
Imagery Rehearsal Therapy (IRT) Combined with Cognitive Behavioral Therapy (CBT)

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Abstract

In cases of post-traumatic stress disorder (PTSD), nightmares can often persist, even after a cognitive behavioral therapy (CBT) for this disorder. Imagery rehearsal therapy (IRT) is a CBT that targets the treatment of nightmares directly. **Objectives:** the present study describes the feasibility and the efficacy of combining IRT with first-line, trauma-focused CBT for PTSD. **Method:** two individuals with PTSD took part in this experimental case study protocol. The efficacy of the combined treatment was evaluated using semi-structured interviews, self-report questionnaires, and daily self-monitoring diaries. **Results:** after three IRT sessions for Participant 1 and five IRT sessions for Participant 2, combined with CBT for PTSD, both participants experienced a slight decrease in sleep difficulties and in the intensity of their PTSD symptoms post-treatment. More particularly, one participant demonstrated a significant decrease in the level of distress associated with his post-traumatic nightmares (PTNM). **Conclusions:** these results demonstrate that it is possible and promising to combine IRT with CBT for PTSD.

Keywords: PTSD, IRT, nightmares, CBT

1. Introduction

1.1. Theoretical and research basis for treatment

Post-traumatic stress disorder (PTSD) is a frequently occurring trauma- and stressor-related disorder, present in 3.5% of the U.S. adult population [1]. To meet the diagnostic criteria for PTSD according to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*

(DSM-5), it is first necessary to have been exposed to a traumatic event, and, as a result of that exposure, to experience symptoms from each of the following four symptom clusters: intrusion (e.g., disturbing recurring flashbacks or dreams); avoidance of memories of the event; negative alterations in cognitions and mood; and alterations in arousal and reactivity (e.g., irritability and sleep disturbance).

To date, the recommended treatment by the International Society for Traumatic Stress Studies is trauma-focused cognitive behavioral therapy (CBT) [2]. This treatment involves several strategies, including: psycho-education on PTSD reactions; training in relaxation strategies to counteract anxiety; cognitive restructuring by challenging, for example, maladaptive trauma-related appraisals; and exposure. Exposure requires the victim to confront his or her fears, which can be done in two ways: (1) through repeated exposure to the trauma memory, either in imagination or through the writing of a narrative; and (2) in vivo exposure to situations associated with the trauma. The rationale is to help change the victim's perception of a situation and his or her reaction to this specific and problematic situation.

The efficacy of trauma-focused CBT is widely documented compared to other types of psychological treatments, such as psychodynamic psychotherapies, or supportive techniques (e.g., [3]). However, in a multidimensional meta-analysis by Bradley et al. [4], including 26 studies and 44 treatment conditions, the authors raised the question on the type of exclusion criteria used in these studies when looking at their efficacy, such as comorbid disorders. Then, in a review by Bisson and Andrew [5], their findings remind that the high numbers of drop-out remained an issue. Considering these results, we may say there is still room for improvement of trauma-focused CBT.

1.2. Nightmares in PTSD

It is estimated that 19–71% of trauma victims diagnosed with PTSD have frequent nightmares, compared to only 2–5% of the general population [6]. These percentage ranges are due to lack of consensus on the definition of a nightmare. The *DSM-5* defines nightmares as “repeated occurrences of extended, extremely dysphoric, and well-remembered dreams that usually involve efforts to avoid threats to survival, security, or physical integrity...” and can only be diagnosed as such if the nightmares do not occur exclusively during the course of another mental disorder. In the *International Classification of Sleep Disorders (ICSD-2)* [7], the definition is more inclusive, calling upon “recurrent episodes of awakenings from sleep with recall of intensely disturbing dream mentations¹, usually involving fear or anxiety, but also anger, sadness, disgust, and other dysphoric emotions.” Some experts in the field also propose their own definition, as illustrated by Zadra and Donderi [8], who describe nightmares as “very disturbing dreams that awaken the sleeper.”

The presence of nightmares seems to be related to the prevalence and severity of PTSD [9]. A recent prospective longitudinal cohort study in combat Veterans indicated that the report of pre-deployment nightmares was associated with an increased risk for the development of

¹Mental activity.

PTSD symptoms [10]. Furthermore, one review reported that of victims experiencing nightmares within 1 month of the trauma, 33% went on to develop PTSD, whereas 9% did not [11]. As a result, nightmares may contribute to PTSD symptom maintenance.

Also, the treatment of nightmares is complex because of the varying conceptualization of nightmares. On one hand, they represent one of the symptoms of the PTSD intrusion cluster and are conceptualized as a normal reaction following a traumatic event [12]. As a result, it is commonly believed that CBT for PTSD will be sufficient to effectively treat them (e.g., [3]). On the other hand, nightmares have an independent diagnosis in the *DSM-5* [1] and in the second edition of the *International Classification of Sleep Disorders (ICSD-2)* [7].

Furthermore, different fields of study (i.e., sleep and dream field vs. PTSD field) conceptualize post-traumatic nightmares (PTNM) differently. In the PTSD field, several models have been developed to explain PTSD emergence, and PTNM are considered an intrusive symptom of this disorder. For example, in the Foa and colleagues model, the authors argued that an entire memory network is created at the time of the trauma. PTNM could be one element of this network, which is reactivated during sleep by ongoing hyperarousal. However, in the dreaming field, PTNM are related to different dream theories and authors reflect on the purpose and function of dreams. For example, Hartmann advances that dreaming is an adaptive function to emotionally adjust to trauma.

Finally, authors also diverge on whether PTNM are a comorbid disorder, rather than a symptom of PTSD [13]. Some authors conceptualize PTNM in two steps after a traumatic event: immediately following a traumatic event, PTNM are considered a trauma-induced symptom of PTSD (B criterion), whereas later, PTNM are perceived as learned behavior and, therefore, would become distinct from PTSD symptoms. According to Krakow and Zadra [14], nightmares persist because the victim is not able to process information related to the event and to the nightmare. The person fears and, therefore, avoids them. As a result, the recollection of the trauma is not incorporated in memory. In addition, as the victim begins to fear going to bed and develops poor sleep hygiene (e.g., drinking alcohol before going to bed or napping during the day), or as nightmares interrupt sleep, sleep becomes fragmented, potentially leading to sleep loss, and ultimately insomnia [12].

Considering nightmares in two steps (i.e., first as a PTSD symptom, then as a learned behavior and comorbidity) offers the opportunity to treat them differently. In fact, the first step represents the traditional view, and nightmares can be treated with conventional CBT for PTSD, while the second step allows targeted treatment for nightmares as a comorbidity.

1.3. Emergence of treatments directly targeting nightmares

New psychological treatments for PTNM are emerging and being tested. Recently, the Standards of Practice Committee (SPC) of the American Academy of Sleep Medicine (AASM) commissioned a task force to assess the literature on the treatment of nightmares disorder. They presented their results in a Best Practiced Guide [15] and listed six specific CBTs for nightmares: imagery rehearsal therapy (IRT), systematic desensitization, lucid dreaming

therapy (LDT), exposure, relaxation and rescripting therapy (ERRT), sleep dynamic therapy, and self-exposure therapy. Although each therapy approaches the treatment for nightmares differently, all conceptualize nightmares as a learned response that can be modified by specific cognitive and behavioral strategies.

Imagery rehearsal therapy (IRT) is one treatment that has gained important empirical support to treat this problem. Its rationale is to select a repetitive nightmare, to transform and write it into a new positive or neutral dream, and finally to rehearse it in imagination. Thirteen group studies and a few case studies have already shown the efficacy of IRT in decreasing the frequency of PTNM. The change mechanisms of IRT are still understudied, although Germain et al. [16] have proposed that IRT decreases nightmares by increasing the victim's perception of control over them, and various methods of implementation exist.

A few studies reported the use of IRT with patients diagnosed with PTSD [17], but no studies have tried to incorporate this specific treatment for nightmares into a first line, trauma-focused CBT for PTSD [18]. In addition, there are no guidelines to include nightmare treatment in first-line treatment for PTSD, nor in which order treatments should be delivered. Should IRT be administered before the CBT for PTSD (first-step treatment) in order to facilitate sleep restoration and, therefore, accelerate trauma recovery? Or should IRT follow PTSD treatment, as a second-step treatment, in cases where the nightmares persist? It would be interesting to record the difficulties from a theoretical and practical point of view, and to observe which treatment should be prioritized in order to reduce all PTSD symptoms.

The first objective of this chapter is to present the feasibility of combining both CBT for PTSD and IRT for PTNM in the same interventional procedure. The second goal is to explore different sequences of treatment.

2. Method

2.1. Case introduction

Two participants, Adam and Eric (pseudonyms), were referred for treatment at the Trauma Studies Centre at the Institut Universitaire en Santé Mentale de Montréal, which specializes in the treatment of trauma victims. Evaluations were conducted by doctoral psychology students and therapies were administered by an experienced psychologist. Both participants experienced a traumatic event and met PTSD criteria (i.e., a CAPS global score of 65 or more). They experienced sleep difficulties (i.e., a PSQI global score of 5 or more) and had at least four nightmares per week, which were not an exact replica of the traumatic event at the baseline assessment. They had not received CBT for insomnia, for nightmares, or for their post-traumatic symptoms over the course of the past year.

Adam (Participant 1) was a married 45-year-old Caucasian male. He worked as a doctor and had been on sick leave for several months. He experienced a skateboarding accident 2 years prior to the initial evaluation. He was referred by a psychiatrist. Several pharmacological options had been tried in the past but were not effective.

Eric (Participant 2) was a 54-year-old Caucasian male, divorced, with three children. He lived alone and received welfare. He was born in Italy but his parents immigrated to Canada when he was 3 months old. He experienced a sexual assault in his home, by three men from the family of a woman he was dating, 10 years prior to his initial evaluation. He did not report any other potentially traumatic events. During the treatment, he followed a prescription for Venlafaxine (225 mg a day) and Quetiapine (150 mg a day).

2.2. Presenting complaints

2.2.1. Participant 1: Adam

At the time of the first evaluation, Adam met DSM-IV-TR criteria for PTSD following a serious skateboarding accident. Adam reported that in the month prior to the evaluation, he experienced intrusion symptoms (intrusive and distressing memories of the traumatic event, flashbacks, and physiological reactions). He also reported recurrent nightmares (four/five times a week) after which he could not go back to sleep. He described his nightmares as repetitive, with the same ending (a sudden fall from the sky). He reported persistent avoidance of stimuli associated with his traumatic event (e.g., thoughts, conversations, and spending time with the friend who was present for the event), and numbing symptoms (e.g., diminished interest in significant activities; and he did not expect to have a normal lifespan due to his physical problems). He also avoided his nightmares by programming his alarm clock to wake him up before the anticipated time of his nightmares. He presented persistent symptoms of increased arousal, more particularly sleep difficulties, difficulties concentrating (e.g., Adam had to write down the questions asked by the clinician before answering them), and outbursts of anger (e.g., he had cue cards suggested by his psychiatrist to help him manage his anger).

Finally, according to the SCID-I, he had comorbid social phobia in the past and was in partial remission for a major depressive disorder (MDD). Due to his profession as a doctor, he reported other potentially traumatic events but did not present any post-traumatic reactions in relation to them.

2.2.2. Participant 2: Eric

Eric met the DSM-IV-TR criteria for PTSD following a sexual assault. At the first evaluation, Eric reported that during the last month he experienced intrusion symptoms, such as intrusive and distressing memories of the traumatic event, and flashbacks. He felt an intense distress and physiologic reactivity after exposure to traumatic reminders (e.g., being with several people in the same room; being alone with only men; and being with people wearing the same religious objects as those who assaulted him). He used distractions (e.g., going out for a walk) to avoid thinking about the assault. He avoided going out in the evenings. Since the event, he also avoided romantic relationships with women. He felt a certain detachment from others, and mentioned his "life ended on the date of the assault" and, therefore, did not plan anything for his future. He reported difficulty concentrating and being hypervigilant (e.g., when walking, he would slow down or change direction to avoid having people walk behind him).

On the SCID-I, he also met criteria for a major depressive disorder (MDD) from the age of 45. He also reported several hospitalizations of 2 or 3 days' duration for suicidal ideation and suicide attempts in the past. Suicidal ideations were always present but he tried to put them aside by taking a walk.

Eric reported being marijuana dependent for 5 years, then stopping use for 1 year, but relapsing 6 months prior to the assessment. At the time of the first evaluation, he was following treatment from an addiction center. He was in complete remission for cocaine abuse after 3 years of use, but admitted that he still smoked marijuana on a daily basis.

2.3. History

Adam's PTSD symptoms started after a skateboarding accident and subsequent hospitalization 2 years before the first evaluation. He explained that he collided with his friend, with whom he was skateboarding. The collision threw him into the air and he landed on his back. He described feeling at that moment an intense pain; he was breathless; he experienced reactions of dissociation. Someone offered to call Adam an ambulance, but Adam refused. Rather, Adam decided to go back to his hotel by car, which he recalled being a very painful experience. The next morning, Adam did not recall any of the details following the fall. Adam was then hospitalized for 4 days for several fractures, including one in his back. He described his stay as negative, experiencing feelings of helplessness at not being able to move anymore. He expressed that his stay was so difficult that he decided to sign a refusal of treatment. During the pre-treatment evaluation at our center, he reported that his PTSD symptoms had had many consequences for his life: he no longer worked; he experienced marital problems and attended couple's therapy; he had to manage physical problems with his back; and he felt he no longer had any friends, other than those of his wife.

Eric's PTSD symptoms started immediately after his traumatic event. At the time, he had been dating for 1 year a woman of another ethnic origin, whose family disapproved of their relationship. When members of her family asked him to stop seeing her, he refused. A few weeks later, three men attacked him at gunpoint in his apartment and sexually assaulted over several hours. Eric explained that during the event he feared for his life and that of his girlfriend. After the event, he never heard from his girlfriend again. He specified that he had not talked about the event for 10 years.

2.4. Assessment

Before their pre-treatment evaluations, both participants were asked to be stable on any medications for at least one month. After signing a consent form, participants were assessed with structured clinical interviews (to determine diagnosis at baseline, to check inclusion criteria, and to gather background information). Once selected for the study, participants were given questionnaires and explanations to complete self-monitoring booklets every day.

Adam and Eric followed two different protocols according to their clinical profile. Adam had 3 weeks of IRT, followed by 7 weeks of imaginal exposure, 9 weeks of exposition in vivo and

one session of relapse prevention. He was re-evaluated (interviews and questionnaires) after IRT, after imaginal exposure, post-CBT and at three and six months after treatment. Since Eric presented only occasional nightmares at the time of the first evaluation, and since they were not his primary complaints, he was not offered initial nightmare treatment. However, he began reporting recurrent and distressing nightmares at the seventh CBT session. Consequently, 5 IRT sessions were added to the original 20 sessions of CBT for PTSD. Thus, he had 3 weeks of psychoeducation about PTSD symptoms, 6 weeks of imaginal exposure, 14 weeks of exposure in vivo and 5 sessions of IRT. He had evaluations (interviews and questionnaires) as follows: at 3 weeks (after the psychoeducation), at 10 weeks (after imaginal exposure), at the end of his CBT (post-CBT at 23 weeks), at the end of the 5 IRT sessions (post-IRT), and 4 months after treatment.

2.4.1. Diagnostic interview

The *Structured Clinical Interview for DSM-IV-TR Axis I Disorders* [SCID-I; [19]] is a semi-structured interview used to determine if a participant presents a DSM-IV-TR Axis I [20], or major mental disorders, in research. It presents good psychometric properties [21].

2.4.2. PTSD measures

The *PTSD Checklist – Specific* [PCL-S; [22]] is a 17-item self-report measure of the 17 DSM-IV symptoms of PTSD. Participants rate each item from 1 (= *not at all*) to 5 (= *extremely*) to indicate the degree to which they have been bothered by that particular symptom over the past month. It demonstrates good psychometric properties in English [22]. The *Clinician-Administered PTSD Scale* [CAPS] is a structured interview to make a categorical PTSD diagnosis. It also provides a measure of PTSD symptoms severity when adding for each item a frequency score from 0 (= *none of the time*) to 4 (= *most or all of the time*), and an intensity score from 0 (= *none*) to 4 (= *extreme*). Psychometric properties are strong [23].

2.4.3. Sleep measures

The *Nightmare Distress Questionnaire* [NDQ; [24]] is a 13-item self-report questionnaire retrospectively evaluating the waking degree of distress associated with experiencing nightmares. It is a 5-point Likert scale from 0 (= *never*) to 5 (= *always*). It demonstrates good psychometric properties. Since the last two items in the questionnaire evaluate the respondent's interest in following a course of therapy, and participants were already enrolled in therapy, we did not consider these two items in the total score. The *Pittsburgh Sleep Quality Index Questionnaire* [PSQI; [25]] includes 19 self-rated questions and 5 questions rated by the bed partner or roommate if one is available. The total score varies from 0 to 21. It also demonstrates good psychometric properties in English [26]. The *Pittsburgh Sleep Quality Index Addendum for PTSD* [IQSP-A; [27]] is a self-report questionnaire designed to assess the frequency of seven PTSD-specific sleep disturbances during the month preceding completion of the questionnaire. A global score is obtained from the sum of all seven items, and has a range of 0 to 21. It demonstrates good psychometric properties [27].

2.4.4. Ancillary measures

The Beck Depression Inventory [BDI; [28]] measures the presence and severity of depression with 21 items in the last 2 weeks. Finally, *The Beck Anxiety Inventory* [BAI] includes 21 self-report items evaluating the anxiety severity. Good psychometric properties were demonstrated [29].

2.4.5. Self-monitoring booklet

Participants were asked to make daily self-observations on a 10-point Likert scale from 0 (= *not at all*) to 10 (= *a lot*) for the following: sleep quality, the presence or absence of nightmares, nightmare frequency, the level of distress related to these nightmares, the global distress they felt the day before, and three questions on PTSD symptoms (one to evaluate intrusive recollection symptoms, one for avoidance, and one to identify hyperarousal reactions).

All questionnaires were administered in French. Initially, Eric did not receive all the questionnaires described above because of his involvement in another study protocol. As a result, Eric did not receive the BDI, BAI, PCL-S and NDQ during his conventional CBT.

2.5. Case conceptualization

Adam's sleep and more particularly, his nightmares were a significant impediment to his daily functioning. He recalled at least four nightmares a week and, sometimes, more than one nightmare a night, that woke him up. He described them as repetitive, with the same ending (a sudden fall from the sky), and without being an exact replica of his traumatic event. The nightmares also generated a lot of distress with the consequences of not being able to go back to sleep and trying to avoid them by setting his alarm to wake him before the onset of the nightmare. We, therefore, offered him the opportunity to focus on his nightmares for the initial three sessions and to approach his PTSD symptoms in a second step.

Eric's primary symptoms were PTSD manifestations with occasional nightmares, and were first treated with CBT for PTSD. At the end of this treatment, the intensity of his global PTSD symptoms decreased but Eric still met DSM-IV-TR criteria for PTSD. In general, his symptoms of intrusive recollection decreased but the frequency of his nightmares increased, and they occurred at least three times a week. He described them as repetitive, with the same theme (three people chasing him until he was stuck in a corner), with the setting changing from one nightmare to another. He described them as being very real, to the point that they made him feel very distressed and, as a consequence, woke him up. No sexual content was reported. Regarding his remaining PTSD symptoms, daily avoidance of activities, places and men in general were recorded. He did not report any sleep loss but mentioned severe difficulties concentrating. Therefore, to deal with his nightmares, five IRT sessions were added after 2 weeks of baseline CBT.

To reduce PTSD symptoms, an empirically validated treatment protocol [2] was adapted following expert recommendations [30, 31]. Twelve sessions were added to the original treatment of Foa et al. [2]. The treatment was designed to last 20 sessions and included the following components: psychoeducation on PTSD symptoms and diaphragmatic relaxation learning;

imaginal exposure; in vivo exposure; and relapse prevention (one session). However, the number of sessions was not fixed and we left open the option to add four sessions depending on client needs (e.g., level of avoidance). A treatment manual for the psychologist and a participant manual were available. This treatment was validated in previous studies [32, 33].

As presented in the introduction of this article, IRT is one of the most promising nightmare treatments [15] and was offered to both participants. IRT sessions were individual meetings of 90 minutes. The course of therapy was derived from strategies outlined in Krakow and Zadra [14], and was initially tested by offering it to another participant in order to adjust it. The content of sessions 1 and 2 were identical for both participants. However, session 1 was split into two sessions for Eric. Also, Eric had two additional sessions in order to give him extra practice. Despite differences in the number of sessions for the two participants, both treatments (IRT and CBT for PTSD) encompassed the same rationale. The sessions were delivered by an experienced psychologist, specialized in CBT and in the treatment of PTSD. She was also trained to deliver IRT. The IRT sessions were conducted as follows:

Session 1 IRT focus (for Eric, sessions 1 and 2): Psycho-education on sleep related to PTSD, and an introduction on IRT rationale. The functions of nightmares and the beginning of a vicious cycle were introduced to the participant. The psychologist emphasized that nightmares initially present as a PTSD symptom, which, theoretically, help to regulate emotions and the traumatic memory of the event. However, they cause distress because of the different emotions they generate (e.g., anger, guilt, etc.); the nightmares then create sleep difficulties as they awaken the sleeper. At that point, the nightmares prevent the person from functioning well during the day and no longer fulfill their initial function. As the nightmares become a learned habit, it becomes necessary to treat them directly. The psychologist underlined that nightmare was negative imagery, occurring during sleep, and that their content could be modified. She specified that there are currently no scientific reason to believe that they are unconscious psychological conflicts, as many people believe. As a result, the IRT rationale was introduced as a psychological treatment to unlearn this habit by modifying a recurrent nightmare and rehearsing it during the day. During the session, the participant also practiced pleasant imagery to familiarize himself with this technique. At the end of the session, guidelines to select a nightmare for the next session were given. The psychologist explained they should not be a replica of the traumatic event; ideally their content should be repetitive and should generate a medium level of anxiety. At the close of the session, the participant is asked to practice an exercise of pleasant imagery during the week.

Session 2 IRT focus (for Eric, session 3): IRT practice. This session was devoted to learning how to change the selected nightmare into a positive or neutral dream. Instructions for its modification were introduced. The psychologist helped the participant to identify the “hot spot,” that is to say when the nightmare’s content caused the most distress for him, and to change the nightmare just before this identified moment. The psychologist encouraged the participant to take control over his nightmares by modifying it in any way he wanted (e.g., changing the setting, adopting super powers, etc.), and to incorporate as many details as possible (e.g., emotions, physical sensations, etc.) in order to facilitate incorporating the new ending into memory. Then,

the participant rehearsed the new dream with the psychologist. Finally, he was encouraged to rehearse the new dream at least twice a day in the time before the next session. Once this strategy was acquired, the participant was directed to continue his practice for the rest of the treatment.

For Adam, the whole treatment lasted 20 sessions (three individual IRT sessions at the beginning, and 17 individual CBT sessions for PTSD). For Eric, the whole treatment lasted 29 sessions (24 individual and CBT sessions, and 5 IRT sessions at the end).

3. Results

3.1. Course of treatment and assessment of progress

The impact of the treatment was measured by daily self-monitoring, clinical evaluations, and questionnaires. Concerning the data collected through self-monitoring, we displayed graphically only the weekly average level of distress related to their nightmares. As we expected the levels to fluctuate according to the number of interventions, we chose to apply a third-order polynomial regression to better fit our data. The results are presented on an individual basis.

3.2. Participant 1: Adam

It was decided in advance that the psychologist would meet with the participant every 2 weeks, to offer support until stability was reached on the following daily self-monitoring variables: the frequency of the nightmares, the level of distress related to the nightmares, and the level of sleep quality. These measures were considered indicative of the participant's progression during the course of treatment. Therapy did not begin until stability for these three measures was reached.

The weekly average levels of the distress related to his nightmares by week, at baseline, and during the treatment are reported in **Figure 1**. Overall, we can observe some variability in the level of distress throughout treatment; however, the trend suggests a decrease in the level of distress, especially at the end of treatment. Indeed, at baseline, the distress varied from 5.71 to 7.14; after the IRT sessions (session 3), the distress decreased on average to 7.26; after imaginal exposure (session 9), it decreased on average to 6.25. At the end of the treatment, it reached 4.29. Therefore, the combined treatment appeared to have been effective in reducing the distress associated with the traumatic nightmares.

The situation appears to be different for the frequency of the nightmares. At baseline, Adam reported having from 3 to 5 nightmares a week. During IRT sessions, their numbers varied from 4 to 6 nightmares a week; during imaginal exposure, from 4 to 10; and finally, at the end of the whole treatment, he recorded 4 nightmares a week.

For sleep quality as recorded with the daily self-observations, at baseline, Adam's perception of his sleep quality ranged from an average of 0.71 to 1.47. During IRT sessions, the quality did not improve (from 0.43 to 1.71). During imaginal exposure, it improved slightly and varied from 1.14 to 2.14. At completion of the CBT, his sleep quality had reached 2.86.

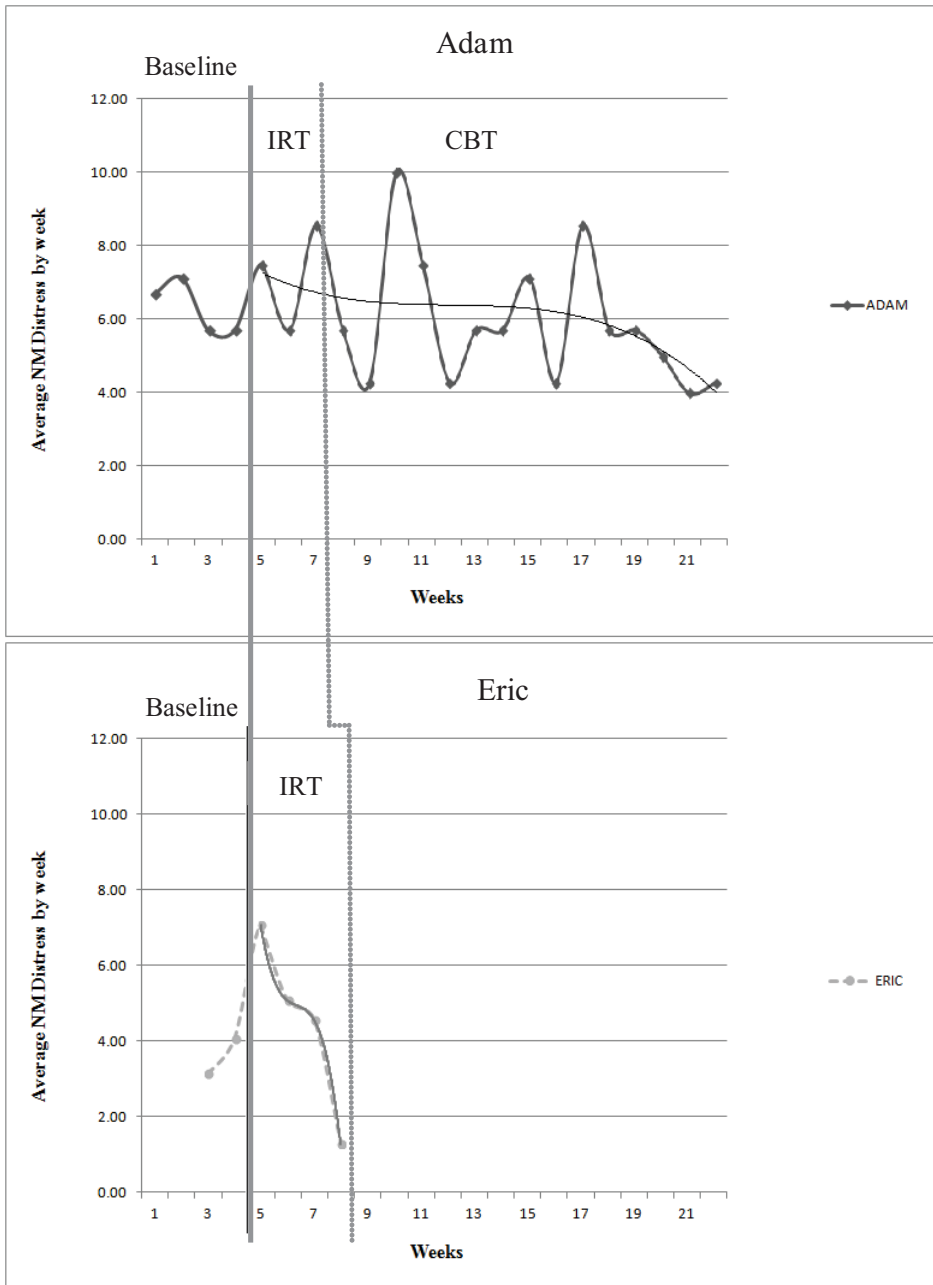


Figure 1. Weekly average levels of distress related to nightmares reported by participants from self-monitoring booklet at baseline and during treatment. The horizontal axis indicates session number and vertical axis indicates weekly average levels of distress related to nightmares over the course of the following week.

Total scores for administered questionnaires show a mitigating impact on PTSD symptoms of the combined treatment. From pre- to post-treatment, the overall score of the PCL-S decreased from 81.00 to 70.00. The total scores of CAPS remained unchanged. However, the intrusive recollection symptoms subscale score, including distressing dreams, decreased from baseline to the end of the combined treatment. Also, the hyperarousal symptoms subscale score, which encompassed sleep difficulties, decreased after IRT sessions and remained at the same level through the treatment.

Looking at sleep questionnaires, some improvements were noted, although significant residual symptoms persisted at the end of the combined treatment. The NDQ received a score of 45.00 (versus 49.00 at baseline), the PSQI demonstrated a score of 15.00 (18.00 at baseline) and the PSQI-A decreased to 10.00 (with a score of 17.00 at the beginning of the treatment).

From a clinical point of view, Adam showed few improvements on the intensity of his PTSD symptoms and still met criteria for PTSD diagnosis at the end of the combined treatment. However, he reported at the end of the therapy feeling less angry and distressed. He reported having gained control over his nightmares and was less afraid to go to sleep. The clinician noticed that, physically, he seemed more rested and to have more energy.

3.3. Participant 2: Eric

Eric reported only occasional nightmares at pre-CBT for PTSD. Since they became present almost every night after the seventh session, and did not disappear post-CBT, we offered Eric five additional IRT sessions. Eric indicated that he was motivated to work on treating his nightmares.

Regarding the frequency of his nightmares, Eric recorded between five and six nightmares a week during the 2 weeks at baseline post-CBT; during the IRT sessions, their numbers successively decreased to two nightmares a week by the end of his treatment. This decrease is coherent with the level of distress reported for his nightmares. The level of distress he experienced as a result of his nightmares decreased between pre-IRT baseline (3.14 out of 10) and post-IRT sessions (1.29 out of 10) with a peak of 7.07 of 10 after the first session. NDQ score was 28.00 and decreased to 22.00. These results suggest that IRT was an effective treatment for him.

Total scores for administered questionnaires show the efficacy of the combined treatment with a decrease in the CAPS total score from pre-CBT (89.00) to post-CBT (70.00) and post-IRT (60.00), more particularly for the intrusive recollection symptoms and the hyperarousal symptoms. When considering the PSQI (pre-CBT = 10.00; post-CBT = 9.00; post-IRT = 7.00) and the PSQI-A (pre-CBT = 9.00; post-CBT = 11.00; post-IRT = 6.00), sleep improvements were observed but sleep difficulties remained.

We observed that the intensity of his PTSD symptoms decreased from 89 to 70 on the CAPS. However, Eric still met the criteria of a clinical PTSD diagnosis. Nonetheless, we observed that, even if he could not complete an imaginal exposure to the whole event, he was able to go into certain details and felt less distressed doing so by the end of the treatment. This step was clinically very important for him, as he had not talked about the event in 10 years.

3.4. Complicating factors

3.4.1. Participant 1: Adam

During the course of treatment, Adam encountered interpersonal problems with his family circle and mentioned their lack of support. He particularly indicated their misunderstanding of his PTSD reactions, reported conflicts with his wife, and expressed his feeling of stigmatization. Social support is reported as being a strong predictor for the development and maintenance of PTSD [34]. Even if Adam demonstrated motivation, these difficulties often had to be addressed during the PTSD treatment, as he felt a lot of anger or isolation when these situations occurred.

It is important to mention that Adam was on sick leave during the treatment and he did not know what to expect regarding the future of his work. A job loss or the threat of losing a job can trigger mixed and confusing feelings, such as anger [35]; on the other hand, a supportive workplace can help in reducing PTSD symptoms by offering, for example, social support. During therapy, Adam began to deal with the possibility of losing his job and this, too, had to be addressed.

A certain cognitive rigidity and significant difficulty concentrating were also observed. To deal with these difficulties, Adam would drink energy drinks before the sessions to be sure to follow everything. Since each session was recorded, Adam sometimes asked to listen to the sessions again, so he could be sure he understood every part of the therapist's intervention. The therapist observed it was difficult for the participant not to be in control of the treatment.

Finally, Adam experienced a lot of pain, more particularly with his back, following the accident, and he received a diagnosis of fibromyalgia during the treatment. Fibromyalgia syndrome is a chronic condition characterized by widespread musculoskeletal pain and multiple tender points on clinical examination. We know from the literature that patients with fibromyalgia are found to be significantly more likely to experience difficulties initiating or maintaining sleep than controls [36]. This variable may have contributed to the quality and quantity of his sleep, as the discomfort awoke him during the night. In addition, it was sometimes difficult for him to report in his self-monitoring booklet if his nightmares were the reason for his waking or if it was because of the pain.

3.4.2. Participant 2: Eric

Ten years had passed since Eric's traumatic event and it was the first time he had talked to someone about it. This brought a high level of anxiety and complicated imaginal exposure. Even though four additional CBT sessions were offered, it was not possible to complete the imaginal exposure of the whole event. However, by the end of treatment, Eric was able to talk somewhat about the details of his sexual assault.

Also Eric had to deal with his marijuana dependence. During sessions, this aspect was approached as it appeared this behavior was a way to manage his emotions and more particularly his anxiety. Eric was never under the influence of marijuana during sessions but used it

at home as a way to compensate for a lack of social network. It was agreed that he would not use marijuana before or after exposition exercises. At the end of the treatment, the clinician observed that Eric had reduced his consumption.

In addition, during the first 3 weeks of IRT, Eric showed difficulties in managing his anxiety because of a colonoscopy he needed, which reminded him of some aspects of the traumatic event. This situation led him to report more nightmares the week before the intervention (after session 1 of the IRT), and more flashbacks after his colonoscopy (before session 3 of the IRT).

3.5. Follow-up

Adam was assessed at 3 and 6 months post-treatment. At the first follow-up (3 months), on the CAPS, he reported a decrease in his PTSD symptoms (from 89.00 to 80.00), more particularly for the avoidance and numbing symptoms. On the PSQI, his overall sleep remained unchanged, while the score on the PSQI-A increased from 10 to 12. However, he mentioned he was less apprehensive to go to sleep and he continued to apply IRT, which helped him to calm down. One first explanation is the PSQI is a subjective self-report measure of sleep over the previous month. Also, the use of one single score for the PSQI could have limited the interpretation of any improvement in different sleep facets [37].

At 6 months follow-up, on the CAPS, we noticed his PTSD symptoms slightly increased (from 80 to 87) to return to the level of the pre-treatment assessment, more particularly for the avoidance and numbing symptoms. He reported having one or two dreams a week but now he could go back to sleep quite easily after them. He also observed it was difficult to separate his nightmares from his pain. On the PSQI and the PSQI-A, the total scores respectively increased from 15 to 17 and to 12 to 16. During the interview he expressed several stressful factors in his life that could have maintained or contributed to the increase in PTSD symptoms and decline in his sleep quantity and quality. These included a dependency to prescribed drugs, family problems and pain.

At 4 months follow-up, Eric's PTSD symptoms had increased slightly (from 60 to 67), except for the intrusive recollection symptoms, which dropped from 12 to 7. He was no longer experiencing nightmares. Avoidance and PTSD symptoms that are common to depression were the most significant symptoms. He still met the diagnostic criteria for PTSD and MDD, and still experienced marijuana dependence. It was not possible to evaluate the other variables as he did not send us back the questionnaires.

4. Discussion

4.1. Treatment implications of the cases

The present study was exploratory and reported the possibility of combining CBT for PTSD with a specific treatment for nightmares (IRT) for adults diagnosed with PTSD. Observations from both participants demonstrated interesting results with: a) a decreasing trend in the level

of distress related to nightmares for Adam and a clear decrease for Eric; b) a slight improvement in sleep; and c) a slight reduction in PTSD symptoms on the CAPS, with a greater reduction for Eric compared to Adam. Nonetheless, both participants still met the criteria for PTSD after treatment. Thus, the results were not as positive as expected. This could be explained by the complicating factors previously outlined, such as pain management, personality traits, and alcohol and drug abuse, which are issues often met by clinicians in their office, and that could affect the results of the combined treatment.

The current study confirmed that both sequences for IRT implementation, before and after CBT for PTSD, are possible. As a result, these data show promising results for clinicians to incorporate IRT, either as a first-step or second-step treatment, for patients diagnosed with PTSD, and who are distressed by their nightmares. Adding a specific treatment for nightmares as a first-step treatment also represents an interesting option for clinicians with clients who are reluctant to directly engage in exposure [38] or are refractory to medication. It therefore offers a way to potentially improve CBT for PTSD [39].

This study is consistent with the findings of past studies' of IRT efficacy in decreasing PTNM distress [40, 41]. Several treatments for nightmares exist, but to our knowledge, it is the first time such a treatment was added as an additional treatment strategy to CBT for PTSD.

Nonetheless, the impact of the combined treatment on the PTSD symptoms was not as positive as we expected. The results are generated from two single-case studies and several complicating factors were reported. Therefore, this study needs to be replicated before conclusions can be drawn. Several aspects should be considered in the future, such as: adding IRT sessions; implementing IRT in a group format; testing the combined treatment with different traumatic events; using a larger sample; and testing the combined treatment with women. Studies should also examine the optimal order for integrating IRT into CBT for PTSD. Also, future controlled and randomized studies are necessary to test IRT efficacy by comparing: IRT alone to IRT combined with a CBT for PTSD and IRT alone to CBT for PTSD alone. Finally, it would also be important to study what the therapeutic component is in order to better adapt IRT and help clinicians to implement it into their PTSD treatment practice.

4.2. Recommendations to clinicians

Both participants experienced a slight decrease in their sleep difficulties and in the intensity of their PTSD symptoms, as well a decrease in the level of distress from the nightmares (slight for Adam, more pronounced for Eric). In addition, Eric demonstrated a decrease in the frequency of his nightmares, which was contrary to Adam's experience. From the findings of this study, we noted that a specific treatment for nightmares, more particularly IRT, combined with CBT for PTSD is possible, and could also be a way of improving a CBT for PTSD.

From the case study of Adam, having only three IRT sessions at the beginning of treatment seemed too short for him, and more IRT sessions could have been beneficial. Also, sleep hygiene was briefly approached and could have been emphasized more. As mentioned and tested in a recent case study [38], CBT for insomnia (CBT-I) is a safe and effective treatment in patients with comorbid insomnia and PTSD. In the case of Adam, who set his alarm to avoid

his nightmares, it would have been interesting to concentrate on a more extended treatment of his sleep disturbances by combining CBT-I and IRT.

In addition, it is interesting to note that Adam's nightmare distress decreased while his nightmare frequency remained the same. This result underlines those of previous studies mentioning that nightmare frequency was not related to the level of distress [42]. As a consequence, nightmare frequency and nightmare distress concepts should be clearly differentiated and clearly explained to clients. For example, the clinician should specify that the client's nightmares may persist at the end of the treatment, but the nightmares will not be as distressing as before. Future studies should continue to monitor both measures in order to better understand the IRT impact.

Both participants expressed difficulties in understanding the rationale of IRT. This nightmare treatment is easy to implement but its rationale and therapeutic components may be an obstacle to delivery by the psychologist and its understanding by the participant. The CBT rationale for PTSD is that nightmares are a reliving of the traumatic event, and gradual exposure to the memory or the stimuli related to the traumatic event should gradually reduce these intrusions by habituation and reducing avoidance. Therefore, when introducing the IRT rationale and by changing the scenario of the nightmare, it may look like avoiding nightmares rather than confronting them. This emphasizes the importance of reinforcing the idea of not avoiding but taking control of the nightmares by changing something that is not real. This also underlines the importance of changing nightmares that do not replicate the traumatic event as we do not attempt to change the story of something that actually happened.

Finally, as the results of a recent study suggested [41], the degree of distress related to the nightmare content was positively linked to the degree of similarity between the nightmare and the trauma. In the current study, we indicated that the selected nightmares were not a replica of the event. It is, therefore, important to keep specifying this nightmare inclusion criterion for future studies to guarantee exactly what they are evaluating. It would also help to understand what the therapeutic component is for IRT (e.g., exposition, mastering, etc.). Otherwise, in the case of different nightmare content, other specific nightmare treatments could be considered, such as ERRT, LDT, sleep dynamic therapy, or self-exposure therapy. It could even be interesting to explore which treatment is more appropriate according to, for example, the degree of avoidance by the victim, the category of his or her traumatic event, and the content of the nightmares.

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