Accelerated Resolution Therapy: A Brief, Emerging Evidence-Based Treatment for PTSD

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Accelerated Resolution Therapy: A Brief, Emerging Evidence-Based Treatment for PTSD

Kevin E. Kip[a]*, Laney Rosenzweig[a], Diego F. Hernandez[a], Amy Shuman[a], Ann Witt[a], Erin Keller[a] and David M Diamond[b,c]
[a]University of South Florida, College of Nursing, Tampa, FL, USA
[b]Department of Psychology, Cognitive, Neural and Social Division, University of South Florida, Tampa, FL, USA
[c]James. A. Haley Veterans Hospital, Research and Development Service, Tampa, FL, USA

Abstract

In both civilian and military settings, emerging therapies for post-traumatic stress disorder (PTSD) are an area of intense scientific interest and need. Accelerated Resolution Therapy (ART) is an emerging, innovative exposure-based treatment for symptoms of PTSD that is delivered in just one to five sessions and requires no homework or skills practice, thereby reducing patient's commitment time and practitioner's intervention time to approximately one-fifth of the time required for traditional first-line evidence-based therapies for PTSD. The ART protocol uses the evidence-based components of imaginal exposure, imagery rescripting, and smooth pursuit eye movements. ART addresses the cardinal PTSD features of distressing emotions, thoughts, sensations, and images in particular, by viewing the development and maintenance of PTSD symptoms as a consequence of a failure of a traumatized individual to exhibit extinction of the affective component of the memory. As of this publication date, there are two completed empirical studies of ART and multiple other studies are in progress. The two empirical studies of ART completed among both civilians and military personnel with symptoms of PTSD provide strong indications of efficacy. However, controlled trials against current first-line evidence-based therapies have not been conducted and long-term post-treatment empirical research data do not exist for ART. These data are considered essential in fully evaluating and quantifying the potential benefit of ART as a first-line treatment option for civilian and military PTSD.

List of Abbreviations

AC	Attention control
ART	Accelerated resolution therapy
CAPS	Clinician administered PTSD scale
CES–D	Center for Epidemiologic Studies Depression Scale
CPT	Cognitive processing therapy
EMDR	Eye movement desensitization and reprocessing
IE	Imaginal exposure
IOM	Institute of Medicine
IR	Imagery rescripting
ITT	Intention to treat
MDD	Major depressive disorder
MH	Mental health
PCL-C	PTSD checklist – civilian version
PCL-M	PTSD checklist – military version

*Email: kkip@health.usf.edu

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PDSQ	Psychiatric diagnostic screening questionnaire
PE	Prolonged exposure
POQ	Pain outcome questionnaire – short form
PTSD	Post-traumatic stress disorder
REMs	Rapid eye movements
SIT	Stress inoculation training
SSRI	Selective serotonin reuptake inhibitor
VA	Veterans administration

Introduction

In both civilian and military settings, emerging therapies for post-traumatic stress disorder (PTSD) are an area of intense scientific interest and need. Ideally, such therapies should be brief in length, highly effective, and have high completion rates (Institute of Medicine 2012; Jakupcak and Varra 2011). The impetus for new, effective therapies is based on multiple sobering realities. First, the public health burden of PTSD is very high. Among adults in the U.S. general population, lifetime and past year prevalence of PTSD have been estimated at 6.8 % and 3.5 %, respectively (Kessler et al. 2008). Since the terrorist attacks on September 11, 2001, 2.6 million servicemen and women have been deployed, often multiple times. Post-deployment prevalence estimates of PTSD (e.g., within 12 months) are 6 % in general military deployed populations and 13 % in infantry samples, with a wide range of 2–31 % (Kok et al. 2012; Ramchard et al. 2010; Richardson et al. 2010; Thomas et al. 2010) most strongly related to level of combat intensity (Dohrenwend et al. 2006; Hoge et al. 2004; Kang et al. 2003; Kulka et al. 1990; Schell and Marshall 2008).

Second, current first-line evidence-based treatments for PTSD, including pharmacotherapy (e.g., SSRI) (Friedman et al. 2007; Watts et al. 2013), prolonged exposure (PE) therapy (Ballenger et al. 2004; Foa et al. 2007; Nemeroff et al. 2006), cognitive processing therapy (CPT) (Ballenger et al. 2004; Resick and Schnicke 1992; Resick et al. 2012), eye movement desensitization and reprocessing (EMDR) (Friedman 2003; Nemeroff et al. 2006; Shapiro 2001), and stress inoculation training (SIT) (Foa et al. 1999; Lee et al. 2002) all have limitations, particularly in the treatment of combat-related PTSD. These can be summarized as having relatively lengthy treatment protocols (Foa et al. 2007; Friedman 2003; Resick et al. 2002; Resick and Schnicke 1993), frequently high dropout rates (Hembree et al. 2003; Schnurr et al. 2007; Schottenbauer et al. 2008), variable effectiveness (Minnen and Hagenaars 2002; Schottenbauer et al. 2008), and possible exacerbation of symptoms (Schottenbauer et al. 2008).

Third, effective therapies for PTSD need to address unique types and magnitude of trauma among specific patient populations. For example, combat and operational trauma is often multidimensional and extensive (Litz 2008), and may differ markedly from civilian traumas including witnessing of intense human suffering and cruelty, killing others in the line of duty, or perpetrating nonsanctioned violence (Steenkamp et al. 2011).

A recent Institute of Medicine (IOM) report recommended "*Research providing evidentiary support for use of emerging prevention methods*, *treatments*, *and rehabilitative services*" (Institute of Medicine 2012). Accelerated Resolution Therapy (ART) is an example of an emerging, innovative treatment for PTSD that meets both the broad definition of a trauma-focused therapy and the IOM criteria for research with evidentiary support. ART was developed in 2008 as an exposure-based therapy incorporating principles from evidence-based components of established trauma-focused therapies, as well as use of right–left eye movements similar to those used with EMDR and other eye movement therapies. ART has been shown to be effective in the treatment of symptoms of PTSD in just one to five sessions; it requires no homework or

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skills practice, thereby reducing patient commitment time and practitioner intervention time to approximately one-fifth of the time required for PE, CPT, or EMDR modalities. This chapter reviews the theoretical basis, delivery (clinical) protocol, and empirical evidence base for ART as an emerging and effective brief treatment for PTSD.

Theoretical, Clinical, and Research Basis of ART

Theoretical Basis of ART. The ART protocol is based on three-evidence based components of trauma-focused therapy; *imaginal exposure* (IE), *imagery rescripting* (IR), and *smooth pursuit* eye movements (Purves et al. 2001) (described below). ART addresses the distressing emotions, thoughts, sensations, and images in particular, which are cardinal inherent problems in PTSD. Specifically, the development and maintenance of PTSD symptoms has been described as a consequence of a failure of a traumatized individual to exhibit extinction of the affective component of the memory (Blechert et al. 2007; Wessa and Flor 2007). The ART protocol aligns with a recent meta-analysis of functional neuroimaging studies of PTSD that reported evidence in support of a neurocircuitry model characterized by hyperactivation of the amygdala (*emotional memory*) and hippocampus (*explicit memory*) and lower activation and imbalance in the medial prefrontal cortex (Patel et al. 2012; Vermetten and Bremner 2002). Hence, in theory, excessive activation of the hippocampus and amygdala in conjunction with descending inhibition of these structures by the prefrontal cortex contributes to the maintenance of the emotional features of the trauma memory (Diamond et al. 2007; Zoladz and Diamond 2013).

The ART protocol supports the postulate that brain processes during fear-based memory retrieval are malleable and receptive to change, a state known as reconsolidation (Monfils et al. 2009). The ART protocol aims to access this "reconsolidation" window, and introduce a patient-directed alternate scenario to alter the affective component of the negative images and sensations through the use of positive images and sensations. A central theme of the ART protocol is that symptoms of PTSD are linked to the combination of intense emotion and sensory features of traumatic experiences. With ART, each component of the memory is targeted to reduce its intensity until the patient is able to choose an alternative scenario to resolve the memory through a technique known as "The Director" Intervention. Thus, the goal of ART is to modify the trauma memory so as to reduce its intrusiveness in the life of the traumatized individual, thereby producing substantial symptom reduction.

The ART protocol makes frequent use of sets of *smooth pursuit* eye movements (Purves et al. 2001) (40 right–left movements per set). The combination of reassurance from the therapist and smooth pursuit eye movements reduces physiological sensations that are elicited during IE, and subsequently, facilitate modification of the processing of the trauma memory so as to selectively reduce the affective components without changing the factual basis of the original experience. Whereas there is controversy and inconsistent findings as to the therapeutic value of the eye movement component, Lee (Lee and Cuijpers 2013) concluded that eye movements alter processing of emotional memories and yield additional value in treatments (i.e., with EMDR). Among competing theories, the potential clinical value of repeated sets of smooth pursuit eye movements, such as with ART, may include: (1) taxing working memory and decreasing the vividness and/or emotionality of autobiographical memories (Andrade et al. 1997; Barrowcliff et al. 2004; Gunter and Bodner 2008; Kavanagh et al. 2001; Stickgold 2002; van den Hout et al. 2001); (2) inducing the relaxation response, through reciprocal inhibition (van den Hout et al. 2011), and thus reducing the future emotionality of thinking about the traumatic experience; and (3) providing some heretofore unknown potential benefits that parallel those associated with rapid eye movements (REMs) during sleep, the majority of which are in the horizontal direction (Hansotia et al. 1990), and are critical for memory consolidation (Poe et al. 2010). Given the current state of uncertainty, future imaging

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studies are needed to elucidate functional brain changes associated with the IE, IR, and eye movements of the ART protocol.

Practice and Procedures

The ART protocol is delivered using the four core elements found in most A-level trauma-focused psychotherapies (U.S. Department of Veterans Affairs 2010). This includes: *Narrative element*: The patient recalls the memory narrative and derives a new, preferred narrative to reflect upon the original trauma; In vivo *and/or IE*: The patient imagines the original traumatic exposure as a "scene," and "reexperiences" this memory through two consecutive phases while physiological sensations that emerge from this IE are processed (reduced/eliminated) by remaining the focus of attention during the use of smooth pursuit eye movements; *Cognitive restructuring* (*image rescripting*): The patient derives his or her own "cognitive restructuring solution" to "replace" the original negative distressing narrative (images and other sensations) with a positive narrative and positive images and sensations; and *Relaxation/stress modulation*: The patient engages in smooth pursuit eye movements, and after completing each set of 40 right–left eye movements, engages in deep relaxation breathing while focusing on somatic senses to reduce or eliminate intensity of symptomatic physiological sensations.

In the first major component of ART, IE is used whereby patients are asked to recall (verbally or nonverbally) details of the traumatic event while focusing their attention on physiological sensations, thoughts, and emotions. With coaching from the ART clinician, the patient becomes composed into a relaxed and alert state of mind, and is then exposed to reactivation of the targeted memory for a very short period of time (30–45 s). This short period of exposure to the memory is immediately followed by identification and diminishment (or eradication) of the emergence of any uncomfortable emotional or somatic symptoms. Two complete phases of short-lived exposure to the targeted memory are performed. In the second major component of ART, IR is used by the patient to change (replace) the negative traumatic narrative including sensory material and images to positive material. This is consistent with the work of Smucker who noted that much of the cognitive-affective disturbance associated with intrusive trauma-related memories is embedded in the traumatic images themselves, and that modifying the traumatic imagery becomes a powerful, if not preferred, means of processing the traumatic material (Smucker 1997).

During both IE and IR, the patient follows the therapist's hand back and forth moving their eyes from right to left, with 40 bilateral eye movements performed per set. During this process, the patient is not speaking, but rather "watching" his or her scene (traumatic experience). Treatment of the scene is considered complete (successful) when distress has been reduced to a satisfactory level and the client is willing to move forward with IR. Once an acceptable alternative is imagined to satisfaction, the physiological and emotional intensity of the memory is altered and minimized, while the factual content of the original scene remains intact. The ART session is often concluded by asking the patient to envision a beautiful bridge, as the foundation upon which the use of metaphors or other interventions such as gestalt, further eliminate any distressing images before crossing the bridge to the other side, which symbolically pictures leaving the past behind and moving forward without the traumatic experience. Additional details on the ART protocol have been published (Kip et al. 2012, 2013a, 2014a). Clinically, the major distinctions between ART and established first-line treatments for PTSD can be summarized as: (i) shorter length of therapy (one to five sessions total and no homework); (ii) changing the distressing narrative, (images, thoughts, and sensations) with a resolved narrative (with positive images and sensations), as opposed to reframing or desensitization; (iii) "silent therapy" whereby the patient need not verbalize any details of the recalled traumatic experience; (iv) frequent use of metaphors to achieve the

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Table 1 Demographics and presenting characteristics of civilian study participants

Characteristic	All ($n = 80$)	Male ($n = 18$)	Female ($n = 62$)
Age in years (mean ± SD)	40.0 ± 10.2	41.9 ± 11.8	40.6 ± 9.8
PDSQ score (mean ± SD) (T-score)	53.7 ± 8.6	54.6 ± 8.6	53.5 ± 8.6
PCL-C score (mean ± SD)	54.5 ± 13.0	57.3 ± 14.3	53.7 ± 12.6
No. of traumatic memories still impacting life (%)			
1–2	19.0	23.57	17.7
3–4	31.6	35.3	30.6
5 or more	49.4	41.2	51.6
Previous treatment for PTSD/other MH condition (%)	67.9	50.0	73.3
On disability for PTSD or other MH disorder (%)	10.1	5.9	11.3
Time lived with traumatic memory(ies) (%)			
Less than 1 year	6.3	5.6	6.5
1–6 years	13.8	22.2	11.3
7 years or more	80.0	72.2	82.3

Note the chronic nature of PTSD among civilians, as illustrated by the fact that about half of all participants had five or more traumatic memories still impacting their life, nearly 70 % had undergone previous treatment for PTSD and/or another mental health condition, and 80 % had lived with one or more traumatic memories for 7 or more years
Adapted through open source access from Kip et al. (2012)
PDSQ Psychiatric Diagnostic Screening Questionnaire, PCL-C: PTSD Checklist, Civilian Version, *MH* Mental Health

desired IE and IR components; (v) frequent use of standardized sets of smooth pursuit eye movements; and (vi) eliminating negative images from view so that the majority of the time, even with effort, patients report not being able to access the images.

Current Evidence Base

As of this publication date, there are two completed empirical studies of ART (Kip et al. 2012, 2013a) and multiple other studies are in progress. The first published study of ART, hereafter referred to as the "*civilian*" study (Kip et al. 2012), was an uncontrolled prospective cohort study of 80 adults, of whom, 66 (82.5 %) completed the full course of treatment with ART including initial post-treatment assessment, and 54 of the 66 completers (81.8 %) provided 2-month follow-up data. The second published study of ART, hereafter referred to as the "*military*" study (Kip et al. 2013a), was a two-group randomized controlled trial with 29 participants initially assigned to the ART intervention and 28 assigned to a brief (2 session) Attention Control (AC) regimen. Participants randomly assigned to AC were offered treatment (crossover) with ART upon completion of the AC regimen. Of the 57 participants, 50 (87.7 %) started treatment with ART and 47 of the 50 (94.0 %) completed treatment. Of these 47 treatment completers, 38 (80.9 %) provided 3-month follow-up data. For both studies, the principal limitation was that measures of treatment response were based on symptom scales, as opposed to blinded evaluation of PTSD treatment response by the Clinician Administered PTSD Scale (CAPS).

ART for Civilian Trauma. In the civilian study, the mean age was 40.0 ± 10.2 years, 77.5 % were female, mean score on the 125-item Psychiatric Diagnostic Screening Questionnaire (PDSQ) was 53.7 ± 8.6, and mean score on the 17-item PCL-C (PTSD) Checklist was 54.5 ± 13.0 (Table 1). The study population had a substantial history of trauma with approximately half reporting five or more traumatic memories still impacting their life, 68 % with previous treatment for PTSD, and 80 % having lived with traumatic memories for 7 or more years. The trauma(s) for which treatment was sought was classified as

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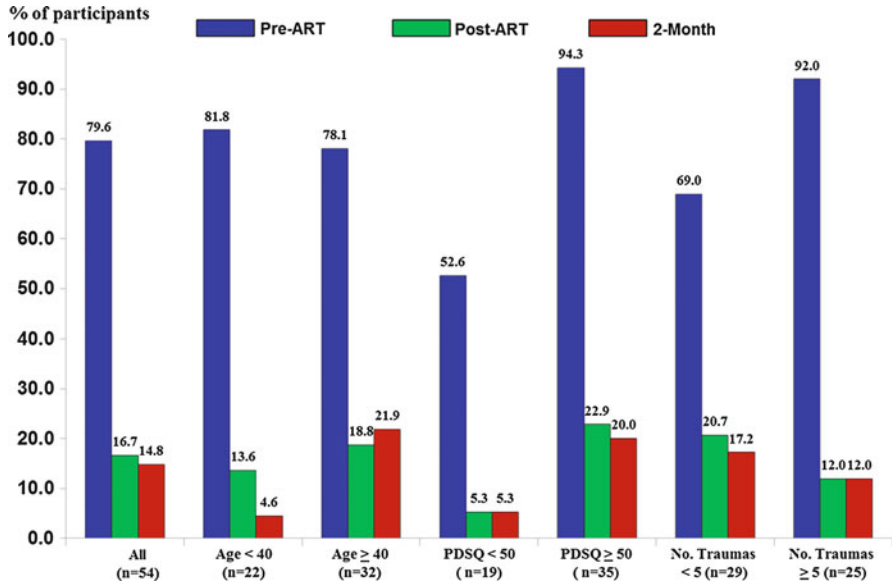

Fig. 1 Percentage of participants with PCL-C scores ≥ 44 among subgroups at baseline, post-treatment, and 2-month follow-up. Note that prior to treatment with ART, approximately 80 % of all participants had PCL-C scores of 44 or higher (a screening cut point for probable PTSD), whereas after treatment and at 2-months follow-up, less than 20 % of participants had a PCL-C score of 44 or higher. Also note that positive treatment effects with ART were evident in all subgroups examined (Through open source access from Kip et al. (2012))

experiencing violent or abusive crime (51 %), loss of a loved one (29 %), divorce (11 %), chronic or acute illness (10 %), and other. Subjects underwent a median of 3 ART sessions (range 1–5).

For the 54 subjects who completed treatment and had 2-month follow-up data, the mean score on the PCL-C was 54.5 ± 12.2 before ART versus 31.2 ± 11.4 after ART (mean difference = 22.8 ± 13.5; effect size = 1.72; $p < 0.0001$). At 2-month follow-up, the mean score on the PCL-C was 30.0 ± 12.4; effect size = 1.98; $p < 0.0001$). For the PCL-C, a score of ≥44 has been shown to maximize diagnostic efficiency (Blanchard et al. 1996). Using this cutoff score, respective percentages of participants meeting this diagnostic criterion of PTSD before ART, after ART, and at 2-month follow-up were 80 % versus 17 % versus 15 % (Fig. 1, $p < 0.001$ for all comparisons with pretreatment scores). Similar results were observed in subgroups classified by age, presenting PDSQ score, and number of reported traumas still impacting life.

In a published subgroup analysis from this study (Kip et al. 2013b), 28 subjects with high symptom levels of both PTSD and major depressive disorder (MDD) were evaluated. Mean age was 40.5 ± 9.2 years, 79 % were female, and 75 % had prior PTSD mental health treatment. Subjects received a mean of 3.7 ± 1.1 ART treatment sessions. On the 17-item PCL-C, the pre-ART mean was 62.5 ± 8.8 with mean reductions of −29.6 ± 12.5, −30.1 ± 13.1, and −31.4 ± 14.0 at post-ART, 2-month, and 4-month follow up, respectively ($p < 0.0001$) (Fig. 2). Compared to pre-ART status, this corresponded to standardized effect sizes of 2.37, 2.30, and 3.01, respectively. For the 20-item Center for Epidemiologic Studies Depression scale (CES-D), the pre-ART mean was 35.1 ± 8.8 with mean reductions of −20.6 ± 11.0, −18.1 ± 11.5, and −15.6 ± 14.4 at post-ART, 2-month, and 4-month follow up, respectively ($p < 0.0001$). This corresponded to standardized effect sizes of 1.88, 1.58, and 1.09, respectively.

The relationship between change in PTSD scores and change in depression scores was strong from pre-ART to 2-month follow-up ($r = 0.79$, $p < 0.0001$) and similarly, strong from pre-ART to 4-month follow-up ($r = 0.76$, $p = 0.0002$) (Fig. 3). Thus, within the limitations of an uncontrolled design, the first

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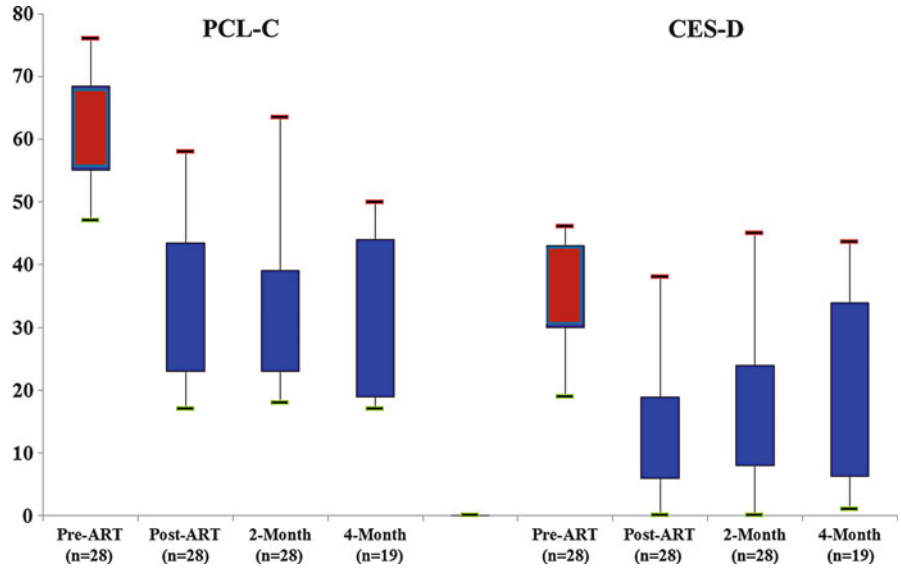

Fig. 2 Distribution of self-report scores on the 17-item PCL-C (*left side*: possible range of 17–85) and 20-item CES-D (*right side*: possible range of 0–60) at baseline, post-treatment, and 2- and 4-month follow-up. The *rectangles* depict the interquartile range; the *lower* and *upper* ends of *vertical lines* depict the 5th and 95th percentiles, respectively. The *dashed horizontal lines* depict established cutpoints that are suggestive of a diagnosis of PTSD and depression, respectively. Note the strong relationship between reductions in symptoms of PTSD and depression after treatment with ART. These reductions were generally maintained at 4-month follow-up assessment (Through open source access from Kip et al. (2013b))

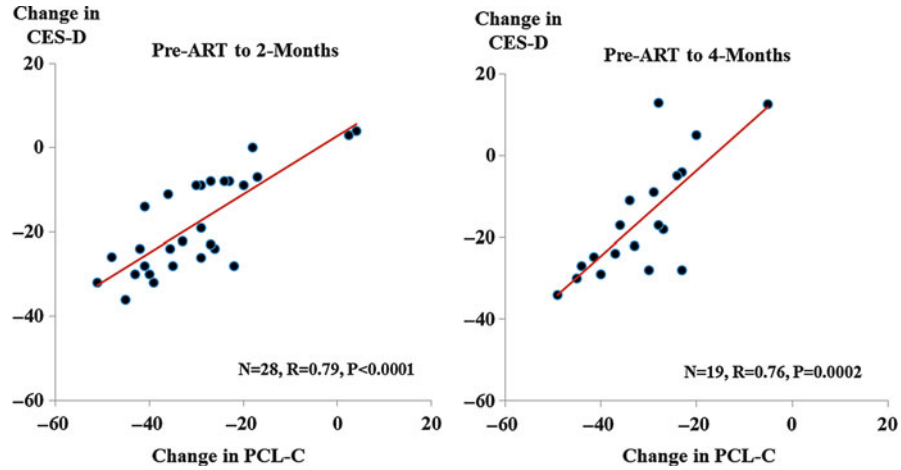

Fig. 3 Plots of change in PCL-C scores (x-axis) and change in CES-D scores (y-axis). The plots are presented as changes from pre-ART to post-ART (*left side*); pre-ART to 2-month follow-up (*middle*); and pre-ART to 4-month follow-up (*right side*). Note the strong relationship between changes in symptoms of PTSD and changes in depressive symptoms. These data illustrate the strong concordance between symptoms of PTSD and depression (Adapted through open source access from Kip et al. (2013b))

empirical study of ART conducted principally among adult civilians provided evidence of this emerging therapy as a brief and effective treatment for symptoms of PTSD and related psychological comorbidities.

ART for Military Trauma. In the military study (Kip et al. 2013a), a total of 57 U.S. service members/veterans were randomly assigned to ART ($n = 29$) versus an Attention Control (AC) regimen ($n = 28$). After random assignment, those assigned to AC were offered crossover to ART, with 3-month follow-up on all participants. Self-report symptoms of PTSD and comorbidities were analyzed among study

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completers and by the intention to treat (ITT) principle. Presenting characteristics were generally similar by random assignment (Table 2). For the full cohort, mean age was 41 ± 13 years with 19 % female, 54 % Army, and 68 % with prior PTSD treatment. The mean presenting score on the PCL-M was 56.9 ± 15.2 and 65 % of subjects had a PCL-M score of 50 or higher. The ART was delivered in 3.7 ± 1.1 sessions with a 94 % completion rate.

The 26 participants assigned to ART who completed treatment underwent a mean of 3.6 ± 1.1 sessions. All 24 participants assigned to the AC group who initiated the intervention completed 2 sessions (per study protocol). Among the 50 completers of their randomly assigned intervention, the mean pre/post change on the PCL-M was −17.2 ± 13.4 in the ART group versus −2.5 ± 6.0 in the AC group (effect size = 1.39, $p < 0.0001$) (Fig. 4). When including the seven-non-completers in the ITT analysis (assuming no treatment response), the mean pre/post change on the PCL-M was −15.4 ± 13.7 in the ART group compared to −2.1 ± 5.6 in the AC group (effect size = 1.25, $p < 0.0001$). For the 39 of 50 treatment completers (78 % of sample) with evidence of refractory PTSD, the mean pre/post change on the PCL-M was −20.4 ± 13.6 in the ART group versus −1.7 ± 5.6 in the AC group (effect size = 1.80, $p < 0.0001$). Results were similar in the ITT analysis (effect size = 1.55, corrected p-value <0.0001).

In the context of military PTSD, it is estimated that as many as 70 % of veterans with chronic pain treated within the U.S. Veterans Administration (VA) system may have PTSD, and conversely, up to 80 % of those with PTSD may have pain ((Beckham et al. 1997; Lew et al. 2009; Otis et al. 2003; Shipherd et al. 2007; Stecker et al. 2010). Patients with both PTSD and chronic pain generally present with more complicated clinical profiles (Sharp and Hanery 2001) and no formal treatment guidelines exist for comorbid PTSD and chronic pain (Muller et al. 2009). In the ART military study, an ancillary analysis was conducted and published on the effects of ART on acute pain secondary to symptoms of PTSD (Kip et al. 2014b). Pain was measured using the Pain Outcomes Questionnaire (POQ) – Short Form (Clark et al. 2003), a reliable and valid instrument that contains 19 primary pain items that are rated on an 11-point (0–10) Likert-type scale and one demographic question. Prior to intervention, mean pain score on a visual analog 0–10 scale was 3.8 ± 2.6. Among 45 completers of their randomly assigned intervention, the mean pre/post change on the POQ was −16.9 ± 16.6 in the ART group versus −0.7 ± 14.2 in the AC group (effect size = 1.04, $p = 0.0006$) (Fig. 5). In the ITT analysis that assumed no response for subjects with missing data ($n = 12$), the mean pre/post change on the POQ was −14.0 ± 16.4 in the ART group versus −0.5 ± 12.2 in the AC group ($p = 0.0009$).

Thus, for the one published randomized controlled trial of ART among military personnel, results indicate that ART appears to be a brief, effective, and safe method of exposure therapy for veterans with symptoms of combat-related PTSD. Moreover, evidence suggests that PTSD-specific therapy with ART generalizes to related comorbidities, including reductions in chronic pain. In aggregate, in an average of <4 treatment sessions, treatment with ART appears to result in substantial, comparable reductions in symptoms of PTSD in civilian and military patients.

Key Facts: Imaginal Exposure (IE) and ART

- The process of IE involves having the patient "reexperience" the traumatic experience, whether mentally or in narrative form.
- A primary goal of the use of IE in ART is to "draw out" physiological responses associated with the trauma (e.g., fear, rapid heart rate) so that these symptoms can be reduced or eliminated with the use of smooth pursuit eye movements.
- With the ART protocol and while performing smooth pursuit eye movements, two courses of IE are performed by the patient to "reexperience" the entire past traumatic experience.

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Table 2 Demographic, military, and clinical characteristics by random assignment – military study

Characteristic	All ($n = 57$)	ART ($n = 29$)	AC ($n = 28$)	p-value
Age in years (mean ± SD)	41.4 ± 12.6	38.9 ± 11.5	44.0 ± 13.4	0.13
Female gender (%)	19.3	17.2	21.4	0.75
Current military status (%)				1.0
Active duty	12.3	13.8	10.7	
Reservist	17.5	17.2	17.9	
Discharged/veteran	70.2	69.0	71.4	
Primary branch of military service (%)				0.09
Army	54.4	65.5	42.9	
Navy	21.0	24.1	17.9	
Air Force	12.3	6.9	17.9	
Marines	12.3	3.5	21.4	
Four or more overseas tours of duty (%)	34.0	29.6	38.5	0.57
Principal location of deployment(s) (%)				0.52
Iraq	40.4	48.3	32.1	
Afghanistan	10.5	10.3	10.7	
Vietnam	7.0	3.5	10.7	
Other	42.1	37.9	46.4	
History of head trauma (%)	35.1	41.4	28.6	0.41
On disability for PTSD/other MH disorder (%)	42.1	51.7	32.1	0.18
Principal type of trauma sought for treatment (%)				0.99
Military sexual trauma	10.5	10.3	10.7	
Witness death, execution, and/or major injuries	36.8	34.5	39.3	
IED blast or combat explosion	36.8	37.9	35.7	
Homicide of civilian	3.5	3.5	3.6	
Multiple traumas (three or more)	12.3	13.8	10.7	
Five or more traumatic memories currently impacting life (%)	47.4	51.7	42.9	0.60
Lived with traumatic memories >10 years (%)	49.1	44.8	53.6	0.60
Previous treatment for PTSD (%)	68.4	65.5	71.4	0.78
Individual therapy	59.7	51.7	67.9	0.28
Group therapy	19.3	17.2	21.4	0.75
Pharmacotherapy	52.6	58.6	46.4	0.43
PCL-M score (mean ± SD)	56.9 ± 15.2	57.4 ± 15.0	56.4 ± 15.7	0.81
PCL-M score ≥ 50 (%)[a]	64.9	69.0	60.7	0.59
CES-D score (mean ± SD)	26.5 ± 13.6	26.2 ± 13.5	26.7 ± 14.0	0.87
CES-D score ≥ 16 (%)	75.4	75.9	75.0	1.0
PDSQ score (mean ± SD) (T-score)	54.5 ± 10.4	54.6 ± 9.1	54.5 ± 11.7	0.97

Note the chronic nature of PTSD among military personnel, as illustrated by the fact that about half of all participants had five or more traumatic memories still impacting their life, about half had lived with one or more traumatic memories for ≥10 years, and nearly 70 % had received previous treatment for PTSD

Adapted with permission from Kip et al. (2013a)

PCL-M: PTSD Checklist, Military Version; CES-D: Center for Epidemiologic Studies Depression Scale; *PDSQ* Psychiatric Diagnostic Screening Questionnaire

[a]Established screening cutpoint score for probable PTSD

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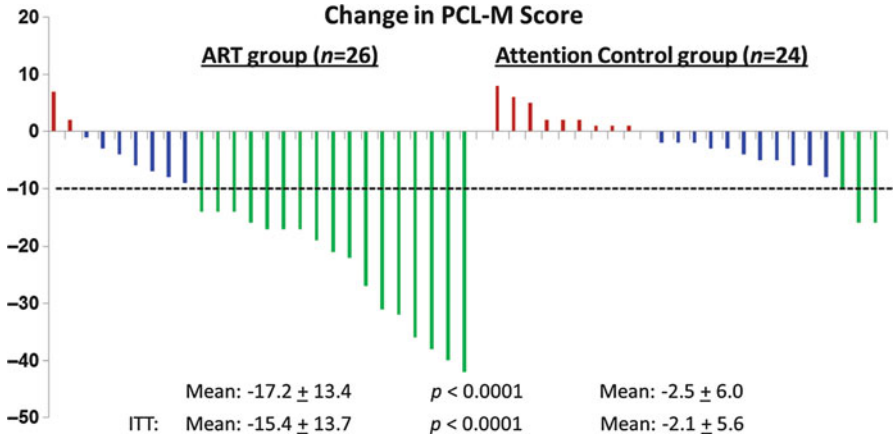

Fig. 4 Plot of change scores on the PCL-M (PTSD) checklist before and after treatment with Accelerated Resolution Therapy (ART) versus before and after an Attention Control (AC) regimen. Each vertical line represents the response of an individual service member or veteran. These data illustrate that the majority of military participants treated with ART achieved favorable reductions in symptoms of PTSD, with many experiencing a reduction of 10 or more points on the PCL-M (*green shading*), an established metric for clinical and statistically meaningful improvement. In contrast, participants in the control condition tended to experience little to no improvement in symptoms of PTSD (With permission from Kip et al. (2013a))

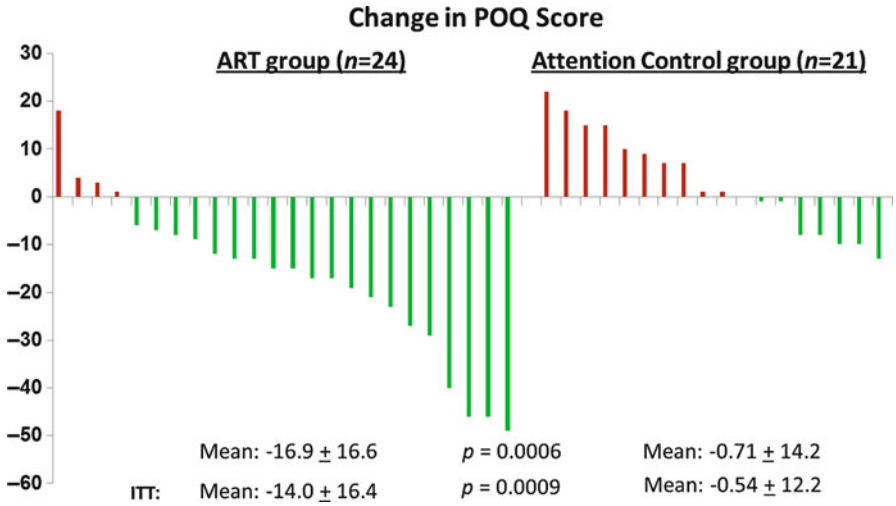

Fig. 5 Plot of change scores on the Pain Outcomes Questionnaire (POQ) before and after treatment with Accelerated Resolution Therapy (ART) versus before and after an Attention Control (AC) regimen. Each vertical line represents the response of an individual service member or veteran. *ITT* intention to treat analysis. These data illustrate that the majority of military participants treated with ART achieved favorable reductions in symptoms of pain, as measured by the Pain Outcomes Questionnaire. In contrast, participants in the control condition tended to experience little to no improvement in symptoms of pain (Through open source access from Kip et al. (2014b))

- After each set of eye movements during IE, the patient is asked about their physiological sensations which are then processed (reduced) intermittently with the use of smooth pursuit eye movements.
- During the second course of IE, patients will often times report "seeing" their scene differently and also may report recalling new details of the original traumatic experience.

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Key Facts: Imagery Rescripting (IR) and ART

- Imagery rescripting is broadly defined as working directly with imagery to change meanings and ameliorate distress (Hackmann 2011).
- The use of IR, as with ART, is theoretically based on the postulate that much of the cognitive–affective disturbance associated with intrusive trauma-related memories is embedded in the traumatic images themselves, and that modifying the traumatic imagery becomes a powerful, if not preferred, means of processing the traumatic material (Smucker 1997).
- Use of IR with ART is also based on the notion that brain processes during fear-based memory retrieval are malleable and receptive to change, a state known as reconsolidation (Monfils et al. 2009).
- With the ART protocol, an intervention known as the "Director" is used whereby patients envision (rescript) the manner in which they prefer to recall prior images and sensations.
- While not empirically based, new material that is introduced with IR and the ART protocol during the reconsolidation period is theorized to be long-lasting, if not permanent (Schiller et al. 2010).

Key Facts: Elements of the ART Protocol

- The ART protocol uses IE, IR, and smooth pursuit eye movements to treat PTSD as a failure of the traumatized individual to exhibit extinction of the affective component of the memory.
- By protocol, ART is delivered in one to five treatment sessions with no homework or outside skills practice exercises.
- During an ART session, one or more traumatic scenes (experiences) are treated, and for each scene, the patient undergoes two complete periods of IE (i.e., imagining the entire scene from beginning to end), follow by IR and session closeout activities.
- Sets of 40 smooth pursuit (right-left) eye movements are used frequently throughout the ART session to process (reduce) physiological sensations and to achieve IR of the preferred new material.
- Gestalt therapy and metaphors are frequently used with the ART protocol to assist with envisioning a new narrative (e.g., images) to the original traumatic experience(s).
- In the case of the patient presenting with multiple traumatic experiences, not all need be treated with the ART, with treatment of the top three most distressing experiences often being able to generalize to overall symptom relief.

Key Facts: Eye Movements and the ART Protocol

- Smooth pursuit eye movements are used frequently throughout the ART protocol, yet with a heretofore unknown mechanism(s) of action, as summarized below.
- Repeated sets of eye movements are postulated to aid in cognitive processing of traumatic experiences by enhancing memory retrieval (Lyle and Martin 2010).
- Eye movements are postulated to render traumatic images less vivid and emotional as a result of taxing working memory (Lee and Cuijpers 2013; van den Hout et al. 2001).
- Use of eye movements has been suggested to induce relaxation and reduce future emotionality of thinking about the traumatic experience by the process of reciprocal inhibition (van den Hout et al. 2001).
- Eye movements are postulated to increase interhemispheric EEG coherence and enhance memory reconsolidation (Dumermuth and Lehman 1981).

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Key Facts: ART Evidence Base and Comparison to Other Evidence-Based Therapies

- Two studies have been completed on ART, a prospective cohort study and a randomized controlled trial, both of which have shown strong evidence of efficacy in the treatment of symptoms of PTSD.
- Empirical data on ART have shown reductions of symptoms of PTSD in both civilian and military personnel, as well as reductions in symptoms of depression and chronic pain.
- By protocol, ART is delivered in less than half the time required for delivery of current first-line evidence-based treatments including PE, CPT, EMDR, and SIT.
- Unlike most therapies, ART can be delivered as "silent" therapy without the patient needing to verbally or in writing describe details of their traumatic experiences.
- The ART protocol aims to "replace" negative images with positive images in the brain, as opposed to current first-line evidence-based therapies that focus on desensitization of images and triggers associated with the traumatic experience.

Summary Points

- This chapter has provided a description of Accelerated Resolution Therapy (ART) as a brief, emerging, evidence-based treatment for civilian and military post-traumatic stress disorder (PTSD).
- The ART protocol, which is used for civilian and military PTSD, uses the four core components found in most A-level trauma-focused psychotherapies (U.S. Department of Veterans Affairs 2010), yet is much briefer (i.e., one to five sessions and no homework) than current evidence-based first-line therapies.
- The pressing need for effective new therapies is driven by: (i) the high prevalence and significant morbidity of PTSD in both civilian and military settings; (ii) limitations of current first-line, evidence-based therapies (lengthy treatment protocols and variable rates of dropout and success); and (iii) unique types and magnitude of trauma for specific patient populations, including U.S. military personnel.
- The ART protocol requires further controlled study, yet appears to be a particularly promising therapy for treatment of civilian and military PTSD, in large part, due to its brevity and lack of need for verbal disclosure of details, including traumas stemming from classified operations and those of a particularly sensitive nature (e.g., sexual trauma).
- Whereas the ART practices of imaginal exposure and imagery rescripting are evidence based in the treatment of PTSD, the underlying mechanisms as to how repeated sets of smooth pursuit eye movements are of therapeutic value is unknown. Major competing theories include: (i) taxing working memory to decrease the vividness and/or emotionality of autobiographical memories, (ii) inducing relaxation through reciprocal inhibition, and (iii) heretofore unknown similarities with rapid eye movements for memory consolidation.
- Long-term post-treatment empirical research data do not exist for ART, and no controlled trials have been conducted against prolonged exposure therapy, cognitive processing therapy, eye movement desensitization reprocessing, or stress inoculation training (i.e., first-line evidence-based treatments). These data are essential in fully evaluating and quantifying the potential benefit of ART as a first-line treatment option for civilian and military PTSD.

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