of eye movements, the pain slowly decreased. After another set, the image switched to a time during his hospital stay when a nurse had accidentally dropped him, causing him to fall on his injured pelvis and producing intense pain. An intense wave of anger came over him that was processed with the eye movements.

Other memories that emerged during the EMDR processing session included his feelings of helplessness and of not knowing what had happened, his inability to move, and his thought that he could not control his current situation because of the debilitating effects of his high medication. During the sets of eye movements, Tom felt the intense emotions of desperation, sadness, grief, and hatred. He moaned and felt pain sensations in his amputated leg, wincing so intensely that he could hardly bear to sit on a chair. This first session came to an end with the emerging thought, "I survived," which countered his strong belief at the moment of the crash that he was going to die. He was glad that he still had the opportunity to create a future with his family. Asked how intense his emotional discomfort was at the end of the session he said 5 (out of 10).

At the beginning of the second reprocessing session, during a review of the previous week, Tom reported that new memories (of his hospital time after the accident) had come up, as well as memories of nightmares he had experienced in the intensive care unit while unconscious in an induced artificial coma under high medication directly following the accident. (This is a medical intervention undertaken in an intensive care unit if victims with severe injuries need time to heal their somatic injuries but are still in intense distress.) Therefore, the target of the next EMDR session was Tom's nightmares while in the coma. His SUD score about these memories was "more than 10." Some of Tom's impressions that emerged during his work on this memory included "each part of my body is going to become amputated" and "my life is just depending on the machines." As this memory was reprocessed, he began spontaneously to recognize new aspects of the experience: "the procedure was necessary to save my life" and the machine stabilized my cardiovascular system."

During the session, Tom also recalled and began to process and differentiate the various dimensions and qualities of pain from each of the medical procedures he underwent, such as the pain originating from the infected urinary bladder versus the abdominal pain caused by the injury to the colon. Each of these special qualities of pain corresponded to the unique memory of the situation when Tom felt that pain for the very first time.

After working through these associations following the standard EMDR procedure, Tom could better acknowledge, step-by-step, his strength and persistence. He recognized that his body was still functioning with a lot of "positive life patterns" that strengthened his confidence in the future. He also realized during this processing session that he had reexperienced and dealt with some qualities of pain that he had not sensed since being discharged from his first hospitalization, 3 years earlier. These observations strengthened his self-confidence in coping with his pain. His SUD score decreased from above 10 to 6. During the following days, he reported that he had gone as much as 4 hr without pain, and that the intensity of the heaviest pain had decreased from a 10 to 7 on the VAS. He was also able to successfully reduce his pain medication by 50%. For example, he lowered his Metamizol medication (an analgesic of medium strength) from 2 g per day to 1 g per day.

Tom's third EMDR processing session was dominated by experiences of loss. He focused on the moment in the hospital when he became aware that he had lost his right leg. No one had told him this during his first 3 weeks at the hospital. His negative thought was: "I am damaged forever." During processing, Tom

**TABLE 1. Treatment Effects and Medication Over Sessions**

Session	Aug 2002 (intake)	1	2	3	4	5	6	December 2002 (outpatient)	February 2003 (outpatient)	7	8	9
Target(s) reprocessed		Traffic accident	Nightmares during artificial coma	Loss of leg and wife's miscarriage	Visit of priest	Medical problems and treatments	Present and future social issues			Photos and reports of crash	Photos and reports of crash	Worst memories
SUD of Event (0-10) Pre-session	10	10+	10+	7	5	6	3	NA	10	7	6	2
Post-session		5	6	4.5	3	3	1			6	2	0-0.5
<i>In week following session:</i>												
Pain:	10+	7.5	7	5.5	4.5	-4	4	4.5	10	7.5	NA	0
VAS (0-10) for maximum PLP												
Pain: PLP-free hours	No pain free time	No pain free time	4 hrs	NA	Two days	Three days	More than three days	Long pain free times	Extensive times	NA	NA	Completely free
Morphine sulfate	600 mg/day	600 mg/day	600 mg	400 mg	300 mg	300 mg/day	200 mg/day	100 mg/day	300 mg/day on demand	100 mg/day on demand	100 mg/day on demand	100 mg/day on demand
Metamizol	2 g/d	2 g/d	1 g/d	0.5-1 g	0.5-1 g	500 mg on demand	0	0	0	0	0	0
Gabapentin	1800 mg/d	900 mg/d	900 mg/d	900 mg	600 mg	600 mg	0	0	0	0	0	0

*Note.* Pre = before processing; Post = after processing; NA = Not asked; Metamizol = COX-1 inhibiting non-steroidal anti-inflammatory drug (NSAID), used in severe pain cases.

returned to the moment of his accident. The sounds and images of the crash very vividly reemerged. Tom reexperienced the moment when he recognized he was not dead but had lost his leg. He also realized during the processing how much he had relied on his functioning body. He remembered a series of events that demonstrated his struggle for survival, which was accompanied by intense feelings of pain, desperation, horror, and his overwhelming fear of death.

As he focused on the moment, he felt his leg being pulled out of his body. Tom felt again the incredible pain. He cried and displayed all the symptoms of intense physical stress. After six sets of 50 eye movements each, Tom was still stuck in the unchanging awful memory of the crash. As changing the direction of the eye movements was not productive, the therapist (J. S.) therefore decided to introduce an EMDR procedure known as a “cognitive interweave” (see Shapiro, 2001), which elicits through questioning potentially useful adaptive information. The therapist’s creative use of the procedure involved asking him: “What could help you best now to restore your image of the abilities of your body?” Tom then described an image of a warm, complete, and healthy leg. He was asked, “As you think of this image, where do you feel the strength in your body?” He answered: “In my leg” and was asked to focus on this image and the body feeling while simultaneously following the eye movements. The feeling of strength increased during the short set of eye movements and after another set expanded to the pelvis. At the end of these sets, Tom came up with the idea that he could learn to walk with a prosthesis or something similar to this (e.g., walk on crutches). At this point, he became calmer, and his pain decreased. He remembered times when he had gone on wonderful walks with his family and that this would be still possible because he was alive.

During the next eye movement sets, thinking about his family activated a different traumatic event, his wife’s miscarriage of their third child, which was induced by her shock at Tom’s accident. Tom experienced a fit of rage and hatred, and his pain increased and spread all over his body. After four more sets of eye movements, he had a new thought about this miscarriage. Whereas previously he had been sure he was impotent as a result of the accident, he remembered that recent results of a medical test had shown that he was still able to father a child. With that realization, Tom felt more comfortable, because he could reconstruct his self-esteem as a functioning man in his role as a complete husband and father.

After this session, Tom’s SUD score had gone down to 4.5. He continued to have some periods

free of pain, and his medication was further reduced. Between sessions, Tom lost more of his memory gaps and recalled that he had suffered a pulmonary embolism in the hospital after the accident, and that at that time he again had been in critical condition.

The topic of the fourth reprocessing session was the visit of a priest during Tom’s initial stay at the hospital, during which they discussed that God always watches what is happening and will protect everyone. He felt that he not been taken seriously by the priest. The SUD score for this event was 5. Reprocessing the event, Tom reexperienced strong emotions of anger, fury, and guilt. His thought was “I’m not good enough to be protected by God.” Then he remembered that after the visit of the priest he had felt the phantom limb pain for the first time. During the ongoing processing, Tom worked through a number of his life events, experiencing emotions of shame, disappointment, helplessness, and anxiety.

At the end of this session, Tom realized that he had done nothing in his life to deserve punishment, and that the accident had been caused by a drunken driver. His conclusion was that he should invest his energy in building up a new life. He came up with a new positive thought: “If I want, I can be successful.” He then focused on the image of a healthy leg, the image he had found in the last session to symbolize his power for a future life. At the end of this session, his SUD score had gone down to 3. The pain medication (gabapentin and morphine sulfate) was further reduced (see Table 1).

During the fifth reprocessing session, Tom focused on some medical procedures that had occurred during his first months of hospitalization. This included the operation on his hands, the operation on his bowel, treatment for acute kidney failure, and the removal of bladder stones that he had acquired during his hospital stay. These all lost their initial painfulness during the eye movements.

During the last session of this hospital stay, Tom focused on his present and future social abilities and problems. He noticed that many things he had done in former times were still possible, although much more difficult; his family was not disgusted by his appearance; and his economic situation was secure. Tom’s subjective stress level after these 7 sessions (1 preparation and 6 processing) significantly decreased. The SUD for the memory of his accident had decreased to a 1, which appeared ecologically linked to his sorrow about the event. He was now free of pain for up to 3 consecutive days plus additional times during the rest of the week. In addition to these total cessations, at other times the pain was bearable, with peaks of 4 (of 10), at which time he used his “antidote,” the image of the healthy leg that



he had associated with his positive sense of self and ability to survive. He called up the image and focused on it while concentrating on the positive body feeling associated with it. He used this technique every evening before he went to sleep and usually slept well. Another time that he used the image was when he sensed the pain coming on again (which rarely happened now). Thereafter, medication was reduced to the level needed only to control the pelvic pain caused for organic reasons. Tom left the hospital taking 4 pills (including 200 mg morphine sulfate), as compared with the 18 pills that he required on admittance to the clinic.

As noted in Figure 2, at the time of discharge, Tom's IES score was 16, which is considered mild/subclinical, and the BDI (10) was at a normal level. Further treatment was organized on an outpatient basis, with a frequency of one consultation per month and telephone calls at regular intervals. Three outpatient follow-up contacts with Tom indicated maintenance of treatment effects. He was formally tested once following his treatment (see Figures 1–3) and the results, and clinical observation during outpatient contacts indicated no signs of PTSD or depression. He remained pain free for prolonged periods, with a maximum pain of 4.5 at other times. As can be seen in Table 1, at these times, he managed pain by giving himself morphine sulfate if he was in distress.

**Second Hospital Stay (EMDR Sessions 8–11).** Five months following the first hospitalization (despite four previous contacts indicating stable treatment effects), Tom requested additional EMDR treatment because of the reappearance of extended discomfort with his leg and some depressive symptoms. The discomfort would inevitably appear at night, at which time Tom could barely sleep, as the pain level was 8–10. In addition, he was emotionally vulnerable and showed symptoms of depression even after the phantom pain had stopped. In this situation, Tom's need for medications was increased (up to 300 mg morphine sulfate). At readmission, his tests indicated that the scores in the IES and the BDI had increased into the clinical range (see Figures 2 and 3).

To identify the cause of the nighttime distress, Tom was questioned about the circumstances of going to bed in the evening. In response, Tom appeared quite astonished and tried to avoid some details. Asked for the reasons of his defensiveness, he admitted to looking at the photographs of his amputated right leg and his damaged body just before going to bed over the previous 3 weeks. The photographs had been taken upon admission to the hospital and showed his severed leg and injured body. Subsequent to the previous

treatment, Tom had requested the photos to deal with an insurance matter. When he noticed that they upset him, he had established a ritual in an attempt to use these photos to desensitize his distress and "to strengthen himself." However, instead of contributing to recovery, his new "method" had exacerbated his distress.

The next 3 sessions of EMDR focused on these photographs and some of the reports Tom had written for the insurance company that described in gruesome detail his accident and all the complications that had occurred. During each of these sessions, the image of the healthy leg was first used as a strengthening resource before beginning to process his stressful memories (Hofmann, 2002). He called up the image of the healthy leg and the positive body feeling associated with it. Then a slow set of eye movements was initiated. Usually the positive body feeling became stronger, and then another short set of eye movements was applied. Starting from this positive point, the initial memory was targeted, and, for the first time, the full memory of his accident came to consciousness. As this memory passed by like a movie before his inner eye during the processing, he again felt the threat of death and realized that he really could have died. The intensity of these feelings subsided in the session, as did the intensity of his mourning for his wife's miscarriage in the next session. It should be noted that while the positive imagery was used to strengthen Tom at the beginning of the session, the target was accessed without distortion and with full associated affect.

At the end of the second set of EMDR sessions Tom's worst memories and the associated sensations (e.g., the crash, some operations, his first confrontation with his damaged body, and his wife's miscarriage) were comprehensively processed and resolved ecologically, including a realistic perspective on coping with his real disabilities and social handicaps. In the last session, a future perspective was developed where he affirmed that he could have more children and imagined that he could learn to walk again with his one leg and maybe a prosthesis. His thought when he focused on the last image became "I am strong again," and he felt it in his body with a VOC of 6–7.

At discharge from the clinic, Tom had no signs of PTSD, and his IES score was at a subclinical level of 8 (see Figures 2 and 3). Table 1 indicates the session-by-session effects of EMDR processing during the two hospitalizations and the assessments previous to each admission. An examination of the table reveals the correspondence between the 0–10 SUD score indicating the level of distress when Tom is asked to think of the memories attendant to his loss and the parallel decline in his phantom limb pain level as indicated

by the VAS scale. The 3 sessions during the second hospitalization were conducted very close in time, so some data were not collected.

**Follow-Up.** At 1-year follow-up, standardized measures indicated no sign of trauma or depression. At both the 1-year and 18-month follow-ups since his last EMDR session in the spring of 2003, Tom reported no more phantom limb pain. He could control the organic pain in his broken pelvis and rarely needed any related pain medication. Tom's subjective organic pain level, especially when driving his modified motorcycle, was in a range of 2–4. His lack of pain allowed him to walk very skillfully on crutches (a prosthesis was not possible because of anatomical reasons). In spring of 2004, Tom began diving and became a certified rescue diver. In the summer of 2004, he was employed as a diving trainer for disabled travelers.

## Discussion

### Treatment Implications

The usefulness of EMDR has been demonstrated in this severe case of chronic phantom limb pain. Following 3 years of largely unsuccessful treatment efforts, 9 EMDR sessions eliminated Tom's phantom limb pain, significantly reduced previously constant organic pain, and reduced his daily use of morphine sulfate (which was also socially debilitating) from 600 to 100 mg on demand (which he rarely uses). EMDR was also used to address his PTSD and depression symptoms. The patient has renewed his ability to enjoy life and to explore new ways of making use of his time.

Research has indicated that while situational stress may exacerbate the experience of phantom limb pain, the sensation itself should properly be viewed as a physiological event, rather than a psychological one alone (see Sherman, 1997, for a comprehensive review of this literature). The same conclusion can be drawn from research demonstrating cortical reorganization, although it is unclear whether the relationship of such changes to the pain is causal or merely correlational (see Ramachandran & Hirstein, 1998). According to the AIP model, both the emotional components of pain and the pure pain sensations should be conceptualized as memories that have been dysfunctionally stored and that may therefore be processed to resolution.

As noted by Shapiro, this model may help to explain why phantom limb pain can sometimes be prevented by administering epidural agents prior to amputation (e.g., Bach, Noreng, & Tjellden, 1988) and sometimes not prevented (e.g.,

Elizaga, Smith, Sharar, Edwards, & Hanson, 1994). That is, if the pain is directly related to the experience of surgical amputation, such procedures may effectively reduce subsequent phantom limb pain. However, if the pain is also related to a traumatic injury, prior to the amputation, the epidural procedure will meet with less preventative success since the patient will have a stored somatic memory of the painful injury. Consequently, one might view the traumatic injuries and the amputation as separate potential pain contributors. For instance, in the present case, Tom described the pain in terms of the accident (“it feels like a crushing blow,” and “my leg is torn to pieces”) and in terms that might be related specifically to the amputation, or its residual affects (“dull,” “burning,” and “pressing”).

As seen in Table 1, the pain reports indicated that the initial pain level of 10 began to decrease subsequent to the initiation of processing and continued to do so over the course of treatment, ultimately resulting in a complete elimination, which was maintained at 18-month follow-up. However, it should be noted that the complete cessation of phantom pain was not achieved until the final reprocessing sessions targeted the triggers and associated memories. This observation underscores the need for a comprehensive EMDR regime and follow-up period that addresses the complete clinical picture. As noted in the present case, the initial cessation and subsequent increase in phantom limb pain (which prompted the second treatment sequence) was correlated with the psychological measures of both PTSD and depression (see Figures 1–3). This may imply that the pain sensations contributed to the depression and traumatization. Reciprocally, the added stress may have increased the sensitivity to the pain sensations. Tom reported that the pain had changed and no longer consisted of the sensations of the accident, but resembled a more dull and pressing pain. However, the comprehensive processing afforded by the targeting of the triggers resulted in a complete elimination of the phantom limb pain, as well as the elimination of PTSD and depression symptomatology, which persisted at 1-year and 18-month follow-up. It is also important to note that the phantom pain sensations appear to be correlated with the level of subjective emotional distress that Tom experienced when asked to think of memories associated with his loss (see Table 1). The AIP model posits that the emotions and physical sensations inherent in the unprocessed event and stored inappropriately in memory are the foundation of the current pathology (see Ray & Zbik, 2001; Shapiro, 1995, 2001; Stickgold, 2002).

Also important is the spontaneous emergence of a “healthy leg” when Tom was asked what could help him to feel better. The association of the eye movements with this image resulted in an immediate increase of positive sensations and diminution of pain. Its use as an antidote was also contiguous to the increased duration of pain cessation that was maintained for greater spans of time during the course of the rest of the treatment. This finding has important implications given the present theories and neuroimaging studies reflecting a reorganization of parts of the sensory cortex (e.g., Flor, 2002b). Evaluations of treatments guided by these theories have reported positive effects attained by the use of visuomotor training (Giroux, & Sirigu 2003; Ramachandran, & Rogers-Ramachandran, 1996) to mimic and project an external image of a healthy appendage. The positive treatment effects were reported only after many weeks of daily practice. Therefore, the present finding that a few minutes of eye movements while focused on an internal image of a healthy leg can result in substantial treatment effects is important and deserving of additional research.

This article details the treatment of Tom, who was a participant in the first published study of EMDR treatment of phantom limb pain, conducted with standardized measures and an extensive follow-up (Schneider et al., in press). Furthermore, this is the most complex of the cases of phantom limb pain successfully treated with EMDR by the present authors. Other cases have not necessitated the use of the antidote imagery; the decrease or elimination of the phantom limb pain was achieved with EMDR by processing the pain sensations, etiological events, triggers, and templates associated with the traumatic event, the sense of identity, and potential for a positive future. Other cases of successful treatment with EMDR (Shapiro & Forrest, 1997; Tinker, Wilson, & Becker, 1997; Wilensky, 2000) have also not reported the use of such imagery. However, it may be that the image of a healthy body part may assist client stabilization, increase cortical reorganization, and/or solidify effects with more resistant clients. Parameters for such utility can only be established through future rigorous research. In addition, anecdotal reports indicate that phantom arms may be more resistant to treatment than phantom legs. Perhaps the combined use of such imagery with EMDR would increase treatment efficacy.

The present case study supports EMDR as a potentially important treatment for what has heretofore been considered an essentially intractable pathology. This outcome is especially encouraging given

the dearth of phantom limb pain treatment studies that include long-term follow-up measures, and the fact that those evaluations that did include follow-up tend to report a deterioration or elimination of initial treatment effects (see Sherman, 1997). The remediation of suffering found in Tom’s case supports conjectures that EMDR produces treatment effects for chronic pain patients not previously afforded by other therapies (see Ray & Zbik, 2001). Furthermore, consistent with the AIP model, this outcome indicates that it is possible to eliminate phantom limb pain by EMDR processing of dysfunctionally stored etiological experiences and the resulting issues of self-efficacy and triggers, without the need for additional self-monitoring and continuous reinforcement.

The difference between EMDR outcomes and those of CBT (i.e., cessation versus decrease of pain; see Ray & Zbik, 2001) may potentially be explained by new neurobiological theories on the differences between memory reconsolidation and extinction (Suzuki et al., 2004). According to these theories, treatments that rely on extinction (such as exposure therapies) result in the formation of competing memories, rather than an alteration of the old ones. However, it may prove that EMDR’s effects are based upon a different process known as *reconsolidation* that would involve the change and restorage of the altered targeted memory itself. It has been posited that longer exposures result in extinction, while shorter exposures result in reconsolidation (see Suzuki et al., 2004). Research is needed to explore these possibilities.

Most importantly, the possibility that phantom limb pain can be eliminated or reduced by a brief course of therapy has major implications for clinicians treating patients suffering from this condition. Given that chronic phantom limb pain is relatively widespread in those suffering from traumatic amputations and was previously considered intractable, these findings may also have an important impact on public policy, given the current number of war casualties and accident victims. The research report that included this case (Schneider et al., in press) indicates that 80% of the patients showed a substantial decrease or elimination of phantom pain, which was maintained at 1-year follow up. Similar effects have been reported in other research settings (de Roos & Veenstra, 2005/submitted; Wilensky, submitted). However, large scale randomized studies are needed to identify more precisely what subgroups of phantom limb patients can benefit and to what extent. Rigorous research with long-term follow-up is urged to further explore these treatment parameters.

## Treatment Recommendations

As indicated by Shapiro (2001; Shapiro & Forrest, 1997), the treatment of somatic problems involves not only physical but also psychological and existential issues. It is the “psychological tension or self-identification as a helpless victim that can be the most debilitating factor” (Shapiro, 2001, p. 255). It is important to remember that cases of phantom limb pain may involve not only the possible debilitation caused by the physical sensations but also issues of self-worth, self-efficacy, and unresolved feelings of loss—not only of the limb, but of identity, social status, and an active, positive future. Thus, it is important to note that in the present case the first step of processing the memories of the past not only consisted of processing the accident itself, but additional memories involving fear of impotence, loss, shame, anger at maltreatment, and so forth. These were all necessary for a permanent elimination of the pain. It is vital to take a comprehensive history of the case to explore contributing factors, as they may not always emerge during processing itself. Other targets involving present triggers, and future templates and the material associated with them should address most of the clinical picture.

In some reports of EMDR treatment of pain patients, the possibility is mentioned that another focus of processing could be the present pain itself (Grant, 2002). Although this approach was not used in our phantom limb pain cases (Schneider et al, in press), further research into this targeting approach may be helpful (de Roos & Veenstra, 2005). In our approach, the pain sensations became the focus of treatment as they emerged during the targeting of the initial accident and other specific events. We would suggest that once this is completed, any residual pain sensations should be addressed through a focus on them, along with attention to present triggers. In addition, the pain itself may be focused on as a target if the processing of past, present, and future is not sufficient.

It is also important to include an extensive follow-up in order to identify any new triggers that may elicit previously unresolved elements or cause retraumatization. In this case, the amnesic gaps that Tom suffered may have been compounded by the medication-induced artificial coma. The heavy doses of medication needed to induce the coma directly after the accident may have prevented a full consolidation of the trauma memory, potentially inhibiting comprehensive EMDR processing during the first hospitalization. The lack of generalization to other aspects of the memory may have resulted. In other cases where a coma is induced

subsequent to the accident, it would be useful to investigate the effectiveness of a frame-by-frame targeting of the available memory similar to that used in the recent event protocol (Shapiro, 2001), as well as increased focus on the residual pain sensations themselves, in order to process any memory fragments. In Tom’s case, the photos may have then triggered these unprocessed memories and/or resulted in retraumatization because of the previously unrecalled appearance of his damaged body and severed limb.

Regardless of the apparent complexity or simplicity of the case, it is important to follow the eight phases of EMDR treatment and use the entire three-pronged protocol for the treatment. Only feedback over time can ensure the stability of effects, and clients should be cautioned to report any disturbance or symptoms for further processing. Given the societal and family pressures attendant to readjustment with a permanent physical disability, it is important to ensure at least a 1-year follow-up.

It is interesting to note that the first published case of the cessation of PTSD and pain involving an amputee (McCann, 1992) reported that the client returned to an active and high-functioning life and became an advocate for the disabled, assisting young children to attain prostheses. Likewise, in this case, Tom became a rescue diver and a trainer for disabled travelers. These advocacy roles are representative of a sense of empowerment that includes the desire to protect and assist those in need. When this does not emerge spontaneously, clinicians should explore any perceived barriers to these types of endeavors. It is not unusual for EMDR processing to result in new insights and an enhanced sense of self, with the desire to make the painful experience fruitful and to help others. When the sense of a positive future is lacking, comprehensive treatment is incomplete, and greater attention should be directed to potential targets manifested in the premorbid history (Shapiro, 2001). Ultimately, overt symptom reduction, such as pain elimination, is only one element in the comprehensive clinical picture.

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# Treatment of Specific Phobias With EMDR

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## Conceptualization and Strategies for the Selection of Appropriate Memories

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Eye movement desensitization and reprocessing (EMDR) has been shown to be a structured, noninvasive, time-limited, and evidence-based treatment for unprocessed memories and related conditions. This paper focuses on EMDR as a treatment for specific fears and phobias. For this purpose, the application of EMDR is conceptualized as the selection and the subsequent processing of a series of strategically important memories of earlier negative learning experiences concerning specific objects or situations. Firstly, the practical application and conceptualization of the treatment of phobias with EMDR is presented and compared with an exposure-based treatment approach. Next, specific attention is given to the assessment and selection of appropriate memories for processing. It is hypothesized that phobias with a nontraumatic background, or those in later stages of treatment after some reduction in anxiety has been achieved, would profit more from the application of a gradual in vivo exposure, whereas trauma-based specific phobias and those with high initial levels of anxiety would respond most favorably to EMDR.

**Keywords:** EMDR; specific phobia; in vivo exposure

**A**part from its protective function, an anxiety response can be disruptive and maladaptive in itself, especially when a person starts to demonstrate an excessive and unreasonable fear of certain objects or situations that are in fact not dangerous. When this is the case, it is likely that the person fulfills the criteria for a specific phobia (*Diagnostic and Statistical Manual of Mental Disorders, DSM-IV-TR*, American Psychiatric Association, 2000). This means that (1) the fear is elicited by a specific and limited set of stimuli (e.g., snakes, dogs, injections, etc.), (2) a confrontation with these stimuli results in intense fear and avoidance behavior, and that (3) the fear is unreasonable and excessive to a degree that interferes with daily life.

Phobic symptoms are remarkably common in the general population (Agras, Sylvester, & Oliveau, 1969). Epidemiological studies that have attempted to evaluate the prevalence of specific phobias show that these are more prevalent than any other group of psychiatric

disorders studied, with lifetime prevalence rates of over 10% (Chapman, 1997; Robins et al., 1984).

The *DSM-IV-TR* distinguishes the following five main categories or subtypes of specific phobia: (1) animal type (phobias of spiders, insects, dogs, cats, rodents, snakes, birds, fish, etc.), (2) natural environment type (phobias of heights, water, storms, etc.), (3) situational type (phobias of enclosed spaces, driving, flying, elevators, bridges, etc.), (4) blood-injury-injection type (phobias of getting an injection, seeing blood, watching surgery, etc.), and (5) other types (choking, vomiting, contracting an illness, etc.). Statistical analyses, however, applied on epidemiological data suggest that a distinction between three groups of phobias (i.e., situational type, animal type, and mutilation type) would be more appropriate (Fredrikson, Annas, Fischer, & Wik, 1996).

The literature on anxiety and phobias suggests that the problem of clinically appropriate anxiety can best



be understood by the application of the behavioral paradigm, which includes the principles of *classical conditioning* and *operant conditioning* (Craske & Rowe, 1997; Davey, 1997). For example, when an individual is bitten by a ferocious dog, that person will respond with fear the next time he or she encounters the dog. That is, the individual has been taught, or conditioned, to associate the dog (the *conditioned stimulus*, CS) with being bitten (the *unconditioned stimulus*, UCS) and will respond to dogs with fear. This phenomenon is known as *classical conditioning*. The person's response has become a learned (i.e., conditioned) response (CR) to a danger signal, which for that individual has predictive value in a potentially harmful situation.

The dynamic of certain types of phobias displays many similarities with that of posttraumatic stress disorder (PTSD). Many phobias develop after a distressing event, such as a dog bite, a terrible motor vehicle accident, or an extremely painful injection as a child (Menzies & Clarke, 1995). For example, a study on dental phobia by de Jongh and his colleagues (De Jongh, Aartman, & Brand, 2003) found that 87% of these highly anxious individuals indicated that they had experienced a horrific dental event that could explain the onset of their dental phobia. Typical examples of traumatically induced phobias include driving phobias, which are generally acquired through a severe automobile accident (Kuch, 1997). The same holds true for choking phobias, which usually develop following an episode of choking on food (De Jongh & Ten Broeke, 1998). In addition, with regard to agoraphobia, there is evidence to suggest that clients' first panic attack can be considered as a traumatic incident comparable to that seen in PTSD (McNally & Lukach, 1992).

The chief difference between specific phobias and PTSD is that the latter involves more compelling trauma at the onset and more generalized distress. Although bringing up the memory of the past event may automatically evoke an emotional response, in general (and by definition) phobic patients do not experience recurrent upsetting memories and sleep disturbances. What PTSD and specific phobia do have in common is that both involve fears of specific cues. In many cases, previously stored memories of conditioning events, such as distressing medical treatments, car accidents, or dog bites can easily be activated as a result of a particular present stimulus or situation. In such moments, the person reexperiences his "nightmare," which results in a level of helplessness and fear comparable to that experienced during the actual event. For example, studies on dental anxiety have shown that almost half of the dentally high anxious individuals endorse trauma-related sequelae (e.g., in-

trusive memories, sleep disturbances, and avoidance of reminders of past dental events) typically observed in individuals who have PTSD (De Jongh et al., 2003; De Jongh, Fransen, Oosterink-Wubbe, & Aartman, 2006; De Jongh, van der Burg, Overmeir, Aartman, & van Zuuren, 2002).

Based on the behavioral conceptualization of fear acquisition, a basic assumption underlying the notion of successful treatment is that a fear response gradually extinguishes when the CS (e.g., spider, injection needle) is repeatedly presented but not followed by the UCS/unconditioned response (UCR) (the original associated painful or otherwise aversive event). Behavioral treatment approaches to specific phobia employ interventions like flooding, systematic desensitization, imaginal exposure, and real-life exposure. Research on specific phobias has shown comparable effectiveness for systematic desensitization and flooding in imagery, while in vivo exposure (i.e., graded and prolonged exposure to the CS) has been found to be more effective than imaginary procedures (Emmelkamp, Bouman, & Scholing, 1989; Öst, 1997).

Although the positive results of outcome studies using (cognitive) behavioral treatment procedures for specific phobias has left the impression that any specific phobia can be treated successfully within a few sessions, it would seem that certain phobic conditions are less suitable for a short-term in vivo exposure approach (De Jongh, Ten Broeke, & Renssen, 1999). This is clearly demonstrated by the results of studies on dental phobia. For example, the results of a study among 332 extremely anxious persons who applied for exposure-based treatment at a Dutch dental fear clinic showed that 15% of them did not start treatment, 12% stopped visiting before treatment was completed, while 36% started to avoid appointments with a dentist after the dental work was done (Van Der Zijpp, Ter Horst, De Jongh, & Makkes, 1996). These findings suggested that the empirical evidence supporting the application of in vivo exposure for a specific phobia cannot simply be generalized to the whole range of phobias, particularly those that developed after a powerful conditioning event (e.g., a horrific medical procedure or otherwise terrifying event). This is illustrated by the following case report.

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### CASE EXAMPLE: JOHN, PART 1

John is a 40-year-old man who developed a phobia of medical situations after a horrifying event during his recovery from a heart operation 20 years earlier. After a new heart valve was implanted, blood leaked into his chest.

As his condition worsened, medical emergency personnel were forced to intervene rapidly by opening his chest. This happened while he was still in his hospital bed. He remembered that they used a pair of scissors to cut loose the stitches in his chest and a large flow of blood gushed from the wound. Although he survived the operation that followed the incident, he later learned that the heart valve had a technical defect. Meanwhile, now 20 years later, many of the people who received the same type of heart valve have died, while others have had their valve removed and replaced by another one. John is fully aware that he should undergo the same operation, but an extreme fear prevents him from doing so. A cardiologist refers him to a psychologist in order to create a psychological opening for the life-threatening situation.

Clearly, this example of an extreme fear of medical situations differs from situations in which the client can easily be exposed to an object, insect, or animal. It is far more difficult to imagine how, in the above case, the phobic condition could be treated using traditional in vivo exposure and how the client should be prepared for such a confrontation. In other words, what type of conditioned stimuli should the client be exposed to? A combination of hospitals, pairs of scissors, blood, or operations? Another question refers to the issue of preventing the client from dropping out of psychological treatment before it is successfully concluded, perhaps due to a lack of motivation or fear-driven avoidance.

Given that PTSD and specific phobias share a number of important features, and that a wide array of controlled studies support the effectiveness of EMDR (Shapiro, 2001) with treatment for unprocessed events and related conditions, EMDR has also been claimed to be an effective treatment for specific phobias (Shapiro, 1995). This article focuses on EMDR as a treatment for specific fears and phobias. Firstly, the practical application and conceptualization of the treatment of phobias with EMDR is presented and compared with an exposure-based treatment approach. In addition, specific attention is given to the assessment and selection of appropriate memories for processing.

## EMDR's Conceptualization of Phobia Treatment

According to Shapiro, distressing events sometimes cause an imbalance of the human information-processing system and remain unprocessed because the immediate biochemical responses to the incident have left it isolated in neurobiological stasis (Shapiro, 2001, p. 338). She asserts that EMDR contains specific elements that stimulate the resolution of negative learning

experiences. From an information-processing perspective, Shapiro's adaptive information processing (AIP) model posits that it is the combination of attention to a distracting stimulus and to a mental representation of a meaningful past experience and their associated states of mind that fosters the creation of new memory associations and the integration of previously isolated elements within the neural network maintaining the present pattern of dysfunction (Shapiro, 1995). To this end, the application of EMDR as a treatment of specific phobias can be conceptualized as the selection and the subsequent processing of a series of strategically important memories of earlier negative learning experiences concerning specific objects or situations.

Research has shown that EMDR can be an effective treatment for specific phobias when the EMDR phobia protocol is applied (see De Jongh et al., 1999 for a review; Shapiro, 2001; see Table 1). The types of phobias that have been reported as being successfully treated by using EMDR with specific phobias include phobias of the situational type (Marquis, 1991), animal type (i.e., snakes, moths, spiders, and mice; Muris & De Jongh, 1996; Muris & Merckelbach, 1995; Ten Broeke & De Jongh, 1993; Young, 1994), blood-injury-injection type (injections, dental treatment; De Jongh & Ten Broeke, 1993, 1994, 1996; Kleinknecht, 1993; Lohr, Tolin, & Kleinknecht, 1995), and other type (i.e., vomiting and choking; De Jongh & Ten Broeke, 1994, 1998).

Besides uncontrolled case studies, controlled case reports on claustrophobia (Lohr, Tolin, & Kleinknecht, 1996) and dental phobia (De Jongh, Van den Oord, & Ten Broeke, 2002) also demonstrated positive effects on both fear and avoidance behavior. However, randomized controlled outcome research investigating EMDR treatment of phobias remains scarce and is limited to the treatment of spider phobia (Muris & Merckelbach, 1997; Muris, Merckelbach, van Haafden, & Mayer, 1997). The results suggest that EMDR is less effective than an in vivo exposure approach in the treatment of spider phobia with children (Muris, Merckelbach, Holdrinet, & Sijnsenaar, 1998).

**TABLE 1. Procedural Steps of Shapiro's Phobia Protocol**

1. Preparation
2. Selection and processing of target memories
3. Installation of positive cognition (PC) on a representative image of a possible future situation
4. Test: running a mental videotape
5. Preparation for future confrontations
6. Closure and homework

It has been stated that EMDR has several advantages over an in vivo exposure approach (De Jongh et al., 1999). One advantage involves client comfort, because the alternative, prolonged real-life exposure to anxiety-provoking stimuli is not always easy to achieve. Clients may not always be ready or motivated enough to endure exposure therapy and drop out before treatment can be successfully concluded. Another possible advantage of EMDR relates to the cost of treatment. For example, with flight phobia, EMDR is more cost effective than in vivo exposure treatment, in which clients have to take many costly flights or visit a specialized flight-simulation center. Furthermore, there seems to be a strong advantage for using EMDR in phobias where (1) the critical elicitors cannot be reproduced or simulated in real life (e.g., certain sexual, illness, or death situations); (2) the phobic stimuli are hard to obtain; (3) the client resists exposure to the stimuli (e.g., large dogs, rats, snakes, bees, or wasps); or (4) the phobic condition has a clear, identifiable origin.

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### CASE EXAMPLE: JOHN, PART 2

In John's case, only one session of EMDR was needed to alleviate his fears related to the horrific memory of his chest being opened up in the hospital bed. After the treatment, he was able to make an appointment with a cardiologist for a consult about his medical situation. However, medical examination showed that the combination of his weak physical health and the complex medical condition, which had developed after 20 years of living with a bad functioning heart valve, would make a new operation too much of a dangerous endeavor. Despite the bad news, John felt relieved as he now had objective, medical information about his condition. He was able to decide whether he would undergo a new operation or not, based on facts rather than fear.

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### Differences Between a Cognitive Behavioral and an EMDR Treatment Approach

How different is EMDR compared to exposure-based treatment, both clinically and conceptually? The chief difference in terms of practical application between both treatment approaches for the treatment of specific phobias seems to be that during behavioral treatment clients are requested to focus their attention on the fear-evoking stimulus (CS) to investigate its predictive value, whereas in EMDR, the focus is the memory of the traumatic incident that caused or

clearly worsened the fear response (representation of the UCS/UCR). Furthermore, in the context of most exposure-based behavioral treatments, it is generally considered most effective for clients to remain focused on the CS until their levels have fully been decreased. In contrast, during EMDR, no explicit attempts are made to maintain attention on either (a representation of the) CS or (a representation of the) UCS. Contrary to seeking heightened arousal, clients are instructed to "just notice" the experience and to follow their mental associations and are encouraged to distance themselves. Experimental research provides empirical support for the contention that emotional processing is equally, or even more, effective when a detached rather than a more focused form of exposure is used (Lee, Taylor, & Drummond, 2006).

Conceptually, these findings do not fit well within a habituation model, but do fit within the theoretical framework of the orienting response model (Barrowcliff, Gray, MacCulloch, Freeman, & MacCulloch, 2003; MacCulloch & Feldman, 1996;). According to this paradigm, a distracting stimulus, such as the eye movements in EMDR, elicits an orienting reaction, but when no immediate threat is identified in the therapeutic situation, the orienting response acts as a so-called reassurance reflex and induces a relaxation response. The authors assert that during EMDR, engagement of the orienting response signals safety and elicits a de-arousal effect, which is subsequently paired with the memory of the traumatic event (MacCulloch & Feldman, 1996). It is suggested that this process can be conceptualized as counter-conditioning where distressing stimulus aspects of the traumatic memory are paired with a neutral response. Support for this notion was obtained in a study by Barrowcliff et al. (2003), which showed that electrodermal arousal to autobiographical memory decreased following an eye movement task, but not in an eye stationary condition.

### Assessment and Selection of Appropriate Memories

#### General Aspects of Assessment

Clearly, treatment of a phobic condition cannot be started if the therapist is still unaware of both the factors that cause and maintain the anxiety response as well as the consequences and characteristics of these complaints. Therefore, one of the first tasks of the therapist is to collect the necessary information, which is usually done by means of an open clinical interview. One of the aims of such an interview is to gain insight into the interplay of factors in several possible

problem areas. Since many clients have several inter-related problems, an important component of the assessment is to establish the relative importance of these problems and how they are related to the diagnosis of specific phobia (Anthony & Swinson, 2002). For example, it may be that a client's claustrophobia is not very specific and occurs in a variety of situations. In this case, it may be wise to consider (or to rule out) the possibility of the diagnosis panic disorder, as this condition generally needs more elaborate treatment. Instead of utilizing unstructured clinical interviews for the assessment of necessary information about the dynamic of the anxiety problem, it is most efficient to use a standardized clinical interview such as the Anxiety Disorder Interview Scale (ADIS-R), which is primarily aimed at the diagnosis of anxiety disorders (DiNardo et al., 1985). In addition, to further enhance the reliability of the diagnostic process, it is often desirable to use valid and standardized diagnostic inventories, which can measure the severity of the anxiety complaints, detect other possible problem areas, and evaluate the course of treatment. Examples of useful self-report questionnaires for specific phobias are the Fear Survey Schedule (FSS, Wolpe & Lang, 1964), the Fear Questionnaire (FQ; Marks & Mathews, 1979), and the Symptom Check List (SCL-90-R; Derogatis, 1977).

The aim of the first of the eight phases of EMDR is to assess clients' readiness for treatment and to formulate the optimal clinical goals. Regarding the treatment of specific phobias, there is a wide variety of possible treatment goals, ranging from simple to more global or complex. For example, a limited goal for a needle-phobic individual might be "pricking a finger," while a more global goal might be "undergoing injections or blood sample taken, while remaining confident and relaxed." Generally speaking, treatment is aimed at reducing anxiety and avoidance behavior to an acceptable level and learning how to cope. Goals can be formulated concerning both what the therapist wants the client to achieve during a single therapy session and what exactly the client should manage to do in natural situations when confronted with the phobic object. Usually, an intermediate objective is selected. Sometimes clients set themselves a target that is not within their reach, unnecessarily difficult, or simply hazardous, such as being able to drive at high speed on a motorway. Likewise, a person with a dog phobia might set the target of acquiring the ability to spontaneously pet all sorts of dogs. A more appropriate aim of treatment, however, could be the ability to walk outside without having to change direction because of the arrival of a dog. The therapist should be clear about the objectives

for each session but also be prepared to adapt to unexpected happenings. Thus, in the treatment of specific phobias, goals are set in consultation with the client and will depend both on the client's level of commitment and the clinical judgment of the therapist about what seems realistic or feasible.

One issue that merits particular attention during the assessment phase is the gathering of information on the current circumstances under which the symptoms become manifest. To this end, information should be collected about external and concrete (discriminative) anxiety-provoking cues (i.e., the CS). Other types of anxiety producing stimuli are critical internal cues, such as particular bodily sensations (e.g., palpitations). Examples of questions to elicit information about specific anxiety-inducing stimuli are as follows:

- "What exactly (object or situation) are you afraid of?"
- "Which aspect of this object or situation triggers your fear most?"

Based in the work of Beck (1976), the cognitive hypothesis proposes that anxiety occurs as a result of the appraisals of the person's situation as threatening. In this conceptualization, anxiety in a given situation is inappropriately elevated because the person overestimates the probability of danger and/or awfulness of that danger were it to happen, or underestimates his or her ability to cope if the threat were to happen. Since such beliefs are all closely related to levels of emotional intensity and are important in the maintenance of the phobic condition, it is important to identify a client's faulty assumptions and predictions. The most commonly used method to elicit this type of information is to ask the client a series of open-ended questions that can be framed in the context of hypothetical situations (e.g., "What is the worst thing that might happen if you were to drive a car?") or actual episodes of anxiety (e.g., "During your recent appointment with the dentist, what did you think might happen?"). In other words, rather than asking for more general thoughts (e.g., "When you are feeling anxious in the elevator, what are your thoughts?"), it is best to ask the client for specific fearful predictions, assumptions, and interpretations (e.g., "When you are feeling anxious in the elevator, what are you afraid might happen?") as the answers may contain specific information ("I will faint," "I will die," "I will suffocate," etc.), thereby referring to predisposing events and early life experiences that might have set the groundwork for the acquisition of the phobia.

## Identification of Appropriate Memories

Given the importance of the role of unresolved past aversive experiences in the AIP model, during the assessment phase the therapist tries to identify particularly unpleasant experiences in order to be able to create a time line containing the critical incidents that have the strongest relation to the client's current symptoms—that is, critical incidents after which the symptoms clearly have begun and/or clearly have worsened. To this end, Shapiro (1995) proposes a model for the identification and processing of meaningful past events, which uses a three-pronged approach of past, present, and future (see Table 2). According to this model, a number of memories should be addressed and processed in a certain order, starting with the first event. Sometimes, additional memories need to be explored and developed. For example, Shapiro (2001) argues that it is important that therapists are also sensitive to memories of experiences prior to the development of the phobia, the so-called ancillary events that may have made the client sensitive to the development of the phobia. Another issue is the possible existence of memories that may have led to collateral damage, by having an effect on the individuals' self-image and self-worth (e.g., children being ridiculed by peers because of their extreme fear response when confronted with a small dog). Such types of damage also need to be assessed and addressed appropriately. By mapping these memories along the same time line, the therapist is able to develop a full case conceptualization with testable hypotheses referring to memories that require processing in order to reach symptom reduction. Next, the set of memories that has been identified is used as a focus for a series of EMDR (basic protocol) procedures that are applied separately, each involving a distinct target memory.

The most important memories are those that relate to the onset of the phobia. An example of a question to identify such a memory may be: "Which experience has caused, or clearly worsened, your fear?" However, the process of identifying core memories for processing is not always without difficulties, as clients may not have access to all appropriate memories, particularly the first (i.e., conditioning) event. In the following paragraph, a number of examples are proposed that are helpful for identifying this type of critical memories.

## Search Strategies for the Identification of Appropriate Memories

It appears particularly helpful if the therapist starts with conceptualizing clients' fear-related problems in terms of the following if-then relationship:

IF .....[stimulus], THEN..... [catastrophe]

Here, *IF* refers to the stimulus that used to evoke emotional disturbance (translated in cognitive behavioral terms: the CS), while *THEN* refers to the threat appraisal, the catastrophe the client expects to happen (which identifies the mental representation of the feared consequence, or in cognitive behavioral terms: the UCS/UCR). The association between the phobic stimulus (*IF*) and client's prediction that as a consequence a negative dangerous event is likely to occur (*THEN*) makes his anxious belief operational. For example, an individual with a phobia of dogs may believe that if he or she gets too close to a dog (*IF*), it will attack (*THEN*); a person with a lightning phobia may believe that he or she will be struck by the lightning (*IF*) as soon as a thunderstorm starts (*THEN*); and an person with an injection phobia may

**TABLE 2. Order of Steps in Shapiro's Three-Pronged Approach of Memory Selection Proposed for the Treatment of Specific Phobias (Including Examples of Questions That May Help to Identify These Memories)**

<ol style="list-style-type: none"> <li>1. The first event. The conditioning event, which caused or clearly worsened the fear, or any other predisposing event that contributed to the onset of the phobia.               <ul style="list-style-type: none"> <li>• "Which experience has caused, or clearly worsened, your fear?"</li> </ul> </li> <li>2. The worst event. The most frightening or disturbing experiences in the past.               <ul style="list-style-type: none"> <li>• "What is the most extreme or most frightening experience related to this fear?"</li> </ul> </li> <li>3. The most recent incident.               <ul style="list-style-type: none"> <li>• "What is the most recent time that you experienced the fear?"</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>4. Present triggers. Any associated present stimuli or specific triggers that elicit disturbance in situations in the present, such as certain physical sensations or other manifestations of fear (e.g., dizziness).               <ul style="list-style-type: none"> <li>• "What kinds of stimuli in the present still elicit this type of fear?"</li> </ul> </li> <li>5. Future template. A mental representation of a future and anticipated situation with a positive outcome.               <ul style="list-style-type: none"> <li>• "Please bring up a mental image of a desired future situation in which you act adequately? This is a picture of a situation that you, until now, avoided and that you are only able to enter or undergo with fear."</li> </ul> </li> </ol>
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believe that he or she will faint or that the needle will break off (THEN) in his or her arm if a blood sample is taken (IF).

Using the conceptualization of an if-then relationship, there are two different search strategies that can be used to identify the memories of events that may have laid the groundwork for the phobia. One search strategy focuses on the identification of core memories pertaining to the stimulus (IF) component, and the other pertaining to that of the feared consequence (THEN). For reasons of clarity, we will refer to this distinction in terms of IF-memories and THEN-memories.

Typical questions referring to IF-memories are: “When did your fear begin?” or “What was the first time this fear was experienced?” Other ways of enquiring may be: “Which incident made that you became afraid of . . .” or “When did you experience this fear for the first time?” Although the answers to these questions provide the therapist information about possible events that contain memories for processing, the therapist should not forget to check whether it is indeed the *first* experience. If not, the therapist should identify the incident when the fear was felt for the first time, as well as any other predisposing events that may have contributed to the fear, by asking: “Is this indeed the first disturbing memory related to this fear?” or “Are you sure you weren’t already fearful prior to this incident?” It is important that the client understands it is not necessary to know how exactly the fear started but how the client *remembers* it, or better, how it is mentally represented in client’s brain.

Typical THEN-memories can be found by identifying the client’s catastrophic ideation—that is, what exactly the client expects to happen when confronted with the phobic stimulus. From an AIP perspective, this catastrophic belief can be conceptualized as dysfunctional information from the earlier disturbing conditioning event, which got stuck in the neural memory network. Therefore, it is important to question the client about where this information might have come from—that is, when and how the client has learned that the feared catastrophe (e.g., fainting, choking, severe pain, etc.) might happen.

In this respect, it should be noted that it is a widespread misconception that the therapist should limit the choice of selecting EMDR targets from memories of clear conditioning events in the sense of the person’s own painful experiences (e.g., the client once fainted in relation to an injection). As people can acquire their phobias through several so-called pathways

of fear (Rachman, 1977), memories of vicarious learning experiences (e.g., the client observed mother’s extremely fearful reactions to needles in a hospital) or negative information (e.g., a client read in a newspaper that someone died in the dental chair following a anesthetic injection) may equally well have led to the development of meaningful memory representations that need to be targeted in order to fully treat the phobic condition.

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### CASE EXAMPLE: PETER

Peter had a flying phobia and had been unable to fly for several years. He had experienced panic-like attacks during several flights. He found looking down through the airplane window to be particularly anxiety provoking. In order to identify the origin of this phobia, the therapist asked “When did your fear begin; what do you remember?” Because this question referring to an IF-memory and a question with the same aim (“When did you feel this anxiety response for the first time?”) did not reveal an appropriate memory for processing, the therapist used a question referring to the feared consequence of an encounter with the anxiety-provoking stimulus, a THEN-memory. The therapist asked, “What do you fear that will happen if you look down below?” The client responded, “It sounds stupid, but I think I will fall.” Because this answer could lead directly to another possible memory, the therapist asked, “When did you experience this fear of falling for the first time?” In response to the last question, the client indicated that prior to his fear of flying, he already had a fear of heights. He described a childhood memory of visiting a lighthouse with his parents. At the top, his father took him on his back and performed all kinds of dangerous and anxiety-eliciting acts. His mother was panicking. This image was still disturbing (NC = “I am in danger”). Targeting the fear of heights, by installing a positive cognition (PC = “I am safe now”), an appropriate future template, and the use of an imaginal future video template, resulted in strong reduction of his anticipatory anxiety. Two weeks after the session, the client was able to make a flight in an airplane, during which he felt remarkably calm.

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It is clear from clinical practice that solely targeting one or more traumatic events sometimes transforms the disturbing memory into one that is no longer emotionally distressing. For instance, in describing his treatment of a snake phobia, Young (1994) provided the following information about the procedure he used: “She was asked to picture herself with

a snake with the associated feelings of terror and helplessness” (Young, 1994, p. 130). The fact that the treatment was successful suggests that reprocessing a single aspect of the pathology, such as the present emotions or one or more past events may result in a generalizing effect to a larger part of the memory network. However, it is our experience that such a response is rather exceptional. Yet, sometimes it proves useful—when other strategies to identify memories have failed—to try to directly gain access to the core of the appropriate neural network. The next case example illustrates how such a memory can be identified and how reprocessing the mental representation of a client’s fear can lead to a situation where the therapeutic goals are met.

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### CASE EXAMPLE: DONALD

Donald had a water phobia (i.e., shark phobia). Since childhood, he avoided swimming or sailing because of an extreme fear of sharks, even in water such as lakes that have no connection with the sea. He remembered that when he was young, he even felt in danger when in a bathtub. During the EMDR assessment it appeared difficult to find a memory for treatment, as Donald indicated that he could not remember the onset of his extreme and irrational fear. There were recollections of earlier confrontations with water, but bringing up these memories did not cue any significant emotional response. Questions pertaining to IF-memories or THEN-memories did not lead to a meaningful memory that could be used for EMDR. For example, he remembered that he had seen the movie *Jaws*, when he was about 7 years old, but he had no present disturbing memory of it. In answer to the question “Which memory or mental picture represents your fear of sharks best?” Donald answered that he had an image—probably a trailer of a movie he must have seen—of a person swimming in the ocean. There is deep, dark water below him, but there is no actual shark in this picture, although it feels as if there certainly is one, somewhere deep down. This disturbing picture still made him feel powerless (NC). The SUD level was 8.

Remarkably, during processing, the emotion that came up was a sense of loneliness, rather than fear. After about 30 min, suddenly a disturbing memory arose of when Donald was about 5 years old. He was watching his younger brother playing on the other side of a deep ditch, when the brother suddenly slid down the bank and vanished completely underwater. When Donald realized what had happened, he started to scream. A group of horsemen had just passed by. One of them responded, dismounted from his horse, and began searching in the depths of the water. He finally brought

Donald’s brother to the surface, after which he was resuscitated and revived. Other people arrived and also took care of him. In the session, Donald cries and feels helpless and alone again as he remembers himself as disconnected from his brother. At the end of this first session, the SUD is 2.

At the beginning of the next session Donald wears a T-shirt that he bought a few days before, depicting the poster of the movie *Jaws* with a big shark. He reports that a few days previously, he walked into the ocean and went into the water up to his waist. EMDR processing continues with the same target image. It is further desensitized until the incident becomes neutral (SUD = 0) and the PC = “I can handle it” is installed. After installing a future template and playing a mental videotape of himself swimming in the sea, his mental representation has changed into a picture of quiet and safe water, of which he is no longer a part anymore. A week after the second session, the therapist gets a telephone call. It is Donald: “Guess who has been swimming last week in the North Sea . . . ?”

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### Conclusions

With regard to the treatment of specific phobias, EMDR and traditional behavior therapy have many differences, both practically and conceptually. Contrary to traditional behavior therapy, which proposes a strategy of gradual exposures to the feared stimuli (CS-exposure) to extinguish the fear response by way of learning new predictive associations between CS and (representations of the) UCS/UCR, the primary goal in EMDR is the processing of disturbing memories of previous negative learning experiences. Despite these differences, research on the application of EMDR with specific phobias demonstrates that EMDR can produce significant improvements within a limited number of sessions. It has been recommended that to fully profit from the effects that are achievable with EMDR, the original and all other appropriate related memories should be identified and addressed (Shapiro, 2001). In this article, several strategies aimed at identifying these memories were described.

Clearly, it is the challenge for future researchers to demonstrate that the clinical effects of EMDR with specific phobias exceeds or equals the application of an in vivo exposure procedure per se. On the other hand, there are indications that a combination of both treatment approaches may have additional value. For instance, it is interesting to note that there is evidence from experimental research to suggest that a combination of exposure and distraction (i.e., so-called distracted exposure) is more

effective than exposure alone (Johnstone & Page, 2004; Oliver & Page, 2003). In one of these studies, 27 individuals with phobias underwent three 10-min sessions of *in vivo* exposure followed by one 10-min exposure session at a 4-week follow-up (Johnstone & Page, 2004). Two groups of people with a phobia of spiders underwent either a stimulus-appropriate focused conversation or a stimulus-inappropriate distracting conversation with the experimenter. It was found that those who underwent distracted exposure showed greater reductions in subjective fear within and between sessions, reported lower levels of anxiety, and demonstrated a better performance on a behavioral task than those who received focused exposure. Likewise, Wells and Papageorgiou (1998) found that social phobic patients who were treated with *in vivo* exposure plus an external attention focus profited more from this treatment than those who received exposure alone.

An interesting finding of the Johnstone and Page (2004) study was that only those with low initial anxiety experienced reductions while undergoing focused exposure. This is in line with Penfold and Page's (1999) findings, which showed that participants with high stimulus-bound anxiety benefited most from the distraction treatment. Thus, it would seem that level of anxiety interacts with distraction and that distraction facilitates anxiety reduction when participants have a relatively high level of anxiety, while focusing facilitates anxiety reduction when participants have a relatively low level of anxiety. This notion is in accord with clinical experience, suggesting that with phobias with a trauma-related aetiology and/or a high level of anxiety, exposure to the CS may be less effective as it will not disconfirm the expected occurrence of the unconditioned stimulus (UCS) but will just activate a representation of the UCS/UCR. Accordingly, it would be enlightening to experimentally investigate whether clients with trauma-based specific phobias and/or high initial levels of anxiety would respond most favorably to an UCS reevaluation intervention such as imagery exposure (see Davey, 1997) or EMDR. Indeed, it has been found that the SUD scores of a subgroup of clients with a trauma-related phobia showed significantly greater reduction after EMDR than the group as a whole (Sanderson & Carpenter, 1992). The other prediction that would be interesting to investigate is whether nonphobic fearful clients with a nontraumatic background, or those in later stages of treatment, after some reduction in anxiety has been achieved, would profit more from the application of gradual *in vivo* exposure or behavioral

experiments, rather than EMDR. In addition, it is conceivable that a combination of both treatments may be of significant practical value in that EMDR can play a major role in the first part of the treatment process (processing memories), while cognitive behavioral procedures are helpful in the second part of treatment, where clients learn to expose themselves to the feared stimuli until they have achieved a degree of self-mastery again and feel that they are able to handle a certain level of anticipatory anxiety and fear with confidence.

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## A Clinical Vignette

### Resource Connection in EMDR Work With Children

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Editorial Note: A vignette is a brief case report that makes a contribution to the literature, but which has used only EMDR's standard protocol measures. This vignette describes a procedure for drawing on and strengthening a child's resources in all phases of EMDR treatment. The procedure facilitates the connection to more authentic and meaningful inner resources that come directly from the child's world, thus strengthening the positive memory networks so that these are available for the child to access when processing his/her traumatic material. Three separate cases are described to illustrate the application.

**T**he therapist who asks a child to work on a problem with EMDR is presenting the patient with an extremely difficult task. In order to process the problem, the child is being asked to face squarely his or her biggest fear, embarrassment, anger, or anxiety. The child is required to experience directly the emotional discomfort that children most often will do anything to avoid. The wonder is that so many children do have the courage to do just that. This vignette<sup>1</sup> illustrates a modification of a technique called resource connection (Laub, 2001). It was developed by the author to lead a child into and through the EMDR processing.

EMDR is guided by Shapiro's (2001) adaptive information processing (AIP) model. She maintains that information processing occurs during EMDR, when associative links are forged between distressing or traumatic material and more adaptive and positive information. Therefore, it is essential that clients have access to memory networks containing personal strengths and positive resources. Part of the role of the therapist is to strengthen positive memory networks so that these are accessible during all the phases of EMDR.

#### Resource-Strengthening Procedures

The safe place procedure is included in the standard EMDR protocol (Shapiro 2001) and it is applied during the Preparation Phase. It recognizes the need for a

positive resource before the processing begins. This is a resource waiting in the wings. The safe place usually comprises an external memory that provides for child or adult the wonderful experience of a comfortable feeling, an escape route when the processing becomes too difficult. When the processing is incomplete, the safe place is used as a comforting closure. For many children, the safe place does its job. The child succeeds in accessing a positive memory of safety, which is usually dependent on an external experience, such as being with mother.

Korn and Leeds (2002) extended the concept of resource beyond safety. Their resource development and installation technique is used in the Preparation Phase to provide the client with a creative framework, allowing that individual to access material relating to a wide variety of resources. Laub (2001) developed the resource connection procedure, which is used during the EMDR Desensitization and Installation phases. In her model, the resources are unique in that they arise from within the client as the person works. They may also relate to a number of facets, such as competency, bravery, and nurturance. They may be either concrete or corrective experiences as well as abstract, metaphoric, or spiritual concepts.

Laub's model allows the client to experience himself or herself within an envelope of resources during the session. The client connects to a past resource before focusing on a specific picture, present resources collected from associations that arise spontaneously

during the processing stage, and a future resource, which he chooses at the end of the session.

## Limitations of These Procedures With Children

Laub's thinking emphasizes the therapist's attention to the client's unconscious use of resources in all stages of the protocol. This focus is well suited to the child therapist's need to facilitate the connection to more authentic and meaningful inner resources that come directly from the child's world. A model that attempts to do this, however, must consider basic principles of child development.

The technique, developed by this author, is based on three principles:

1. Children do not usually access memories in an organized way as easily as do adults.
2. The child lives and functions much more completely in the present than do adults.
3. The child has a much more immediate and labile reaction to present emotions than do adults.

The therapist's task is to observe closely the unique experience of the child in the here and now of the playroom and watch for the appearance of the positive aspects of the child's being that he or she brings to this small segment of life. These are the child's own, unique resources.

## The Inner Space of EMDR Processing

EMDR processing can be conceptualized as taking place in an inner space that is full of all the terrible feelings that threaten a traumatized or disturbed child. The therapist meets the child crouching on the edge of this space, usually hanging onto his or her defenses for dear life. The child wants to play, or talk, or be quiet, or act out. The therapist says to the child, "Go on into that inner space." This is tremendously difficult for the child. He does not know that scattered among the unbearable feelings of embarrassment, fear, rage, and helplessness are his own personal strengths, such as joy, humor, fun, love, knowledge. It is these strengths that will help bring the child to a new balance. If the therapist can help the child to connect to some of these strengths in the here and now, before and during the work, the plunge into the processing and its continuation to a new resolution is easier.

## Resource Connection for Children

Resource connection (Laub, 2001), in this light, means that the therapist must be alert to any indication of

a spontaneous strength that arises in the therapeutic hour and install it immediately with bilateral stimulation. The therapist must watch carefully for a positive resource, such as joy, humor, or competency. These may arise directly, for example, as the child wins a game. They may arise indirectly, as in a body sensation or a body position. Examples might be the feeling of a cool breeze through the window on a hot day, which leads to a feeling of comfort and well being, or the flexing of the child's muscles while telling how strong or what a good helper he or she was when lifting the living room rug. These kinds of strengths may arise in different contexts.

The therapist should look for these resources at the following times:

- During the preliminary assessment or trust-building period
- While the child is processing
- During play therapy

The fact that the therapist validates the child's resource throughout the session and highlights the child's positive qualities strengthens the therapeutic connection and the child's optimism. It is easier to trust such a person as a safe, containing, hopeful helper, who can bring the child through the difficult journey of processing his or her problem.

## Conceptual Frameworks

This technique of resource connection for children builds on several conceptual frameworks (space limitations prevent detailed explanations), as follows:

1. Shapiro's (2001) AIP model highlights the imperative of strengthening positive memory networks so that these can be accessed during processing.
2. Narrative therapy aims to identify and validate the past, present, and future resources, which are called unique outcomes (White & Epston, 1990). The therapist is searching for and emphasizing incidents different from the usual dysfunctional life story of the client.
3. Hypnosis aims at the utilization of resources in the service of the unconscious healing process (Fromm, 1992). It also refers to the concept of anchoring as a way of accessing, as does neural linguistic programming (Bandler & Grinder, 1975).
4. Interactive therapies, such as Kohut's self-model (Kohut, 1968) or object relations models (Fairbairn, 1952) use positive mirroring and reflecting to allow the child to progress to new stages of development.

## Case Examples

The following three examples provide brief illustrations of the resource connection for children technique.

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### CASE 1: ROIE

Roie was a 9-year-old boy who was terrified of terrorist attacks. His anxiety was intense and had generalized to many facets of his life. He did not want to go to school by himself or to visit friends. His fear often flung him into dissociative reactions.

After establishing a safe place, his room at home, he began working on his fear that he might be blown up. He became so anxious that he asked to stop and move around the room. He began to shoot darts. He was good at it, and his involvement in the game allowed him to move away from his fear. The therapist noticed his pride, joy, and excitement when he hit a high number, as well as his facial expression, his glad cry “yesh” (in Hebrew the equivalent of “great!”), and his open body position. She realized that she was looking at Roie’s unique resources. These were the kind of resources that we all need in order to continue living in the face of uncertainty. This was certainly a frightened, quivering boy, but he also had within him the ability to feel competency and joy as he played.

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#### Resource Connection: Identifying the Resource and Naming the Feelings, Sensations, and Thoughts

When he hit a high number and jumped up and down joyfully, the therapist called “Freeze” and asked him as he stood still as a statue, “Where do you feel the “yesh” in your body?” Roie answered, “In my hands and my feet.” The therapist asked, “What feelings do you have?” He said, “Happy.”

“What do you think of yourself now?” the therapist asked. He said, “I’m pretty good at this,” “I can do stuff,” and “This is fun.”

#### Installation

During installation, the therapist said, “Think of all those feelings in your body and how you’re pretty good at having fun and shooting darts, and look at my fingers,” The therapist continued watching his game and calling “Freeze” when he succeeded. By the time he had hit the 100 mark on the target five times and had undergone five installations of his feelings of competency and pleasure, he was ready to continue processing to a positive and appropriate cognition. “Eema (mother) doesn’t let me go to dangerous places. I’m safe.”

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### CASE 2: LIDOR

Lidor, age 10, had been attacked viciously by a dog. Since the attack he had changed from a sturdy, assertive child to a boy who clung to his mother and was afraid to leave the house by himself. The processing was looping around the picture of the “dog’s teeth” and “nothing.” He was able to continue the processing only after he had connected to feelings of direct anger, power, and competency.

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#### Identifying the Resource and Naming the Feelings, Sensations, and Thoughts

The therapist noticed that one of the child’s feet was moving back and forth against the chair leg. She suggested that he let his foot kick the chair leg hard as he could, harder and harder. “How does your leg feel when it kicks?” the therapist asked. Lidor answered, “Strong.” Then the therapist asked, “How does your body feel?” The child said, “Kind of mad,” “Now really mad,” “I can kick hard,” and “I got a goal in football.”

#### Installation

The therapist asked the child to think of all those things and to follow her fingers. Lidor could then continue the processing through his anger at the dog and the “stupid kid” who let him off the leash to a resolution where he could talk about carrying a stick when he went out and also say that “I really like dogs. Most dogs are nice.”

According to our conceptualization, children such as Lidor and Roie can usually access a variety of emotions in their here and now experience, as they react to the material in the therapeutic session. These are their own unique resources. Most children, even as they exhibit symptoms of emotional disturbance, still have a natural attraction and interest in the here and now of life, a pride in and drive toward competency, a joy in new experiences, a striving for fun and, in most situations, some experience of nurturance. In our conception, the therapist helps the child to identify and harvest these resources as they appear. They can thus be utilized in the service of processing and reaching a new balance.

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### CASE 3: ALLON

The following case is described in detail because it illustrates in particular the dramatic change that a resource

connection can engender. When the therapist first met Allon, he was a frightened, nervous little boy, suffused by his anxiety and unable to focus. The resource that emerged in reaction to a language slip of the therapist was a roaring laugh and his organized, age-appropriate sense of humor. Once this resource was stressed and installed, he made a strong interpersonal connection with the therapist, which enabled him to begin the EMDR work, to weather a difficult abreaction, and to complete the processing to resolution.

Allon was 7 years old, suffered from ADHD, and was extremely fearful, often confusing reality and fantasy. Several months before treatment, he had watched a television program about dinosaurs. Since then, he had been obsessively preoccupied with these monsters. His father described Allon, “When night and darkness fall, terror falls on Allon.” He clung to his parents, struggled against going to sleep, often woke in a panic, and was wetting his bed again.

This anxious, jumpy little boy refused to separate from his mother and stuck perseveratively to the topic of dinosaurs. After a short period of play, the therapist tried to establish a safe place, unsuccessfully. Allon wanted only to talk about Jurassic Park. (In Hebrew, Park Jura). Park Jura, the place where dinosaurs live, did not seem useful as a safe place. As Allon wiggled about, turning in all directions, the therapist felt little sense of mutual connection. His anxiety was a mountain dividing them. The therapist considered postponing the EMDR, when she inadvertently hit on Allon’s own unique and powerful resource.

The word in Hebrew for Jurassic is *Jura*, with a y sound at the beginning of the word. As the therapist talked about the park, she mistakenly said *Jura* with a hard J. This word means sewer—the place for toilet wastes. The appeal to a 7 year old is obvious. Allon connected immediately to his wonderful sense of age-appropriate humor and ability to laugh (joy).

“Jura. Jura. Jura,” he shouted. “Jura is for the toilet. Don’t you know?”

When the therapist joined his laughter, the connection between them was made. It was possible to anchor that feeling of fun and connection in his body.

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## Identification of the Resource and Installation

The therapist asked him to think of that laughing fun that they were having together.

Therapist: “Where do you feel it in your body?”

Allon: “In my tummy.”

Therapist: “What does it make you think?”

Allon: “I like to laugh.”

Therapist: “Think of that laughing fun in your tummy and follow my fingers.”

Therapist: “OK, now breathe.”

Allon: “Every time you tell me to breathe.”

Therapist: “Yes, because we want you to feel the fun all through your body. Every time you feel afraid, you can think of the laughing and *Jura* and feel the fun in your body.”

He was now able to feel himself not only as “frightened Allon” but also as “funny Allon,” who could share a joke. He could now enter, with the therapist the internal space where he knew his fear resided.

Therapist: “Now you can think of the scary dinosaur and follow my finger.”

Allon: “Now I’m really afraid.”

Therapist: “Where do you feel the fear?”

Allon: “In my heart.”

Therapist: “What are the words that fear in your heart makes you say?”

Allon: (doesn’t answer)

Therapist: “Could it say, ‘I’m in danger’?”

Allon: (He begins talking about which dinosaurs he’s afraid of, their scales and teeth.)

Therapist: “How big is the fear?” (shows with hands)

Allon: “The number is a million. No. A million and 20.”

Therapist: “That’s a lot. Follow my fingers and think of the dinosaur and the scariness of one million and 20.”

Allon: “I’m still afraid.”

Allon: “I still feel it a lot.”

Allon: “Shall I still think of the scary dinosaur?”

Allon: “I’ll go home and really be scared tonight.”

(His facial expression shows terror.)

Allon: “Now I’m afraid even more—two hundred plus a million.”

Allon: “What a fear! I can’t get rid of it.” (He throws his head back and holds his stomach.)

Allon: “Now it went back to a million and 20.”

Allon: “Now it’s zero.”

He finished the processing while drawing a picture of “dinosaur bones and graves” as his mother tapped his shoulders. “All the dinosaurs are extinct,” he said. He had harvested another resource, his good intelligence and wide knowledge. This, of course, was installed.

“All the dinosaur graves are far away in China” he added.

The therapist asked, “Are there any dinosaurs in Israel?” “Well yes,” he said. “But only very small ones. They don’t do anything really bad. They only yell.”

At times, even a very frightened child, such as Allon can begin processing within a relatively short time

when resources are accessed. Often, though, it may be necessary to work with play therapy methods for a number of sessions, collecting the child's resources as they appear. Some children enjoy writing or drawing each resource, as it emerges in play sessions and storing them in a special box, to take out when needed.

## Summary

The fears that each of these children brought to the playroom were mainly concerned with safety. Safety, for most children, is dependent on external conditions that do not always exist. The resources that emerged naturally as the therapist interacted with each child were his or her own internal feelings of strength, competence, and joy. When these qualities were identified and installed, each of the children was able to process and arrive at some resolution.

If we place these examples in the larger context of living in Israel at this time and question ourselves as to what anyone needs in order to live in a place when safety is uncertain and where triggers for activating traumatic symptoms are numerous, it becomes apparent that it is precisely a child's unique personal resources that enable him or her to go on enjoying and developing in daily life. It is these internal strengths that allow Roie and Lidor to continue playing football and shooting darts, and Allon to keep on laughing.

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## ■ CLINICAL Q&A ■

Editorial Note: The Clinical Q&A is a regular journal feature in which master clinicians answer questions posed by readers who are requesting assistance with clinical challenges. In this issue's column, responses are written by two psychologists who are EMDRIA Approved Consultants, Dr. Denise Gelinias and Dr. Howard Lipke. Readers can send questions to [journal@emdria.org](mailto:journal@emdria.org)

**Question:** *I recently took the EMDR training, but I'm having trouble getting started with EMDR. What do you suggest?*

### ANSWER FROM DENISE GELINAS:

It seems to me that your experience is not unusual—most of us have paused for that deep breath as we moved from practicing EMDR in a training setting to doing it on our own for a client. For most clinicians, EMDR is a new way to work. There are a number of strategies to manage this. I'll mention the ones I know about to add to the ones you may have already come up with for yourself.

My first suggestion is for the clinician new to this way of working to review why and how EMDR works, and what elements of EMDR it would be helpful for his or her clients to know, and to actually write down the major points for themselves. [Shapiro's *Eye Movement Desensitization and Reprocessing* (2001) and the EMDR training manuals are excellent resources for this, as they are both accurate and well organized.] Depending upon the clinician and the client, these elements might include the following: the adaptive informative processing (AIP) model; why we use eye movements or some other form of alternating bilateral stimulation; the dual focus of awareness; information about how EMDR is supported by numerous "gold standard" outcome studies; and that EMDR is the recommended treatment or treatment of choice for post-traumatic stress disorder in the national health care systems of many countries, the U.S. Departments of Defense and of Veterans Affairs (2004) as well as the International Society for Traumatic Stress Studies (2000) *Practice Guidelines*. This conversation could end with the procedural aspects of how EMDR is actually done.

Since each clinician has his or her own style, a second suggestion might be to practice reviewing those elements out loud, so that when the time comes to provide this information to the client, it is all fairly organized and coherent.

Third, it might be useful at this point to work with the safe place exercise. As well as being a necessary preparatory

element of EMDR treatment with every client, safe place provides the client with a gentle introduction to some of the procedural and experiential aspects of EMDR, and, just as important in this present context, it does the same thing for the clinician!

Fourth, I am an advocate of using so-called cheat sheets while learning to do EMDR (i.e., copies of any lists or protocols that might be useful). It can be useful for clinicians to print out copies of the actual steps for doing safe place or for the assessment and desensitization of a memory or for the closure for both a complete and an incomplete session. Many clinicians find it helpful to have lists ready on hand of negative and positive cognitions, and also of cognitive interweaves. Obviously, the idea here is simply to provide yourself with the procedural protocols for whatever helps you to feel more comfortable in providing EMDR. (For the artistically inclined or the merely marginally obsessive, you can use different colored paper for each type of cheat sheet to be able to find it rapidly when you need it!)

When the time comes to choose the first target memory to desensitize, my suggestion for the clinician new to EMDR is to keep target selection basic. It is usually best to begin doing EMDR with clients who have old traumatic memories in the context of a personal history with relatively few traumas. (Clinicians who tend to work with extensively traumatized individuals may have to look rather carefully to see if they have one or two such individuals in their caseloads and begin moving into EMDR work with these clients, rather than their more extensively and repetitively traumatized clients.)

This "start basic" target selection approach allows a clinician to more easily identify a relevant target memory and thus concentrate his or her attention on the procedural aspects of the Assessment, Desensitization, and Reevaluation phases. As these procedural aspects become well learned, the clinician's confidence in both his or her own abilities and in EMDR are reinforced. At that point, he or she might feel ready to address clinical situations that require more complicated EMDR case conceptualization and target choices. These might include using EMDR for current anxieties, phobias, trauma-based



depressions, complex PTSD, or recent traumas. (EMDR treatment of each of these is clearly described in either the training manuals or in Shapiro's texts.)

This implies *not* embarking on one's EMDR learning trajectory by beginning with clients who have extensive childhood trauma (which usually requires more extensive case conceptualization and/or strategies for target choice), nor with clients with a very recent trauma (which requires the recent trauma protocol). Recent trauma is usually regarded as a traumatic experience that occurred only 2 or 3 months previously. Since recent traumas require a protocol different than almost all other traumas, why start with this? It's more useful to learn the basic approach, and when the clinician is comfortable with this to begin to address cases calling for more complicated EMDR case conceptualization and target choices.

Finally, most clinicians find that making the transition to actually using EMDR with their clients is inestimably aided by meeting regularly with an EMDR consultation group (either of peers or with a consultant) or by working regularly with an EMDRIA Approved Consultant. It seems that some clinicians have come to feel that they should be able to do EMDR immediately upon their first exposures to it, but this seems to me unrealistic and perhaps even unduly harsh in terms of their expectations of themselves. Perhaps this expectation contributes to some clinicians' hesitancy in making that transition from training to actually using EMDR. It is probably helpful to remember that just because EMDR works rapidly for the client does not necessarily mean that it can be learned just as rapidly by the clinician. Realistically, it cannot. EMDR does work rapidly and thoroughly, but it is in fact a rich and widely applicable approach, and it can take time and practice to learn a variety of applications.

So, for all those clinicians inhaling that deep breath before taking the plunge into actually using EMDR, I would encourage you not to feel that you absolutely need to know everything overnight and to instead just take it one step at a time, getting consultation along the way and enjoying this way of working, which, I would guess, will surprise and delight you and will be a gift to many of your clients. Best wishes.

*Denise Gelinas  
Northampton, MA*

#### **ANSWER FROM HOWARD LIPKE:**

In my experience, there are a number of reasons clinicians have trouble beginning to use EMDR. Not all of them could be addressed in the amount of space available; they probably all couldn't even be listed. I think the most common of the issues is related to clinician, rather than client hesitancy. Even when therapists have seen the method be startlingly effective during the training practica, they still sometimes feel uncomfortable explaining the method to clients. They become nervous about waving their arms in front of clients' faces or taking out a contraption like the light bar.

## **Understanding the Underlying Theory**

I think the core of getting over this barrier is for the therapist to have satisfactory understanding of how EMDR, and the eye movement in particular, fit into a scientific understanding of the therapeutic change process. One of the basic principles of EMDR practice is that we work in the specifics of experience. I think it is reasonable for new EMDR therapists to imagine the specific scenario in which they are asked by their client to explain this "crazy" idea. If they cannot imagine themselves responding expertly, many therapists are going to hesitate to go ahead.

It is a reasonable hesitation.

While several hypotheses are offered for the mechanism of effect in EMDR training, there is little time to practice explaining the theoretical and research justifications to the client. Therefore, this first step of integration in practice is given little time. So, my first recommendation is for the therapist to be very clear about the justification for using eye movement. Bob Stickgold's 2002 paper is strongly recommended for the therapist to not only read, but study.

There are two main parts to Stickgold's sophisticated analysis. The first involves memory. Based on my interpretation of the psychophysiological and memory research he addresses, I explain to my clients that we can consider two types of memory: (1) reliving and (2) historical. Traumatic events may become stuck in reliving memory because of the emotion attached. The memory is prevented from moving and becoming historical memory.

For example, if one has a reliving memory of an event in which one felt terror, then the terror is felt again. If one has an historical memory of the event, then one does not relive the fear; instead, one remembers that fear was felt, and in fact, the emotion experienced with the now historical memory could be relief. Therapy then could be considered the promotion of moving memory from the reliving system to the historical system. The above is a brief version of what I explain to clients.

The second part of the analysis concerns the role of the eye movement. This is shorter and less fully understood. What I usually explain to clients is that the understanding is still theoretical, but that it is reasonable to believe that the eye movement or other activity creates a so-called orienting response in the brain, which is associated with the brain being less stuck in its patterns of remembering.

Consequently, I suggest that when new EMDR therapists are familiar with the information that Stickgold describes, they will likely be more comfortable getting started. The next step, after becoming familiar with the material, is to practice explaining the ideas to a colleague or friend. Do as we suggest to our clients, role-play the explanation. The ability to discuss the theoretical underpinnings of EMDR should lead to an increased level of confidence, born of expertise. I think the therapist can approach the beginning of using eye movements (or other sensory/motor stimulation) with justified confidence.

While the theoretical understanding will help the therapist, and may interest the client, acceptance of the

plausibility of eye movement may sometimes be more effectively explained by putting the activity in a context outside EMDR. The therapist might consider and ask the client if he or she has found music to be calming when try to relax or, alternatively, invigorating when trying to exercise. The exact mechanism by which music has these effects may not be known, but we accept, and even seek out, its effects regardless.

### **Borrow Assessment Phase Questions Into the History Phase**

Another issue that might keep beginning EMDR therapists from applying the method is the number of new specific steps added to the therapeutic interaction. New therapists may be so concerned about getting so many new things right that they may just give up. Practice in actual therapeutic situations can be obtained by borrowing the questions from the Assessment Phase and putting them into the History-Taking Phase. If during our initial history taking we ask clients about beliefs, emotions, and sensations connected to a traumatic event, and have practice rating these in the history section, we gain several benefits besides the therapist just getting more comfortable with the questions. In getting the cognitions and VoC and SUDs, the therapist has an opportunity to incorporate some of the valuable lessons of cognitive and behavior therapy early in treatment. For some clients, attention to emotion and body sensation allows them to be aware of the importance of these dimensions. For other clients who are all too aware of these dimensions, they get to see how emotion and feeling can be considered systematically, that the therapist is aware of their importance, and that therapy is not just about so-called thought games. The above does not even include the value in the assessment

of early knowledge about the client's way of experiencing the world and himself or herself.

Borrowing the Assessment Phase questions into an earlier phase of treatment also results in the client having familiarity with this way of understanding experience, so that when it comes time to use assessment questions in the Assessment Phase, to produce the target for desensitization, the work proceeds more efficiently.

Beginning therapists should be aware, however, that using the assessment questions can lead to insight and therapeutic change even before the Desensitization Phase. The other side of this is that a very few clients are too fragile for the therapist to ask such specific questions about their trauma during the History-Taking Phase, so the above suggestion should be used with some caution.

The above is recognized to be a very brief response to only some aspects of the general question raised. Nonetheless, I hope this discussion has been helpful.

Howard Lipke  
Chicago, IL

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# *Journal of EMDR Practice and Research*

## INSTRUCTIONS FOR AUTHORS

The *Journal of EMDR Practice and Research* is a quarterly, peer-reviewed publication devoted to integrative, state-of-the-art papers about Eye Movement Desensitization and Reprocessing. It is a broadly conceived interdisciplinary journal that stimulates and communicates research and theory about EMDR, and their application to clinical practice. The journal publishes experimental studies; theoretical, review, and methodological articles; case studies; brief reports; and book reviews. Examples of research areas include: randomized clinical trials; treatment outcomes with specific populations; investigation of treatment processes; evaluation of the role of eye movements and bilateral stimulation; and contribution of individual factors and personality variables to treatment outcome and/or process. Articles address theoretical issues and clinical challenges to broaden clinicians' understanding and skills; they discuss such complex issues as: strengths and weaknesses in the literature; impact of ethnicity and culture; and evaluation of client readiness for treatment.

### **Manuscript Submission**

Submit manuscripts, in English, in MS Word format by e-mail to the Editor, Dr. Louise Maxfield at maxfield@rogers.com. Manuscripts will be acknowledged on receipt. Following preliminary review by the Editors, to ensure compliance with required elements, manuscripts will be peer-reviewed by members of the Editorial Board.

### **Manuscript Style**

The following are guidelines for developing and submitting a manuscript. Manuscripts that do not conform to these guidelines will be returned to the author without review, and with recommendations for changes needed to complete the submission process.

1. Manuscripts must be professionally prepared in accordance with the *Publication Manual of the American Psychological Association*, 5th edition, 2001.
2. Manuscripts are generally expected to be 20–25 pages in length and double-spaced throughout; however, longer manuscripts may be considered. Brief reports will be 10–15 pages in length. Clinical vignettes are brief case reports and are 4–8 pages long.
3. The title page must include authors' names, positions, titles, affiliations, full contact information (address, phone, fax, and e-mail). This information should not be included elsewhere in the manuscript, to ensure blind review.
4. The second page should contain the title of the paper, an abstract of no more than 125 words, and 3 to 5 key words listed below the abstract. Key words should express the precise content of the manuscript, as they are used for indexing purposes.
5. All articles must contain a comprehensive literature review. For example, a manuscript describing EMDR treatment of a certain disorder would summarize the literature about the nature of that disorder, review research studies that investigated outcomes of other treatments, as well as studies that evaluated EMDR treatment of that disorder.
6. Articles that recommend a clinical approach that differs from EMDR's standard protocol or its foundational Adaptive Information Processing model (Shapiro, 2001) should explain these differences.
7. In order to promote critical thinking and an unbiased approach for the dissemination of ideas, recent advances, and current research, all articles must take an objective, scientific stance.
8. It is recommended that Case Studies comply with the following format: (1) Literature review, (2) Introduction of the case, (3) Presenting problems, (4) Client history, (5) Assessment, (6) Case conceptualization, (7) Course of treatment, including assessment of progress and outcome, (8) Discussion of treatment implications, (9) Recommendations, and (10) References.
9. Photos and line art figures should be sent as tiff (300 ppi) or eps files.
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