In this edition of our Clinical Newsletter, we focus on recent research on the neurobiological correlates of EMDR therapy, with the hopes of increasing understanding of the effects of eye movements on the physiological substrate of PTSD.

As the EMDR Research Foundation Board of Directors works to create more research opportunities for our community, we hope you join the conversation with your suggestions for upcoming newsletters.

Eye-Movement Intervention Enhances Extinction via Amygdala Deactivation

Improving extinction learning is essential to optimize psychotherapy for persistent fear-related disorders. In two independent studies (both n=24), we found that goal-directed eye
movements activate a dorsal frontoparietal network and transiently deactivate the amygdala ([graphic1]=.17). Connectivity analyses revealed that this down-regulation potentially engages a ventromedial prefrontal pathway known to be involved in cognitive regulation of emotion. Critically, when eye movements followed memory reactivation during extinction learning, it reduced spontaneous fear recovery 24 hours later ([graphic2]=.21). Stronger amygdala deactivation furthermore predicted a stronger reduction in subsequent fear recovery after reinstatement (r=.39). In conclusion, we show that extinction learning can be improved with a non-invasive eye-movement intervention that triggers a transient suppression of the amygdala. Our finding that another task which taxes working memory leads to a similar amygdala suppression furthermore indicates that this effect is likely not specific to eye movements, which is in line with a large body of behavioral studies. This study contributes to the understanding of a widely used treatment for traumatic symptoms by providing a parsimonious account for how working memory tasks and goal-directed eye movements can enhance extinction-based psychotherapy, namely through neural circuits (e.g., amygdala deactivation) similar to those that support cognitive control of emotion. Learn more.

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**How Does Eye Movement Desensitization and Reprocessing Therapy Work? A Systematic Review on Suggested Mechanisms of Action**

**Background:** Eye movement desensitization and reprocessing [EMDR] is an innovative, evidence-based and effective psychotherapy for post-traumatic stress disorder [PTSD]. As with other psychotherapies, the effectiveness of EMDR contrasts with a limited knowledge of its underlying mechanism of action. In its relatively short life as a therapeutic option, EMDR has not been without controversy, in particular regarding the role of the bilateral stimulation as an active component of the therapy. The high prevalence of EMDR in clinical practice and the dramatic increase in EMDR research in recent years, with more than 26 randomized controlled trials published to date, highlight the need for a better understanding of its mechanism of action.

**Methods:** We conducted a thorough systematic search of studies published until January 2018, using PubMed, ScienceDirect, Web of Knowledge and Scopus databases that
examined the mechanism of action of EMDR or provided conclusions within the framework of current theoretical models of EMDR functioning.

**Results:** Eighty-seven studies were selected for review and classified into three overarching models; (i) psychological models (ii) psychophysiological models and (iii) neurobiological models. The evidence available from each study was analyzed and discussed. Results demonstrated a reasonable empirical support for the working memory hypothesis and for the physiological changes associated with successful EMDR therapy. Recently, more sophisticated structural and functional neuroimaging studies using high resolution structural and temporal techniques are starting to provide preliminary evidence into the neuronal correlates before, during and after EMDR therapy.

**Discussion:** Despite the increasing number of studies that published in recent years, the research into the mechanisms underlying EMDR therapy is still in its infancy. Studies in well-defined clinical and non-clinical populations, larger sample sizes and tighter methodological control are further needed in order to establish firm conclusions.

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**Psychotherapeutic Treatment and HPA Axis Regulation in Posttraumatic Stress Disorder: A Systemic Review and Meta-Analysis**

Posttraumatic stress disorder (PTSD) has been associated with dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis. Research over the past years has investigated potential changes of these alterations in the context of psychotherapy. Yet, no systematic review has been conducted. To summarize the current state of research on psychotherapy and HPA hormones, namely cortisol, dehydroepiandrosterone and its sulfate form (DHEA(S)), we searched for studies investigating predictions or changes in hormones over treatment course within the databases PubMed, Scopus, Medline, PsychINFO, Pilots/ProQuest, and Web of Science, and in the grey literature up to May 2018. Controlled and uncontrolled trials investigating adult samples with a clinical status of PTSD were eligible for inclusion. Twelve studies (428 participants) were included. Study quality was overall sufficient. Hormone assessment designs differed considerably. Treatment efficacy on PTSD symptom reduction was mostly high, but predictions of pre-treatment hormone
concentrations on treatment efficacy were largely non-significant. Changes from pre- to post-test in basal cortisol ($g = -0.07$, 95% CI = -0.36; 0.21) and in the cortisol awakening response ($g = -0.07$, 95% CI = -0.48; 0.35) were also non-significant. Future studies require comparable designs and need to be sufficiently powered to be able to detect potential associations with HPA regulation. Learn more.

Neural Circuits Underlying a Psychotherapeutic Regimen for Fear Disorders

A psychotherapeutic regimen that uses alternating bilateral sensory stimulation (ABS) has been used to treat post-traumatic stress disorder. However, the neural basis that underlies the long lasting effect of this treatment—described as eye movement desensitization and reprocessing—has not been identified. Here we describe a neuronal pathway driven by the superior colliculus (SC) that mediates persistent attenuation of fear. We successfully induced a lasting reduction in fear in mice by pairing visual ABS with conditioned stimuli during fear extinction. Among the types of visual stimulation tested, ABS provided the strongest fear-reducing effect and yielded sustained increases in the activities of the SC and mediodorsal thalamus (MD). Optogenetic manipulation revealed that the SC–MD circuit was necessary and sufficient to prevent the return of fear. ABS suppressed the activity of fear-encoding cells and stabilized inhibitory neurotransmission in the basolateral amygdala through a feed forward inhibitory circuit from the MD. Together, these results reveal the neural circuit that underlies an effective strategy for sustainably attenuating traumatic memories. Learn more.
Announcing a $50,000 Grant Award

In honor of the legacy of Dr. Francine Shapiro, the EMDR Research Foundation is pleased to announce a $50,000 grant to be awarded and funded by the Francine Shapiro Memorial Fund. It was her dedication to research that inspired and motivated us to form the EMDR Research Foundation. Her mantra was Research, Research, Research! She would often say to clinicians making a verbal report of success, “Will you write that up? That needs to be published!” Whatever is claimed in your clinical practice, must be validated in research. We hope to be able to carry that legacy forward in our work together. Learn more.

Grants & Awards

Our next grant application deadline is February 1, 2020 and can be submitted through our website.

RESEARCH AWARD GRANTS
Researchers, if you are interested in doing research that addresses EMDR topics related to the military and you need additional funding, consider applying for a $25,000 research award through the EMDR Research Foundation.

RESEARCH CONSULTATION AWARDS
Up to $1,000 may be available to facilitate access to required expertise that would advance the development of an EMDR Therapy research project, to support the completion of an EMDR Therapy research project underway, or the writing of an article on EMDR Therapy for publication in a professional journal. Applications for these awards are accepted at any time during the year. Learn more.
Revised Fidelity Rating Scale

NEW for Clinicians, Consultants, and Researchers! The EMDR Fidelity Rating Scale (EFRS) has been significantly revised since it was originally published, making it more precise and user-friendly.

Learn more.

New ISTSS Prevention and Treatment Guidelines

The new International Society for Traumatic Stress Studies' (ISTSS) guidelines on the prevention and treatment of post-traumatic stress disorder (PTSD), and position papers on complex PTSD, have recently been published. An international committee of experts was established in 2015 to update guidelines published in 2009 by reviewing the latest evidence from clinical research trials. The guidelines and position papers are intended to assist clinicians providing prevention and treatment interventions for children, adolescents and adults with, or at risk of, developing PTSD and Complex PTSD. Professor Julian Ford, ISTSS President, said, "The excellent work of the ISTSS Treatment Guidelines Committee will make a real difference to people affected by traumatic events" The new guidelines and position papers are available to download from the ISTSS website.

Learn more.

Create a Fundraising Page

You have the opportunity to create a fundraising page in which your network can easily donate to the EMDR Research Foundation in honor of a family member, friend, colleague, yourself, or through a special event or occasion like a wedding, graduation, or running in a 5K race!

Learn more.
See Our Updated Toolkit

Whether humanity inflicting harm on itself or due to natural disasters, left untreated, traumatic life experiences can lead to more harm. The EMDR Research Foundation has created the EMDR Early Intervention (EEI) Toolkit as a research to clinicians and researchers in times of need.

Learn more.