Early Intervention Eye Movement Desensitization and Reprocessing Following Major Musculoskeletal Trauma: How Soon Is Too Soon?

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Major trauma centers have increased survival following serious physical injury, resulting in increased demand for specialist multidisciplinary rehabilitation. We aimed to explore the feasibility of using early intervention eye movement desensitization and reprocessing (EMDR) therapy in an acute inpatient setting, using a non-concurrent, multiple-baseline, pre-post test case-series design. Unfortunately, no patients were recruited. This paper sets out the challenges and reflections of setting up a psychological intervention study in this setting and provides suggestions for further research.

Keywords: eye movement desensitization and reprocessing; EMDR; recent traumatic episode protocol; major musculoskeletal trauma; case-series design

Major traumatic injury is a physical injury requiring hospital admission for longer than 72 hours or admission to a high dependency unit (HDU). These injuries can occur as a result of road traffic accidents, sporting injuries, falls, or assaults and are the leading cause of death in those aged below 40 years old (Murray et al., 2012). In 2012, 24 hospitals in England were identified as regional major trauma centers. The aim of these major trauma centers was to increase specialty in medical management of complex traumatic injuries. This restructuring led to higher rates of survival following major trauma (Moran et al., 2018) and, as a result, people are now living with more severe injuries. It was subsequently identified that there was a lack of specialist rehabilitation for this population, particularly in relation to psychosocial needs (National Audit Office, 2010; National Institute for Health and Care Excellence [NICE], 2009). One study reported that 31% of a sample of 677 participants admitted to a major trauma center met the criteria for probable PTSD 6 months post-injury (Shih et al., 2011).

There is substantial evidence to indicate that the psychological impact of a traumatic event results in poorer physical health or recovery from illness or injury (Kellezi et al., 2017; Lamers et al., 2012; Ramchand et al., 2008) and reduced quality of life (Chhari & Mehta, 2016; Davydow et al., 2009; Dobie et al., 2004; Zatzick et al. 2002; 2008). Individuals with traumatic injuries may experience psychological distress in the form of adjustment difficulties, traumatic bereavement, anxiety, low mood, anger, and acute stress as well as possible cognitive impairment due to traumatic brain injury or delirium. There is also evidence that hospital admission can increase psychological distress (Alzahrani, 2021; Kotrotsiou et al., 2001). This suggests that this population are psychologically vulnerable and may benefit from psychological intervention; however, there is a lack of research around the effectiveness of different interventions, especially any using eye movement desensitization and reprocessing (EMDR) therapy.

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This article aims to explore early psychological interventions in this population, specifically with the use of EMDR. We developed a proof-of-concept research study to determine whether Early EMDR Intervention (EEI) is feasible and acceptable within one month of major trauma in an acute inpatient setting. We were unable to recruit and, as such, this article focuses upon the clinical and methodological challenges associated with generating an evidence base for EEI in this setting and provides recommendations for future research and clinical pathway development.

Psychological Trauma Responses

DSM-5 criteria for posttraumatic stress disorder (PTSD) defines a traumatic event as exposure to threatened or actual death or serious injury or sexual violence (APA, 2013). PTSD can only be diagnosed after experiencing the specified symptoms (re-experiencing or intrusive symptoms, i.e., nightmares, flashbacks, intrusive memories, avoidance of stimuli associated with the traumatic event, including thoughts, memories or feelings, significant changes in arousal, and negative changes in thought and mood) for more than 4 weeks following the traumatic event. Prior to this, symptoms are classified as Acute Stress Disorder (ASD). Therefore, the treatment being explored in this paper is for ASD and the prevention of PTSD.

It has been cited that risk factors for developing PTSD include acute high levels of pain in severe injury, admission to an Intensive Care Unit (ICU), level of physical disability and lack of ability to return to work, financial stress, and legal involvement (Sareen, 2014). These are prevalent risks within the major traumatic injury population.

There is some literature regarding the validity of PTSD screens in major traumatic injury inpatients in predicting future PTSD, with 26%–28% of patients being classified as at-risk (deRoon-Cassini et al., 2019; Johnson et al., 2019; Manser et al., 2018); however, evidence is lacking regarding the prevalence of inpatient ASD and the predictive power of ASD for PTSD. One study reported that ASD was found to be present in 10% of individuals admitted to major trauma hospitals in Australia and 10% were found to meet criteria for PTSD at 12 months post-admission (Bryant et al., 2012). Thirty-one percent had "any other psychiatric diagnosis" at 12 months. Only 36% of those diagnosed with ASD went on to develop clinically significant symptoms of PTSD and 65% developed "any other psychiatric disorder." Therefore, the majority of those who had PTSD at 12 months did not have a diagnosis of ASD. Although this indicates that ASD does not predict PTSD, it appears to have utility in predicting future psychological distress of other kinds. Similarly, Garfin et al. (2018) conducted a systematic review of acute stress and subsequent health outcomes and reported that early psychological responses to trauma were associated with both short and long-term physical health and psychological outcomes including, anxiety, and depression.

It has been suggested that the risk of developing PTSD remains for a longer period than the traumatic event episode due to people becoming sensitized to acute stress (McFarlane, 2010). This suggests that accumulative stress following a traumatic event could result in a delayed onset of PTSD, leading to suggestions that early psychological therapies should have some focus on increasing resilience to restore coping and equilibrium as well as prevention for those experiencing acute traumatic stress post-injury. The principal aim of psychological intervention is to enable the brain to go through the normal course of processing information adequately.

Early Trauma Interventions

Clinical guidelines suggest that psychological therapies can be implemented within the first month after trauma for those who have acute stress disorder or clinically important symptoms of PTSD, and that these interventions may prevent longer-term symptoms of distress developing (NICE, 2018). Several therapies, including prolonged exposure and debriefing, have been trialed in the prevention of PTSD. Psychological focused debriefing for the prevention of PTSD is considered unhelpful, and may actually increase acute stress and PTSD symptoms (Rose et al., 2002). Cognitive behavioral therapy (CBT) has been the predominant therapy of choice for the prevention and treatment of PTSD (NICE, 2018); however, EMDR has a rapidly growing evidence base for its efficacy in the treatment of traumatic stress (Bisson et al., 2013; Chen et al., 2014). Although studies comparing CBT to EMDR do not suggest significant differences in efficacy, EMDR has been found to be more cost-effective (Mavranezouli et al., 2020; NICE, 2018) and is gaining momentum as a promising psychological therapy for PTSD as research is emerging.

EMDR applies therapist-directed bilateral stimulation to guide the brain in processing distressing information so that it no longer causes current distress. Francine Shapiro (Shapiro, 2007) hypothesized that within 2 to 3 months of a traumatic event, the memory remains unconsolidated and therefore fragmented. Therefore, it was suggested that a number of targets

for one event need to be processed to achieve consolidation. Thus, she adapted the original EMDR protocol to create the protocol for Recent Traumatic Events, also known as the Recent Event Protocol (REP). Other EEI followed, namely the Protocol for Recent Critical Incidents (PRECI) created by Jarero and Artigas (2015) which amended the REP to accommodate situations where there are extended periods of trauma or ongoing lack of safety. In 2008, Elan Shapiro and Laub (2008, 2014) developed the EMDR Recent Traumatic Episode Protocol (R-TEP) to be used immediately after a traumatic event. Jarero and Artigas (2018) have suggested that memory consolidation may not take place when there is no post-trauma safety and continued traumatization may occur, therefore the originally hypothesized 2-to-3-month window may be expanded by years. Therefore, it is proposed that the R-TEP protocol can be effectively administered a few years after the event and in situations where difficulties are unresolved or there are ongoing stressors. This protocol differs from the EMDR PRECI as it does not ask for the worst aspect of the memory.

The R-TEP protocol is a systematic approach, which incorporates and extends existing EMDR protocols. It includes Phase I, History; Phase II, Preparation; Phase III, Assessment; Phase IV, Desensitization; Phase V, Installation; Phase VI, Body Scan; Phase VII, Closure, and Phase VIII, Reevaluation. One of the differences between this protocol and the standard EMDR protocol is that an additional measure for containment and safety is introduced, and a briefer history is typically taken about the trauma. The assessment also includes an episode narrative, whereby the client recalls the whole event up to the present day whilst the therapist provides bilateral stimulation (BLS). Following this, the client will perform a free recall search, which has been termed a "Google search" of the memory, stopping where anything distressing comes up. This distressing point will become the target for desensitization and will be assessed as per standard protocol. In a standard EMDR protocol, the whole event is assessed and processed rather than these fragments otherwise known as "points of disturbance" (PoDs) picked up during the google search. Once the PoD has been effectively processed, a "google search" is performed again until no more PoDs are present. Finally, the protocol moves to episode-level processing to install a positive cognition and concludes with a body scan (Shapiro & Laub, 2014). This protocol reflects the fragmented nature of the recent traumatic memory.

Although relatively new, evidence is gathering to support the effectiveness of EEI in reducing traumatic stress symptoms (Shapiro, 2012; Shapiro & Maxfield, 2019). This has been evidenced in a number of different populations including, but not exclusive to, workplace violence, victims of sexual assault, and within a medical military context (Oosterbaan et al., 2019; Tarquinio et al., 2016; Wesson & Gould, 2009). It has also been successfully administered in crisis situations. Shapiro et al. (2018) implemented EEI with clients who live in a town that had experienced heavy rocket attacks. They completed the early intervention (within 3 months) which included three 90-minute R-TEP sessions. Results showed a reduction of post-traumatic stress and depression symptoms in comparison to waiting list controls. Acaturk et al. (2016) similarly found a significant reduction in PTSD and depression in Syrian refugees using this protocol following a mean number of 4.2 sessions. In an Italian disaster situation, the R-TEP was also found to reduce distress using between two and four sessions within 3 months of experiencing an earthquake (Saltini et al., 2018).

Promising evidence also exists to support the feasibility and acceptability of R-TEP within an emergency healthcare setting. A study based in a Bordeaux University Hospital emergency room (ER) (Gil-Jardiné et al., 2018) demonstrated that PTSD levels were lower 3 months post-ER attendance in those treated with a single session of R-TEP (3%) in comparison to individuals who received a 15-minute session with a trained psychologist, focused upon reassurance (16%) or treatment as usual including medical attention and care only (19%). Participants included in this study were those who presented to the ER with an injury or illness that had occurred within the previous 12 hours and who were considered at high risk of post-concussion-like symptoms (PCLS), thought to be linked to PTSD and stress. A study in Israel also reported significant reductions in self-reported distress using a single session of early modified EMDR in a general hospital for individuals with acute stress following accidents and terrorist bombing attacks (Kutz et al., 2008). In this study, 50% of the participants reported immediate alleviation of symptoms and 27% partial alleviation. Data at 4 weeks' and 6 months' follow-up indicated that those who reported immediate alleviation in the terrorist attack group remained symptom-free.

Some studies have also reported upon the format in which the R-TEP was most successful. Shapiro and Laub (2015) explored the use of the R-TEP immediately after a critical incident and delayed treatment (1 week after the incident). Although both groups improved, those receiving the delayed treatment experienced less improvement. Chaikin and Oren (2017) identified that R-TEP sessions delivered on five

consecutive days produced faster improvement than R-TEP sessions delivered once a week; however, both groups showed comparable treatment gains overall.

Although EMDR therapy research is beginning to establish effectiveness for the R-TEP intervention following traumatic experiences, there is currently little guidance as to how this should be applied with individuals following major traumatic injury during hospital admission. Despite some research being based within physical healthcare settings, the severity of injuries sustained in these studies tended to be mild. The R-TEP protocol was chosen as the EEI due to accessibility to training in this method as well as its approach to incorporating both a past and present focus on trauma processing, acknowledging the impact of ongoing stressors (Shapiro & Laub, 2008).

Proof-of-Concept: Using R-TEP in a Major Trauma Rehabilitation Inpatient Setting

The intended proof-of-concept study was designed as a non-concurrent, multiple-baseline, pre-post case-series design (Ottenbacher, 1997). This methodology is recommended by the Medical Research Council (MRC) for the testing of theory and interventions, particularly when they are of a complex nature and where judgements on clinical rather than statistical significance are required (Campbell et al., 2007). Experimental case-series involve studying a single individual or system (small group) by taking repeated measurement of one or two dependent variables (outcome measures) and systematically applying, and sometimes withdrawing, the independent variable (intervention). If the application, withdrawal or manipulation of the intervention (independent variable) is associated with a consistent change in the outcome measures (dependent variable), an inference can be made that it was the intervention that produced the change (Ottenbacher, 1997).

Design

The study was to adopt an A-B-A design (i.e. baseline, no intervention; intervention; follow-up, no intervention) with continuous assessment throughout the baseline, intervention, and follow-up phases (Ottenbacher, 1997). See Table 2 for a list of the intended outcome measures.

Procedure

Consecutive individuals admitted to two acute musculoskeletal trauma wards of a single major trauma center in North East England were screened over a 3-month recruitment period (November 2019 to January 2020) against a pre-determined set of inclusion and exclusion criteria (Table 1) by two clinical psychologists (EI and TC), with post-graduate training in EMDR therapy.

Individuals meeting the eligibility criteria were provided with a participant information sheet and given a minimum of 24 hours to decide whether they

TABLE 1. Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
Age 18 years and over	Not yet medically stable (i.e., may require further surgery, on levels of medication that reduce engagement in therapy, have had a brain injury or currently going through a substance detox)
Excessive suffering and persistent disturbing symptoms (i.e., Intrusive images, sleep disturbance not due to medical condition) determined by a PTSD Checklist Scale (PCL-5) score ≤ 33	English is not their first language or those using British Sign Language as their primary means of communication
Any description of distress in relation to their traumatic injury as rated by a Likert scale of 0–10	Suffering from active symptoms of severe and enduring mental health disorder (e.g., psychosis, bipolar disorder, or schizophrenia)
Predicted length of stay longer than 18 days from admission to hospital to allow for 24-hour consent period as requested by R&D, baseline measure collection as per case series design and up to six sessions as an inpatient due to lack of capacity for outpatient follow-up. Patients can often be too unwell to engage in therapy on immediate admission, which was also taken in account with this stipulation of an 18-day length of stay	Suspected or confirmed to be experiencing post-traumatic amnesia (PTA)
	Currently prescribed and taking benzodiazepines
	Under the influence of illicit substances
	Not deemed to have enough psychological resources to withstand therapeutic input of this nature at this time (i.e., are unable to work with calming exercises, etc.)
	Age-related cognitive impairment, e.g., dementia—unable to provide informed consent

TABLE 2. Outcome Measures

Outcome measure	Description
Subjective Units of Distress (SUD)	This is a Likert Scale. Participants would be asked to rate their symptoms on a scale of 1–10 in response to the following question: How distressed are you currently in relation to your traumatic accident? This measurement tool is recommended in the R-TEP protocol
Impact of Events Scale—Revised (IES-R)	A 22 item self-report measure that assesses subjective distress caused by traumatic events (Weiss, 2007). This assessment incorporates measures of hyperarousal, avoidance, and intrusion. Participants are asked to identify the major traumatic event and rate how much they have been bothered in the past 7 days by each difficulty. A score of 24 or more represents significant symptoms of PTSD
PTSD checklist for DSM—5 (PCL-5)	This is a self-report rating scale with 20 items for assessing the symptoms of PTSD (Weathers et al., 2013). A score of 33 or more represents clinically significant symptoms of PTSD
Brief Resilience Scale (BRS)	This scale measures the ability to recover from stress. It has been found to be a reliable measure which negatively relates to anxiety, depression and negative affect, and physical symptoms. It also found to be helpful for those coping with health-related stressors (Smith et al., 2008)

would like to take part in the study. This initial contact was within days of admission to the hospital. In concordance with single-case designs, we aimed to recruit between four and ten participants to take part in this exploratory proof-of-concept study (Barlow & Henson, 1984).

Upon receipt of informed written consent, participants were to be randomized to one of three baseline data collection phases (2, 3, or 4 days) and asked to complete subjective units of distress (SUD) scores twice daily. The SUD rating was to be completed twice daily to provide a sufficient number of data points to aid visual analysis of the case series data. Prior to commencing the EEI, participants would have completed the revised Impact of Events Scale (IES-R), PTSD Checklist for DSM-5 (PCL-5) and Brief Resilience Scale (BRS). See Table 2 for details. The Impact of Events Scale was used to detect psychological distress in relation to the traumatic accident. This was used in addition to the PCL-5 as a broader measure of distress. The PCL-5 was selected due to its robust association to the DSM-5 criteria for PTSD. As resilience has been highlighted as an important factor in the prevention of longer-term distress, the BRS was included. This measure has been found to have one of the best psychometric ratings for resilience (Windle et al., 2011) with an individual-level focus of resilience.

On commencing the EEI sessions, participants would have been asked to complete the SUD rating twice daily to track their symptoms. Participants would have been provided between two and six sessions based on direct advice within the protocol written by Elan Shapiro which recommends two to five sessions. Furthermore, recent research indicates an average of four sessions (Chaikin & Oren, 2017; Kaya et al., 2010). We allowed for an additional session based on this being an unknown population with different clinical needs, including increased physical symptoms and medical interventions that might limit session length. Although the International Society for Traumatic Stress Studies (ISTSS; 2020) states that one session of EMDR R-TEP is beneficial for those at risk of PTSD, further evidence is required to support the use of a single session of EMDR to prevent future PTSD. Furthermore, with regards to early treatment interventions which target people with clinically significant symptoms of PTSD, all treatments were multiple session, including EMDR. In this research protocol, we were selecting people with significant symptoms and therefore we felt that multiple sessions were indicated based on these recommendations. On completion of the EEI, participants would have repeated the three baseline measures (IES-R, PCL-5, and BRS), together with a short evaluation questionnaire to assess satisfaction, perceived appropriateness, and positive or negative effects of the intervention (see Appendix).

The plan was to follow up participants by telephone at one, three, and six months post-intervention to complete the IES-R, PCL-5, and BRS. Participants describing symptoms of distress and delayed-onset PSTD at any of these time-points would have been eligible to receive standard community-based psychological therapies (usual practice).

One hundred and sixty-three patients were admitted to the acute musculoskeletal trauma wards during the 3-month screening and recruitment period (Figure 1).

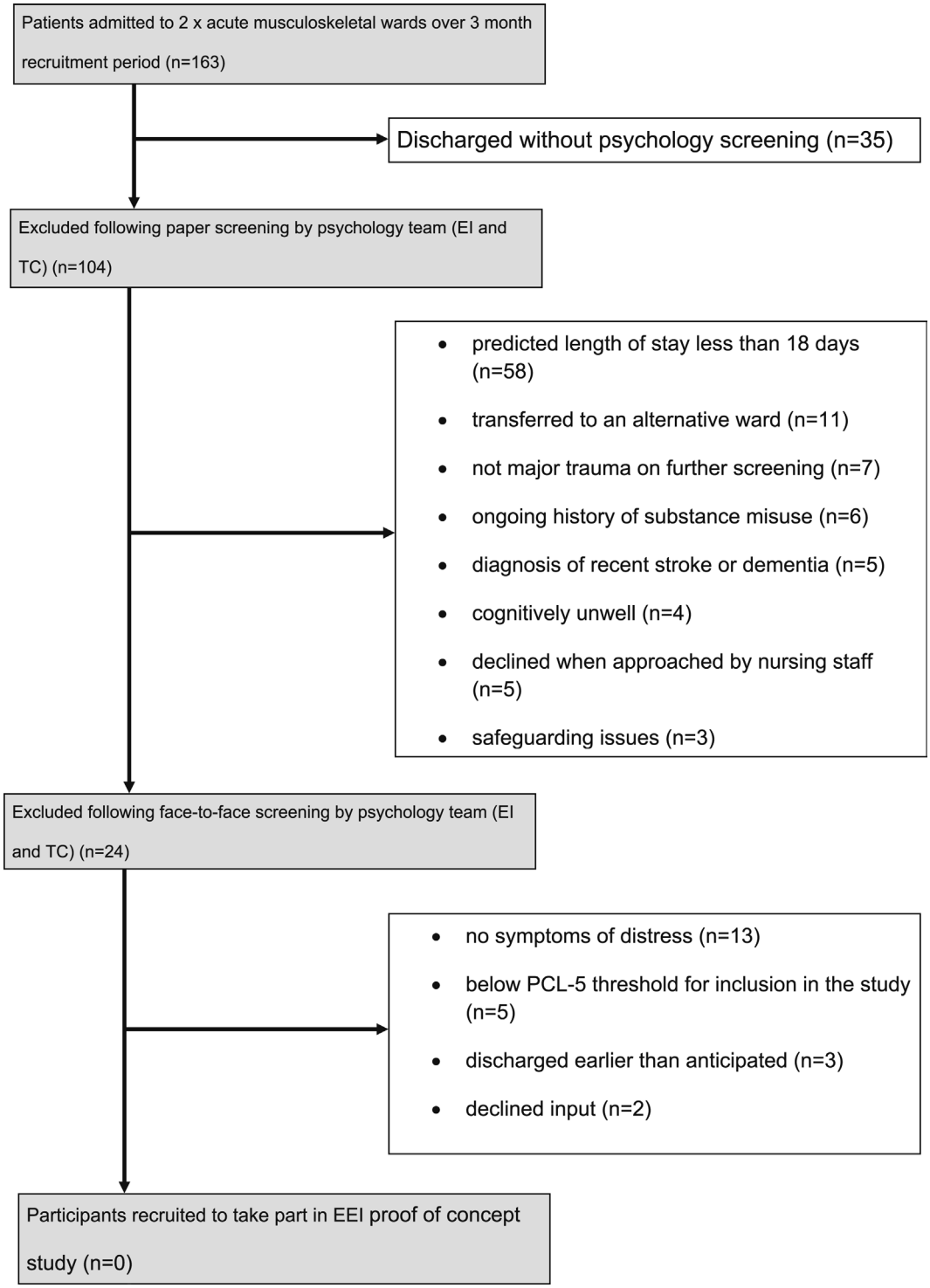

Figure 1. Recruitment flow chart.

Of these 163 participants, 35 were discharged without screening due to lack of clinician availability. One hundred and four patients were not eligible at the paper screening stage (58 predicted length of stay less than 18 days from hospital admission, 11 patients were transferred to an alternative ward, seven patients were not classified as major trauma on further screening; six had ongoing history of substance misuse, five had a diagnosis of recent stroke or dementia, four were cognitively unwell; three declined to take part in the study when approached by a member of the nursing team, three were identified as unsuitable due to high risk (safeguarding or suicidality), two patients had a severe and enduring pre-existing mental health condition, two were under the age of 18 years with no distress reported via general introduction prior to study protocol paper screening, and one was documented to be non-compliant with hospital treatment).

Twenty-four individuals received a face-to-face psychology screening from EI and TC. From these 24 individuals, none were identified as being eligible for inclusion into the study (13 reported no symptoms of distress; five scored below the PCL-5 threshold for inclusion in the study; three were discharged earlier than anticipated; two declined input; one was already receiving therapy as an outpatient).

Discussion

This study aimed to determine whether EEI is a feasible and acceptable intervention for individuals within 1 month of traumatic injury when delivered in an acute inpatient setting. Despite a lack of recruitment for this study, much can be learnt from this outcome and it is important to explore and disseminate the results to influence future research in this population. There are several factors to be considered in relation to the nature of the study design in this setting, as well as inferences about the population based on the 24 who were initially identified as being potentially eligible for inclusion in this the study.

Challenges and Reflections

The high incidence of participants being unsuitable for the study at the paper screening stage suggests that EEI may not have been appropriate for individuals in an acute inpatient setting following a major musculoskeletal trauma. The most common reason for this was predicted length of stay in hospital, (less than 18 days) although this only accounted for 36% of exclusions. This, therefore, does not imply that therapy is unsuitable at this stage but instead highlights the need for an early intervention which can span both inpatient and outpatient settings. Being physically too unwell to engage in any type of psychological therapy, either due to cognitive impairment or current substance misuse, was the next most prevalent exclusion factor. This may be more indicative of a longer-term challenge with engaging in therapy.

Previous research has reported no issues with declining to engage in EEI therapy in medical settings (Gil-Jardiné et al., 2018). Consequently, the responses from the 24 participants who went on to receive a face-to-face psychology screening are worthy of further exploration. Of the 24 who were approached, 13 reported no symptoms of distress and the two who did report distress declined input. It is unclear from this small exploratory proof-of-concept study whether this is due to a lack of distress at that time-point or due to patients not prioritising or wanting psychological input during their inpatient stay and thus choosing to report no symptoms. Anecdotally, patients who attended an outpatient multi-disciplinary team outpatient clinic provided as part of routine care within the Major Trauma Rehabilitation Service have reported that they did experience distress during their inpatient stay but felt it would get better on its own or they wanted to focus on their physical recovery. There is a lack of literature regarding acceptability of psychological therapy whilst an inpatient in an acute physical healthcare setting; however, Manser et al. (2018) found that patients in this population predominantly did not access therapy once they were outpatients due to focusing on their injury or rehabilitation, and financial concerns, including loss of job due to injuries. More research is needed to determine psychological therapy acceptability as an inpatient within a major trauma population.

Furthermore, this study is unable to determine whether patients who do not experience distress as inpatients experience delayed onset PTSD at a later stage of recovery because of an accumulation of stressful events (McFarlane, 2010). A systematic literature review found that 25% of those who had a diagnosis of PTSD had delayed onset PTSD, (Smid et al., 2009) and this diagnosis has now been added to DSM-5 criteria. This might be particularly relevant for this population, as they are likely to have ongoing stressors due to being unwell in hospital, which has been reported to negatively affect patients' ability to cope and adjust (Alzahrani, 2021); however, this is speculative and requires further evidence.

A further five patients who received face-to-face screening were found to be below the PCL-5 cut-off score of 33 that was set as one of the inclusion criteria. This was included as a screening measure, as it corresponds to the DSM-5 PTSD criteria as well as being able to provide a provisional diagnosis of PTSD (National Center for PTSD, 2021). The DSM-5 criteria would also therefore allow for a reliable and valid diagnosis when reassessing at later stages in the study; however, given that the individuals who were approached were within the 4-week timeframe post-injury, this measure is less appropriate in capturing subclinical signs of early distress. In hindsight, therefore, an acute stress measure such as the Stanford Acute Stress Reaction Questionnaire (SASRQ) (Cardefia et al., 2000) or the Posttraumatic Adjustment Scale (PAS; O'Donnell et al., 2008) may have been more suitable for this study. ISTSS (2020) recommends that those who are at higher risk of PTSD could receive EMDR within acute phases. The PCL-5 may not have captured those individuals. Furthermore, there may be other stress responses that do not readily map on to PTSD symptoms. Other distress measures, either with a lower

threshold or assessing a different diagnostic label, should therefore be considered for inclusion criteria in any future research. For example, the IES-R is used in some studies providing early EMDR intervention, (Acaturk et al., 2016; Shapiro & Laub, 2015).

It is important to compare these findings to those found in R-TEP studies completed in similar healthcare environments. Studies based in these settings recruited patient populations with less severe physical injuries and this may have influenced both ability and willingness to engage in psychological therapies. In the Gil-Jardiné et al. (2018) study of EMDR therapy in an ER setting, 16 participants in the R-TEP group were attending the ER Department following an injury; however, an exclusion criterion for this study was requiring admission to the operating room or critical care unit, implying a lesser severity of physical injury than major musculoskeletal trauma. The other 18 participants in the EMDR group presented to the ER department following a medical event, and again were not admitted to critical care or an operating room. It was also reported that pain levels for this group were rated on average as 5.5 out of 10 and intensity of stress as 4 out of 10 at admission. Patients also rated on average 10 out of 10 for belief in odds of recovery, suggesting low levels of uncertainty and potential distress about the future. Finally, the research team recruited participants with symptoms suggestive of post-concussion syndrome as opposed to self-reported or other symptoms of distress. In this study, we relied on self-reported measures of distress rather than clinician-led assessment tools, which relied upon patients self-identifying clinically significant symptoms of PTSD for treatment. The use of the Post-Concussion Symptom Scale alternatively does not require this and therefore may be able to recruit patients experiencing lower symptoms of distress impacting positively on recruitment. All these factors may help to explain the differences in recruitment between our study and the previous published literature. Kutz et al. (2008) also reported use of the R-TEP in a physical healthcare setting. Some of the participants had their therapy delivered as an outpatient, which may imply a lower severity of physical injury; however, 59% of the 86 participants who reported immediate relief of symptoms (n = 43 participants) were recruited from a group where 78% were inpatients on surgical or orthopaedic wards, as opposed to 22% who were outpatients with mild injuries. Consequently, it is difficult to determine the nature and severity of the injuries sustained by this group. Finally of note, other R-TEP studies appear to be completed within 3 months of the traumatic injury, as opposed to days after the event. This may also have positively impacted on uptake rates in previously published studies. Given these noted differences between the studies, it is worth considering the impact of pain, medication, severity of health condition and injury on the experience of distress and patients readiness to engage in psychological therapy at early stages post-trauma.

Long commended for their applicability to clinical practice (Riddoch & Lennon, 1991) and well-established in the field of health psychology (Morley, 1994), case-series designs provide an attractive option where establishing clinical effectiveness and feasibility is required prior to traditional experimental approaches requiring the random assignment of large numbers of participants to treatment and no treatment (control) groups (Ottenbacher, 1997). Adopting this methodological approach meant that all suitable participants could receive the EEI, effectively acting as his or her own 'control' during the baseline data collection phase and permitting causal inferences to be made about each individual case (Zetterberg et al., 2008). However, the minimum time period of 24 hours for individuals to decide whether they would like to take part in the study stipulated by the Research Ethics Committee, together with the inclusion of a baseline data collection phase of up to 4 days, meant that a high proportion of patients were excluded at the paper screening and face-to-face assessment stages, due to their predicted length of hospital stay, reducing the pool of potential participants quite considerably.

In case-series designs, the effectiveness of an intervention is judged by the extent to which the post-test measures shift when the intervention is introduced, and by whether this change is sustained throughout the duration of the intervention and follow-up phases. If the measures are relatively stable during the baseline data collection phase, Ottenbacher (1997) states that it is not unreasonable to infer that any changes observed at the point of introducing the intervention occurred as a direct result of the intervention. We elected not to recruit participants from the critical care unit, due to concerns that individuals might be physically unwell or unstable, and, therefore, unable to engage in this type of psychological process. Although the decision not to recruit individuals from critical care was clinical as well as methodological, this may have reduced the overall length of time in which a patient was able to engage in EEI in an acute inpatient setting.

At the time of recruitment, our clinical team did not offer an out-patient psychology service; however, the recent introduction of a brief intervention psychology service for patients recently discharged from our major trauma center provides an opportunity to establish the feasibility and acceptability of

commencing EEI in an acute inpatient setting, once the patient is medically stable and able to engage in psychological interventions as an outpatient. This would be an interesting area of future study to help establish the optimum timing and duration of formal psychological protocols with this population group.

Conclusion and Future Recommendations

To the best of our knowledge, this is the first study in the UK aiming to establish the feasibility and acceptability of the R-TEP for individuals in an acute inpatient setting within 1 month of major musculoskeletal trauma. The findings from this proof-of-concept study would suggest that having the capacity to offer psychological intervention at later stages of recovery may make the intervention more accessible. This would eliminate length of stay as an exclusion criterion as well as allowing participants to access it at a later stage in their recovery. Our Major Trauma Rehabilitation Service is now beginning to implement an acute outpatient service that bridges the gap between hospital and community care.

Future research should explore patient preferences for accessing psychological therapies in the major trauma population during the early stages of physical recovery, as well as levels of distress experienced by individuals at various time-points in their rehabilitation. Following a sample of patients by assessing levels of distress within a week of injury, and at 3 months' and 6 months' post-injury will help to identify the prevalence rates of trauma and PTSD as well as when symptoms arise in this population. This would help to identify when and if EEI should be offered. Finally, exploration of the impact of pain and medication upon distress experienced and readiness to engage in therapy would also be of benefit for this population.

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Appendix

Semi-structured questionnaire evaluating the feasibility and acceptability of EMDR R-TEP 2–4 days following a traumatic injury

Participant ID number:……..

The following questions are about your experience of engaging in EMDR R-TEP therapy following your traumatic injury.

1. Please rate how helpful you found it to be offered this type of intervention during your hospital stay.

Very Unhelpful	Unhelpful	Neither helpful or unhelpful	Helpful	Very helpful

Additional comments:
……
……
……
……

2. How well-timed do you feel this intervention was?

Not well-timed	Unsure	Well-timed

Additional comments:
……
……
……
……

3. How suitable do you think the environment was for this intervention?

Very unsuitable	Unsuitable	Neither suitable or unsuitable	Suitable	Very suitable

Additional comments:
……
……
……
……

4. The intervention helped me to reduce distress associated with my injury (including events that occurred in hospital).

Not at all	Slightly	Moderately	Significantly	Completely

Additional comments:
……
……
……
……

5. I feel better able to cope with any memories of my injury following the accident

Not at all	Slightly	Moderately	Significantly	Completely

Additional comments:
……
……
……
……

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6. The intervention helped me to feel confident about managing distress associated with my injuries

Not at all	Slightly	Moderately	Significantly	Completely

Additional comments:
……
……
……
……

7. Overall, how helpful was the intervention?

Very Unhelpful	Unhelpful	Neither helpful or unhelpful	Helpful	Very helpful

Additional comments:
……
……
……
……

8. What was the most helpful thing about the intervention?

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……
……

9. What was the least helpful thing about the intervention?

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10. Would you change anything about this intervention and the way it was delivered?

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……
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Any additional comments: