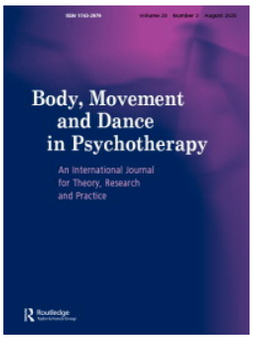

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Psychomotor therapy for posttraumatic stress disorder

Minke M. van de Kamp[a,b], Claudia Emck[a], Mia Scheffers[c], Marieke Hoven[c], Pim Cuijpers[a] and Peter J. Beek[a]

[a]Faculty of Behavioural and Movement Sciences, Amsterdam Movement Sciences, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands; [b]ParnassiaGroep, Mental Health Institute, The Hague, The Netherlands; [c]Department of Human Movement and Education, Windesheim University of Applied Sciences, Zwolle, The Netherlands

ABSTRACT

Posttraumatic stress disorder (PTSD) is a significant mental health condition that may occur after traumatic events. Given its body- and movement-related features, psychomotor therapy (PMT) may be a valuable treatment option for PTSD. PMT employs body- and movement-oriented activities to reduce psychiatric symptoms, enhance mental health, and improve psychosocial functioning. The potential merits of PMT for individuals with PTSD are reviewed, combining evidence from a systematic literature search and insights from an expert panel. Body-oriented psychotherapy professionals are informed about how PMT can address trauma-related mental health conditions and provide a theoretical background for its implementation. Various interventions tailored to diverse populations within the trauma spectrum are included. Common factors across these interventions, which may underpin PMT's working mechanisms, include developing adaptive interoceptive awareness, regulating arousal, and improving interpersonal functioning. The reviewed literature indicates that PMT may be beneficial in both the diagnosis and treatment of trauma-related conditions.

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KEYWORDS Posttraumatic stress disorder; psychomotor therapy; body-oriented therapy; movement-oriented therapy; body experience

Posttraumatic stress disorder (PTSD) is a significant mental disorder affecting individuals who have experienced traumatic events (American

CONTACT Minke M. van de Kamp M.m.vande.kamp@vu.nl Faculty of Behavioural and Movement Sciences, Vrije Universiteit, De Boelelaan 1105, 1081 HV Amsterdam, the Netherlands

Psychiatric Association, 2013). Given its body- and movement-related features (see 'Psychomotor characteristics and diagnosis' section), body- and movement-oriented psychotherapies (Röhricht, 2009), such as psychomotor therapy (PMT), may be valuable treatment options (van de Kamp et al., 2023). PMT employs movement activities and focusses on bodily experience to reduce psychiatric symptoms, enhance mental health, and improve psychosocial functioning (Emck & Scheffers, 2019). In the Netherlands, PMT is integrated into mental health care, which is predominantly based on the biomedical model with a strong emphasis on evidence-based practices. While PMT interventions align with this model, its theoretical foundation is rooted in phenomenological and embodiment-based perspectives. PMT adheres to the biomedical model for symptom reduction with an added focus on personalised treatment, integrating a transdiagnostic and embodied approach.

Despite historical and methodological differences, PMT and other body-oriented psychotherapies share some key elements, such as the importance of movement and physical expression, the mind-body connection, and the use of insights from affective neuroscience and neuropsychology. These therapies emphasise the body's role in emotional regulation and mental health, integrating elements from various disciplines in a comprehensive approach to healing.

This article[1] highlights the potential benefits of PMT in addressing PTSD by combining available evidence and clinical expertise. We conducted a systematic literature search on body- and movement-oriented interventions for PTSD and trauma-related conditions (see van de Kamp et al., 2023 for the search strategy) and integrated insights from an expert panel of the Dutch Society for Psychomotor Therapy, specialising in trauma treatment. Interventions were included if they were theoretically grounded, practically outlined, relevant to the population, and had some evidence of effectiveness. Our aim is to inform body-oriented psychotherapy professionals about how PMT can address trauma-related mental health conditions and provide a theoretical background for its implementation, which may be shared with other body-oriented psychotherapies.

Trauma-related mental health problems

PTSD can develop after traumatic experiences (American Psychiatric Association, 2013). It is characterised by symptoms of re-experiencing, avoidance, emotional numbing, and hyperarousal. The DSM-5 identifies a dissociative subtype of PTSD, marked by persistent additional symptoms of depersonalisation and/or derealisation (American Psychiatric Association, 2013), observed in 38.1% to 48.1% of individuals with PTSD (White et al.,

2022). Herman (1992) suggested the existence of complex PTSD (cPTSD), a variant seen in survivors of prolonged trauma such as childhood abuse or genocide, which is included in the International Statistical Classification of Diseases and Related Health Problems (11th ed.; World Health Organization, 2021), but not in the DSM-5 (American Psychiatric Association, 2013). It is distinguished by additional symptoms such as difficulties in emotion regulation, relational disturbances, alterations in attention and consciousness, negatively impacted belief systems, and somatic distress (Cloitre et al., 2014). Due to the complexity of symptoms, specialised interventions for cPTSD may be necessary (Karatzias et al., 2019).

The burden of trauma-related conditions and the related functional impairment and psychosocial impact can be significant (Jellestad et al., 2021). High rates of comorbid psychiatric conditions, especially depressive and anxiety disorders are reported (Karatzias et al., 2019). Furthermore, individuals with PTSD have a high prevalence of physical comorbidities like diabetes, metabolic syndrome, cardiovascular and neurohormonal disorders, immune dysfunction, and digestive and musculoskeletal disorders (D'Andrea et al., 2011; Gupta, 2013). These conditions are associated with chronic stress reactions and adverse lifestyle behaviours (D'Andrea et al., 2011; Godfrey et al., 2013). All these factors make trauma-related conditions complex and challenging to treat, emphasising the need for well-suited treatments.

Psychomotor characteristics and diagnostics

Individuals with PTSD display psychomotor difficulties, such as poorer balance, flexibility and coordination, and higher muscular tension, pain, and functional limitations than individuals without PTSD (Nyboe et al., 2017). Furthermore, they display psychomotor reactions, like startle or freeze responses, elevated arousal and anxiety in situations involving interpersonal touch or proximity, and heightened alertness to environmental stimuli.

Trauma-related conditions are typically diagnosed through clinical interviews or questionnaires. Complementary to verbal and written information, body posture, movement, and expression can provide valuable information about symptomatology, clinical features, and global functioning of individuals with PTSD. Therefore, a Psychomotor Diagnostic Instrument (PMDI) was developed to observe individuals during psychomotor exercises (van de Kamp et al., 2018). While the PMDI's reliability and validity require further study, initial findings are promising (Houtman & Harteveld, 2023).

Body experience significantly influences mental health and social functioning (Wilson et al., 2013) and is considered a central component of how individuals experience themselves in the world (Stelter, 2000). Assessment

of body experience subdomains is typically conducted using self-report questionnaires. Given the central role of body experience in PMT, this information is highly relevant.

Traumatic experiences negatively impact a person's relationship with their body (van der Kolk, 2015), affecting various subdomains of body experience. Individuals with PTSD exhibit lower body satisfaction compared to non-clinical populations (Borgmann et al., 2014; Scheffers et al., 2017). Body satisfaction is strongly related to self-esteem and social anxiety (Tsartsapakis et al., 2023), potentially hindering participation in social and physical activities. Moreover, individuals with PTSD often exhibit negative body attitude (Dyer et al., 2013; Talmon & Ginzburg, 2018) and discomfort with interpersonal proximity and touch (Rabellino et al., 2020; Strauss et al., 2019), complicating intimate relationships and sexuality.

Individuals with PTSD show varying degrees of interoceptive awareness across studies (Machorrinho et al., 2022; Reinhardt et al., 2020; Scheffers et al., 2017; Smit et al., 2023). This variation may be influenced by symptoms such as hyperarousal, numbing, depersonalisation, and dissociation (Kearney & Lanius, 2022; Ogden & Fisher, 2015). Consequently, individuals with PTSD may struggle to recognise and respond appropriately to their bodily signals, which is crucial for self-regulation and self-care (van de Kamp et al., 2024).

Individuals with intellectual disabilities are at high risk of experiencing sexual abuse (Tomsa et al., 2021) and consequently display a wide range of psychological and behavioural problems, including posttraumatic stress symptoms (Smit et al., 2019). Since intellectual disabilities often hinder verbal communication and expression (Smit et al., 2019), structured observation of psychomotor symptoms using the PsyMot-ID (Kay et al., 2016) may also provide valuable information about body experience in this group (Smit et al., 2023).

Treatment

Theoretical background for the implementation of PMT for PTSD

Although psychotherapeutic interventions have been successful in addressing PTSD (Lewis et al., 2020), residual symptoms often remain, especially in cases of cPTSD and dissociative symptoms (Corrigan & Hull, 2015; Hoeboer et al., 2021). Research on the effectiveness of interventions is generally limited to 'regular' PTSD (Lewis et al., 2020). Complex cases are often excluded from pertinent studies because they do not align seamlessly with the standard diagnostic categories needed for robust research, implying that these conditions are seldom studied (Corrigan & Hull, 2015).

A key factor in the onset and persistence of PTSD symptoms may be the dysregulation of the stress system (Krupnik, 2021; Ogden & Fisher, 2015). Neurobiological theoretical frameworks suggest that verbal and cognitive interventions may not adequately reach the subcortical brain regions essential for processing intense stress (Kearney & Lanius, 2022).

During high stress, the body prepares for fight or flight by increasing physiological arousal. A tonic immobility response, characterised by increased muscle tone and reduced body movement, can also be triggered and is a significant predictor of PTSD development (Coimbra et al., 2023). Hypo-arousal can occur after tonic immobility, especially when opportunities for self-defense and escape are minimal or in cases of chronic traumatisation (Schauer & Elbert, 2010). This passive response to prolonged threat is marked by decreased muscle tone and emotional shutdown, potentially leading to out-of-body experiences or loss of consciousness (Kearney & Lanius, 2022; Schauer & Elbert, 2010).

After a survival action is successfully completed, the stress system returns to a state of rest and recovery. However, in cases of tonic immobility or hypo-arousal, the survival action may not be completed. Incomplete responses to threats can lead to exaggerated motor patterns or defensive states in trauma survivors and may occur in everyday situations or when confronted with trauma triggers (Kearney & Lanius, 2022). Post-trauma, sensory systems may prioritise self-protection and defense over social orientation and higher cognitive functioning (Ogden & Fisher, 2015). These defensive states are perceived as possible causes for the dysregulation of the stress system, a core feature of PTSD, along with problems in social attunement and cognitive impairments. This theory underpins body- or movement-oriented interventions like Somatic Experiencing or Sensorimotor Psychotherapy, which aim to resolve these incomplete responses, thereby restoring balance to the stress system (Levine, 2010; Ogden & Fisher, 2015).

The 'Window of Tolerance' model (Siegel, 1999) offers a framework for understanding the rapid and unpredictable fluctuations in arousal states associated with the dysregulation of the stress system (Ogden & Fisher, 2015). It proposes that individuals have an optimal arousal range, or 'window', between hypo- and hyperarousal extremes. Within this 'window', emotions are manageable, and experiences can be integrated. The model is valuable in clinical settings, helping individuals understand their arousal state fluctuations and implement effective regulation strategies (Ogden & Fisher, 2015). Arousal regulation involves not only calming, but also increasing arousal through well-dosed behavioural activation and stimulating sensory awareness.

As outlined by Kearney and Lanius (2022), sensory input (e.g., vestibular, proprioceptive, and tactile), can directly influence subcortical brain regions

to regulate arousal and strengthen our sense of self. Breathing exercises can also influence the arousal system (Balban et al., 2023; Toussaint et al., 2021). Therefore, applying sensory stimulation with awareness or breathing exercises may enhance the effectiveness of current psychotherapeutic interventions. PMT could be a valuable addition to mainstream treatments by helping individuals to integrate sensory, cognitive, and emotional information and regulate arousal through various interventions like yoga and physical activation (Emck & Scheffers, 2019; van de Kamp et al., 2023).

Current psychomotor interventions

A diversity of psychomotor interventions may be feasible for treating trauma-related conditions (Emck & Scheffers, 2019). Examples include progressive muscle relaxation (Jacobson, 1938; Vera et al., 2022), breathing exercises (Carter et al., 2013; Descilo et al., 2010), expressive and symbolic exercises for aggression regulation (Boerhout et al., 2013; Zwart, 2001), sensory awareness and tactile exercises (Emck & Scheffers, 2019; Hoven et al., 2009). These interventions focus on developing effective coping skills and deepening the understanding of the origin of trauma-induced problems. Goals of PMT in PTSD may include arousal regulation, enhancing adaptive interoceptive awareness, and handling emotions, especially in cases of suppression or impulsive and aggressive behaviour. They may also involve developing present-moment orientation skills to reduce re-experiencing and dissociation symptoms, improving interpersonal functioning, and enhancing psychomotor skills including balance and coordination (Hoven & Scheffers, 2014; Kamp et al., 2018; Nyboe et al., 2017). Additionally, goals may include decreasing behavioural avoidance of trauma-related stimuli, and promoting adaptive responses to those stimuli (Ogden & Fisher, 2015; Putica et al., 2024).

Interpersonal and social difficulties are common features of (c)PTSD. Neurophysiological disturbances, such as autonomic dysregulation and ineffective defensive reactions in social contexts, significantly contribute to these problems (Ardizzi et al., 2013; Steuwe et al., 2014). Psychomotor therapists are skilled in observing and reacting to shifts in individuals' physical and affective states, thereby promoting interactive arousal regulation. This approach may help clients safely explore and regulate their inner experiences (Ogden & Fisher, 2015). Reconnecting with bodily experiences within a supportive therapeutic relationship can counteract previous negative experiences and attachment disruptions (van der Kolk, 2015). Among the interpersonal problems, difficulties with physical contact stand out (Scheffers et al., 2017; Strauss et al., 2019). Affective touch is regarded as a medium through which we display social concern and attenuate stress,

non-verbally communicating our presence with another person (Kearney & Lanius, 2022). Touch interventions are commonly integrated in PMT interventions, such as the Feel-Own-Move intervention and interventions aimed at recovery of intimacy and sexuality described below. Furthermore, preparative exercises in Pesso Boyden System Psychomotor (Slaninová & Pidimová, 2014) are useful for incorporating touch in PMT. These exercises ensure that the person being touched controls the experience by communicating preferences and setting boundaries.

Exercise for PTSD

Physical exercise, either alone or combined with standard treatment, can positively influence PTSD symptoms through mechanisms such as desensitisation to internal arousal cues, improved cognitive function, exercise-induced neuroplasticity, regulation of the hypothalamic-pituitary-axis (HPA), and decreased inflammatory markers (Hegberg et al., 2019). Considering the high rate of physical comorbidity, exercise is crucial for maintaining overall health, even though individuals with PTSD may over-exercise to avoid trauma-related symptoms. The therapist and individual should collaboratively assess the purpose, amount, and nature of the exercise to maximise effectiveness and prevent injuries, exhaustion, or drop-out.

Adding exercise to conventional treatments for PTSD could enhance their effectiveness (Bryant et al., 2023; Rosenbaum et al., 2015). Standalone exercise interventions have limited effects on PTSD symptoms (van de Kamp et al., 2023), but may reduce comorbid depression symptoms (Hall et al., 2020) and improve sleep quality (Whitworth et al., 2019).

Trauma-sensitive yoga

Trauma-Sensitive Yoga (TSY) is developed for PTSD individuals and aims to improve body and emotional awareness and manage arousal and emotions (Emerson & Hopper, 2011). TSY focuses on experiencing the present moment, making choices, taking effective action, and creating rhythms (Emerson & Hopper, 2011). It employs adaptable yoga postures and promotes a mindful approach, reminding participants that they can control their experience. TSY can be used alone or combined with standard treatment.

A qualitative study in women with PTSD engaged in TSY revealed themes related to perceived symptom changes and personal growth: gratitude, compassion, relatedness, acceptance, centeredness, and empowerment (West et al., 2017). Yoga interventions significantly alleviate PTSD symptoms (van de Kamp et al., 2023).

Sensorimotor psychotherapy

Sensorimotor psychotherapy, a mindfulness-based therapy, integrates sensorimotor, cognitive, and emotional processing to treat trauma (Ogden & Fisher, 2015). The therapy focuses on modulating autonomic arousal and reinstating adaptive responses, using the body as the primary entry point for processing trauma. This improves emotional and cognitive processing, thus alleviating the effects of trauma on the body (Ogden & Fisher, 2015).

Two studies indicated improvements after a sensorimotor intervention in PTSD symptoms, depression, overall health, and social functioning (Gene-Cos et al., 2016), and body awareness, anxiety, and soothing receptivity (Classen et al., 2021).

Somatic experiencing

Somatic Experiencing (SE), a body-focused therapy for PTSD, aims to create awareness of inner physical sensations, considered as carriers of traumatic memory (Levine, 2010). SE aims to release this traumatic activation by increasing tolerance of bodily sensations and related emotions, thereby inviting a discharge process to dissolve the activation (Levine, 2010). SE engages clients with traumatic memories causing high arousal, teaching them to downregulate arousal using body awareness and self-regulatory mechanisms (Levine, 2010).

Two single group studies in tsunami survivors resulted in significant improvement of PTSD symptoms after one or two SE sessions (Leitch et al., 2009; Parker et al., 2008). The only controlled study comparing 15 SE sessions to a waitlist control condition resulted in a large effect size on both PTSD and depression symptoms (Brom et al., 2017).

Movement in trauma

'Movement in trauma', a psychomotor group intervention, consists of 12 weekly sessions focusing on interoceptive awareness, arousal regulation, personal space, and boundary communication (Scheffers et al., 2016). Playfulness is integrated to counteract the lack of play in many complex trauma individuals' childhoods (Ogden & Fisher, 2015; Sheets-Johnstone, 2003).

A non-randomized controlled study on 'Movement in trauma' showed less general mental health problems and PTSD symptoms in the intervention group. CPTSD individuals benefitted more, showing its potential for complex trauma treatment (van Poelgeest, 2017).

Safe and Strong

The individual psychomotor intervention 'Safe and Strong' was developed for adults with mild intellectual disabilities and borderline intellectual

functioning who have experienced sexual abuse (Leeflang et al., 2021). This intervention aims to improve body experience, physical self-regulation of arousal and emotions, and the development of adaptive coping skills. The number of sessions varies between 26-44 weekly sessions, tailored to the individual.

In a multiple baseline study, four out of five participants showed significant improvements in body awareness, arousal regulation, confidence, and boundary setting (Leeflang et al., 2024). 'Safe and Strong' may serve as a valuable addition to current therapeutic interventions, which caters to the needs of this specific group.

Arousal regulation intervention

The arousal regulation intervention (Nissen et al., 2024) is a body-oriented treatment for arousal problems in people with trauma-related conditions. It consists of eight sessions, combining techniques from PMT and sensorimotor psychotherapy. The goal is to help participants regulate psychophysiological arousal by recognising and interpreting arousal signals, understanding individual orientation behaviour and its effect on arousal, utilising physical resources and orientation skills, and exploring optimal arousal. The Window of Tolerance model (Siegel, 1999) is used to map arousal signals, aiming to work from the optimal arousal zone as much as possible. However, individuals undergoing this intervention, often experience hypo- or hyper-arousal rather than optimal arousal. This means that arousal during the session, including dysregulation, is central to the intervention. The intervention is built up in small steps, and includes extensive written materials for clients to review at home, supplemented with exercise sheets.

Feel-Own-Move intervention

Feel-Own-Move (FOM) is a PMT program aimed at treating survivors of intimate partner violence to regain body awareness and control (Machorrinho et al., 2023). It uses movement, expression, breathing, and relaxation techniques to promote non-judgmental awareness of bodily sensations and their relationship with emotions, and to increase self-regulation. The program consists of 24 sessions during eight weeks, 16 individual and eight in a group, each consisting of three parts: warming-up, body awareness and grounding, and relaxation. The warming-up entails aerobic exercises and strength training to activate proprioceptive and interoceptive sensations. The middle part employs sensory awareness through slow movements, therapeutic touch, and guided sensations. Various relaxation techniques are used to reduce excessive physiological arousal and promote emotional regulation. The FOM program also includes methods to reinforce

feelings of body ownership and promote the sense of wholeness of the body.

A pilot study on the FOM program (Machorrinho et al., 2023) found that the program reduced bodily dissociation without significantly impacting PTSD symptoms, depression, anxiety, or quality of life. The intervention's effectiveness may have been limited by challenges such as poor shelter conditions, shortened sessions due to childcare needs, and the short duration of the program due to the brief stay of participants in the shelters.

PMT interventions for recovery of intimacy and sexuality

Individuals with PTSD generally report problems with interpersonal touch and very low sexual fulfilment (Scheffers et al., 2017; Strauss et al., 2019). Moreover, PTSD significantly affects sexual functioning (Wang et al., 2023), with reports of both hypo- and hypersexuality (Rellini, 2008). Problems in sexual functioning are often explained by psychological and neurobiological processes and may be partly related to the use of pharmacotherapy and comorbid depressive disorders (Yehuda et al., 2015). Despite the far-reaching effect on intimate relationships, sexuality issues are often overlooked in standard treatments. Recent research demonstrated that intensive trauma-focused treatment improved sexual satisfaction and desire in individuals with PTSD, albeit with small effect sizes (Woudenberg et al., 2023). This improvement was not related to decrease in PTSD symptoms, suggesting that specific interventions aimed at sexuality and intimacy may be valuable.

To address problems with sexuality, psychomotor interventions were developed. The intervention by Scheffers and Helleman (2013) consisted of 12 bi-weekly sessions with PMT and verbal psychotherapy, focused on body awareness, relaxation, personal space and boundaries, touching and being touched, balance between control and letting go, and attending to one's own wishes and needs. A pilot study showed it improved body satisfaction in individuals with war-related trauma (Bhagwandas et al., 2014). Building on this, Schildmeijer and Bieleveldt (2023) developed a 13-session program that also targets trauma and body experience and sexuality, aiming to improve self-awareness and social interactions.

Sensory perception training for dissociative conditions

The sensory perception training is a 7-week program for individuals with dissociative conditions (Hoven et al., 2009). It includes psychoeducation, psychomotor and arts therapy interventions to develop sensory and body perception, decrease dissociation, and increase present-time orientation. Elements of the intervention may also aid individuals with PTSD in decreasing re-experiencing symptoms or dissociative symptoms.

In a pilot study mindfulness skills increased, however, there were no significant effects on body experience or dissociative symptoms (Hoven & Scheffers, 2014).

Conclusion

Based on the reviewed literature, PMT may provide an important adjunct treatment for trauma-related conditions. It aids diagnosis through psychomotor observation (Smit et al., 2023; van de Kamp et al., 2018) and body experience assessment (Scheffers et al., 2017; van de Kamp et al., 2024) and enriches treatment with integrated body- and movement-oriented interventions (van de Kamp et al., 2023).

The ICD (World Health Organization, 2021) differentiates PTSD from cPTSD, but in practice we observe a spectrum of symptom complexity rather than distinct categories. PMT, though operating within the biomedical framework, follows a personalised approach. This overview presents various interventions tailored to the needs of different populations within the trauma spectrum. However, the evidence is still limited due to a shortage of high-quality studies with proper controls and long-term follow-up (van de Kamp et al., 2023). The effectiveness of interventions needs further research; most described interventions were investigated in small pilot studies.

Throughout the overview of the intervention programs, we noted common factors, namely developing adaptive interoceptive awareness, regulating arousal, and improving interpersonal functioning. Developing interoceptive awareness involves perceiving, interpreting, and attending to bodily signals related to stress, emotions, and physiological processes in a balanced and effective manner. Arousal regulation includes learning to recognise and interpret arousal signals and utilising physical resources to establish optimal arousal. Improving interpersonal functioning entails communicating wishes and boundaries, as well as restoring interpersonal touch, intimacy, and sexuality. These factors might be crucial elements of working mechanisms in movement- and body-oriented therapies like PMT.

Recommendations for practice

Based on the included literature in this overview, we recommend including PMT in treatment options for individuals with trauma-related symptoms. Psychomotor therapists should deliver personalised care, focusing on developing adaptive interoceptive awareness, arousal regulation, and interpersonal skills.

Note

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Minke M. van de Kamp, MSc, (psychomotor therapist) is a PhD student and teacher at the Vrije Universiteit, Faculty of Behavioural and Movement Sciences, Amsterdam, The Netherlands. She is specialised in psychomotor diagnosis and interventions for patients with post-traumatic stress disorder.

Claudia Emck, PhD, (psychomotor therapist, clinical and health psychologist) is assistant professor at the Faculty of Behavioural and Movement Sciences, Vrije Universiteit Amsterdam (The Netherlands). She is specialised in psychomotor diagnosis and interventions for people with psychiatric disorders, with a special interest in gross motor performance and body experience in neurodevelopmental disorders (Autism, ADHD, Intellectual disabilities).

Mia Scheffers is associate professor Human Movement, Health and Wellbeing at Windesheim University of Applied Sciences, Zwolle, the Netherlands. Her research focuses on body- and movement-oriented diagnostics and interventions for people with trauma-related disorders. Other relevant topics in her work are sexual violence, gender related issues in psychotrauma, and psychometric evaluation of Patient Reported Outcome Measures for psychomotor therapy.

Marieke Hoven, Psychomotor therapist MA, Certified Advanced Practitioner Sensorimotor Psychotherapy at Heelzorg, Center for Psychotrauma and teacher in Psychomotor Therapy at Windesheim University of Applied Sciences, Zwolle, the Netherlands. The main focus in her work for people with complex trauma and dissociative disorders, is to treat severe symptoms in a simple and accessible way and regaining positive body-experience.

Pim Cuijpers is Professor emeritus of Clinical Psychology and Director of the WHO Collaborating Centre for Research and Dissemination of Psychological Interventions at the Vrije Universiteit Amsterdam (The Netherlands). He is specialised in conducting randomised controlled trials and meta-analyses on prevention and psychological treatments of common mental disorders. Much of his work is aimed at prevention of mental disorders, psychological treatments of depression and anxiety disorders, and Internet-delivered treatments. Pim Cuijpers is Editor-in-Chief of the Journal of Consulting and Clinical Psychology.

Peter J. Beek is Professor of Coordination Dynamics at the Department of Human Movement sciences at the Vrije Universiteit Amsterdam (The Netherlands). His research focuses on the control and acquisition of complex perceptual-motor skills,

particularly in the context of sports and rehabilitation. He is currently coordinator for the scientific support of elite swimming on behalf of Tongelreep National Swimming Center at Eindhoven, the Royal Dutch Swimming Federation and the Dutch National Water Safety Council Foundation.

ORCID

Minke M. van de Kamp http://orcid.org/0000-0003-1405-6278
Claudia Emck http://orcid.org/0000-0003-2015-6574
Mia Scheffers http://orcid.org/0000-0003-0469-1569
Pim Cuijpers http://orcid.org/0000-0001-5497-2743
Peter J. Beek http://orcid.org/0000-0002-0917-8548

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