

Evidence of the Efficacy of EMDR With Children and Adolescents in Individual Psychotherapy: A Review of the Research Published in Peer-Reviewed Journals

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Research on psychotherapy with children is generally underrepresented in the empirical literature. Currently, there are four randomized clinical trials (RCT) evaluating EMDR in individual psychotherapy with traumatized children—two for children diagnosed with PTSD and two for children presenting with symptoms of posttraumatic stress. Since the first case studies of EMDR with children were published in 1993, 19 studies were identified that met the inclusion criteria for this review. The gold standards identified by Foa and Meadows (1997) to assess the methodology of studies designed to treat trauma were applied to the research on EMDR with children. This analysis discusses the challenges to conducting research on psychotherapy with children including the debate regarding the assessment and diagnosis of PTSD in children. Recommendations for future studies designed with methodological rigor are suggested to investigate the efficacy of EMDR with children who have experienced trauma and other mental health symptoms and diagnoses.

Keywords: children; adolescents; EMDR; review; trauma; efficacy

Research on psychotherapy with children is generally underrepresented in the empirical literature. This is especially true of studies assessing the efficacy of psychotherapy treatment for children and adolescents diagnosed with posttraumatic stress symptoms. Following the inclusion of the diagnosis of posttraumatic stress disorder (PTSD) in the *DSM-III* in 1980, new treatment protocols and assessment tools were created. Then randomized clinical trials were necessary to conduct efficacy studies of the treatment protocols specifically designed to treat PTSD not only for adult clients but also for children and adolescents. Since 1980, the majority of the randomized clinical trials (RCT) treating children with posttraumatic stress symptoms or PTSD have focused on the use of variations of cognitive behavioral therapy (CBT) including trauma-focused cognitive behavioral therapy (TFCBT) used to treat trauma in young children who have experienced sexual abuse. Of these seven RCTs (Cohen, Deblinger, Mannarino, & Steer,

2004; Cohen & Mannarino, 1996; Cohen, Mannarino, Perel, & Staron, 2007; Deblinger, Lippmann, & Steer, 1996; Deblinger, Mannarino, Cohen, & Steer, 2006; King et al., 2000; Smith et al., 2007), all focused on the use of some variation of CBT with children who had experienced sexual abuse. Currently, there are four RCTs of EMDR in individual psychotherapy with children—two of EMDR for children diagnosed with PTSD (Ahmad, Larsson, & Sundelin-Wahlsten, 2007; Chemtob, Nakashima, & Carlson, 2002) and two RCTs of EMDR for children presenting with symptoms of posttraumatic stress (de Roos, Greenwald, de Jongh, & Noorthorn, 2009; Jaberghaderi, Greenwald, Rubin, Dolatabadim, & Zand, 2004).

This article summarizes the history of EMDR with children and adolescents, hereafter referred to as children, and reviews the efficacy of EMDR with children presenting with various problems and disorders. The article then analyzes the methodological strengths of studies investigating EMDR with children by applying

the methodological gold standards proposed by Foa and Meadows (1997; see also Maxfield & Hyer, 2002). Recommendations for future research on EMDR in psychotherapy with children include a discussion of the pragmatic issues in the assessment, diagnosis, and treatment of children, as well as suggestions for improving the methodological rigor of future studies necessary to rigorously examine the efficacy of EMDR with children.

The History of Using EMDR in the Treatment of Children

Shapiro created eye movement desensitization and reprocessing (EMDR) as an integrative treatment for trauma in adults (Shapiro, 1989a, 1989b). Twenty years of research have documented the treatment efficacy of EMDR with adult clients with PTSD. However, the research on EMDR with children has been slower, even though Shapiro (personal communication, April 2009) included children in her original unpublished research and began presenting on the effectiveness of her work with them in 1989. This is consistent with findings in the larger field, showing that there are far fewer psychotherapy outcome studies investigating child treatment and that child research tends to lag behind that of adults (Herschell, McNeil, & McNeil, 2004). Subsequently, the first case studies of EMDR with children were published in 1993 (Cocco & Sharpe, 1993; Pellicer, 1993), at the same time as the publication of the first empirical studies on the treatment of PTSD with children (for review, see Cohen, 2008).

During the first 10 years following the inception of the EMDR protocol, seven studies were published on EMDR with children (Cocco & Sharpe, 1993; Greenwald, 1994; Muris, Merckelbach, Holdrinet, & Sijsenaar, 1998; Muris, Merckelbach, Van Haaften, & Mayer, 1997; Pellicer, 1993; Puffer, Greenwald, & Elrod, 1998; Scheck, Schaeffer, & Gillette, 1998). Even though these articles suggested protocols for using EMDR with children, it was not until 1999 that three books were published describing the use of EMDR with children (Greenwald, 1999; Lovett, 1999; Tinker & Wilson, 1999). A group protocol was also designed for treating groups of children subsequent to community disasters. (see Jarero & Artigas, this issue, for a summary of the protocol and related research).

During the second decade of EMDR, 13 studies of EMDR in individual psychotherapy with children and adolescents were presented in journal publications using single case designs, controlled studies,

comparative studies, and qualitative studies (Adler-Tapia & Settle, 2009; Ahmad et al., 2007; Chemtob, et al., 2002; de Roos & de Jongh, 2008; de Roos et al., 2009; Fernandez, 2007; Hensel, 2009; Jaberghaderi et al., 2004; Oras, Cancela De Ezpeleta, & Ahmad, 2004; Rubin et al., 2001; Soberman, Greenwald, & Rule, 2002; Tufnell, 2005; Wanders, Serra, & de Jongh, 2008). One additional book was published on the use of EMDR with children (Adler-Tapia & Settle, 2008).

Published studies have documented the application of the individual EMDR protocol to children presenting with symptoms of attention deficit hyperactivity disorder (ADHD) (Friday, 2003), PTSD (Ahmad et al., 2007; Chemtob et al., 2002; Cocco & Sharpe, 1993; Fernandez, 2007; Tufnell, 2005), self-esteem issues (Wanders et al., 2008), conduct disorders (Soberman et al., 2002), spider phobia (Muris et al., 1997; Muris et al., 1998), choking phobias (de Roos & de Jongh, 2008), child sexual abuse (Jaberghaderi et al., 2004), sexual deviancy (Hiraoka, 2006), suicidality (Högberg et al., 2008), nightmares (Pellicer, 1993), reactive attachment disorders (Taylor, 2002), dissociation (Eckley, 2002; Wieland, 2003), selective mutism (Weinberg & Dye, 2002), symptoms of depression (Adler-Tapia & Settle, 2009; de Roos et al., 2009; Oras et al., 2004), and traumatic stress from natural and manmade disasters including car accidents (Tufnell, 2005), Hurricane Iniki (Chemtob et al., 2002), Hurricane Andrew (Greenwald, 1994), fireworks explosion (de Roos et al., 2009), earthquake (Fernandez, 2007), and war (Oras et al., 2004).

A Review of the Articles on EMDR With Children in Peer-Reviewed Journals

To ensure that this review was comprehensive, a search for studies was conducted using PsycINFO and PILOTS databases, and by contacting identified researchers around the world in an attempt to identify any in press articles. Inclusion criteria are that the research must test the EMDR individual treatment protocol; the study must be published, in press, or accepted for review in a peer review journal as of July 15, 2009; and the sample must have at least 80% child/adolescent participants defined as participants between the ages of 0 and 18 years. The research design could be a single case design, clinical trial, or qualitative study. Nineteen published studies met these criteria (Adler-Tapia & Settle 2009; Ahmad et al., 2007; Chemtob et al., 2002; Cocco & Sharpe, 1993; de Roos & de Jongh, 2008; de Roos et al., 2009; Fernandez,

2007; Greenwald, 1994; Hensel, 2009; Jaberghaderi et al., 2004; Muris et al., 1997; Muris et al., 1998; Oras et al., 2004; Pellicer, 1993; Puffer et al., 1998; Rubin, et al., 2001; Soberman, et al., 2002; Tufnell, 2005; Wanders et al., 2008).

Participants

The studies in this review provided EMDR to a total of 391 children and adolescents. Child participants included in the studies ranged in age from 1 year and 9 months to 18 years. Children in the studies were from various ethnic and cultural groups from countries throughout the world.

Number of Sessions

Participants were provided a range of 1–25 sessions of EMDR. The reported length of each session ranged from .5 hours to 2.5-hour sessions. Of the 19 studies, 15 reported providing 6 or fewer sessions of EMDR (mean = 2.28 sessions), with 5 of these studies providing only one EMDR session. Although the Jaberghaderi et al. (2004) study reported up to 12 sessions for participants, a larger number of sessions were provided to the CBT group (mean 11.6) because the CBT protocol required a minimum of 10 sessions while the mean number of sessions provided to the participants receiving EMDR was 6.1. Oras et al. (2004) reported providing 5–25 sessions per participant depending on the need of the participant.

EMDR for the Treatment of PTSD and Posttraumatic Symptoms With Children

Randomized Studies of Children With PTSD

There have been only two RCTs investigating EMDR treatment of children diagnosed with PTSD (see Table 1). In the Chemtob et al. (2002) study, the diagnosis was related to a specific trauma (Hurricane Iniki), often described as disaster-related PTSD, while in the Ahmad et al. (2007) study, the traumas were individual and personal. Both Chemtob et al. and Ahmad et al. found EMDR superior to waitlist. Both studies reported significant improvement on PTSD symptoms. Ahmad et al. (2007) found that the greatest improvement with EMDR was on the re-experiencing symptoms, with less improvement shown on hyperarousal symptoms. Chemtob et al. (2002) reported that gains were maintained at 6-month follow-up and noted symptom improvement following treatment was accompanied by a significant reduction in health visits to the school nurse.

While Ahmad et al. (2007) used valid and reliable treatment measures administered by blind independent evaluators to diagnose PTSD in participants, the authors reported that the evaluators were trained but not evaluated as reliable. Ahmad et al. (2007) reported the use of a published manual with random assignment of participants to EMDR treatment versus waitlist control (WLC); the authors were also the primary therapists in the study who did not assess treatment adherence. In the Chemtob et al. (2002) study, children were assessed as having PTSD by blind evaluators who were trained as reliable but not evaluated; however, the authors did not use any PTSD measures for pre/posttreatment outcome measurement (see Table 2). The authors also randomly assigned participants to EMDR versus WLC treatment, used a written EMDR protocol administered by more than two therapists, and evaluated treatment adherence.

Randomized Studies of Children with Posttraumatic Symptoms

There have been two RCTs investigating EMDR treatment of children with symptoms of posttraumatic stress (see Table 1). One study compared EMDR to CBT and the second compared EMDR to TFCBT, and both reported that EMDR treatment used fewer sessions, did not require homework, and was generally much more efficient.

Jaberghaderi et al. (2004) conducted the only RCT investigating the use of EMDR for sexually abused girls with posttraumatic symptoms. They compared EMDR with CBT and concluded that both treatments produced significant improvement on the child and parent measures, with no difference in outcome between treatments. However, EMDR was described as more efficient, using fewer sessions (EMDR mean of 6.1 sessions versus a CBT mean of 11.6 sessions), with EMDR not requiring homework that is part of the CBT treatment protocol.

De Roos et al. (2009) compared the treatment of EMDR versus TFCBT for the treatment of disaster-related PTSD symptoms for 52 children exposed to a fireworks explosion. Thirty-eight children ages 4–18 were randomly assigned to either EMDR or TFCBT where the children received four sessions of up to 60 minutes each, with specific criteria established for completing the research protocol. Even though participants in both active treatments demonstrated a decrease in posttraumatic stress symptoms, the authors noted that the EMDR treatment was more efficient overall than the TFCBT treatment. Participants in the EMDR group ($N = 18$) completed the treatment

TABLE 1. Application of Gold Standards to the Methodology of Randomized Clinical Trials of EMDR With Children With PTSD or PTS Symptoms

| Year of study | Studies: Author and brief description | GS1 Clearly defined target symptoms | GS2 Reliable and valid measures | GS3 Use of blind independent evaluators | GS4 Assessors trained & evaluated as reliable | GS5 Manualized treatment that is replicable per author report | GS6 Random assignment or stratified sampling, w/ treatment by minimum of 2 therapists | GS7 Treatment adherence | Findings |
|---------------|--|---|------------------------------------|--|--|--|--|--|--|
| 2007 | Ahmad et al. EMDR for children diagnosed w/ PTSD vs. WLC | Yes PTSD diagnosed | Yes 15, 18, 20, 28, 38 | Yes | Trained but reliability not evaluated | Yes Published manual | Random assignment to tx vs. WLC to 2 therapists | No fidelity assessed | Tx group demonstrated decreased PTSD symptoms |
| 2002 | Chemtob et al. ABA design brief therapy with EMDR vs. WLC | Yes Disaster related PTSD | Yes 6, 8, 9, 22, 32, 47 | Yes | Trained but reliability not evaluated | Yes Written step-by-step protocol | Random assignment to tx: Tx by 4 therapists | Videotaped & evaluated by therapists & PIs | Substantial sustained improvement in PTSD symptoms |
| 2009 | de Roos et al. EMDR vs. CBT fireworks explosion | Yes Firework disaster-related symptoms | Yes 1, 5, 10, 23, 46 | Yes | NR | Yes | Random assignment to tx but NR to therapist: 8 therapists | Yes | Substantial sustained improvement EMDR fewer sessions required |
| 2004 | Jaberghaderi et al. CBT vs. EMDR sexually abused Iranian girls | Yes PTS symptoms | Yes 10, 33, 39 | Yes | Trained but reliability not evaluated | Yes | Random assignment to tx: 1 therapist per treatment | No fidelity assessed | A decrease in PTSD symptoms for both treatments; EMDR had fewer sessions |

Note. NR = not reported PI = principal investigator; Tx = treatment; WLC = wait list control. For explanation of measures see Table 2.

TABLE 2. Pre-Post Measures Key

| | |
|--|--|
| 1. Achenbach Child Behavior Checklist Form (CBCL) | 25. Parent interview |
| 2. BASIC-Ph | 26. Parent monitor |
| 3. Behavior Avoidance Test | 27. Positive and Negative Affect Self-Statement Questionnaire for Children (PNG-C) |
| 4. Behavioral Assessment System for Children (BASC) | 28. Post Traumatic Stress Symptoms Scale for Children (PTSS-C) |
| 5. Birelson Depression Scale (BDS) | 29. Problem behavior assessed |
| 6. Child Depression Inventory | 30. Problem Rating Scale (PRS) |
| 7. Child Dissociative Checklist (CDC) | 31. PTSD symptom interview |
| 8. Child Ratings of Helpfulness | 32. Revised Children's Manifest Anxiety Scale |
| 9. Child Reaction Index | 33. Rutter's Teacher Scale |
| 10. Child/Parent Report of Post Traumatic Symptoms (CROPS/PROPS) | 34. Self-Assessment Manikin |
| 11. Children's Impact of Traumatic Events Scale (CRITES) | 35. Sensory Integration Scales |
| 12. Children's Manifest Anxiety Scale | 36. Skin Conductance Level (SCL) |
| 13. Child PTSD Symptom Scale (CPSS) | 37. Spider Phobia Questionnaire for Children (SPQ-C) |
| 14. Depression Questionnaire for Children (DQ-C) | 38. Subjective Units of Disturbance Scale (SUDS), Validity of Cognition (VOC) |
| 15. Diagnostic Interview for Children and Adolescence (DICA) | 39. Subjective Units of Disturbance Scale (SUDS) |
| 16. Diagnostic Interview Schedule for Children Revised (DISC-R) | 40. Target Behavior Scale (posttreatment only) |
| 17. Dutch version of Self-Perception Profile for Children (SPCC) | 41. Teachers' Pre/Post Behavioral Observations |
| 18. Genogram | 42. The Self-Esteem Scale |
| 19. Global Assessment of Functioning (GAF) | 43. Therapist Interview |
| 20. Harvard-Uppsala Trauma Questionnaire for children (HUTQ-C) (8) | 44. Thought Problem Subscale |
| 21. Impact of Events Scale (IES) | 45. Trauma Symptom Checklist for Children (TSCC) |
| 22. Kauai Recovery Inventory | 46. UCLA Post-Traumatic Stress Disorder Reaction Index (PTSD-RI) |
| 23. Multi-Dimensional Anxiety Scale for Children (MASC) | 47. Visits to school nurse |
| 24. Nijmegen Parenting Stress Index | 48. Structured Clinical Interview for <i>DSM-IV</i> (SCID-I) |

protocol in fewer sessions (mean 3.17) as compared to the TFEBT group ($N = 20$) (mean 4.0 sessions).

In addition to the RCTs, there are eight nonrandomized treatment outcome studies of EMDR for children with PTSD and PTSD symptoms (see Table 3).

Nonrandomized Treatment Outcome Studies for Children With PTSD

In response to an earthquake in Molise, Italy, Fernandez (2007) used EMDR to treat 22 children who were buried in their school when it collapsed and killed many of their classmates. EMDR was provided in three cycles over the course of a year

following the earthquake. The participants were administered an average of 6.5 sessions of EMDR with pre/posttreatment assessment for each cycle of treatment. During the treatment protocol, the authors reported increase in symptoms with a final decrease in the three clusters of PTSD—avoidance, intrusiveness, and arousal. Because there were periods of no treatment to the children, the treatment methodology documented symptom presentation between cycles of EMDR. At the beginning of treatment, 61.1 % of the children were diagnosable with PTSD 3 months after the earthquake. At the final posttreatment assessment improvement was documented in all symptom clusters of PTSD, with 9.1%

TABLE 3. Application of Gold Standards to the Methodology of Nonrandomized Treatment Studies of EMDR With Children With PTSD or PTS Symptoms

| Year of study | Studies Author and brief description | GS1 | GS2 | GS3 | GS4 | GS5 | GS6 | GS7 | Findings |
|---------------|--|--|--------------------------------|-----|---|--|---|------------------------------|---|
| 2009 | Adler-Tapia et al. Fidelity study of EMDR with child victims of crime | Yes PTSD, depression, dissociation, sensory integration | Yes 4, 7, 11, 13, 35, 45 | NR | NR | Yes Published manual | NR random assignment, Treatment delivered by more than 2 therapists | Yes Assessed by raters | Children demonstrated decrease in depressive symptoms |
| 1993 | Cocco et al. Single case study—auditory variant of EMD | Yes PTS symptoms | Yes 1, 26, 44 | NR | NR | NR | NR | NR | Both symptoms and behavior changed |
| 2007 | Fernandez Field study of PTSD in children exposed to earthquake | Yes PTSD diagnoses or symptoms | Yes 38, 48 | Yes | Trained: reliability not evaluated | NR | No | NR | Overall reduction in PTSD symptoms over the course of tx |
| 1994 | Greenwald 5 case studies of treatment of trauma | Yes Posttraumatic symptoms | No 25, 30, 39 | No | No | Yes (child EMDR technical manual) | No, 1 therapist | NR | Substantial sustained improvement |
| 2009 | Hensel, EMDR vs. WLC for single incident trauma | Yes PTS, anxiety and depression | Yes 10, 43 | No | Therapist assessed | Yes; Manual written by author | No, 1 therapist | No | Significant improvement in PTS in EMDR group |
| 2004 | Oras et al. Traumatized refugee children treated w/EMDR in psychodynamic approach | Yes PTSD symptoms | Yes 19, 28 | Yes | Trained but reliability not evaluated | No; EMDR incorporated into a psychodynamic model | No | NR | Significant improvement in functioning & PTSD symptoms re-experiencing |
| 1998 | Puffer et al. One 90-minute session EMDR vs. delayed tx | Yes PTS symptoms | Yes 12, 21, 38 | NR | NR | NR | Not randomized Assignment to tx based on convenience | No | Significance on IES; less significant on CMAS |
| 2005 | Tufnell Case studies children after MVA | Yes PTSD diagnosed | No 43 | NR | NR | NR | NR | NR | PTSD symptoms resolved, results maintained |

Note. MVA = motor vehicle accident; NR = not reported; PI = principal investigator; Tx = treatment; WLC = wait list control. For explanation of measures see Table 2.

of the children diagnosable with PTSD at the end of treatment.

In a study of 13 refugee children in Sweden, Oras et al. (2004) reported that the greatest improvement following EMDR was on the re-experiencing symptoms of PTSD, with less improvement on avoidance symptoms. Overall functioning reportedly increased and was associated with a decrease in depressive symptoms. However, it should be noted that in this study, EMDR was integrated with psychodynamic therapy, so that the specific effects of EMDR were unclear.

Nonrandomized Treatment Outcome Studies for Children With PTS Symptoms

Adler-Tapia et al. (2009) conducted a naturalistic study to assess therapists' ability to adhere to the EMDR protocol with young children who were victims of crime as identified by law enforcement. Treatment outcome was also assessed in this study using pre/posttest measures. Twelve children ages 2–10 years were referred to a children's advocacy center where the children were interviewed by law enforcement and assessed by medical personnel before being referred to the clinical department for mental health services. Even though this was a pilot study to assess adherence, pre/posttest measures were used to assess symptom improvement. Of the 12 children referred to the study, 7 completed the research protocol. Prior to treatment the 12 children were assessed as being in the at-risk or clinically significant range on the Behavioral Assessment System for Children (BASC) (Reynolds & Kamphaus, 2002). Following EMDR reprocessing of one target identified by the child, each of the 7 children who completed treatment evidenced significant reduction in symptoms of posttraumatic stress. For these children scores on the BASC depression scale fell within the normal range after reprocessing one target.

Hensel (2009) treated 36 children and adolescents referred to the author's private practice after exposure to single-incident trauma. Hensel found that all 36 children demonstrated significant and rapid improvement, as reported by parents at posttreatment with effects maintained at 6-month follow-up. He also noted that there was no significant difference between the treatment response of preschoolers and school-age children.

Similarly, improvement on posttraumatic symptoms was reported by Greenwald (1994) for five children after Hurricane Andrew, with effects maintained at 1-week and 4-week follow-up.

Case Studies of Children With PTSD

Two case studies have investigated EMDR treatment of children with PTSD (see Table 3). In a case series by Tufnell (2005), EMDR was used to treat four children with PTSD following motor vehicle accidents. The children had complex presentations; one had a parent with depression and another with bereavement. Tufnell treated a 4-year-old and 5-year-old with an age-adapted EMDR protocol and a 10-year-old and 11-year-old with standard EMDR. The treatment was provided as part of a multimodal approach. The combination of EMDR with other treatments makes it difficult to determine the exact effects of EMDR. Tufnell reported that the PTSD symptoms resolved at posttreatment with results maintained at 6 months. Positive responses were noted for the preadolescent children.

In a single case design, Cocco and Sharpe (1993) evaluated eye movement desensitization (EMD) for the treatment of PTSD in a 4-year-old boy. EMD was the precursor to EMDR. This study was unique in the use of auditory bilateral stimulation rather than eye movements. The authors reported that the PTSD symptoms resolved.

Other Diagnoses and Presenting Problems

In addition to studies investigating the treatment of traumatized children, published studies have investigated the use of EMDR to treat children with other types of presenting problems. It should be noted that, in spite of the differences in diagnostic focus, symptoms of traumatic stress were noted in most studies and the traumatic event was presumed to be the etiological precipitant for the disorder. This formulation is consistent with Shapiro's (2001) adaptive information processing model. This focus was used in all of the studies except for the spider phobia studies, in which EMDR was not effective.

Simple Phobias

There have been two RCTs and one case series evaluating EMDR treatment of children with phobias (see Table 4). Muris et al. (1997) compared the use of EMDR versus exposure therapy in the treatment of 22 children with spider phobias and reported little gain from EMDR. In this study, the treatment protocol reportedly consisted of targeting the fear of spiders—a symptom—rather than targeting a distressing memory as indicated both in the EMDR basic protocol and in the EMDR phobia protocol (Shapiro,

TABLE 4. Application of Gold Standards to the Methodology to Studies of EMDR With Children With Phobias

| Year of study | Studies Author and brief description | GS1 | GS2 | GS3 | GS4 | GS5 | GS6 | GS7 | Findings |
|---------------|---|---|----------------------------|-------------------------|---------------------------------------|------------------------------------|---|-----|---|
| 2008 | de Roos et al. Case studies: children with choking phobia | Yes Trauma-related choking phobia | No | Measures not reported | NR | EMDR with de Jongh phobia protocol | NR | NR | Choking eliminated in all cases; eating returned to normal |
| 1997 | Muris et al. EMDR vs. in vivo exposure for spider phobic children | Yes Simple phobia Spider phobic | Yes 3, 34, 36, 37 | Yes for phobic symptoms | NR | NR | No | NR | Exposure significantly better as far avoidance behaviors, subjects reported positive response to EMDR |
| 1998 | Muris et. al EMDR vs. exposure therapy vs. computer exposure | Yes Simple phobia Girls w/ spider phobia | Yes 3, 16, 34, 37 | Yes for phobic symptoms | Trained but reliability not evaluated | NR | Random assignment: 1 therapist per treatment | NR | Exposure significantly better as far avoidance behaviors, subjects reported positive response to EMDR |

Note. NR = Not reported. For explanation of measures see Table 2.

1995). EMDR was not as effective as exposure therapy and no significant improvement was found from the use of EMDR on avoidance symptoms; however, the authors noted that client self-report favored EMDR.

Muris et al. (1998) used EMDR, in vivo exposure, and computerized exposure to treat the symptoms of spider phobia in 26 White girls ages 8–17. The researchers indicated that in vivo exposure was superior to the other treatment protocols for the avoidance symptoms of spider phobia; however, again self-report measures suggested that participants reported feeling better based on EMDR treatment even though avoidance symptoms did not improve with the EMDR treatment. The authors of this study discussed targeting the worst memory regarding the spider phobia, most recent, and future; however, these authors did not report the first memory as is indicated in both the standard EMDR protocol and the phobia protocol, and they did not assess for ancillary events as is also part of the phobia protocol (Shapiro, 1995) (see de Jongh and Ten Broeke, 2009, and Shapiro, 1995, 2001, for further discussion of these issues).

In a case series of four children with choking phobia, de Roos & de Jongh (2008) targeted distressing memories that were related to the onset of the phobia. The results indicated that all four children demonstrated symptom elimination following one or two sessions of EMDR. The application of the EMDR protocol to a specific target memory demonstrated by de Roos et al. followed EMDR standard procedures and provides preliminary evidence that EMDR may be effective in eliminating phobias related to traumatic events.

Conduct Disordered Youth

Soberman et al. (2002) compared treatment as usual to treatment as usual plus three sessions of EMDR for 29 boys ages 10–16 years who were diagnosed with conduct disorder and were being treated in a residential treatment facility or day treatment services (see Table 5). This study found a significant reduction in memory-related distress, but only trends toward reduction of posttraumatic symptoms. These researchers concluded that addressing the underlying trauma improved the expression of overt behavior and reduced conduct problems. In this study, participants were participating in milieu treatment, group therapy, and some of the participants were living in the residential treatment facility. The researchers did not differentiate between the boys living at the residential center and the boys in intensive outpatient services when randomly assigning to treatment and control groups. Of the 29 boys in this study, 59% were diagnosed with

conduct disorder in addition to other primary diagnoses of PTSD, ADHD, oppositional defiant disorder (ODD), learning disabilities, and substance abuse. These additional diagnoses suggest a complex set of symptoms, which three sessions of EMDR may be insufficient to address.

Nightmares, Behavioral Problems, Low Self-Esteem, and other Mental Health Symptoms

In a single case study, Pellicer (1993) documented the use of EMDR to treat nightmares in a 10-year-old girl, and the nightmares abated following one session of EMDR. In another study, Rubin et al. (2001) randomly assigned 39 children ages 6–15 years who were referred by the staff of a child guidance center to either routine treatment or routine treatment plus EMDR. The children were assessed pre/posttreatment with the Achenbach Child Behavioral Checklist (CBCL). The children in this study were diagnosed with an array of diagnoses, and 41% of the children also had at least one parent with a diagnosable mental health disorders. The authors suggested that EMDR was not as effective with mental health symptoms in children when the symptoms were not specifically related to trauma. Wanders et al. (2008) compared the use of EMDR versus CBT to treat behavioral problems and low self-esteem in 26 children ages 8–13 years. The authors conducted a randomized controlled trial of EMDR versus CBT and concluded that EMDR produced larger changes in target behaviors while both treatments reduced symptoms; however, the children who were treated with EMDR demonstrated continued improvement when assessed at follow-up. This research suggests that EMDR has the potential to be efficacious for mental health symptoms evidenced in children without an obvious traumatic etiological origin.

Methodology

The research methodology of most studies evaluating the EMDR treatment of children and adolescents highlights the challenges of conducting RCTs with children. This article analyzes the methodology of the 19 published studies on EMDR with children and adolescents by applying the seven methodological gold standards (GSs) recommended by Foa and Meadows (1997) (see also Maxfield & Hyer, 2002).

In order to evaluate the methodological rigor of each of the 19 studies, data were collected from the actual published articles; however, information about the seven specific GSs were not discussed in each study. Tables 1, 3, 4, and 5 note when the information

TABLE 5. Application of Gold Standards to the Methodology to Studies of EMDR Treatment of Children With Other Presenting Problems

| Year of study | Studies Author and brief description | GS1 | GS2 | GS3 | GS4 | GS5 | GS6 | GS7 | Findings |
|---------------|---|--|----------------------------------|---|---------------------------------------|-----|---|--|---|
| 1993 | Pellicer Single session for child with nightmares | Yes Nightmares | No 38 | NR | NR | NR | NR | NR | Nightmares abated |
| 2001 | Rubin et al. EMDR vs. control group in child guidance center | No Various diagnoses | Yes 1 | No | No | Yes | No random assignment, treatment delivered by more than 2 therapists | Yes Videotaped sessions reviewed by independent rater | No significance |
| 2002 | Soberman et al. Boys w/ conduct problems in RCT or day tx Standard care vs. standard care plus 3 sessions of EMDR | Yes PTS, Conduct problems/behavior problems | Yes 10, 21, 30, 39 | Yes | Trained but reliability not evaluated | NR | Random assignment to treatment: 1 therapist for EMDR | No | Less distress, decreased PTSD symptoms, large reduction in behavior problems |
| 2008 | Wanders et al. EMDR vs. CBT for behavioral problems and low self-esteem | Yes Self-esteem damaging events | Yes 1, 14, 17, 24, 27, 40, 42 | NR Independent evaluators reportedly only observed behaviors | NR | Yes | Random assignment to treatment: 2 therapists provided all treatment | NR | EMDR produced larger changes in target behaviors while both treatments reduced symptoms |

Note. NR = not reported. For explanation of measures see Table 2.

regarding the specific GS was not reported in the published article.

Gold Standard 1: Clearly Defined Target Symptoms

Of the 19 studies, 18 met GS1: *clearly defined target symptoms*. In our determination of whether studies met this standard, we examined the inclusion criteria and whether the study specifically described the symptoms treated with EMDR. The target symptoms identified in the specific studies are listed in the GS1 column of Tables 1, 3, 4, and 5. The specific symptoms identified as the focus of treatment for the child participants included anxiety, PTSD, symptoms of depression, dissociation, posttraumatic stress, trauma-related choking phobia, firework disaster-related symptoms, simple phobias (spider), self-esteem, and behavioral symptoms; significant variability in diagnoses and lack of diagnostic criteria remain. Even though the studies discussed symptoms of trauma exhibited by the participants, no consistent application of the diagnoses of PTSD in children and adolescents were applied across the studies. In six studies (Ahmad et al., 2007; Chemtob et al., 2002; Cocco & Sharpe, 1993; Fernandez, 2007; Oras et al., 2004; Tufnell, 2005), the participants were reported as being diagnosed with PTSD. Ahmad et al. (2007) and Chemtob et al. (2002) used blind independent evaluators to diagnose the participants with PTSD, while in the Tufnell (2005) case series, the EMDR therapist diagnosed the children. In the Rubin et al. study (2001), Rubin reported that with regards to GS1, “Eligibility for participation in the study was based on whether experienced child therapists who were EMDR-trained believed, after an open-ended interview assessment, that each child’s history and presenting symptoms made them a good fit for EMDR treatment” (personal communication, May, 2009).

Gold Standard 2: Reliable and Valid Measures

Forty-eight pre/posttreatment measures were used to assess treatment outcome in 19 studies (see Table 2). In our determination of whether studies met this standard, we considered whether the study used measures with good psychometric properties, with published/presented reliability and validity data. Only four studies did not use either standardized global symptom measures and/or scales specifically designed to assess for the targeted symptoms. Standardized global symptom measures (CBCL, BASC, SCID-I) were used in six studies. Scales assessing posttraumatic symptoms

in children (CPSS, CRITES, HUTQ-C, IES, PTSS-C, TSCC, PTSD-RI, CROPS/PROPS) were used in 8 studies. 7 studies also used measures assessing depression, or anxiety, or other types of symptoms. Therefore, the reported use of at least one reliable and valid measure (GS2) to evaluate the targeted symptoms was met in 15 of 19 studies.

Gold Standard 3: Blind Evaluators

Seven studies (Ahmad et al., 2007; Chemtob et al., 2002; de Roos et al., 2009; Fernandez, 2007; Jaberghaderi et al., 2004; Oras et al., 2004; Soberman et al., 2002) reported that they used *blind evaluators* to assess for PTSD symptoms in study participants and thus were evaluated as meeting the criteria of GS3. See Tables 1, 3, and 4. Even though Muris et al. (1997, 1998) reported the use of blind independent evaluators, the evaluators were assessing for phobic symptoms, not PTSD.

Gold Standard 4: Assessor Training and Reliability

The seven studies that reported having blind evaluators (GS3) also reported these assessors were trained. However, none reported that they had assessed the second standard of GS4: *assessing interrater reliability*. Since these seven studies primarily used one independent rater, it would not be possible to establish interrater reliability regarding the use of the specific assessment procedures.

Gold Standard 5: Manualized, Replicable, Specific Treatment Programs

The use of treatment manuals (GS5) to provide *manualized replicable, specific treatment EMDR programs* to the participants was reported in nine studies (Adler-Tapia et al., 2009; Ahmad et al., 2007; Chemtob et al., 2002; de Roos et al., 2009; de Roos et al., 2008; Greenwald, 1994; Hensel, 2009; Rubin et al., 2001; Wanders et al., 2008).

Gold Standard 6: Unbiased Assignment to Treatment Conditions, With Treatment Delivered by at Least Two Therapists

The criterion for GS6—*unbiased assignment to treatment conditions, with treatment delivered by at least two therapists where clients are also randomly assigned to each therapist*—was partially met by seven studies including randomized clinical trials, conducted by Ahmad et al. (2007), Chemtob et al. (2002), de Roos et al. (2009), Jaberghaderi et al. (2004), Muris et al. (1998),

Soberman et al. (2002), and Wanders et al. (2008). However, none of the studies documented using two therapists for each treatment intervention with participants randomly assigned to therapists within each treatment.

Gold Standard 7: Assessment of Treatment Adherence

Only four studies reported *assessment of treatment adherence* (GS7) (Adler-Tapia et al., 2009; Chemtob et al., 2002; de Roos et al., 2009; Rubin et al., 2001). While nine studies fully met GS5, only five studies were assessed as meeting GS7.

Efficacy of EMDR in the Treatment of Children With Mental Health Symptoms

Nineteen published studies of the use of EMDR in individual treatment with child clients suggest that EMDR with children is a promising practice in need of additional research. The studies included in this review document the use of EMDR with children presenting with a variety of mental health symptoms and diagnoses.

Efficacy in Treatment of Posttraumatic Stress in Children and Adolescents

There have been four RCTs, two with children diagnosed with PTSD, and two with children with posttraumatic stress symptoms. The PTSD studies (Ahmad et al., 2007; Chemtob et al., 2002) compared EMDR to waitlist controls and found that EMDR significantly reduced diagnosis and related symptoms. The other RCTs compared EMDR to CBT and TFCBT (de Roos et al., 2009; Jaberghaderi et al., 2004) and found that both treatments produced similar outcomes, with significant reductions in symptoms. Further, the EMDR participants needed fewer sessions and no homework, compared to the CBT participants, suggesting that EMDR may be a more efficient therapy. It should also be noted that EMDR treatment of traumatized children relieved symptoms of posttraumatic stress, anxiety, and depression.

Even though the Chemtob study was not specifically designed to assess the efficacy of EMDR with children, this study met the GSs proposed by Foa and Meadows (1997) for research on the treatment of PTSD. Ahmad et al. (2007) met six of the seven GSs with the exception of the assessment of treatment adherence. Both studies found a decrease in PTSD symptoms in participants diagnosed with PTSD. Some interesting questions arising from the research include whether all

symptoms show the same robust effect. For example, two studies have suggested that avoidance symptoms associated with PTSD may not show the same level of improvement as re-experiencing symptoms. Oras et al. (2004) reported that the greatest improvement following EMDR was on re-experiencing symptoms, with less improvement on avoidance symptoms. The children in this study were living as refugees, and the authors noted that symptoms disappeared when the children's families established permanent residence.

Ahmad et al. (2007) also found that the greatest improvement with EMDR was on the re-experiencing symptoms, with less improvement shown on hyperarousal symptoms. It is important to note that of the 33 children in Ahmad et al. study, 26 were given a comorbid diagnosis in addition to PTSD. In order to be eligible for the Ahmad study, children must have also grown up with a family member with "at least one socially exposed condition" (p. 350). Even though this study was a randomized clinical study of children diagnosed with PTSD compared to a waitlist control, the confounding variables of requiring that children must have one additional "socially exposed condition" and that 79 % of the children in this study were diagnosed with a concurrent diagnosis in addition to PTSD raise the possibility that these other variables might have contributed to the lack of improvement noted on the hyperarousal symptoms exhibited by the children in this study. Both studies suggest that the child's environment including the stability of the child's living situation affect the resolution of PTSD symptoms. When children are living in unstable environments, the hyperarousal may be a predictable and appropriate physiological response to a stressful living environment.

Fernandez (2007) noted that over the course of a year of three cycles of EMDR, the PTSD symptom clusters showed different trends over time, with symptom improvement in all three symptom clusters at the end of treatment. Hensel (2009) noted that the children with the highest PTSD scores benefited the most from the EMDR treatment with sustained outcomes at 6-month follow up. In addition, the Greenwald (1994) study noted unexpected findings that after EMDR the participants appeared to cope well with new challenges, hinting at increased resiliency for children following EMDR treatment. This possibility was also found in a research study by Zaghrou-Hodali, Alissa, and Dodgson (2008), which used the EMDR group protocol.

These studies suggest that the response of children with PTSD symptoms to EMDR treatment may vary

according to intervening variables such as environmental factors and severity of the child's symptoms. Foa et al. (2000) suggested that multiple variables affect the unique individual manifestation of PTSD. Further research is needed to investigate the possible role of individual factors in treatment response.

Efficacy in Treatment of Other Disorders of Childhood

Soberman et al. (2002) proposed that trauma may be an underlying condition contributing to the diagnosis of conduct disorder in adolescent boys and reported that with the addition of three sessions of EMDR, the participants in this study evidenced a decrease in distress and PTSD symptoms along with a reduction of behavioral problems. The possibility that EMDR treatment of earlier traumas may reduce behavioral problems in children requires further research investigation.

Two studies reported improvement in children's *depressive symptoms* (Adler-Tapia & Settle, 2009; de Roos et al., 2009) following EMDR treatment for a traumatic event. Depressive symptoms often correlate with PTSD in children (Cohen, Berliner, & March, 2000). The successful amelioration of depressive symptoms following EMDR suggests that the reprocessing of the etiological event was sufficient to reduce the depressive symptoms.

The Muris et al. (1997, 1998) studies did not find that EMDR was effective in the treatment of spider phobias in children. It is possible that this finding resulted from the nontraumatic etiology of the phobia, or it may have resulted from the researchers' alternate application of Shapiro's (1995) recommended EMDR phobia protocol (see Shapiro, 1995, 2001, for discussion, as well as de Jongh & Ten Broeke, 1998). For simple phobias, Shapiro described specific steps including starting with the first time that the client can recall experiencing the phobia and ancillary events continuing with the most disturbing event. Muris et al. (1997, 1998) applied the EMDR phobia protocol to children with spider phobia but found that exposure treatment addressed symptoms of avoidance more effectively than EMDR even though subjects reported greater improvement from EMDR.

De Roos et al. (2008) used the phobia protocol to treat choking phobia in children and targeted the trauma memory rather than symptom. These authors noted that the EMDR treatment resulted in resolution of all symptoms of choking phobia. The disparity in findings illustrates the need for further research in EMDR treatment of phobias and anxiety disorders. It

is unclear if the differences lie in the traumatic nature of the choking phobia, the application of the untested protocol, or other factors. Future research is needed to determine if EMDR can be effective with phobias or other anxiety disorders.

Methodological Issues

Although research studies with children can be complicated, it is recommended that future research comply, as far as possible, with the methodological GSs (Foa & Meadows, 1997; Maxfield & Hyer, 2002). In particular, for GS1, it is recommended that, if possible, the symptoms and diagnoses of child participants should be clearly defined to ensure clarity about the outcome and effects of the treatment. For GS2, researchers should ensure that they use appropriate and standardized measures to assess children. Using unknown or personal measures can interfere with the study's conclusions and its acceptability in the larger community. For GS3 and GS4, it is recommended that assessors be trained and reliable. The assessors should understand that the manifestation of PTSD in children is not the same as in adults because of the integration of developmental and environmental issues that influences diagnoses with children and especially very young children. For GS5 and GS7, it is important to ensure that therapists have expertise with young children and competence in implementing new treatment modalities. They should show reliable compliance with the treatment manual. And finally, for GS6, when possible, researchers should conduct RCTs to control for various factors and to provide the most rigorous test for the treatment.

In addition to the GSs, additional methodological concerns not applied in this article include sample size and statistical analysis of outcome data. The 19 studies only investigated the treatment of 391 participants. Although consideration was given to completing a meta-analysis, the range of study types and sample sizes made it too difficult to conduct a meta-analysis of the effects of these 19 studies.

Discussion

The exploding advancements in neurobiology and neurochemistry have provided a deeper understanding of how traumatic events are processed on a neurobiological level affecting human development. Research has established that childhood distress and trauma contribute to increased adult mental health and medical issues (Felitti et al., 1998), and affect neurodevelopment (Perry, 2001, 2006; Perry, Pollard, Blakley, Baker, & Vigilante, 1995; van der Kolk,

2005). Given the significance of these findings, early interventions with children exposed to trauma have the potential to change the trajectory of children's futures by addressing the adverse impact of childhood experiences.

Therapists treating children need to be trained to use new assessment tools and diagnostic criteria to assess the symptoms of posttraumatic stress in children. Literature suggest that the manifestation of PTSD in children is not the same as in adults because of the impact of developmental and environmental issues that influence the manifestation of traumatic stress symptoms in children and especially very young children. With the application of PTSD to children, therapists also needed to create and assess the efficacy of psychotherapies to alleviate PTSD symptoms with children.

Furthermore, there are several issues that may affect the ability of researchers to conduct randomized clinical trials on the efficacy of psychotherapy for children and adolescents presenting with symptoms of posttraumatic stress. First, it is possible that the efficacy of EMDR with children is only beginning to emerge because of the difficulty inherent in conducting clinical trials with young children. Second, defining and assessing what constitutes PTSD in children continues to be discussed in the professional realm because child symptoms do not parallel symptoms demonstrated by adults. Third, fidelity to the EMDR protocol, which has been linked to the success of EMDR in adults (Maxfield & Hyer, 2002), may need to be standardized in studies of EMDR with children to be able to produce more consistent methodology and research results. Operationalizing treatment of EMDR with children has been an ongoing process with manualized treatment protocols for using EMDR with children being published.

Methodologically sound research for child participants receiving EMDR needs to include a detailed definition of what an EMDR session entails. The studies included in this article report that there are anywhere from 1 to 12 sessions of EMDR provided to participants. Considering that EMDR is defined as an eight-phase integrative protocol with past, present, and future targets, it is unclear which phases of EMDR were provided to participants in these studies.

Conclusions

What can now be concluded about the efficacy of EMDR with children? Studies of the efficacy of EMDR with children that meet established criteria for robustness in research methodology are beginning

to emerge; however, the efficacy of EMDR with young children cannot be dismissed simply because of the limited quantity of rigorous empirical studies with RCTs. Two RCTs documenting the efficacy of EMDR with children diagnosed with PTSD along with two RCTs of EMDR with children with post-traumatic stress symptoms have been published in peer-reviewed articles. On the eve of the 20th anniversary of EMDR, the research has substantiated the efficacy of EMDR for adults. The purpose of this review was to summarize the evidence of the efficacy of EMDR with children. For over a decade, anecdotal evidence of successful treatment of children with EMDR with a variety of diagnoses has been reported internationally by EMDR-trained therapists in professional groups, workshops, at professional conferences, and in professional publications. These successes have driven the pursuit of methodologically sound research studies on the efficacy of EMDR with children. This article has documented that a substantial amount of research also demonstrates that EMDR with children is a promising practice rapidly moving toward substantiation as evidence-based practice. A growing body of research suggests that EMDR is efficacious for children with PTSD symptoms; however, its efficacy with other diagnoses and behavioral symptoms has yet to be established. Future studies should strive to integrate many variables in RCTs that meet methodological standards in order to substantiate the efficacy of EMDR with young children. However, the absence of RCTs on EMDR with children that meet the methodological rigor only suggests that additional research needs to be conducted, not that the treatment protocol lacks efficacy (Foa, Keane, & Friedman, 2000).

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