Evidence Compass

Technical Report

What emerging interventions are effective for the treatment of adults with PTSD?

A Rapid Evidence Assessment

August 2013

Australian Government
Department of Veterans' Affairs

Disclaimer

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Please forward any comments or queries about this report to at-ease@dva.gov.au

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Executive Summary

- While efficacious psychological interventions for post-traumatic stress disorder (PTSD) have been established, a number of new therapies termed 'emerging interventions' have generated interest within the popular media. This has created a flow-on effect whereby trauma survivors, including veterans, are increasingly requesting access to emerging interventions. Therefore, the efficacy of these interventions needs to be established.

- The aim of this rapid evidence assessment (REA) was to review the effectiveness of emerging interventions for the treatment of adults with a diagnosis of PTSD. The emerging interventions identified for review included mindfulness, acceptance and commitment therapy, meditation, transcendental meditation, acupuncture, power therapies (including emotional freedom technique (EFT), thought field therapy (TFT), visual-kinaesthetic dissociation (VKD), rewind technique (RT) and traumatic incident reduction (TIR) and experiential psychotherapies including adventure therapy, art therapy, music therapy, canine and equine assisted psychotherapy.

- Literature searches were conducted to collect studies published from 2003-2013 that investigated emerging interventions in adults with a diagnosis of acute stress disorder or PTSD. Studies were excluded if they did not measure PTSD symptoms, less than 70% of participants met diagnostic criteria for PTSD or where the sample was receiving concurrent psychological treatment for PTSD. Studies were assessed for quality of methodology, risk of bias, and quantity of evidence, and the consistency, generalisability and applicability of the findings to the population of interest. These assessments were then collated for each emerging intervention to determine an overall ranking of level of evidence support for each intervention.

- The ranking categories were 'Supported' –clear, consistent evidence of beneficial effect; 'Promising' – evidence suggestive of beneficial effect but further research required; 'Unknown' – insufficient evidence of beneficial effect; 'Not supported' – Clear, consistent evidence of no effect or negative/harmful effect.

- Eight studies met the inclusion criteria for review. Two-thirds originated from the USA, a quarter came from the UK and a final study originated from Uganda.

- One study investigated acceptance and commitment therapy, one investigated acupuncture, one study investigated meditation, two studies investigated transcendental meditation, one study investigated music therapy, one study

investigated EFT and final study investigated VKD. Overall, the quality of the studies was low and had high risk of bias. This influenced the ranking of the studies significantly.

- The evidence for traditional acupuncture in treating PTSD in adults received a 'Promising' ranking.
- The evidence for acceptance and commitment therapy in treating PTSD in adults received an 'Unknown' ranking. Other interventions that received an 'Unknown' ranking were meditation, transcendental meditation, music therapy, EFT, and VKD.
- No studies met the inclusion criteria for a number of the emerging interventions, including canine and equine assisted psychotherapy, adventure therapy, mindfulness, TFT, RT, TIR, and art therapy. The lack of any studies for these interventions meant they did not achieve a ranking according to this REA methodology.
- Well conducted, rigorous trials are required to test the efficacy of interventions identified in this REA in the treatment of PTSD. Currently, there is a paucity of evidence supporting to use of these interventions in the treatment of PTSD.

Introduction

Guidelines for the treatment of acute stress disorder (ASD) and posttraumatic stress disorder (PTSD)[1-3] outline the range of psychotherapeutic interventions effective for the treatment of adults with PTSD. These evidence-based interventions include trauma-focused cognitive behavioural therapy (TF-CBT) and eye-movement desensitisation and reprocessing therapy (EMDR)[1], underpinned by a strong evidence base supporting their use across a variety settings and populations. At the same time, there are a large number of therapies in the treatment of adults with ASD and PTSD that can be classed as 'emerging interventions', but their effectiveness to improve symptoms has not yet been firmly established in the scientific literature.

The aim of the current review was to examine the scientific literature for evidence of support for a number of therapies considered to be emerging interventions for the treatment of adults with PTSD. Three broad categories of emerging interventions for the treatment of adults with PTSD were considered. These included psychological interventions (e.g., mindfulness and power therapies), physical therapies (traditional acupuncture), and a range of experiential psychotherapies including adventure therapy, art therapy, music therapy, or animal therapy (i.e. canine therapy, equine therapy). A brief description of these therapies is provided below.

Mindfulness

Mindfulness-based therapies are considered part of the 'third-wave' of cognitive and behavioural psychotherapies. Although relatively new to Western approaches, mindfulness has a long history of practice in Eastern philosophies (e.g., Buddhism, Taoism and Yoga). Mindfulness can be defined as 'the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment' (p.145) and includes 'an affectionate, compassionate quality within the attending, a sense of openhearted, friendly presence and interest' (p.145)[4]. It is from this stance - that is at the same time highly present, yet removed from the event and overwhelming emotions - that the individual is able to approach difficult internal experiences, and reconsider these as transitory ones inherent to our humanness. In comparison to standard treatments like CBT, the individual's symptoms are not the focus of treatment. Rather, the treatment is focussed on helping the individual redirect attention to the present moment, and reconsider relationships between thoughts, feelings and current experience[5].

Acceptance and Commitment Therapy (ACT)

ACT is an increasingly popular form of mindfulness-based therapy and was considered separately in this review, in addition to mindfulness more broadly. ACT encourages the individual to create a rich and meaningful life, through committing to taking effective value based actions, remaining fully present and engaged, and accepting difficult experiences as an inevitable part of life[6]. To achieve this, ACT promotes the six core processes of: acceptance, cognitive defusion, being in the present moment, self as context, values, and committed action[7]. In common with mindfulness, ACT does not focus on inner experiences - but instead targets the effects of these experiences on behaviour, using behavioural based approaches that promote actions consistent with the individuals values[8]. In this way, ACT is thought to alleviate mental distress and symptoms of disorder more as a by-product, than an actual focus of the therapy[6].

Meditation and Transcendental Meditation

Meditation is well-known and has been practised as a part of western approaches to psychotherapy for many years. Broadly speaking, meditation involves developing a greater awareness of the mind. There are a range of types of practises and disciplines within the meditation field, that are distinguished by their distinct aims[9]. Mantra meditation, for example, involves focussing on an object to bring about a sense of peace and relaxation[9]. Mantram repetition is the selection of a meaningful word or phrase with spiritual associations to focus attention on through silently repeating it, which has been found to have a calming effect in stressful situations[10]. In the current review, meditation and transcendental meditation were considered. Transcendental meditation (TM) also involves mantra repetition, but the aim is to bring about a transcendental experience through the repetition, a step beyond the heightened awareness of mantram repetition. TM is a formalised practise, and begins with the individual sitting comfortably with their eyes closed, and silently appreciating a mantra at ‘finer’ levels until the mantra becomes increasingly secondary to the persons experience and ultimately disappears as self-awareness becomes more primary (the experience of transcending)[11].

Power Therapies

‘Power therapies’ is a collective term used to refer to a number of novel and supposedly fast acting exposure-based treatments specifically for PTSD. The current review examined the evidence base for support for the use of the following techniques in the treatment of adults with PTSD; emotional freedom technique (EFT), thought field therapy (TFT), visual-

kinaesthetic dissociation (VKD), rewind technique (RT) and traumatic incident reduction (TIR). Common to all power therapies is some form of visualisation regarding the traumatic event/s. Some of the therapies pair the visualisation with physical touch, or working with physiological responsiveness. For example, EFT requires the individual to focus on the traumatic memory while the therapist (or patient) taps lightly on various traditional acupuncture meridian points on the face, upper body and hands[12]. Underlying EFT is the assumption that emotional disturbances associated with traumatic events are caused by disturbances in the body's energy field (meridian system)[12].

By comparison, VKD does not use physical touch, and involves the therapist working with the individual's physiological responsiveness. In VKD the individual briefly focusses on the traumatic event/s until there is an observable physiological response (change in heart rate, breathing, or skin tone) detected by the therapist[13,14]. The individual's attention is then brought back to the present context. This is followed by a three-part dissociation (a series of visualisations) with the individual, for example, asked to imagine they are seated in a movie theatre watching themselves, watching their trauma story on the screen; to view their story in black and white; and later very quickly in reverse. After this series of visualisations, each sensory system is probed for possible triggers using the questions that evoked the physiological response at the beginning. When there is no physiological response, the intervention is thought to have worked[13]. VKD is argued to assist individuals to have a degree of kinaesthetic detachment from kinaesthetic memories of the traumatic event/s.

The process for RT and TIR also begin with the individual being asked to close their eyes and watch a 'movie' of their trauma. However, the next step in RT involves the individual stepping in to the movie at the end, and imaging it is been quickly rewound so that it is not possible to see or feel the same amount of content as in the forward playing movie. When this is done, the individual opens their eyes, signalling the end of the therapy[15]. It is argued that RT provides a strategy for intrusion phenomena by providing a metaphorical 'box with a key' into which the trauma content can be stored and locked. In the TIR technique, after the individual has watched the 'movie' of their trauma, they are asked to disclose what was seen and experienced to the therapist[16]. These two steps are repeated (often in the one session) until an end point is reached, where all memories of the event/s have been recalled and no longer cause distress[16]. It is hypothesised that TIR allows the individual to experience the trauma related content in a way that is briefly separated from the cognitive processing that takes place during the recall and verbalisation of the experience[17], enabling processing of the content until extinguishment.

It is acknowledged that there are similarities between the power therapies and other types of imaginal exposure therapies which are a standard feature of trauma-focussed CBT. Yet the power therapies remain novel in that the client is not generally required to verbalise or otherwise express their experience, but rather to re-experience it in their mind just as it regularly re-represents itself to them[15].

Traditional Acupuncture

Acupuncture is a modality of Traditional Chinese Medicine practiced in Asia for thousands of years, that has continued to gain acceptance for the treatment of physical and mental health issues in the mainstream health systems of Western countries[18,19]. Traditional Chinese Medicine views the health and well-being of an individual holistically, and acupuncture is one of several techniques used to treat the 'underlying disharmony' contributing to illness[18]. In practical terms, acupuncture is a procedure where small, solid needles are placed into rationally chosen points in subcutaneous tissue for a given period of time and manipulated (by turning the needle at the appropriate time)[20]. This process gives a sensation of 'de qi' (a fullness or heaviness and warmth, but not pain) and aims to move vital energy around the body to restore balance between bodily systems[18]. Acupuncture stimulates neural pathways, including central, peripheral and autonomic nervous systems and the limbic system, as well as immune and inflammatory system responses.

Experiential psychotherapies

Another group of emerging interventions for the treatment of adults with ASD and PTSD are loosely grouped together as experiential psychotherapies because they draw on certain modalities of lived experiences for therapeutic gain. Adventure therapy (such as the Outward Bound program[21]), art therapy, music therapy, and canine and equine assisted psychotherapy were examined in this review.

Adventure therapy is a term used to cover a broad range of wilderness, outdoor and adventure based interventions[22]. The Outward Bound Experience (OBE) is well known for its use with veterans and employs a series of challenging experiences in a wilderness setting to facilitate change[21]. Over the intervening years, wilderness, outdoor and adventure-based interventions has held appeal for the treatment of the complex problems at risk youth present. However, concern over the lack of engagement of families systems in this process, and the need for the industry as a whole to establish standards of care, accreditation and credentialing of practitioners has been noted[23-27].

The literature on the use of animal based psychotherapies – in particular equine and canine therapy have also focussed on work with at risk adolescents, as well as people with trauma histories, substance use disorders and veterans[28,29]. At the core of these approaches is therapeutic alliance between the individual, the horse or dog, and the therapist[30,31]. The animal provides a means for working through interpersonal and emotional issues that traditional client/ therapist paradigms is not able to provide[30,32,33]. Issues of trust, agency and responsibility, self-worth and self-esteem are commonly worked on in this form of psychotherapy.

Art therapy is a form of exposure therapy, and provides a visual means for the expression of trauma content (without verbalising) that is possibly aligned with the visual manner in which trauma content presents itself to the individual[34,35]. Art therapy is argued to assist individuals to recall, re-enact, and integrate the trauma content with their sense of self which may assist the individual to have a sense of mastery of emotion [36]. Art therapy is also hypothesised to allow for the containment of the trauma experience in the art object which may assist the individual to regain a sense of control over past and present experiences[35,36].

Music therapy is argued to work on trauma symptoms at a preconscious level, with neural areas common to both the trauma experience and music stimulated through the sensory experience[37]. The emotional responses that are elicited are then able to be worked with providing self-expression and a sense of control over past and present experience[38]. In some forms of music therapy for trauma, the therapist will work with the individual on composing and recording relaxing music, before leading in to musical improvisation and song-writing to provide a cohesive narrative of their trauma and autobiographical experiences[39]. In the group music therapy format, individuals might be introduced to a range of instruments and encouraged to improvise, while the therapist provides accompaniment and gradually extends and varies the nature of the musical interaction. This is followed by reflection, with the therapist providing supportive psychotherapeutic interventions, drawing together common themes[38]. In addition to the therapeutic process, music therapy is hypothesised to assist with relaxation and thus have an impact of the modulation of arousal[40].

Method

This literature review utilised a rapid evidence assessment (REA) methodology. The REA is a research methodology which uses similar methods and principles to a systematic review but makes concessions to the breadth and depth of the process, in order to suit a shorter timeframe. The advantage of an REA is that it utilises rigorous methods for locating, appraising and synthesising the evidence related to a specific topic of enquiry. To make a REA rapid, however, the methodology places a number of limitations in the search criteria and in how the evidence is assessed. For example, REAs often limit the selection of studies to a specific time frame (e.g., last 10 years), and limit selection of studies to peer-reviewed published, English studies (therefore not including unpublished pilot studies, difficult-to-obtain material and/or non-English language studies). Also, while the strength of the evidence is assessed in a rigorous and defensible way, it is not necessarily as exhaustive as a well-constructed systematic review and meta-analysis. A major strength, however, is that an REA can inform policy and decision makers more efficiently by synthesising and ranking the evidence in a particular area within a relatively short space of time and at less cost than a systematic review/meta-analysis.

Defining the research question

The components of the question were precisely defined in terms of the population, the interventions, and the outcomes (PICO - refer to Appendix 1). Operational definitions were established for key concepts for each question, and from this specific inclusion and exclusion criteria were defined for screening studies for this REA. As part of this operational definition, the population of interest was defined as adults with a diagnosis of PTSD or ASD, and not currently receiving any psychological treatment for ASD or PTSD, and the outcome was defined as PTSD symptoms as measured by validated measures of PTSD.

Search strategy

To identify the relevant literature, systematic bibliographic searches were performed to find relevant trials from the following databases: EMBASE, MEDLINE (PubMed), PsychINFO, Cochrane, Clinical Guidelines Portal (Australia), National Guideline Clearinghouse (USA)

No guidelines, meta-analyses or systematic reviews were identified which covered any of the emerging interventions of interest that met the inclusion/exclusion criteria of the current review.

Search terms

The search terms specific to emerging interventions were included in searching the Title/s, Abstract/s, MeSH terms, Keywords lists and Chemical included: *Acceptance and Commitment Therapy, acupuncture, adventure therapy, Outward Bound therapy, art therapy, canine therapy, equine therapy, meditation, Transcendental Meditation, Mindfulness, music therapy, Emotional Freedom Therapy/Technique, Rewind Therapy/Technique, Thought Field Therapy, Traumatic Incident Reduction, Visual Kinaesthetic Dissociation Technique*.

An example of the search strategy conducted in the Embase database appears in the Appendix 2.

Paper selection

Papers were included in the review of the evidence if they met all of the following inclusion criteria.

Included:
1. Internationally and locally published peer-reviewed research studies 2. Research papers that were published from **1st January 2003** to **26th April 2013** 3. Trials with outcome data that assesses Acute Stress Disorder (ASD) or Posttraumatic Disorder (PTSD) symptom severity, or diagnosis 4. Human Adults (i.e. ≥ 18 years of age) 5. English Language 6. The majority of the sample of participants have diagnosed ASD or PTSD (≥ 70%)
Excluded:
1. Non-English papers 2. Papers where a full-text version is not readily available 3. Validation study 4. Animal studies 5. Grey literature (e.g. media: websites, newspapers, magazines, television, conference abstracts, theses) 6. No quantitative outcome data reported 7. Papers where rates of baseline ASD or PTSD were not reported 8. Concurrent psychological treatment for ASD or PTSD (concurrent medication and case management were permitted).

Information management

A screening process was adopted to code the eligibility of papers acquired through search strategy. The content of screening at the title and abstract screening stage is presented in Appendix 3. Papers were directly imported into EPPI-Reviewer 4 software. All records that were identified using the search strategy were screened for relevance against the inclusion criteria. Initial screening for inclusion was performed by one reviewer, and was based on the information contained in the title and abstract. Full text versions of all studies which satisfied this initial screening were obtained.

In screening the full-text paper, the reviewer made the decision on whether the paper should be included or excluded, based on criteria for the specific question. If the paper met the criteria for inclusion, then it was subject to data abstraction. At this stage in the information management process, 10% of the articles being processed were randomly selected and checked by two independent reviewers. In the case of discrepancies regarding inclusion/exclusion, discussions were held between the two independent reviewers and the lead researcher, and the discrepancies reconciled. The following information was extracted from studies that met the inclusion criteria: (i) study description, (ii) intervention description, (iii) participant characteristics, (iv) primary outcome domain, (v) main findings, (vi) bias and (vii) quality assessment.

Evaluation of the evidence

There were four key components that contributed to the overall evaluation of the evidence. These components were:

- The **strength of the evidence base**, in terms of the quality and risk of bias, quantity of evidence, and level of evidence (study design)
- The **consistency** of the study results
- The **generalisability** of the body of evidence to the target population (e.g. veterans)
- The **applicability** of the body of the evidence to the Australian context

The first two components provided a gauge of the internal validity of the study data in support of efficacy (for an intervention). The last two components considered the external factors that may influence effectiveness, in terms of the generalisability of study results to the intended target population, and applicability to the Australian context.

Strength of the evidence base

The strength of the evidence base was assessed in terms of the a) quality and risk of bias, b) quantity of evidence, and c) level of evidence.

a) **Quality and risk of bias** reflected how well the studies were conducted, including how the participants were selected, allocated to groups, managed and followed-up, and how the study outcomes were defined, measured, analysed and reported. An assessment was conducted for each individual study with regard to the quality and risk of bias criteria utilising a modified version of the Chalmers Checklist for appraising the quality of studies of interventions[41] (see Appendix 4). Three independent raters rated each study according to these criteria, and together a consensus agreement was reached as to an overall rating of 'Good', 'Fair', or 'Poor'.

b) **Quantity** of evidence reflected the number of studies that were included as the evidence base for each ranking. The quantity assessment also took into account the number of participants in relation to the frequency of the outcomes measures (i.e. the statistical power of the studies). Small underpowered studies that were otherwise sound may have been included in the evidence base if their findings were generally similar- but at least some of the studies cited as evidence must have been large enough to detect the size and direction of any effect.

c) **Level of evidence** reflected the study design. The details of the study designs which are covered by each level of evidence are as follows:

- Level I: A systematic review of RCTs
- Level II: An RCT
- Level III-1: A pseudo-randomised controlled trial (i.e. a trial where a pseudo-random method of allocation is utilised, such as alternate allocation).
- Level III-2: A comparative study with concurrent controls. This can be any one of the following:
    - Non-randomised experimental trial [this includes controlled before-and-after (pre-test/post-test) studies, as well as adjusted indirect comparisons (i.e. utilise A vs B and B vs C to determine A vs C with statistical adjustment for B)]
    - Cohort study
    - Case-control study

  - Interrupted time series with a control group

- Level III-3: A comparative study without concurrent controls. This can be any one of the following:
  - Historical control study
  - Two or more single arm study [case series from two studies. This would include indirect comparisons utilise (i.e. A vs B and B vs C to determine A vs C where there is no statistical adjustment for B]
  - Interrupted time series without a parallel control group.
- Level IV: Case series with either post-test or pre-test/post-test outcomes

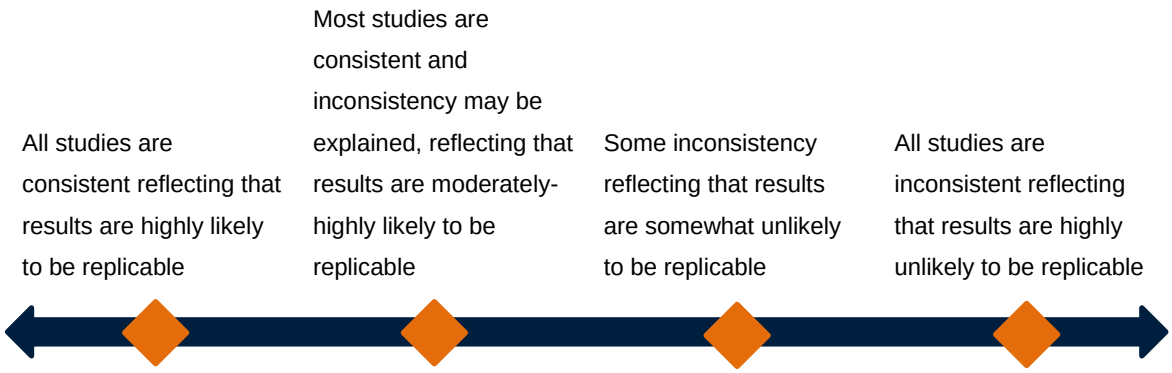
Overall strength

A judgement was made about the strength of the evidence base, taking into account the quality and risk of bias, quantity of evidence and level of evidence. Agreement was sought between three independent raters and consensus about the strength of the evidence based was obtained according to the categories below.

High beneficial strength	**Moderate beneficial strength**	**Low beneficial strength**	**High non-beneficial strength**
Clear evidence of beneficial effect. One or more Level I studies with a low risk of bias **OR** three or more Level II studies with a low risk of bias	*Evidence suggestive of beneficial effect***.** One or two Level II studies with a low risk of bias **OR** two or more Level III studies with a low risk of bias	*Insufficient evidence at present.* One or more Level I through to Level IV study with a high risk of bias	*No effect or a harmful effect.* One or more Level I studies with a low risk of bias **OR** three or more Level II studies with a low risk of bias

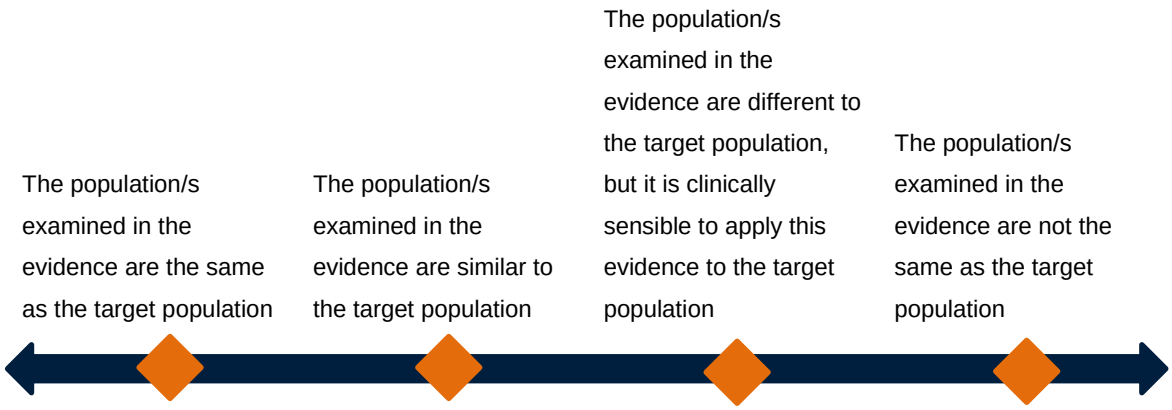
Consistency

The consistency component of the ranking system of the body of the evidence assessed whether the findings were consistent across the included studies (including across a range of study populations and study designs). It was important to determine whether study results were consistent to ensure that the results were likely to be replicable or only likely to occur under certain conditions.



Generalisability

This component covered how well the participants and settings of the included studies could be generalised to the target population. Population issues that might influence this component included gender, age or ethnicity, or level of care (e.g. community or hospital).



Applicability

This component addressed whether the evidence base was relevant to the Australian context, or to specific local settings (such as rural areas or cities). Factors that may reduce the direct application of study findings to the Australian context or specific local settings include organisational factors (e.g. availability of trained staff) and cultural factors (e.g. attitudes to health issues, including those that may affect compliance).

Ranking the evidence

On balance, taking into account the considerations of the strength of the evidence (quantity and risk of bias, quantity of evidence and level of evidence), consistency, generalisability and applicability, the total body of the evidence was then ranked into one of four categories: 'Supported', 'Promising', 'Unknown' and 'Not Supported' (see Figure 1). Agreement on ranking was sought between three independent raters. NOTE: If the strength of the evidence was considered to be low, the next steps of rating consistency, generalizability and applicability were not conducted and the evidence was rated as "Unknown".

Figure 1: Categories within the intervention ranking system

SUPPORTED	PROMISING	UNKNOWN	NOT SUPPORTED
Clear, consistent evidence of beneficial effect	Evidence suggestive of beneficial effect but further research required	Insufficient evidence of beneficial effect, and further research is required.	Clear, consistent evidence of no effect or negative / harmful effect

Results

The following section presents figures pertaining to the volume of records identified at each stage of the rapid evidence assessment (Figure 2), the source of the records (Figure 3), and the year of publication (Figure 4). From all the sources searched, a total of eight papers met the inclusion criteria and were included in the final report. Of the eight studies, 62.5% (n= 5) originated from the USA (refer to Figure 3). A further two studies (25.0%) were sourced from the UK, and the final study came from Uganda (12.5%). The year of publication for studies that were included in this rapid evidence assessment is presented in Figure 4. As can be seen, there is a slight increase in the number of studies meeting inclusion criteria in 2011 and 2012 and none were identified prior to 2007.

Figure 2: Flowchart representing the number of records retrieved at each stage of the rapid evidence assessment

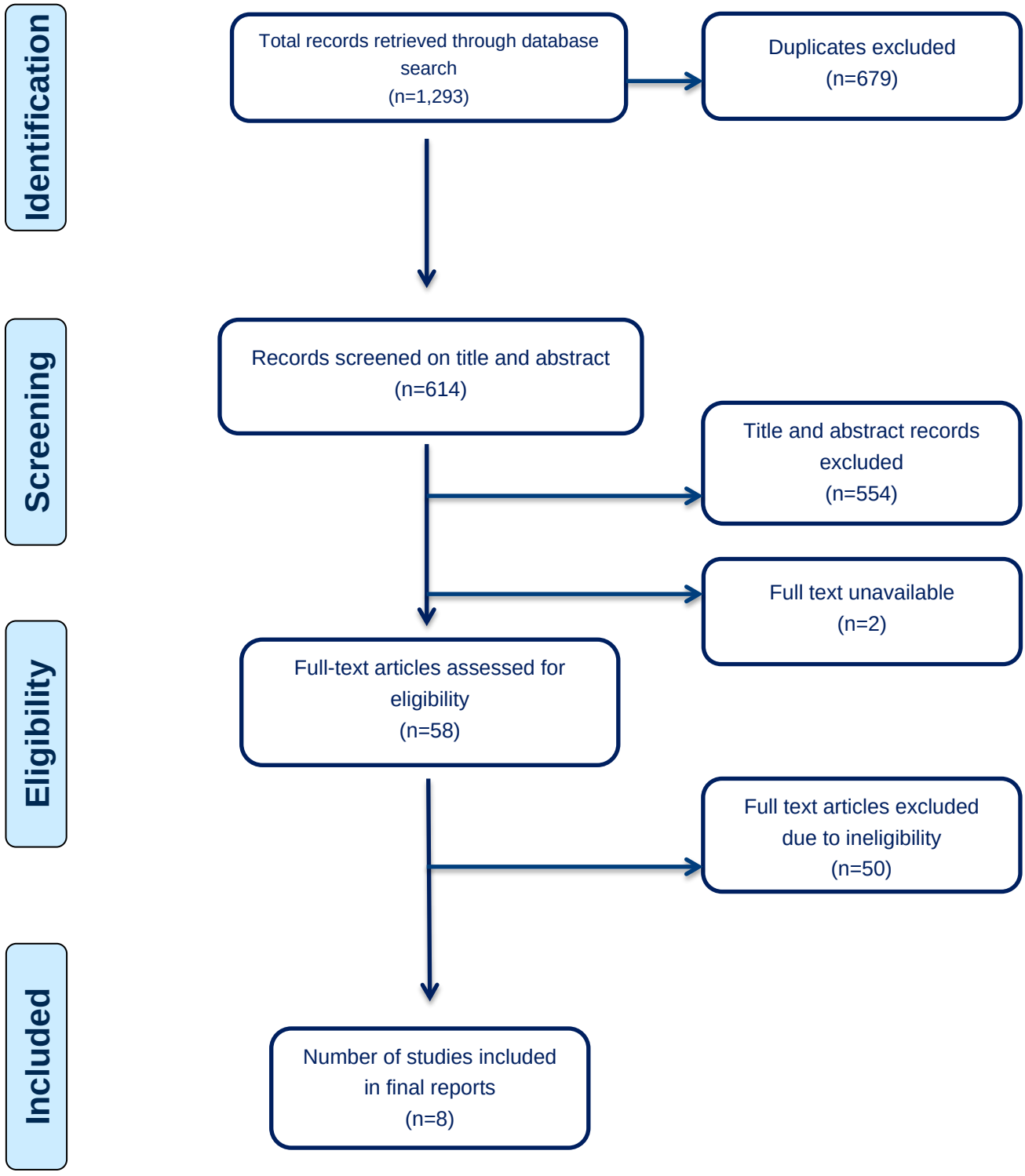


Figure 3. Where studies included in the rapid evidence assessment originated from

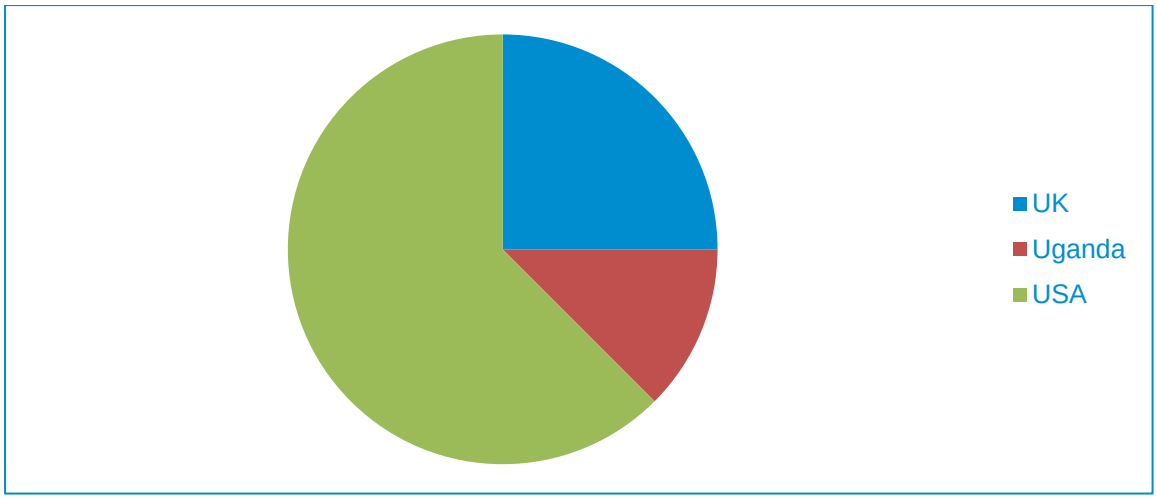
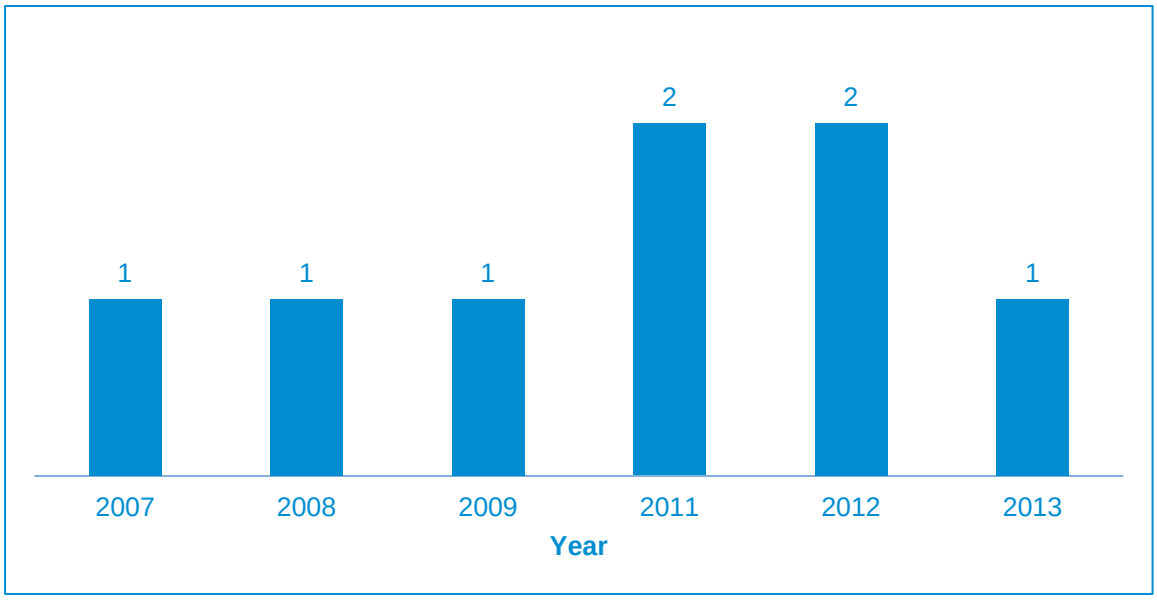


Figure 4. Year of publication of studies included in the rapid evidence assessment



Summary of the evidence

A total of eight articles were included in this review that examined the effectiveness of the specified emerging interventions in the treatment of adults with PTSD. The eight studies pertained to acceptance and commitment therapy (ACT; one studies), acupuncture (one

study), meditation (one study), transcendental meditation (TM; two studies), music therapy (one study), emotional freedom technique (EFT; one study) and visual kinaesthetic dissociation (VKD, one study). A summary of the studies is found in the evidence profile presented in Appendix 5 in detail and in Appendix 6 as a brief overview.

Acceptance and Commitment Therapy

Only one study testing the efficacy of ACT in treating PTSD satisfied the inclusion criteria for this REA[8]. The single case study documented clinically significant reduction in PTSD symptoms in a 42 year old woman with a history of child abuse. This was seen over 21 x 60 minute, weekly sessions of ACT for PTSD, and followed a 20 week course of CBT for PTSD which had not alleviated the symptomatology. Given there was only a single case study identified in support for ACT, the strength of the evidence base supporting the use of ACT in the treatment of adults with PTSD was judged to be of low beneficial strength.

Given the strength of the evidence base for the use of ACT in the treatment of PTSD was low, generalizability, consistency, and applicability were not assessed. The use of ACT in the treatment of adult PTSD was ranked as 'Unknown'.

Traditional Acupuncture

Only one study testing the efficacy of traditional acupuncture in treating PTSD satisfied the inclusion criteria for this REA[20]. This randomised controlled trial comprised a sample of adults with PTSD (n= 61) with mixed trauma histories. The study consisted of three groups with acupuncture (n=19) compared to group CBT for PTSD (n=21), and a wait list control (n=22). Participants in both intervention groups received up to 24 hours of therapy over 12 weeks, with at least 15 minutes per day of home-based therapy. At post-treatment there was no significant difference in PTSD severity between those in the acupuncture condition and those in the group CBT condition with participants in both conditions reporting significantly lower rates of PTSD than at pre-treatment. Both acupuncture and group CBT conditions had significantly lower PTSD severity than those in the wait list condition at post-treatment. At post-treatment, 63% of the acupuncture, 36% of the group CBT and 17% of the wait list control participants reported PTSD scores below the diagnostic threshold and these findings were similar at three months follow-up.

In evaluating the strength of the evidence this study received a 'Good' quality and risk of bias assessment. It was recognised that a blinded randomisation method was utilised, as was a standardised self-report measure. Drop-out rates were within an acceptable level (17% to 19% of participants). An intention-to-treat statistical analysis was performed. It was noted that the comparison condition group was group cognitive behavioural therapy which is

not considered a first-line treatment of PTSD. Taking all these issues into account, the evidence base supporting the use of acupuncture in the treatment of adults with PTSD was judged to have moderately beneficial strength.

Given the strength of the evidence base for the use of acupuncture in the treatment of PTSD was moderate, we considered generalizability, consistency, and applicability. An assessment of consistency was not able to be made given a single study comprised the evidence base for acupuncture. Generalisability of the findings to the Australian adults with PTSD was considered moderate due to similarities between a mixed trauma sample and the general population, or those who have experienced trauma in Australia. In terms of applicability, the finding was good, with adequate detail provided on the acupuncture intervention allowing replication within the professional field by acupuncture practitioners in Australia. Taken together, use of acupuncture in the treatment of adult PTSD was ranked as 'Promising'.

Adventure therapy/ Outward Bound therapy, Art therapy, Canine therapy and Equine therapy

The review did not find any studies regarding adventure therapy/outward bound therapy, art therapy, canine therapy, and equine therapy that satisfied the inclusion criteria.

Meditation

Only one study testing the efficacy of meditation in treating PTSD satisfied the inclusion criteria for this REA[10]. This randomized controlled trial involved a small sample of Vietnam, Korean and first Gulf War veterans (N=29) and compared the effectiveness of a mantram repetition intervention group (n=14) to a usual care delayed intervention group (n=15). The intervention involved 90 minutes of mantram repetition weekly, for 6 weeks. Although at post-treatment the intervention group demonstrated a reduction in PTSD symptom severity on the self-report (PCL; with a large effect size d=-.72) and at clinician administered interview (CAPS; with a small effect size d=-.33), there was no significance testing analyses conducted. Whether, there was a significant difference between PTSD severity scores in the intervention and control groups was not reported.

In evaluating the strength of the evidence it was recognised that this study utilised a blinded randomisation method. The withdrawal rate was acceptable and minimised the potential for selection bias after treatment group assignment. Limitations included the small sample size, the absence of any significance testing analysis (including an intention to treat analysis) and no follow-up data. In addition, veterans continued with their usual medical care during the

intervention which included weekly or monthly case manager and/or primary care provider visits and medication management, yet the possible confounding effect of ongoing concurrent support was not assessed. Taking all these issues into account, the evidence base supporting the use of meditation in the treatment of adults with PTSD was judged to have low beneficial strength.

Given the strength of the evidence base for the use of meditation in the treatment of PTSD was low, generalizability, consistency, and applicability were not assessed. The use of meditation in the treatment of adult PTSD was ranked as 'Unknown'.

Transcendental Meditation

Two studies testing the efficacy of TM in treating PTSD satisfied the inclusion criteria for this REA[11,42]. One study was a case controlled study [11] and the other was a case series study[42]. In the case controlled study[11], refugees in a Ugandan refugee camp (n=21) practised TM for 20 minutes twice daily, for 135 days, and were compared to a delayed intervention control group (n=21). At post-treatment, PTSD symptom severity was significantly reduced among the intervention group, and in comparison to the control group. The case series study[42] followed a small sample of OIF/OEF veterans (n=5) who practised TM for 20 minutes twice a day for 12 weeks. At post-testing, a significant reduction in PTSD symptom severity was seen on both the self-report (PCL-M) and clinician administered interview (CAPS). Outcome measures were not used at follow-up.

The strength of the evidence base for using TM to treat adults with PTSD was found to be of low beneficial strength. The case controlled study presented significant methodological limitations including a breaking of the randomisation process, a lack of blinding in some of the waves of the outcome assessments, and no formal compliance assessments. Although the case series study was well conducted, the type of study design, and small sample size meant that less weight could be attributed to this evidence.

Given the strength of the evidence base for the use of TM in the treatment of PTSD was low, generalisability, consistency, and applicability were not rated, and the use of TM in the treatment of adult PTSD was ranked as 'Unknown'.

Mindfulness

The review did not find any studies regarding Mindfulness that satisfied the inclusion criteria.

Music therapy

Only one study testing the efficacy of music therapy in treating PTSD satisfied the inclusion criteria for this REA[38]. This small exploratory RCT compared the effectiveness of weekly (60

minutes per week, for 10 weeks) group music therapy sessions (n=9) to a delayed intervention group (n=8). The adults in the sample had mixed trauma histories and were drawn from the UK National Health Service wait list for CBT for PTSD. At post-testing, a significant decrease in PTSD symptoms was noted in the intervention group.

This study received a 'Fair' quality and risk of bias assessment. The exploratory RCT provided only limited information in terms of treatment assignment, blinding and statistical analysis (including whether an intent to treat analysis was conducted). The number of withdrawals following treatment group assignment was minimal. The intervention itself was free in form and reliant on clinician guidance, and would be difficult to standardise or replicate, in spite of delivery by accredited group music therapy clinicians. The group dynamic was central to the intervention as was the reflective guidance and support provided by the clinician. It is difficult to separate out the benefits of the group activity itself, the expression through music, the insights facilitated by the clinician, or all of these as resulting in an improvement in PTSD symptoms. Attendance at the sessions was also highly variable so the 'dose' of the treatment varied (participants attended between 2 to 9 sessions, and an average of 7 sessions). In light of these issues, the strength of the evidence base for using music therapy to treat adults with PTSD was found to be of low beneficial strength.

Given the strength of the evidence base for the use of music therapy in the treatment of PTSD was low, generalisability, consistency, and applicability were not rated, and the use of music therapy in the treatment of adult PTSD was ranked as 'Unknown'.

Emotional Freedom Therapy/Technique

A single study testing the efficacy of EFT in treating PTSD satisfied the inclusion criteria for this REA[12]. The RCT compared the effectiveness of EFT to Eye Movement Desensitisation and Reprocessing (EMDR) as an intervention for PTSD[12]. The small sample of adults (n=23) were drawn from the waiting list for National Health Psychotherapy Services in Scotland and had mixed trauma histories and PTSD diagnoses. In each treatment arm, participants received up to 8 x 60 minute sessions of EFT or EMDR. Large treatment effect sizes were found via self-report (PCL-C) and clinician administered interview (CAPS) for both the EFT and EMDR intervention groups at post-testing and follow-up. No statistically significant interaction effects were found, suggesting that both arms of treatment were as effective as the other. Overall, up to 40% of participants in both intervention groups evinced a clinically significant reduction in PTSD symptoms as assessed by the CAPS at follow-up.

In evaluating the strength of the evidence it was recognised that the study was an RCT that utilised a blinded randomisation method. The study also employed a standardised self-report measure and clinician administered interview, and follow-up was performed at three months.

However, close to 40% of participants in both treatment groups withdrew from the study post randomisation. Although an intention to treat analysis model was used, the high number of withdrawals from the study potentially significantly biased the findings. Taking all these issues into account, the evidence base supporting the use of EFT in the treatment of adults with PTSD was judged to be of low beneficial strength.

Given the strength of the evidence base for the use of EFT in the treatment of PTSD was low, generalisability, consistency, and applicability were not rated, and the use of EFT in the treatment of adult PTSD was ranked as 'Unknown'.

Rewind Therapy/Technique, Thought Field Therapy, Traumatic Incident Reduction

The review did not find any studies regarding Rewind Therapy/ Technique, Thought Field Therapy or Traumatic Incident Reduction Therapy that satisfied the inclusion criteria.

Visual Kinaesthetic Dissociation Technique

A single study testing the efficacy of VKD in treating PTSD satisfied the inclusion criteria for this REA[13]. The single case study involved a 30-year-old Iraq war veteran, diagnosed with PTSD that was treatment resistant to 18 months of individual and group psychotherapy[13]. After 3 x 60 minute sessions of VKD over six days, the PTSD symptoms had completely abated. At post-testing (30 days later) the veteran remained symptom-free.

In evaluating the strength of the evidence it was recognised that single case studies have many limitations. Furthermore, this study did not use outcome measures at follow-up (three months), and presented anecdotal evidence regarding the continued absence of PTSD symptoms from the veteran's wife. It is important to note that the case study supplemented a paper for clinicians on the use of VKD for treating PTSD. As such many details expected in an intervention study were not provided. Taking all these issues into account, the strength of the evidence base supporting the use of VKD in the treatment of adults with PTSD was judged to be of low beneficial strength.

Given the strength of the evidence base for the use of VKD in the treatment of PTSD was low, generalisability, consistency, and applicability were not rated, and the use of VKD in the treatment of adult PTSD was ranked as 'Unknown'.

Discussion

The aim of this review was to assess the evidence for the efficacy of emerging interventions in the treatment of adults with PTSD. The results indicate that at the current time there is insufficient evidence to support the use of the majority of the emerging interventions considered as part of this review in the treatment of PTSD. In many cases the search strategy failed to identify any eligible studies for these emerging interventions. We were therefore unable to rank the evidence base for canine and equine assisted psychotherapy, adventure therapy, mindfulness, thought field therapy, rewind technique (RT), traumatic incident reduction, and art therapy. It was important to note that our methodology allowed a wide range of trial methodologies. We allowed studies from methodologies which are often excluded from systematic reviews such as single case studies or case series designs. This broad inclusion of such a wide range of study designs was in recognition of the emerging nature of the literature. Despite this, we identified very studies to meet our inclusion criteria. There may have been a number of reasons for this. First we only accepted studies that had gone through a peer review process and were published in a peer review journal. Secondly, we required that PTSD symptoms were measured, and a validated outcome scale was used. Experiential studies in particular, such as those involving actions, movements and activities, failed to make inclusion in this review (often) because of these criteria. Some may argue that these criteria were too rigorous. The counter argument to this is, however, that given there is an established evidence based for certain psychological treatments for PTSD, new therapies must be tested against the rigor of the established evidence.

A total of eight studies met our inclusion criteria. Few utilised a randomised controlled trial design, and of those that did utilise this design, most suffered significant limitations. Acupuncture was the only emerging intervention found to be ‘Promising’. However, further rigorous and robust studies are required before traditional acupuncture could be considered as a first line treatment for PTSD.

Despite the ‘Unknown’ ranking given to the majority of emerging interventions it is important to note that the emerging stage of all interventions requires initial small-scale trials first, followed by larger-scale RCTs to establish efficacy[2]. Thus, there is an initial evidence base for the emerging interventions studies reviewed here that future, well-conducted studies have to build on. It is acknowledged that it may only require one or two well performed RCTs to shift the rankings of ‘Unknown’ to ‘Promising’ for some of the therapies. Transcendental meditation, EFT and music therapy in particular would benefit from a small number of well-conducted studies to move into the ‘Promising’ category. However, a great deal of well-

conducted research with positive findings is required before these interventions could be classified as having the same evidence base to support their use as TF-CBT or EMDR.

When considering the findings of this REA it is important to recognise that the way the question was defined impacted on the studies we included and excluded. We used a 'Population Intervention Comparison Outcome' (PICO) framework to formulate the question in an objective way. This is an essential part of creating a discrete question and defining the set of inclusion/exclusion criteria. For example because the question was about treating a diagnosis of PTSD we excluded studies that did not report rates of a diagnosis of PTSD or where the reported baseline diagnostic rates of PTSD/ASD was < 70%. As such this REA does not answer the question about whether there are emerging interventions that are effective in targeting sub-syndromal PTSD or low levels of PTSD symptoms. Defining the interventions was also important because it impacted on the inclusion and exclusion of studies. For example, this REA focused on traditional acupuncture. Studies that included other forms of acupuncture such as those running a electric current thru the needles were excluded. Defining the intervention specifically was necessary to ensure that like studies were compared with like studies. So while this is a rigorous methodology, it does mean that every variation of a given intervention was not included in the review.

The true novelty of the emerging interventions, and how they are distinguished from established psychotherapies, remains unclear. While the emerging interventions reviewed here appear to differ from established interventions significantly, there may be elements of the therapies that are essential the same. The APA guidelines[2] noted on the topic of 'new psychotherapies', that there was the need to establish whether or not they contain the 'active components' of efficacy-proven PTSD interventions. For example, emerging interventions may contain elements of established psychotherapies, such as imagined exposure. If some emerging interventions develop a substantial evidence base, then these emerging interventions which incorporate efficacy proven elements, may have the potential to increase service delivery, enhance adherence and reduce dropout through their modality. However, there is still a long way to go before this evidence base is established.

Implications

The emerging interventions offer modalities of treatment that are novel, and involve a broad range of approaches for dealing with the psychological consequences of trauma. Some of these approaches are considered forms of exposure therapy, while others rely on therapeutic alliances or Eastern philosophies of the body as a system in balance, the rhythm

of which can be restored through heightened states of consciousness. Aspects of these approaches may appeal to a broader audience, or to different audiences, than those that are currently accessing and engaging in standard treatments. The efficacy of emerging interventions, however, remains to be established. In the future, if some of these emerging interventions develop a sufficient evidence base, then perhaps they may offer a wider range of socially and culturally acceptable treatment options to those with PTSD. Ultimately this may assist funders and services to meet the needs of the broader audience of Australian veterans. However, there is a long way to go before this may occur.

If some of these emerging interventions did develop a sufficient evidence base, then it would be important to consider that some emerging interventions may be more suited to certain individuals and not others. For example, ACT may be found to be promising with veterans who have a preference to be disengaged from the actual trauma content and to work on other areas of life functioning. Similarly, this type of therapy may not be suitable for those who have a high level of trauma-related intrusion symptoms. In the same way, power therapies which rely heavily on guided visualisation to create a dissociative reviewing of the trauma-related content may not be suited to those for whom dissociation is a feature of their symptom profile.

Limitations of the rapid evidence assessment

The findings from this REA should be considered alongside its limitations. In order to make this review ‘rapid’, some restrictions on our methodology were necessary. These limitations included: the omission of potentially relevant papers that were published prior to or after the defined search period; the omission of non-English language papers; and reference lists of included papers were not hand-searched to find other relevant studies. Similarly, although we did evaluate the evidence in terms of its strength, consistency, and generalisability, these evaluations were not as exhaustive as in a systematic review methodology. Finally, we made a qualitative judgement based on the level of evidence about the certainty of our estimates of prevalence. We did not use a meta-analysis methodology to combine or synthesise the results in a statistical way.

The information presented in this REA is a summary of information presented in available papers. We recommend readers source the original papers if they would like to know more about a particular area.

Conclusion

This rapid evidence assessment concludes that there is currently insufficient evidence to support the majority of emerging interventions in the treatment of PTSD, with only one intervention (acupuncture) obtaining a ‘Promising’ ranking. While the promising ranking indicates a beneficial effect, more research is needed to confidently establish efficacy. Moreover, many emerging interventions (e.g. canine, equine, adventure, mindfulness) resulted in no eligible studies suitable for inclusion in this review. This is in spite of a growing body of grey reports, online information and articles published in the popular media on the application and efficacy of these emerging interventions. There is a clear need for future research to address the effectiveness of emerging interventions for PTSD.

References

1. Australian Centre for Posttraumatic Mental Health. *Australian Guidelines for the Treatment of Adults with Acute Stress Disorder and Posttraumatic Stress Disorder.* Melbourne,Victoria: ACPMH; 2007.
2. Ursano RJ, Bell C, Eth S, et al. Practice guideline for the treatment of patients with acute stress disorder and posttraumatic stress disorder. *The American Journal Of Psychiatry.* 2004;161(11 Suppl):3-31.
3. Benedek DM. Guideline Watch (March 2009): Practice Guideline for the Treatment of Patients with Acute Stress Disorder and Posttraumatic Stress Disorder. *FOCUS - AMERICAN PSYCHIATRIC PUBLISHING INC.-.* 2009;7(2):204-213.
4. Kabat-Zinn J. Mindfulness-Based Interventions in Context: Past, Present, and Future. *Clinical Psychology: Science & Practice.* 2003;10(2):144-156.
5. Arch JJ, Ayers CR, Baker A, Almklov E, Dean DJ, Craske MG. Randomized clinical trial of adapted mindfulness-based stress reduction versus group cognitive behavioral therapy for heterogeneous anxiety disorders. *Behaviour Research and Therapy.* 2013;51:185-196.
6. Harris R. Embracing your demons: an overview of acceptance and commitment therapy. *Psychotherapy in Australia.* 2006;12(4):70.
7. Hayes S, C. , Luoma J, B., Bond F, W. , Masuda A, Lillis J. Acceptance and Commitment Therapy: Model, processes and outcomes. *Behaviour Research and Therapy.* 2006;44:1-25.
8. Twohig M, P. . Acceptance and Commitment Therapy for Treatment-Resistant Posttraumatic Stress Disorder: A Case Study. *Cognitive and Behavioral Practice.* 2009;16:243-252.
9. Lang AJ, Strauss JL, Bomyea J, et al. The Theoretical and Empirical Basis for Meditation as an Intervention for PTSD. *Behavior Modification.* 2012;36(6):759-786.
10. Bormann JE, Thorp S, Wetherell JL, Golshan S. A spiritually based group intervention for combat veterans with posttraumatic stress disorder: feasibility study. *Journal Of Holistic Nursing: Official Journal Of The American Holistic Nurses' Association.* 2008;26(2):109-116.
11. Rees B, Travis F, Shapiro D, Chant R. Reduction in Posttraumatic Stress Symptoms in Congolese Refugees Practicing Transcendental Meditation. *Journal of Traumatic Stress.* 2013;26(2):295-298.
12. Karatzias T, Power K, Brown K, et al. A Controlled Comparison of the Effectiveness and Efficiency of Two Psychological Therapies for Posttraumatic Stress Disorder: Eye Movement Desensitization and Reprocessing vs. Emotional Freedom Techniques. *Journal of Nervous & Mental Disease.* 2011;199(6):372-378.
13. Gray RM, Liotta RF. PTSD: Extinction, Reconsolidation, and the Visual-Kinesthetic Dissociation Protocol. *Traumatology.* 2012;18(2):3.
14. Dietrich AM. A Review of Visual/Kinesthetic Disassociation in the Treatment of Posttraumatic Disorders. *Traumatology.* 2000;6(2):85.
15. Utuza AJ, Joseph S, Muss D. Treating Traumatic Memories in Rwanda With the Rewind Technique: Two-Week Follow-Up After a Single Group Session. *Traumatology.* 2012;18(1):75.
16. Descilo T, Greenwald R, Schmitt TA, Reslan S. Traumatic Incident Reduction for Urban At-Risk Youth and Unaccompanied Minor Refugees: Two Open Trials. *Journal of Child & Adolescent Trauma.* 2010;3(3):181-191.
17. Gerbode FA. Traumatic Incident Reduction: A Person-Centered, Client-Titrated Exposure Technique. *Journal of Aggression, Maltreatment & Trauma.* 2006;12(1/2):151-167.
18. Highfield ES, Lama P, Grodin MA, Kaptchuk TJ, Crosby SS. Acupuncture and Traditional Chinese Medicine for Survivors of Torture and Refugee Trauma: A Descriptive Report. *Journal of Immigrant and Minority Health.* 2012;14(3):433- 440.

19. Horowitz S. Acupuncture for treating mental health disorders. *Alternative & Complementary Therapies.* 2009;15(3):135-141.

20. Hollifield M, Sinclair-Lian N, Warner TD, Hammerschlag R. Acupuncture for posttraumatic stress disorder: a randomized controlled pilot trial. *Journal of Nervous & Mental Disease.* 2007;195(6):504-513.

21. Hyer L, Boyd S, Scurfield R, Smith D, Burke J. Effects of outward bound experiences as an adjunct to inpatient PTSD treatment of war veterans. *Journal of Clinical Psychology.* 1996;52(3):263-278.

22. Crisp S. *International Models of Best Practice in Wilderness and Adventure Therapy.* 1998.

23. Becker SP. Wilderness Therapy: Ethical Considerations for Mental Health Professionals. *Child & Youth Care Forum.* 2010;39(1):47-61.

24. Berman D, Davis-Berman J. The Promise of Wilderness Therapy: Reflecting the Past, Projecting into the Future. *New Zealand Journal of Outdoor Education: Ko Tane Mahuta Pupuke.* 2007;2(2):24.

25. Harper NJ. Session IV: Current Insights into Wilderness and Adventure Therapy. Family Crisis and the Enrollment of Children in Wilderness Treatment. *Journal of Experiential Education.* 2009;31(3):447-450.

26. Larivière M, Couture R, Ritchie SD, Côté D, Oddson B, Wright J. Behavioural Assessment of Wilderness Therapy Participants: Exploring the Consistency of Observational Data. *Journal of Experiential Education.* 2012;35(1):290-302.

27. Scott DA, Duerson LM. Continuing the Discussion: A Commentary on "Wilderness Therapy: Ethical Considerations for Mental Health Professionals.". *Child & Youth Care Forum.* 2010;39(1):63-68.

28. Hamama L, Hamama-Raz Y, Dagan K, Greenfeld H, Rubinstein C, Ben-Ezra M. *A preliminary study of group intervention along with basic canine training among traumatized teenagers: A 3-month longitudinal study.*

29. Masini A. Equine-assisted psychotherapy in clinical practice. *Journal Of Psychosocial Nursing And Mental Health Services.* 2010;48(10):30-34.

30. Bachi K, Terkel J, Teichman M. Equine-facilitated psychotherapy for at-risk adolescents: the influence on self-image, self-control and trust. *Clinical Child Psychology And Psychiatry.* 2012;17(2):298-312.

31. Kirby M. Gestalt Equine Psychotherapy. *Gestalt Journal of Australia & New Zealand.* 2010;6(2):60-68.

32. Gavriele-Gold JR. The human-canine bond: new learnings and a changing rationality from a psychoanalytic perspective. *Psychoanalytic Review.* 2011;98(1):91-105.

33. Selby A, Smith-Osborne A. A systematic review of effectiveness of complementary and adjunct therapies and interventions involving equines. *Health Psychology.* 2013;32(4):418-432.

34. Gray AEL. Expressive arts therapies: working with survivors of torture. *Torture: Quarterly Journal On Rehabilitation Of Torture Victims And Prevention Of Torture.* 2011;21(1):39-47.

35. Avrahami D. Visual art therapy's unique contribution in the treatment of post-traumatic stress disorders. *Journal Of Trauma & Dissociation: The Official Journal Of The International Society For The Study Of Dissociation (ISSD).* 2005;6(4):5-38.

36. Collie K, Backos A, Malchiodi C, Spiegel D. Art Therapy for Combat-Related PTSD: Recommendations for Research and Practice. *Art Therapy: Journal of the American Art Therapy Association.* 2006;23(4).

37. Bensimon M, Amir D, Wolf Y. A pendulum between trauma and life: Group music therapy with post-traumatized soldiers. 2012;39(4):223-233.

38. Carr C, d'Ardenne P, Sloboda A, Scott C, Wang D, Priebe S. Group music therapy for patients with persistent post-traumatic stress disorder--an exploratory randomized controlled trial with mixed methods evaluation. *Psychology And Psychotherapy.* 2012;85(2):179-202.

39. Jaap O. Music Therapy with Traumatized Refugees in a Clinical Setting. *Voices: A World Forum for Music Therapy.* 2005(2).

40. Jespersen KV, Vuust P. The Effect of Relaxation Music Listening on Sleep Quality in Traumatized Refugees: A Pilot Study. *Journal of Musix Therapy.* 2012;49(2):205-229.

41. NHMRC. How to review the evidence: systematic identification and review of the scientific literature. Handbook series on preparing clinical practice guidelines. In: Council NHaMR, ed. Canberra: Biotext; 1999.

42. Rosenthal JZ, Grosswald S, Ross R, Rosenthal N. Effects of Transcendental Meditation in Veterans of Operation Enduring Freedom and Operation Iraqi Freedom With Posttraumatic Stress Disorder: A Pilot Study. *Military Medicine.* 2011;176(6):626-630.

Appendix 1

PICO

This question was formulated within a Population Intervention Comparison Outcome (PICO) framework. Application of a PICO framework helps to structure, contain and set the scope for the research question. Inclusion of intervention and comparison components is dependent on the question asked, and may not be appropriate for all question types.

- **What emerging interventions are effective for the treatment of adults with PTSD?:**

  PICO format: In adults with diagnosed Acute Stress Disorder (ASD) or Posttraumatic Stress Disorder (PTSD), have the following emerging therapies (Acceptance and Commitment Therapy, acupuncture, adventure therapy/Outward Bound therapy, art therapy, canine therapy, equine therapy, meditation, Transcendental Meditation, Mindfulness, music therapy, Emotional Freedom Therapy/Technique, Rewind Therapy/Technique, Thought Field Therapy, Traumatic Incident Reduction) shown to be effective in reducing symptoms of ASD or PTSD?

P Patient, Problem, Population	**I** Intervention	**C** Comparison (*optional*)	**O** Outcome *when defining "more effective" is not acceptable unless it describes **how** the intervention is more effective*
Adults with diagnosed PTSD AGE≥: 18years GENDER: no restrictions TREATMENT: NAÏVE (i.e. not currently receiving any psychological treatment for ASD or PTSD)	• Acceptance and Commitment Therapy; • acupuncture; • adventure therapy/Outward Bound therapy; • art therapy; • canine therapy; • equine therapy; • meditation; • Transcendental Meditation; • Mindfulness;	None	Reduction in PTSD symptoms on validated measures of the PTSD syndrome

	• music therapy; • Emotional Freedom Therapy/Technique; • Rewind Therapy/Technique; • Thought Field Therapy; • Traumatic Incident Reduction; • Visual Kinaesthetic Dissociation Technique.		

Appendix 2

Information retrieval/management

The following is an example of the search strategy conducted in the Embase database:

Step	Search Terms	No of records
S1	(post*traumatic stress disorder or PTSD or acute stress disorder or ASD).af.	43,001
S2	(stress disorders post-traumatic or stress disorders traumatic acute or combat disorders or stress disorders traumatic).af.	112
S3	(acceptance and commitment therapy or acupuncture or adventure therapy or outward bound therapy or art therapy or canine therapy or equine therapy or meditation or transcendental meditation or mindfulness therapy or power therapy or emotion freedom therapy or emotion freedom technique or thought field therapy or traumatic incident reduction or visual kinaesthetic dissociation or rewind therapy or rewind technique).af.	38,352
S4	1 or 2	43,016
S5	3 and 4	241
S6	Limit 5 to (human and English language and yr=”2003-Current” and journal and (adult<18 to 64 years> aged <65+years>))	45

Appendix 3

Screening Form

The screening form was designed to be used to code the eligibility of references acquired through search paradigms. The content of the screening form at the title and abstract screening stage was as follows:

Screen on title & abstract

1. EXCLUDE Language: *Exclude if non-English*
2. EXCLUDE Date: *Exclude if published prior to 2003*
3. EXCLUDE Publication Type: *Exclude if not a peer-reviewed study (e.g. web content, media, thesis, editorial, book chapter, book review)*
4. EXCLUDE Study Type*: exclude if validation study, animal study, review paper, meta-analysis, systematic review, stand-alone methods paper, qualitative study*
5. EXCLUDE Age : *Exclude if participants mean age < 18*
6. EXCLUDE Diagnosis: *Exclude if at least 70% of sample does not have a diagnosed Acute Stress Disorder (ASD) or post-traumatic stress disorder (PTSD)*
7. EXCLUDE Intervention: *Exclude if there is no emerging therapy psychological intervention trial arm – specific to: Acceptance and Commitment Therapy; acupuncture; adventure therapy/Outward Bound therapy; art therapy; canine therapy; equine therapy; meditation; Transcendental Meditation; Mindfulness; music therapy; Emotional Freedom Therapy/Technique; Rewind Therapy/Technique; Thought Field Therapy; Traumatic Incident Reduction; Visual Kinaesthetic Dissociation Technique*
8. EXCLUDE concurrent Psychological Treatment: *exclude if another form of psychological therapy for PTSD concurrently offered to study participants in addition to intervention*
9. INCLUDE based on title & abstract
   Cannot be excluded so is marked as INCLUDE. Will require retrieval of full paper.

Appendix 4

Quality and bias checklist

Chalmers Checklist for appraising the quality of studies of interventions[41]:

Completed		
Yes	No	
		1. **Method of treatment assignment**
		• Correct, blinded randomisation method described OR randomised, double-blind method stated AND group similarity documented
		• Blinding and randomisation stated but method not described OR suspect technique (eg allocation by drawing from an envelope)
		• Randomisation claimed but not described and investigator not blinded
		• Randomisation not mentioned
		2. **Control of selection bias after treatment assignment**
		• Intention to treat analysis AND full follow-up
		• Intention to treat analysis AND <25% loss to follow-up
		• Analysis by treatment received only OR no mention of withdrawals
		• Analysis by treatment received AND no mention of withdrawals OR more than 25% withdrawals/loss-to-follow-up/post-randomisation exclusions
		3. **Blinding**
		• Blinding of outcome assessor AND patient and care giver (where relevant)
		• Blinding of outcome assessor OR patient and care giver (where relevant)
		• Blinding not done
		• Blinding not applicable
		4. **Outcome assessment (if blinding was not possible)**
		• All patients had standardised assessment
		• No standardised assessment OR not mentioned

		5. Additional Notes
		• Any factors that may impact upon study quality or generalisability

Appendix 5

Evidence Profile

Authors & year	Design	Intervention (I) and Comparison (C)	Country	Population Age (M,SD)[1] Gender (%)	Delivered to	Dosage (total number of sessions)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))	Total sample size	Participants	
										Intervention	Comparison
Acceptance and commitment											
Twohig 2009	- Case Study	I: Acceptance and Commitment Therapy (ACT) for PTSD	USA	Civilian with history of childhood abuse with persistent PTSD following 20 CBT sessions I: 43 years, female (n=1)	Individual	Twenty one, one hour, weekly sessions	PTSD (SCID, PCL-C)	- Depression (BDI-II) - Anxiety (BAI)	N=1	n=1	N/A
Case study documented a clinically significant reduction in PTSD symptom severity over the course of the intervention to non-clinical levels by the end of the intervention. The same pattern was found for depression and anxiety symptoms. Outcome measures were not used at follow up, and this it is not known if the change remained clinically significant over time											

[1] Mean age and SD is given when provided, alternatively age range is provided

Acupuncture											
Hollifield et al., 2007	- Randomized Controlled Trial	I: Acupuncture C1: Group CBT C2: Assessment, followed by wait list	USA	Mixed trauma I: Mean age=42.3, (SD=12.1); 62.1% female C1: Mean age=40.9 (SD=13.4); 78.6% female C2: Mean age=43.4 (SD=13.5); 63.0% female	Individual Group	I: sixty minute sessions, twice weekly with up to 15 minutes daily home based therapy C1: 120 minutes, weekly with up to 15 minutes daily home based therapy	PTSD (PSS-SR)	- Depression (HSCL) - Anxiety (HSCL)	N=61	I: n=19	C1: n=21 C2: n=21
This RCT found reduced PTSD symptom severity for the acupuncture and group CBT treatment groups in comparison to the wait list control. With large treatment effect sizes for both treatment groups. No significant differences were found between the acupuncture and the group CBT groups, suggesting that acupuncture was as effective as group CBT. At post-treatment, 63%, 36% and 17% of the acupuncture, group CBT and wait list control groups scored below the diagnostic threshold respectively. This pattern was also observed for depression and anxiety. At the three month follow up, the improvement in PTSD, depression and anxiety symptom scores was maintained for both the acupuncture and group CBT groups.											
Adventure therapy / Outward Bound therapy											
No papers identified											
Art therapy											

No papers identified											
Canine therapy											
No papers identified											
Equine therapy											
No papers identified											
Meditation											
Bormann et al., 2008	- Randomized Controlled Trial	I: Meditation: Mantram intervention C: Assessment, followed by usual care	USA	Vietnam, Korean and first Gulf War veterans Mean age=56 (SD=6.6); 100% male	Individual	Six weeks, 90 minutes per week	PTSD (CAPS, PCL)	- Quality of life (Q-LES-Q:SF)	N=29	n=14	n=15
This RCT found a reduction in symptom severity at post-testing on the self-report measure (with a large effect size, d = –.72) and to a lesser extent, at clinical interview (with a small effect size, d = –.33). An improvement in quality of life scores was also found (with a large effect size, d=.72). The maintenance of these changes was not examined at follow up.											
Transcendental Meditation											
Rees et al., 2013	- Case controlled study	I: Meditation: Transcendental	Uganda	Mixed Trauma Sample	Individual & Group	20 minutes, twice daily for	PTSD (PCL-C; administered	None assessed	N=42	n=21	n=21

		Meditation (TM) C: Assessment, followed by delayed intervention		I: Mean age=32.8 (SD=7.3); 61.9% male C: Mean age (SD=7.8); 61.9% male		135 days	in Swahili, French, Lingala, and English).				
This case control study documented a clinically significant change reduction in PTSD symptom severity among the TM group over the course of the intervention. Differences in the PCL-C scores between the TM and delayed intervention group were also found to be statistically significant. The maintenance of these changes was not examined at follow up.											
Rosenthal et al., 2011	- Case series	I: Meditation: Transcendental Meditation	USA	OIF/OEF veterans I: Age range 25-40 years; 100% male	Individual	20 minutes twice a day for 12 weeks	PTSD (CAPS, PCL-M)	- Depression (BDI) - Quality of life (Q-LES-Q)	N=5	n=5	N/A
This case series study found a reduction in PTSD symptom severity over the course of the intervention on both self-report and clinical interviews. This was also seen with a significant reduction in depression scores, and an increase in quality of life scores over the period of the intervention. It was noted that one veteran reported worsened scores on the BDI at 8 weeks, than at baseline, but this may have been explained by changes to medication. Outcome measures were not used at follow up, and it is not known if the symptom changes were maintained.											
Mindfulness											
No papers identified											
Music Therapy											

Carr et al., 2012	- Randomized Controlled Trial (exploratory)	I: Group Music Therapy C: Assessment, followed by wait list	UK	Mixed trauma Sample I: Mean age=34 (range=20-57); 62% female C: Mean age=44 (range=33-53); 50% female	Group	One hour weekly, for 10 weeks	PTSD (IES-R)	- Depression (BDI-II)	N=16	n=8	n=8
This pre-post study reported a reduction in PTSD symptom severity (p = .0035) over the course of the intervention. Although there was a reduction in depression scores over the course of the intervention, this was not found to be statistically significant. There was no follow-up, and it is not known if the changes in symptom severity were maintained.											
Emotional Freedom Therapy/Technique											
Karatzias et al., 2011	- Randomized Controlled Trial	I: Power Therapy: Emotional Freedom Technique C: EMDR	UK	Mixed trauma Sample I: Mean age=39.7 (SD=10.9); 52% female C: Mean age=41.5 (SD=10.8); 61% female	Individual	Sixty minutes, for up to 8 sessions	PTSD (CAPS, PCL-C)	- Depression (HADS) - Anxiety (HADS)	N=23	n=12	n=11
This RCT found large treatment effect sizes for both EMDR and EFT groups. However, there were no significant differences found between the EMDR and EFT groups, suggesting that the EFT was as effective as the EMDR. Clinically significant change was recorded on the CAPS and PCL-C by 40% and 35% of the EMDR and 39% and 9% of the EFT groups, respectively. This pattern											

was also observed for depression and anxiety. At the three month follow up, large treatment effect sizes for both EMDR and EFT groups on all outcome measures were maintained, and again there was no significant differences found between the EMDR and EFT groups. At the follow-up clinically significant change was recorded on the CAPS and PCL-C by 35% and 26% of the EMDR and 39% and 17% of the EFT groups, respectively.											
Rewind therapy/technique											
No papers identified											
Thought field therapy											
No papers identified											
Traumatic Incident Reduction											
No papers identified											
Visual Kinaesthetic Dissociation Technique											
Gray et al., 2012	- Case Study	I:Power Therapy: Visual Kinaesthetic Dissociation Technique	USA	Iraq war veteran I: 30 years, male (n=1)	Individual	Three, 60 minute sessions, 3 days apart	PTSD (PCL-C)	None assessed	N=1	n=1	-
The case study documented clinically significant change with reduced PTSD symptoms over the course of the treatment to non-clinical levels by the end of the treatment period. Outcome measures were not used at follow up and it is not known if these clinically significant changes were maintained over time.											

Appendix 6

Evaluation of the evidence

Type of Intervention	Included Studies
Supported	
None found	-
Promising	
Acupuncture	Hollifield, Sinclair-Lian, Warner & Hammerschlag (2007)
Unknown	
Acceptance and Commitment Therapy	Twohig (2009)
Meditation	Bormann, Thorp, Wetherell & Golshan (2008)
Transcendental Meditation	Rees, Travis, Shapiro & Chant (2013)
	Rosenthal, Grosswald, Ross & Rosenthal (2011)
Music Therapy	Carr, d'Ardenne, Sloboda, Scott, Wang & Priebe (2012)
Emotional Freedom Therapy/Technique	Karatzias, Power et al (2011)
Visual Kinaesthetic Dissociation Technique	Gray & Liotta (2012)