

Description of an early cognitive behavioral intervention (UPFRONT-intervention) following mild traumatic brain injury to prevent persistent complaints and facilitate return to work

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This series of articles for rehabilitation in practice aims to cover a knowledge element of the rehabilitation medicine curriculum. Nevertheless they are intended to be of interest to a multidisciplinary audience. The competency addressed in this article is the neuropsychologist.

Abstract

Purpose: Many patients with mild traumatic brain injury do not fully return to work owing to persistent posttraumatic complaints. Research suggests that preventing chronic complaints might be prevented by giving cognitive behavioral therapy early after injury. Therefore, a new cognitive behavioral intervention (UPFRONT-intervention) was developed to not only prevent chronic complaints but to also establish a more successful return to work. The intervention is currently being evaluated in a multicenter randomized controlled trial design (trial number ISRCTN86191894) in mild traumatic brain injury patients who are at-risk of negative outcomes (patients with high numbers of early complaints). Two case examples are presented to demonstrate the application of the intervention.

Rationale: Psychological factors, like cognitive appraisal and coping, play an important role in the persistence of posttraumatic complaints. Some patients are less able to adapt and thus to cope with the injury and its initial consequences than others. Dealing with the injury in a passive, avoidant way, focusing on negative feelings, will hamper recovery and is therefore a valuable target for an intervention.

Theory into practice: The UPFRONT intervention is a short cognitive behavioral therapy intervention for patients that are at-risk of developing persistent posttraumatic complaints. Patients will undergo five sessions of cognitive behavioral therapy within 4–10 weeks after trauma. The intervention aims to enhance patients' feeling of competency of dealing with the consequences of mild traumatic brain injury by providing psycho-education, identifying and challenging unrealistic illness perceptions and improving coping style (decreasing maladaptive coping and enhancing adaptive coping).

Keywords

Intervention, cognitive behavioral therapy, mild traumatic brain injury, coping, return to work

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Introduction

Annually, an estimate of 100–300/100,000 people sustain a mild traumatic brain injury.¹ In the early stage of recovery, patients can experience a variety of posttraumatic complaints including headache, fatigue, dizziness, difficulty concentrating and irritability.² Although these complaints resolve in the majority of patients within days to weeks without a specific therapy, a subgroup (20%–25%) will develop persistent posttraumatic complaints. Patients with a high report of posttraumatic complaints in the acute phase have been identified as being at-risk for developing these persisting complaints,^{3,4} which can last from months to years' postinjury and interfere with the return to work and other activities.⁵ Given the negative consequences for long-term outcome and community integration, designing an effective intervention to prevent the development of persisting posttraumatic complaints and to advance return to work is of the utmost importance.

Psychological treatment of mild traumatic brain injury patients with persistent complaints in the chronic phase is often done with cognitive behavioral therapy. Although persistent complaints are traditionally seen as difficult to treat and resistant to therapy,⁶ several studies that treat mild traumatic brain injury patients with cognitive behavioral therapy in the chronic stage did report improvements.^{7–9} In a recent study, Potter et al. found treatment effects for quality of life, posttraumatic complaints, anxiety and fatigue.¹⁰ However, no evidence of effectiveness in global functioning was found, which emphasized the existing challenge in improving daily life functioning of mild traumatic brain injury patients with persistent complaints.^{7–9}

Recently, various studies suggest that patients might benefit more from therapeutic interventions early after injury to prevent the patient from developing unrealistic ideas; which in turn reduces the number of complaints.^{11,12} For example, several studies revealed the importance of education and

reassurance early after injury,^{12,13} which was found to reduce reported posttraumatic complaints. However, with regard to cognitive behavioral therapy, routine preventative treatment of all mild traumatic brain injury patients offered little benefit,¹⁴ which emphasizes that interventions should only target the patients at-risk of suffering from persisting complaints. In a study that did investigate preventative cognitive behavioral therapy for at-risk patients only, Silverberg and colleagues demonstrated that preventative cognitive behavioral therapy shortly after mild traumatic brain injury resulted in a reduction of posttraumatic complaints and depression at three months postinjury.¹¹ However, like many of the other intervention studies,^{9,13,14} their description of the cognitive behavioral therapy intervention was meager, lacking details and theoretical underpinnings to facilitate replication and further research.

Therefore, the aim of the current study is to present one of the first detailed descriptions of a cognitive behavioral therapy prevention for at-risk patients early after mild traumatic brain injury, to aid professionals in the use of this intervention and promote future research. The UPFRONT cognitive behavioral therapy intervention aims to prevent persisting posttraumatic complaints and facilitate a successful return to work following mild traumatic brain injury, and is currently evaluated in a multicenter randomized controlled trial as part of the UPFRONT study: "Cognitive behavioral therapy-based intervention compared with telephone counselling early after mild traumatic brain injury: A randomized trial." The trial was registered with the International Standard Randomized Controlled Trial Number Register (ISRCTN86191894). We will discuss the theoretical background of the treatment protocol, the content of the protocol and description of the sessions, followed by a discussion of the treatment. To illustrate the application of the intervention protocol in practice, we provided two case descriptions of consenting patients in Boxes 1 and 2.

Box 1.

Case 1: X is a 46-year-old woman who sustained a mild traumatic brain injury by a fall down the stairs. At the time of the start of the intervention (five weeks postinjury) she still complained about extreme fatigue, concentration problems, forgetfulness, dizziness and headaches. X describes that prior to the injury, she had a lot on her plate. There was a reorganization at her work place, which would probably mean a demotion in job function. Overall, X expressed major concerns about her recovery and position within her work and was distressed by many ruminative thoughts. She also developed a pattern of periods of overburdening herself alternated with very sedentary periods.

Case 2: Y is a 57-year-old man who sustained a mild traumatic brain injury by being hit by a car on a bike. In the first few weeks after injury, he found himself forgetful, easily distracted, fatigued, more chaotic and easily irritated. Y worked as a planner, and started working half days at the start of the intervention (six weeks post-injury). He read a lot about traumatic brain injury on the Internet, and believed that the outcome would not be good. Y presented himself as a perfectionistic and introvert person: He almost never talked to others about his feelings. Y experienced a lot of anger about the accident and was easily frustrated at work when he was not able to do a task the way he would have done before.

Box 2.

X was avoiding work-related issues, and negative thoughts concerning work and her abilities were a main focus in the intervention. In the sessions, she created more helpful thoughts and prepared the meeting with her new boss by writing down her qualities, experience and needs. X felt very reassured when she came back from her meeting with her new boss, which went very well. Moreover, she was happy to learn to be able to say no to requests from others so she would not overburden herself, avoiding periods of total exhaustion. She gradually noticed that by pacing herself sometimes, she could do more activities in a day.

Y was relieved when the accurate information on mild traumatic brain injury and its favorable prognosis was discussed. In the sessions he created helpful thoughts like: "I will gradually improve," "If I explain to others what I need, they will be more understanding." With regard to the latter, Y implemented this by providing his colleagues with the information booklet, and explained that he had difficulty concentrating sometimes. Afterwards, his colleagues made an effort not to interrupt him while he was doing his job, and were understanding when things happened more slowly. Y noticed that when he had less interruptions and pressure from his colleagues, he gradually could get the same amount of work done before.

Rationale

With regard to the often-debated etiology of persisting complaints following mild traumatic brain injury, the oldest view was formulated by Lishman and dates back to 1988.¹⁵ Lishman stated that organic factors are relevant in the early stages, and secondary neurotic developments are to blame for the perpetuation of posttraumatic complaints. Currently, the most dominant view is that from the outset, a complex interplay exists of organic, psychological and social factors, such as the injury itself, life stressors and pre-morbid (mental) health status.^{8,16} Psychological mechanisms, such as cognitive appraisal and coping style, have been found to play a key role in the perpetuation of complaints.¹⁷ For example, measures of injury severity

have been found to be poor predictors of outcome, and persistent cognitive complaints are unrelated to performance on neuropsychological tests. Instead, these persisting complaints were related to feelings of distress (depressed mood and anxiety) and higher levels of fatigue.¹⁸ Apparently, some patients are better able to adapt and thus to cope with the distressing nature of the injury and its initial consequences than others.^{19,20}

Coping refers to psychological adaptation to stressors and serious life events, and an important element of coping is the ability to regulate (especially negative) emotions in order to adapt to challenging situations. Although the effectiveness of a coping style is dependent on the situation, it is generally acknowledged that an active coping style with positive thinking will more

frequently lead to a positive adaptation, whereas a passive coping style with denial or avoidance of problems and focusing on negative feelings is considered to be maladaptive.²¹ For example, perceiving the complaints after mild traumatic brain injury as catastrophic will lead to feelings of threat and loss of controllability. This may cause patients to be unrealistic in their perception of illness and expectations of recovery.²² An explanation for this is that a maladaptive coping style and unrealistic illness perceptions result in persisting feelings of depression and anxiety. This in turn may cause an enhanced focus on symptoms resulting in excessive complaints creating a vicious cycle.^{23–25} Not surprisingly, psychological interventions have increasingly become subject of interest for treatment of these persisting complaints and breaking the self-reinforcing nature of this negative cycle, of which cognitive behavioral therapy seems one of the most promising methods.¹¹

The design of the UPFRONT intervention protocol is based on the Cognitive and Graded Activity Training (COGRAT) protocol²⁶ for dealing with fatigue after a cerebrovascular accident, that showed positive effects on poststroke fatigue.²⁷ The COGRAT protocol was adapted to be a preventative intervention, customized to fit the specific needs of the mild traumatic brain injury group. For the structure of the sessions we used a similar format described by Miller and Mittenberg in their preventative treatment.¹⁷ Cognitive restructuring (by means of thought reports) is used to train patients to identify their automatic negative thoughts and misattributions concerning the symptoms, and aid them to form constructive thoughts instead. Moreover, by providing insight in their own coping style and promoting an active and assertive approach, patients' sense of self-control grows, which will enable them to develop more adaptive responses.¹⁷ Through behavioral activity scheduling, rewarding activities are gradually increased, providing behavioral evidence of intact abilities.⁷ Moreover, patients receive information on expected symptoms and strategies to cope with these symptoms and manage stress in order to support a gradual increase of activities towards a previous level of participation.²⁸

In summary, the UPFRONT intervention is a preventative intervention that is currently under evaluation in a multicenter randomized controlled trial in at-risk patients with mild traumatic brain injury. The general aim is to enhance patients' feeling of competency of dealing with the situation by providing psycho-education (informing the patient about the injury and the consequences), identifying and challenging unrealistic illness perceptions and improving coping style (decreasing passive coping and enhancing sense of self-control).

Procedures

Case descriptions

To illustrate the use of the intervention protocol in practice, we will refer to two case descriptions throughout the procedures section (Boxes 1 and 2). The two cases describe patients that underwent the intervention as part of the randomized controlled trial. Besides a signed informed consent for participation in the intervention, the patients have given additional consent for this anonymized use of their experiences.

Target group

The randomized controlled trial (trial number ISRCTN86191894) in which this protocol is currently being evaluated, is part of a larger multicenter prospective cohort study on outcome in mild traumatic brain injury. Patients with an age of 16 and older were included at the emergency department of three Level I trauma centers in the Netherlands; University Medical Center Groningen, St. Elisabeth Hospital Tilburg and Medical Spectrum Twente. Mild traumatic brain injury was defined according to the recommended guidelines of the American Congress of Rehabilitation Medicine.²⁹ Patients suffered a blunt impact to the head resulting in: A Glasgow Coma Scale score of 13–15 on presentation at the emergency department, posttraumatic amnesia of less than 24 hours and/or loss of consciousness lasting less than 30 minutes (Table 1).

Based on their reported complaints at two weeks postinjury, patients at-risk for persistent postconcussive complaints were selected for enrollment in the UPFRONT intervention, starting within 4–6 weeks

Table 1. Characteristics of the UPFRONT treatment protocol.

Inclusion criteria	Mild traumatic brain injury patients (GCS score 13–15, PTA <24 hours and or LOC ≤30 min) with age between 18–65 years, normal admission CT, having paid work or studying at time of injury. Reporting ≥3 complaints on the HISC, of which at least one should be in the cognitive or emotional domain
Exclusion criteria	Patients suffering from chronic alcohol and/or drug abuse and major psychiatric or neurological disorders. Patients without comprehension of the Dutch language or without a permanent home address
Therapists' competence	Psychologist/healthcare specialist educated in cognitive behavioral therapy and with traumatic brain injury rehabilitation expertise
Location	Outpatient setting: Department of Neuropsychology or Medical Psychology of a general or university hospital
Number of sessions	Five group sessions over a period of 4–6 weeks
Duration of session	One hour per session
Materials	Protocol booklet for therapists, flip-over for in-session thought schemas, information booklet and homework assignment booklet for patient
Tailoring	The psychologist has some freedom concerning the content of the sessions, depending on the patient's specific problem areas

GCS: Glasgow Coma Scale; PTA: post-traumatic Amnesia; LOC: loss of consciousness; CT: computed tomography; HISC: Head Injury Symptom Checklist.

postinjury. At-risk status was based on the score on the Head Injury Symptom Checklist,³⁰ which is derived from the Rivermead Post Concussion Symptoms Questionnaire.³¹ The Head Injury Symptom Checklist compares 21 complaints commonly described after traumatic brain injury with premorbid levels, using values from 0 to 2 (0 = never, 1 = sometimes, 2 = often). Patients had to report three or more complaints of which at least one should be in the cognitive or in the emotional domain.

There were additional inclusion and exclusion criteria for participation in the cognitive behavioral intervention: Age between 18 and 65 years and normal admission computed tomography scan. Furthermore, patients eligible for the intervention must have paid work or be studying at the time of injury. Reasons not to select for the intervention were: Chronic substance abuse, major psychiatric and/or neurological disorders and having no permanent home address or insufficient comprehension of the Dutch language owing to anticipated communication problems.

Materials

At the start of the first session, patients receive a copy of Mittenbergs' *Recovery after mild traumatic*

brain injury: A guide for patients and their families,³² which was translated in Dutch and adjusted in consonance with the latest scientific knowledge. This guide serves as written support of oral information given by the therapist on a realistic recovery trajectory, the gradual resumption of activities and the relation between stress and complaints. Patients also receive a workbook with homework assignments (with explanation of the rationale behind the exercises) per session applicable in the home situation, to consolidate changes in behavior. Within the sessions, the Utrecht Coping List³³ is used as a homework assignment to give patients insight into their personal coping style. It consists of 47 items divided into seven subscales that represent different coping styles: Active, distraction-seeking, avoidant, seeking social support, passive, expression of emotions and positive reframing. The total score of each subscale can be labeled based on norm scores on a five-point scale, from a very low use (1) of that coping style to a very high use (5).

Location and therapist

The sessions take place in an outpatient setting at the Medical Psychology or Neuropsychology Department. The sessions are given by an

experienced healthcare psychologist with at least three years of experience in the rehabilitation of traumatic brain injury. Psychologists must have extensive experience with cognitive behavioral treatment, expressed by a registration as cognitive behavioral therapist in the quality registry of the Dutch scientific and professional association for behavioral and cognitive therapists, the VGCT.³⁴

Treatment sessions

In total, five sessions of one hour face-to-face treatment are given within a time period between 4–10 weeks after trauma, in small groups of 2–4 patients. This choice was motivated by the fact that group therapy is common as the first line of treatment, it is cost-effective and it has been found to be a great way to provide support and motivation.³⁵ The sessions start 4–6 weeks after treatment and are scheduled once a week. Table 2 provides a summary of the content of the individual sessions, in which the focus is on psycho-education, coping styles, resuming activities (finding balance and complicating factors) and preparing for further recovery, respectively.

Session 1: Psycho-education. The core of the first session is psycho-education, which is done by discussing the information booklet *Recovery after mild traumatic brain injury: A guide for patients and their families* and giving information on the etiology of posttraumatic symptoms. The expected positive recovery trajectory is discussed, but also the acknowledgment of the injury and the necessity to adjust to current complaints for a more rapid and successful recovery. In this session, an introduction is given of the organization of the treatment and its rationale. Patients are invited to share their experiences of the injury and posttraumatic complaints they suffered from and might still be suffering from. The intervention is focused on discussing current problem areas (e.g. work environment, financial issues, relationships) and identifying potential mood disorders or posttraumatic stress-related symptoms, in which case additional care (or a referral) is indicated. With each individual patient, realistic and attainable treatment goals are

established. For example, a goal that Mr Y posed for himself was being able to explain to his colleagues what he was experiencing and ask for support.

Session 2: Coping with complaints. The second session is focused on introducing coping styles, and their influence on dealing with complaints. The patients fill out a coping questionnaire as part of their homework and are given the results in this session. This is done to provide insight in the adaptive and maladaptive sides of different coping styles and to help patients recognize the influence of their own way of dealing with current issues. This provides a logical transition to the explanation of thought records. For example, Mrs X scored very high on the avoidant coping style, which gave rise to situations where this had hindered her, and what she was thinking and feeling at that moment. Thought records are introduced as a means to gain insight in the consequences of thoughts and emotions on behavior, of which they are expected to fill out for the next session. The influence of maladaptive thoughts on behavior with respect to the recovery process and the importance and effect of cognitive restructuring is explained by using examples from their own experiences in daily life.

Session 3: Resuming activities I. The third session is focused on the thought records that patients filled out as part of their homework, and hereby recognizing commonly made cognitive distortions, such as “black-or-white” thinking, overgeneralizations and catastrophizing (e.g. “this will last forever”). For each participant, one thought report on a different situation is written on the flip-over and discussed thoroughly. The aim is to facilitate consolidation and to give the participants the opportunity to detect the cognitive distortions in their own thoughts and those of one another. Mrs X for example, was pointed to her own cognitive distortions by one of her group members, who noticed that she was determined to see malevolent intentions of her employers (e.g. “They want to get rid of me”). Patients are encouraged to practice assertive behavior and overcome difficult situations by active coping behavior in daily life. At the end of

Table 2. Summary of session contents.*Session 1: Psycho-education*

1. Introductions and agenda-setting
2. Information mild traumatic brain injury, common complaints and the influence of stress
3. Presentation of the treatment rationale, cognitive behavioral therapy and coping model
4. Determine/detect acute problems, establishing goals
5. Homework: Read brochure *Recovery after mild traumatic brain injury: A guide for patients and their families* and fill out coping style questionnaire
6. Summary and review

Session 2: Coping with complaints

1. Agenda setting
2. Review previous session, past week and homework
3. Introduction to case-formulation and identification of unhelpful cognitive distortions
4. Coping with complaints: Preventing doing too much or too little
5. Homework: Creating an own case-formulation using the A–B–C model
6. Summary and review

Session 3: Resuming activities I (finding balance)

1. Agenda setting
2. Review previous session, past week and homework
3. Discussion of individual case-formulations, identifying helping thoughts
4. Balancing high-demand and relaxing activities
5. Homework: Finding relationships between activities and complaints, body scan exercise
6. Summary and review

Session 4: Resuming activities II (complicating factors)

1. Agenda setting
2. Review previous session, past week and homework
3. Dealing with external demands and feelings of stress
4. Stimulating optimal adjustment by active coping strategies
5. Homework: Read chapter *Assertive communication* in workbook
6. Summary and review

Session 5: Preparing for further recovery

1. Agenda setting, with input from participants
2. Review previous session, past work and homework
3. Discuss communication with environment (e.g. friends, employer)
4. Preventing relapse and anticipation of difficult situations
5. Summary and review
6. Evaluation

this session, the focus of the last two sessions is explained. Homework consists of practicing with a body scan exercise for relaxation that patients receive on a disk or via email.

Session 4: Resuming activities II. This goal of this session is to let the patient experience as much control over his/her situation as possible. We focus on the

resumption of activities and work, and what hampers patients in this process. If necessary, a thought record is analyzed in the group. Do patients observe relations between when/where or what kind of activities are performed and the experiencing of complaints? Based on their insights, the goal is to actively look for solutions in their work situation. Also, the focus is on relaxation, and finding out

what gives relaxation after the injury. The homework body scan exercise is reviewed and possibilities to incorporate relaxation in patients' daily work schedule are discussed. Mr Y for example, did not appreciate the body scan exercise, but found an alternative in taking a walk when he felt a headache coming on. The upcoming last session is announced, together with the homework for that session, in which patients should think of what they need to keep making progress after the end of the sessions.

Session 5: Preparing for further recovery. The last session is mainly focused on what the patients need to be able to confidently face their further recovery process, and can differ per therapy group. The role of others and possible negative responses of people in their environment that play a role in their recovery are also discussed, for example non-understanding employers. Different ways of communication (assertive, submissive, aggressive) are presented and patients' own way of communication are discussed. Examples of the effects of these communication styles are put in a thought report that is written on the flip-over. Alternative ways of communicating and ways of transferring a message best are discussed and practiced with roleplays. The session closes with an evaluation of the preventative treatment. Although a little bit anxious of the rest of their recovery period, both Mrs X and Mr Y felt that the intervention supported them in this phase and helped them to make certain adjustments of which they noticed had benefited their daily functioning. It is explained to all patients that they can contact their general practitioner in the coming months when needed.

Practical issues and tailoring

With the UPFRONT-intervention, we aim to provide an intervention for the postacute phase that is relatively non-expensive and easy to implement. Implication in clinical practice would require the follow-up of patients via a telephone call within the first two weeks after injury, and the availability of a neuropsychologist who is able to perform the

cognitive behavioral treatment at the medical psychology or neuropsychology department. By offering the intervention in groups and only to at-risk patients, likely preventing them from seeking further healthcare, costs can be justified and kept to an acceptable level. Owing to the fact that the randomized controlled trial study was already closely linked to the clinical setting, we have experienced the feasibility firsthand.

Although very valuable and rewarding for both the therapist and the participant, group sessions can pose several challenges. First, it might be difficult to find session dates on which all the participants are available, especially if they are dependent on a spouse that brings them to the hospital. It is therefore recommended to instruct patients to bring their calendar to the first session, so that all session dates can be fixed at that first meeting. Second, it is important to be aware to actively divide the time over the participants, and keep the goals of that particular session in mind. For example, in the first session patients are invited to discuss their complaints. It can be a great relief for participants to receive attention for their complaints, which can cause them to elaborate on them extensively. In the other sessions, however, the emphasis is more on dealing with the consequences, and in those sessions it is the therapists role to be directive and keep this part of the session short.

To optimize the intervention effect and therapeutic adherence, the psychologist has some freedom concerning the content of the sessions, to cater for patient's specific problem areas. Examples of this are the behavioral interventions flowing out of the thought reports. Although themes will commonly overlap, the situations that a person appraises as stressful can differ for every individual, and so will the individual behavioral interventions. Another way in which the intervention can be tailored is with regard to homework assignments. Some patients can still experience complaints (difficulty concentrating, fatigue) that can hamper them in their execution of the assignments. In this case, the therapist can propose alternative options, which are cognitively less demanding but still enables the patient to actively participate the next session.

Discussion

The UPFRONT intervention, consisting of preventative cognitive behavioral therapy soon after mild traumatic brain injury, aims to advance return to work, enhance coping skills and decrease posttraumatic complaints in at-risk patients. In current preventative interventions of persistent complaints following mild traumatic brain injury, cognitive-behavioral techniques have shown promising results, but accurate descriptions of the used interventions are lacking.^{8,9,36} With regard to treatment based on the cognitive behavioral model and etiology of persisting complaints, the assumption that the complaints in the acute phase may have an organic basis, but that persisting complaints are caused by complex pre-existent patient characteristics (e.g. personality traits and psychological status).¹⁷ The focus of the UPFRONT intervention therefore, is to prevent the persistence of complaints by means of psycho-education, identification and replacement of dysfunctional beliefs about mild traumatic brain injury with functional beliefs, and enhancement of effective coping techniques to give patients a sense of self-control early after injury.

Studies suggest that a brief intervention early after injury might avert the necessity for more extensive rehabilitation strategies later on.^{7,12,37} Shortly after development of the UPFRONT intervention, Silverberg and colleagues¹¹ published a pilot-study on the effectiveness of a cognitive behavioral therapy protocol for at-risk mild traumatic brain injury patients. They found that cognitive behavioral therapy six weeks after injury (in addition to education) reduced posttraumatic complaints at three months in a small group of patients. However, they had a very short follow-up, and did not look at effects on functional outcome measures, such as return to work. The patient group was also highly selected, consisting of patients that were already referred to, or sought help at a concussion clinic. Moreover, although it forms an essential part of cognitive behavioral therapy treatment, no measures of coping styles were obtained, in contrast to the UPFRONT intervention.

Beside the very early start of treatment having a preventative effect, another strength of our current

prevention is that it is specifically designed to improve coping and return to work and therefore aiming to improve long-term outcome. For example, there is room in the sessions for individual coaching in coping with work situations or the resumption of other activities. Moreover, the intervention is designed for the at-risk (high number of posttraumatic complaints) patients specifically, reducing the need for unnecessary follow-up and prevent medicalization of other patients.³⁸

The intervention description presented in this article has some limitations. First, there is the challenge of selecting the group of patients that would benefit most from the intervention. Although strong links exist with a high report of early complaints and persisting complaints, it is possible that some patients are missed when using this inclusion criterion. Some studies stress the importance of depression and anxiety in the early phase, which could be an additional factor for selecting patients for the intervention. Second, our intervention is tailored to patients with a relatively mild injury, without major cognitive and emotional impairments. The starting point and goals of the UPFRONT-intervention are optimistic (i.e. a full recovery and return to the previous level of functioning). This means that although some aspects of our intervention (e.g. focus on coping and adaptation) will apply to severe traumatic brain injury patients too, the angle and set-up of the intervention will take major adjustments to be applicable to more severe traumatic brain injury. Lastly, the sessions are given in an outpatient setting and start approximately four weeks after injury. Therefore, there may be multitrauma mild traumatic brain injury patients who will not yet be mobile enough to attend owing to their physical injuries. Because these patients would also benefit greatly from psycho-education, alternative ways, such as telephone counselling, should be considered, combined with sending the information booklet to the patients directly after the injury.

To summarize, the UPFRONT prevention is an innovative cognitive behavioral therapy intervention designed to be given shortly following mild traumatic brain injury and is currently being evaluated. This detailed description of the intervention

might aid professionals in the use of this intervention and contribute to a better treatment (and follow-up) of mild traumatic brain injury patients, and could subsequently be an important step forward to a reduction of patients with persistent complaints and the subsequent costs of loss of work productivity.

Clinical messages

- The UPFRONT intervention seems a promising intervention to prevent persistent complaints in at-risk patients after mild traumatic brain injury.
- Therapists giving the UPFRONT intervention should have knowledge of cognitive behavioral therapy and rehabilitation after mild traumatic brain injury.

Conflict of interest

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Supplementary materials

The intervention protocol and the necessary materials (workbook and information brochure) are available on request by contacting the corresponding author.

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