

The Effectiveness of Eye Movement Desensitization and Reprocessing in the Treatment of Traumatized Children and Youth

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This article provides a summary of all the studies that have investigated eye movement desensitization and reprocessing (EMDR) treatment of traumatized children and adolescents. The effectiveness of the treatment is revealed in more than 15 studies. This article considers the differences between Type I and Type II traumas and specifically examines the effects of EMDR on traumatic stress experienced by children and youth following Type I and Type II traumas. There is a considerable body of research evaluating EMDR treatment of Type I traumas, showing strong evidence for its efficacy, but there are few studies that have specifically investigated EMDR treatment of Type II traumas. The effect of EMDR on various symptoms and problem areas is also examined. Recommendations are made for the clinical application of EMDR and for further research.

Keywords: children; trauma; post-traumatic stress disorder (PTSD); treatment; review; eye movement desensitization and reprocessing (EMDR)

Every day around the world, children and youth are exposed to various kinds of traumatic experiences. These can range from the horrors of war and the devastation of natural disasters to more personal traumas such as serious accidents, losses, violence, and sexual assault. Children, like adults, respond in various ways to these disturbing events. Although many show resilience and recover quickly, some experience disabling symptoms and others develop diagnosable disorders such as post-traumatic stress disorder (PTSD).

PTSD is an anxiety disorder that may be diagnosed in both adults and children following a traumatic event despite differences in symptomatology (American Psychiatric Association [APA], 2000). A diagnosis of PTSD requires that the child first experience a traumatic event involving actual or threatened death, serious injury, or threat to oneself or others. In response to this event, fear, horror, hopelessness, agitation, or disorganized behavior must be displayed, and other symptoms must also persist for at least 1 month and must significantly impair the child's functioning. These symptoms fall into three clusters: reexperiencing, avoidance and numbing, and hyperarousal. For children, reexperiencing may include nightmares, distress in response to cues that resemble or represent the event, and repetitive play or reenactments. Avoidance may be expressed not only

toward aspects of the trauma, but also as a general numbing with diminished interest in activities, decreased range of affect, and a sense of foreshortened future. Symptoms of increased arousal may involve an exaggerated startle response, difficulty sleeping and concentrating, irritability, and hypervigilance for threat. The expression of these symptoms may vary over time, and transformations have been observed from one childhood developmental stage to the next (Kerig, Fedorowicz, Brown, & Warren, 2000).

Although some children's symptom presentation may be insufficient for a diagnosis of PTSD, they can still be very impaired by the disturbing memory of their trauma and related symptoms. For example, after a car accident, one child may experience overwhelming nightmares, whereas another child may be too terrified to ride in a car. Children whose traumas occur within interpersonal relationships may develop the associated symptoms of PTSD (APA, 2000). These included difficulties with trust, affect regulation, somatic problems, impulse control, and identity. Further, children who have been abused often develop additional symptoms related to self-efficacy and sexuality (Pelcovitz et al., 1997; Van der Kolk, 2002; Wolfe, Gentile, Michienzi, Sas, & Wolfe, 1991).

Terr (1991) identified two different types of trauma. Type I refers to unique, unexpected events, or single-incident traumas such as car accidents or natural

disasters. Type II traumas are anticipated enduring experiences such as sexual abuse or war. Wenar and Kerig (2006) stated that Type II traumas can put the individual at a higher risk for PTSD, as well as producing more severe, chronic symptoms caused by repeated exposure. Other factors also influence the severity of symptoms, for example, events that involve human design and aggression and those that are directly experienced by the individual, as opposed to being witnessed, also tend to have a more negative outcome (Wenar & Kerig, 2006).

Although it appears that sexual abuse puts individuals at a higher risk for developing PTSD (Wenar & Kerig, 2006), some (e.g., Adler-Nevo & Manassis, 2005) have argued that child abuse, particularly of a sexual nature, can be differentiated from other types of trauma and thus the response differs from the traditional PTSD criteria that are specified in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; APA, 2000). For example, attachment disorders and severe personality changes can be a greater issue (Terr, 1991), thus impacting on the required treatment.

Treatment of Traumatized Children and Youth

Cognitive Behavioral Therapy

Several international guidelines including those by the United Kingdom National Institute for Clinical Excellence (NICE; National Collaborating Centre for Mental Health, 2005), recommend the use of cognitive behavioral therapy (CBT) for the treatment of traumatized children. CBT utilizes a range of techniques such as psychoeducation, behavior modification, cognitive therapy, exposure therapy, and stress management to help the child change maladaptive beliefs, thoughts, and behavior. There is a large evidence base to suggest that CBT is effective in both individual- and group-based formats with a range of traumas including both Type I (e.g., natural disasters) and Type II traumas (e.g., sexual abuse), and its use is therefore recommended (Giannopoulou, Dikaiakou, & Yule, 2006; King et al., 2000). A meta-analysis by Wethington et al. (2008) compared individual- and group-based CBT to play, art, psychodynamic, and pharmacological therapies. They showed that, among children and adolescents exposed to various traumas, both types of CBT were most successful in reducing psychological harm including symptoms of PTSD, depression, anxiety, and suicidal behavior. A meta-analysis

by Sánchez-Meca, Rosa-Alcázar, and López-Soler (2011) analyzed studies investigating treatment of sexually abused children and adolescents. They found that CBT, particularly when combined with other treatments such as supportive therapy or play therapy, achieved the greatest improvements in psychological well-being and was therefore efficacious in this application.

Pharmacological Treatment

The NICE guidelines (National Collaborating Centre for Mental Health, 2005) do not recommend the use of pharmacological interventions with children and adolescents. It is possible, however, that when young individuals are suffering with comorbid disorders, pharmacological treatment may provide a positive addition to a multiple modality treatment package. A review by Donnelly (2003) recommends selective serotonin reuptake inhibitors (SSRIs) because they have been shown to improve social and occupational functioning as well as symptoms of PTSD, anxiety, and depression (Donnelly, Amaya-Jackson, & March, 1999; Seedat, Lockhat, Kaminer, Zungu-Dirwayi, & Stein, 2001). It is also proposed that particularly problematic symptoms or disorders such as attention deficit and hyperactivity disorder (ADHD) can be targeted with specific agents (Donnelly, 2003).

Eye Movement Desensitization and Reprocessing

Eye Movement Desensitization and Reprocessing (EMDR) is also recommended for the treatment of PTSD in both adults and children by NICE (National Collaborating Centre for Mental Health, 2005) and by numerous other international guidelines such as the Cochrane Review (Bisson & Andrew, 2007), the U.S. Substance Abuse and Mental Health Services Administration (2011), the U.S. Department of Veterans Affairs and Department of Defense (2010), and the APA (2004). Research has indicated that it is more effective for adults than care as usual, no treatment, and wait-list control groups (Davidson & Parker, 2001; Lee, Gavriel, Drummond, Richards, & Greenwald, 2002; Marcus, Marquis, & Sakai, 1997) and equivalent (Bisson, et al., 2007; Foa, Keane, & Friedman, 2000; Van Etten & Taylor, 1998). Some researchers have viewed it as more effective than exposure-based CBT, both in vivo and imaginal, in improving the symptoms of PTSD particularly because of its rapid effects, low drop-out rates, and lower ratings of

distress following treatment (e.g., Ironson, Freund, Strauss, & Williams, 2002).

Description of Eye Movement Desensitization and Reprocessing

EMDR is a therapy that was developed for the treatment of traumatic memories in both adults and children (Shapiro, 2001). It is a standardized procedure, consisting of eight phases, progressing from history and treatment planning to a reevaluation of the improvements made at the beginning of the subsequent session. Once a full assessment has been carried out and the client has been taught relaxation, guided imagery, and eye movement techniques, target memories for reprocessing are identified in the form of a representative image, an associated negative cognition, and a desired positive cognition, although with children, there may be less focus on cognitions and emotions and more on imagery and sensations (Shapiro, 1989b; Smith & Yule, 1999). Where used, the positive and negative cognitions are assessed on the Validity of Cognition (VOC) scale (Shapiro, 1989a) and the Subjective Units of Disturbance (SUD) scale (Wolpe, 1982; where 0 is no disturbance and 10 is worst possible disturbance). These are rated numerically for adults and older children but can be indicated using the spread of a young child's hands or by drawing lines or shapes of different sizes.

During the dual attention treatment stages, the negative cognition is brought to mind together with the image, and the client is then told to track the therapist's fingers, which are moved repeatedly across the patient's line of vision (Shapiro, 1989b). The speed of the eye movements is gradually increased until it is as fast as is comfortable for the client to maintain accurate tracking. During this process, the patient is told to report any information that they become aware of, and once tracking is finished, they are told to "let it go" or "blank it out" (Smith & Yule, 1999, p. 269). This process is repeated until no further change takes place, SUD ratings are at 0 or 1, and when the original target memory is brought to mind, no further associations require processing. At this point, the positive cognition may be installed by simultaneously thinking of the event and the cognition during the completion of a further set of eye movements. For children it is more common to install a positive image, particularly when working with nightmare sufferers, which may show them or a powerful figure, such as a superhero, overcoming the object of their fear (Cocco & Sharpe, 1993). This is repeated until the VOC is reported as 7. A final set of eye movements are then carried out to

target any residual tension that is noticed when the installed positive cognition and traumatic memory are attended to, known as a body scan (Smith & Yule, 1999). Lastly, relaxation or guided imagery techniques may be used to end the session. The number of sessions required varies depending on the type of traumatic event and the severity of the psychopathology (Rodenburg, Benjamin, de Roos, Meijer, & Stams, 2009).

A variant of EMDR, the EMDR-Integrated Group Treatment Protocol (EMDR-IGTP; Jarero, Artigas, & Hartung, 2006), was developed to provide rapid treatment to groups of people who have experienced a single-incident traumatic event such as a natural disaster or a large-scale terrorist attack. The EMDR-IGTP has been implemented successfully with all age ranges in a variety of disaster settings affecting children, demonstrating the efficacy of EMDR in group situations (Jarero, Artigas, Montero, & Lena, 2008). The EMDR group protocol and its successful treatment of recent trauma is beyond the scope of this article.

Research Investigating EMDR Treatment of Traumatized Children and Youth

Research investigating EMDR treatment of traumatized children and youth has evaluated the application using various research designs ranging from randomized clinical trials to single case designs. Although randomized clinical trials control for more variables than case series, case studies can provide a valuable contribution to the literature as well as being easier to conduct in field settings. This design assumes that any progress made while undergoing treatment is caused by the procedure itself and not merely a result of time. Support for this design comes from findings that chronic PTSD may not remit without appropriate treatment. For example, when Morgan, Scourfield, Williams, Jasper, and Lewis (2003) conducted a 33-year follow-up with the survivors of the Aberfan disaster in Wales, in which a coal mine landslide buried a primary school and killed 116 children, they found that approximately 29% of the survivors still suffered from PTSD. Similarly, Chemtob, Nakashima, and Carlson (2002) found that many traumatized children still presented with PTSD diagnoses 3.5 years after Hurricane Iniki. Fernandez (2007) has argued that childhood PTSD appears to persist in the absence of therapy.

A meta-analysis of seven studies by Rodenburg et al. (2009), including 109 children treated with between three and eight sessions of EMDR and 100 control-group children, all between the ages of 4 and 18, found a medium effect size for EMDR, indicating that

it is an effective treatment for traumatized children. They also found that it added a small but significant incremental value when compared to the results of children treated with other established treatments including CBT. The authors therefore concluded that it should be the treatment of choice, and recommended further research, particularly into its working mechanisms. Rodenberg et al. (2009) identified several factors, which were associated with lower effect sizes, including the use of child-report measures rather than parent-report or combined child-parent reports; a high rate of treatment completers, perhaps because these studies also include the less successfully treated children; and a higher percentage of girls, perhaps because they are more at risk for developing PTSD symptoms following traumatic events and are less able to cope with these reactions.

The populations treated in EMDR research have ranged from children and youth showing only symptomatic distress to those diagnosed with PTSD. The types of trauma have varied greatly including sexual abuse and natural disasters. In the following summary, studies are organized according to the type of trauma.

EMDR Treatment of Type I (Single Incident) Traumas

Kemp, Drummond, and McDermott (2010) investigated the treatment of subclinical PTSD in a randomized clinical trial with Australian children, aged 6–12 years, who had been traumatized in motor vehicle accidents. Twenty-seven children were randomly assigned to four sessions of EMDR or to a 6-week wait-list control condition. Inclusion criteria were a minimum of two diagnosed PTSD diagnostic criteria (e.g., reexperiencing and hyperarousal criteria) and a moderate score on a self-report measure of traumatic stress. It was found that EMDR produced significant improvement on trauma measures compared to the wait-list, and that following EMDR treatment, only 25% of children met two or more PTSD criteria compared to 100% of the wait-list control group. These gains were maintained at 3- and 12-month follow-up. Although parent ratings of symptoms showed no improvement, it was noted that these symptoms were not at a high level at pretreatment.

Ribchester, Yule, and Duncan (2010) conducted a case series to evaluate EMDR treatment of 11 children aged 8–15 years with diagnosed PTSD following road traffic accidents in England. Children received one to four sessions of EMDR (mean 5.24 sessions). A multimodal measurement approach was used with

self-report measures, parent-report measures, standard clinical interviews with parents and children, and computer testing of attentional, memory, and attributional processes associated with PTSD. Prior to EMDR treatment, all 11 children were diagnosed with PTSD, 1 child was also diagnosed with major depressive disorder, and 7 were also diagnosed with generalized anxiety disorder. At posttreatment, none of the children met diagnostic criteria for any of these disorders except for one case of generalized anxiety disorder. Significant improvements were found on all self-report and parent-report measures of PTSD, anxiety, and depression both immediately following treatment and at long-term follow-up. Improvement was also reported in the clinical interviews, and treatment was found to be associated with a significant trauma-specific reduction in attentional bias on the modified Stroop task. Ribchester et al. (2010) conclude that “EMDR is an effective and rapid treatment of single-incident PTSD in children” (p. 145).

Case studies, such as that documented by Cocco and Sharpe (1993), have reported improvements in PTSD symptoms following Type I trauma through the use of EMDR. They treated a 4-year-old boy who had developed PTSD following an armed robbery in his family home in which he and his parents were threatened and physically abused. An age appropriate adaptation of the standard EMDR protocol was used in which drawings replaced imaginal exposure and auditory finger clicks replaced visual tracking. The young boy became asymptomatic after one session of treatment, and these improvements were sustained at a 6-month follow-up. It was noted, however, that although the young boy no longer displayed symptoms of PTSD, behavioral issues, such as sleeping in his parents' bed and not wanting to go to the bathroom alone at night, resurfaced and required further treatment. Similar results were shown in a case series by Greenwald (1994) in which five children aged between 4 and 11 years were treated with either one or two 20–90 minute sessions of EMDR. The children were all presenting with symptoms of PTSD following Hurricane Andrew in Florida. Self-report and parent-report measures were used to monitor progress, although self-report measures were not taken at follow-up and were primarily used to indicate to the therapist the completion of a particular treatment focus. Parent-report measures were taken at pretreatment for prehurricane, posthurricane and pretreatment ratings, and again at 1- and 4-week follow-up. All the children had made improvements at 1-week follow-up and either maintained these gains after 4 weeks or continued to improve. All subjects had returned to their prehurricane levels on

all symptoms to within at least one rating unit and two subjects made improvements in some areas.

Also following a natural disaster, an example of a single-incident Type I trauma, Chemtob et al. (2002) conducted a randomized controlled trial to compare a wait-list control group to an EMDR treatment group. The sample consisted of 32 children aged 6–12 years in Hawaii who had been unresponsive to previous interventions and still met diagnostic criteria for PTSD following Hurricane Iniki 3 years previously. Three treatment sessions resulted in significantly reduced symptoms of depression, anxiety, and PTSD at post-treatment and 6-month follow-up.

A field study by Fernandez (2007) provided an average of 6.5 individual EMDR sessions over a 1 year period to 22 children aged 7–11 years who were buried alive when their school collapsed in an earthquake in Molise, Italy, killing many of their fellow students. Treatment resulted in a decrease, over the year, in the number of children meeting DSM-IV criteria for PTSD from 61% at pretreatment to 9% at posttreatment, with significant decreases in all clusters of PTSD symptoms.

A randomized control trial by de Roos et al. (2011) compared EMDR and CBT among 52 children aged between 4 and 18 years who had all been exposed to a Type I trauma when a fireworks factory exploded. The parents received up to four parental guidance sessions, and the children received up to four 60-minute sessions of their assigned treatment. PTSD symptoms, depression, anxiety, and behavior problems were all assessed at pretreatment, posttreatment, and 3-month follow-up using parent-report measures as well as self-report measures for those aged over 7 years. Both treatments lead to an improvement on all measures, and these were maintained at follow-up. It was also found that EMDR produced these improvements in significantly fewer sessions, and it was therefore concluded that although both interventions can significantly improve the functioning of children exposed to Type I traumas, EMDR appeared to be more efficient in achieving these developments.

Hensel (2009) recently showed that, following EMDR treatment, the improvements among 36 children and adolescents aged 1–18 years, all of whom had suffered a Type I trauma, not only remain stable at 6-month follow-up, but may even increase slightly. His study was also the first to recruit a sample of children younger than 4 years old, and he successfully demonstrated that children as young as 1 year and 9 months can be treated with EMDR with the same benefits as older school-age children.

EMDR Treatment of Type II Traumas

A randomized controlled trial by Jaberghaderi, Greenwald, Rubin, Zand, and Dolatabadi (2004) assessed self-reported symptoms of trauma, including but not limited to those required for a diagnosis of PTSD, and problem behaviors among a group of 14 sexually abused Iranian girls aged 12–13 years. They were randomly assigned to receive up to 12 sessions of either EMDR or CBT, with a minimum of 10 sessions of CBT and no minimum for EMDR. Measures included self-report, parent-report, and teacher-report, all of which were conducted at pretreatment and 2 weeks posttreatment. Both treatments were found to significantly improve both traumatic symptom and behavior outcomes with a large effect size for EMDR and a medium effect size for CBT. Although there was a trend for EMDR to improve self-reported traumatic symptoms more than CBT, this difference was nonsignificant. EMDR was found to be significantly more efficient, and although three participants in the CBT group had to be referred for further treatment, none from the EMDR group were.

War is another common Type II trauma that affects many children worldwide. Wadaa, Zaharim, and Alqashan (2010) evaluated EMDR for children following their immigration to Malaysia to escape the recent war in Iraq. Twelve children (aged 7–12 years) were assigned to 12 sessions of EMDR, and 25 children were assigned to a no-treatment control group. Self-report measures translated into Arabic were used to determine that at pretreatment, 68.5% of the children were suffering from symptoms of PTSD. At pretreatment, there was no difference between the groups in mean scores of PTSD symptoms, but at posttreatment, the scores for the EMDR group had decreased significantly.

Studies Evaluating EMDR Treatment of Children With Various Traumas

In Sweden, Ahmad, Larsson, and Sundelin-Wahlsten (2007) conducted a randomized controlled trial with 33 children and adolescents aged 6–16 years, all of whom met DSM-IV criteria for a diagnosis of PTSD after experiencing a range of Type I and Type II traumas such as sexual abuse and maltreatment, road accidents, and witnessing unnatural death. Compared to a wait-list control group, the participants who received EMDR reported greater PTSD symptom improvements, particularly those from the re-experiencing cluster, 2 months after receiving between one and eight sessions of EMDR (average 5.9). Ahmad

and Sundelin-Wahlsten (2008) commented that the children with Type I trauma following an accident required fewer treatment sessions than the other participants.

Scheck, Schaeffer, and Gillette (1998) assigned 60 traumatized adolescents and young females between the ages of 16 and 25 years to an EMDR group and an active listening control group, all of whom were also asked to keep a journal as a homework task. The women had been engaging in high-risk behavior such as substance abuse, sexual promiscuity, and runaway behavior, and 77% had a diagnosis of PTSD. They demonstrated that the young women had a greater reduction in standardized self-report measures of PTSD symptoms, depression, and anxiety, but not self-concept, following two 90-minute sessions of EMDR compared to active listening, also known as supportive counselling. Treatment gains were maintained at 3-month follow-up for both groups.

Discussion

Efficacy of EMDR for Different Types of Trauma

Clearly, not all traumatic events are the same and diverse responses can be observed. Adler-Nevo and Manassis (2005) suggested in their review that it is therefore possible that different treatments are most effective for different types of trauma and different combinations of symptoms.

Treatment of Type I Traumas. A number of studies have investigated the effect of EMDR on children following Type I traumas such as natural disaster (Chemtob et al., 2002; Fernandez, 2007; Greenwald, 1994), burglary (Cocco & Sharpe, 1993), and road traffic accidents (Kemp et al., 2010; Ribchester et al., 2010). These have shown that symptoms of PTSD, depression, anxiety, and behavior problems can be reduced to pretrauma levels following EMDR and that these improvements are maintained at follow-up. A comparison of EMDR and CBT by de Roos et al. (2011) found that although both treatments successfully reduced symptoms of trauma, EMDR did this in fewer sessions and the authors therefore concluded that EMDR is more efficient.

Treatment of Type II Traumas. Although the treatment of Type II traumas, particularly interpersonal violence, has been heavily researched in studies investigating CBT therapy (Sánchez-Meca et al., 2011), there has been only one EMDR controlled study that has focused on this trauma type with children (Jaberghaderi et al., 2004). This lack of EMDR research

is surprising given that Type II traumas are related to an increased risk for PTSD as well as many other life-long consequences (Wenar & Kerig, 2006). This lack of child research appears to parallel a lack of EMDR research investigating treatment of adults with complex PTSD from childhood interpersonal traumas (Korn, 2009).

The majority of CBT research with victims of sexual abuse has been shown to be effective in reducing the symptoms of PTSD in victimized children as well as symptoms of depression, behavior problems, and trauma-related shame and guilt (Cohen, Deblinger, Mannarino, & Steer, 2004; King et al., 2000). In a comparison of EMDR and CBT for sexual abuse victims, Jaberghaderi et al. (2004) found that both were effective in reducing measures of PTSD symptoms and that EMDR was more efficient and appeared to cause a greater reduction in symptoms than CBT, although this difference was nonsignificant.

Attachment disorders and severe personality changes can follow Type II traumas (Terr, 1991), thus impacting on the required treatment. In such cases, family therapy can be of great benefit and has been shown to be particularly advantageous in cases of domestic violence and abuse (Amaya-Jackson, 1995). The integration of EMDR with family therapy can address the complex sequelae that follow sexual abuse (Maxfield, 2007), and other interpersonal stressors such as divorce (Klaff, 2007). De Roos et al. (2011) offered parental counselling to the parents of all the children involved in their study. This enabled the parents to resolve their own anxieties and cognitive distortions regarding their child's traumatic exposure and provided them with psychoeducation and parental skill training that would help them support their child and correct maladaptive coping behaviors. Further research is needed to investigate the effects of an integrative approach such as this.

Efficacy of EMDR for Children of Various Ages

Young children are less able to retrieve traumatic memories and also have difficulties inhibiting their thoughts and emotions (Yule, Perrin, & Smith, 1999), thus resulting in fewer re-experiencing and avoidance symptoms. Although various authors have suggested that EMDR can be modified for younger children (Adler-Tapia & Settle, 2009; Ahmad & Sundelin-Wahlsten, 2008; Cocco & Sharpe, 1993; Tufnell, 2005), there has only been one study that directly investigated this factor. Hensel (2009) showed that children as young as 1 year and 9 months received the same benefits as older school-age children.

Efficacy of EMDR for Different PTSD Symptoms

Post-Traumatic Stress Disorder Symptoms Reexperiencing Symptoms. Adler-Tapia and Settle's (2009) review documented that although randomized controlled trials have shown EMDR to be effective, in some cases more so than CBT, this seems to be limited to intrusive reexperiencing symptoms, with less improvement found for hyperarousal and avoidance symptoms. This may be because the EMDR procedure focuses on images, memories, emotions, and cognitions that intrusively enter one's mind and then target these for reprocessing. Children also often display fewer reexperiencing symptoms, which may contribute to the comparative success in this symptom cluster. Ahmad et al. (2007) found that, over time, the most significant between-group difference was the improvement in reexperiencing symptoms. This result was also mirrored in the Oras, de Ezpeleta, and Ahmad (2004) study.

Hyperarousal Symptoms. Two studies (Ahmad et al., 2007; Oras et al., 2004) have found that participants showed less improvement in hyperarousal symptoms compared to reexperiencing symptoms. Adler-Tapia and Settle (2009) suggested that the instability in the children's living environment may account for the lack of improvement found for hyperarousal symptoms. The children in the Oras et al. (2004) study were unsettled refugees, and in the Ahmad et al. (2007) study, the children had been exposed to an unusual and stressful social environment, having grown up among "criminality, substance abuse, chronic illness, handicap, or having the caregiver physically or mentally unavailable" (p. 350). Ahmad et al. (2007), however, suggested that this effect may be caused by the overlap of symptoms of possible comorbid disorders and hyperarousal symptoms because 26 of the 33 children they investigated had a second diagnosis.

Avoidance Symptoms. Tufnell and De Jong (2008) advised that EMDR is particularly effective with avoidant children as it relies less on verbal proficiency and a willingness to communicate orally with the clinician than CBT. One may therefore expect to see large improvements in avoidance symptoms, but this is contradicted by Oras et al. (2004), who found that, although significant, it was these symptoms that improved least following treatment. They note, however, that once the living situation of the refugees they investigated had stabilized, these symptoms improved, thus supporting Adler-Tapia and Settle's (2009) idea that the child's environment influences the resolution of PTSD symptoms.

Other Symptoms

Maladaptive Cognitions. Event appraisal and maladaptive cognitions associated with interpersonal trauma about oneself and loved ones are directly targeted in EMDR. Studies have used the SUD scale and the VOC scale to assess the amount of distress felt regarding a negative cognition and to what extent a positive cognition is believed to be true respectively. Eye movements are continued until SUD ratings are 0 and VOC ratings are 7, indicating that the memory associated with the cognitions has been successfully reprocessed. A 9-year-old boy described by Greenwald (1994) believed that the accidental death of a classmate was his fault and that he was next to die. Following two sessions of EMDR, he no longer felt guilty about the incident and reversed these statements.

Ribchester et al. (2010) criticized the use of verbal report measures such as the SUD and VOC scales because they are liable to demand characteristics and procedural limitations. They therefore adopted a multimodal approach to investigate attentional and memory biases using computer tasks for 11 children aged between 8 and 15 years with PTSD following road traffic accidents. Unlike previous research, the inclusion of these cognitive measures allowed the investigation of the cognitive change that is alleged to occur as a result of adaptive processing. Using the modified Stroop task, Ribchester et al. (2010) found that, at pretreatment, children took significantly longer to color-name PTSD words compared to neutral words, whereas at posttreatment, PTSD words were named significantly faster and interference of these words was significantly reduced. Neutral words, however, remained unchanged. It appears that EMDR caused a trauma-specific decrease in attentional bias, therefore suggesting that EMDR is effective in causing cognitive change in children.

Interpersonal Difficulties. Improving relationships and emotion regulation are also key factors that can be damaged by trauma but which are targeted for improvement with EMDR. A few studies have used interpersonal and social measures to assess outcome. For example, de Roos et al. (2011) and Kemp et al. (2010) both used "The Child Behavior Checklist" (Achenbach, 1991) to assess the improvement of behavior problems following EMDR. de Roos et al. (2011) found that scores were significantly reduced at 3-month follow-up, and the difference in scores between pretreatment and follow-up was greater for those treated with EMDR compared to CBT. Kemp et al. (2010) conversely found a nonsignificant effect of EMDR on scores from pretreatment to posttreatment

and 3-month follow-up. The authors point out, however, that pretreatment scores were notably low in this sample.

Greenwald's (1994) case series describes "improved concentration and school performance, more cooperative and responsible behavior, less emotional reactivity, and better sibling relationships" (p. 88) among other behavioral improvements determined using parental telephone interviews. These included no longer sleeping in the parents' bed, enhanced mood and communication skills with others, and better coping skills for personal difficulties and family conflicts. Cocco and Sharpe's (1993) case study also demonstrates that EMDR can help with behaviors that increase a child's independence such as sleeping alone and going to the toilet alone at night. It should be noted, however, that in this case, a relapse in these improvements occurred requiring further treatment.

Evaluation of Integration of EMDR With Other Treatment Modalities

There may be an advantage to integrating EMDR with other treatments, particularly when comorbid disorders or social issues also need to be targeted and may influence the treatment response. Early family experiences can often affect one's response to trauma and so it has been suggested that family therapy can be used alongside EMDR to target family relations (Shapiro, Kaslow, & Maxfield, 2007). It is therefore important that the therapist conduct a detailed assessment and get a full history in order to identify interpersonal factors that may be affecting the client's current pathology and therefore needs processing. For example, a mother's overprotectiveness may cause her child to feel hopeless and unable to cope, which in turn prevents him or her from developing adequate coping skills to deal with his or her most recent trauma. In this instance, it is not just the memories of the recent trauma that need to be processed, but also the memory of feeling hopeless. In such cases, EMDR may be used in conjunction with family therapy in order to target both internal processing and family understanding and interactions (Bardin, Comet, & Porten, 2007).

Bronner, Beer, Jozine van Zelm van Eldik, Grootenhuys, and Last (2009) showed that a combination of trauma-focused CBT and EMDR decreased stress reactions in a 16-year-old girl with acute stress disorder following spinal cord injury. These improvements remained stable, and she reported no more distressing flashbacks, memories, or difficulties sleeping. It may be that intermixing the EMDR and CBT

protocols may have had additional positive effects compared to each treatment given individually, but further research is needed to determine this.

Oras et al. (2004) found that incorporating the EMDR protocol into a psychodynamic approach by using talking therapy with adolescents and play therapy with those younger than 13 years old significantly reduced symptoms of depression and PTSD, particularly reexperiencing symptoms, among 13 refugee children aged between 8 and 16 years. All the children met DSM-IV criteria for a PTSD diagnosis following a range of Type I and Type II traumas, such as rape, assault, torture, imprisonment, and witnessing relatives being assaulted or killed, as well as the ongoing Type II trauma of war. Children received between 5 and 25 psychotherapeutic sessions and between one and six EMDR sessions. No follow-up was conducted in this case series.

Tufnell (2005) showed that, in four preadolescents, one of whom had suffered a recent Type I traumatic bereavement, with other complex difficulties as well as PTSD, using between just two and four sessions of EMDR as part of a multimodal treatment package can resolve PTSD symptoms and maintain this improvement at a 6-month follow-up. It was therefore concluded that EMDR is suitable for use with children and adolescents with comorbid mental health problems when used in conjunction with other treatments.

Should EMDR Be the Treatment of Choice for Children With PTSD?

EMDR has solid research support for the treatment of Type I traumas. It may be more efficient than CBT (de Roos et al., 2011; Jaberghaderi et al., 2004), and its application results in significant remission of symptoms with results maintained at long-term follow-up. It has only preliminary evidence for the treatment of Type II traumas, however, with just one study showing its effectiveness with sexually abused girls (Jaberghaderi et al., 2004). The results are promising, but more research is needed to assess EMDR's effects with children who have suffered repeated interpersonal traumas, and clinicians also need to be aware that in some cases, it may be beneficial to provide EMDR as part of a multimodal treatment package.

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