

# An individually tailored behavioral medicine treatment in physical therapy for tension-type headache – two experimental case studies

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**Aim:** The aim of this study was to describe and evaluate the effect of an individually tailored behavioral medicine treatment in physical therapy, based on a functional behavioral analysis (FBA), for tension-type headache (TTH).

**Patients and methods:** Two case studies with A1-A2-B-A3 design of two patients with TTH was conducted. Outcome variables were headache frequency, headache index (mean intensity), consumption of analgesics, self-efficacy in headache management (Headache Management Self-efficacy Scale [HMSE]), disability, and perceived loss of happiness for activities with family and friends.

**Results:** The results showed that headache frequency and headache index decreased for one of the patients. Self-efficacy in headache management increased markedly for both patients.

**Conclusion:** A behavioral medicine treatment in physical therapy based on an FBA can be a way for physical therapists to handle patients with TTH. Future investigations should focus on large group studies with longer observation periods.

**Keywords:** headache index, self-efficacy, loss of happiness, functional behavioral analysis

## Introduction

Headache disorders are common and one of the most frequent diagnoses is tension-type headache (TTH).<sup>1,2</sup> According to the second edition of the International Classification of Headache Disorders (ICHD-2 and also the ICHD-3), TTH has to meet two of the following four criteria: headache 1) with a bilateral localization, 2) with pressing or tightening quality, 3) of mild to moderate intensity, and 4) which is not aggravated by routine physical activity such as walking and climbing stairs.<sup>3,4</sup> It is also required that the person has had at least ten episodes for at least 30 minutes.

The pathophysiology of TTH is not clearly understood, but the most common trigger for TTH is psychological stress.<sup>5,6</sup> Nash and Theberge<sup>6</sup> concluded that psychological stress and headache are interrelated in a multifaceted way, i.e. physiologically as well as psychosocially. The relationship is mutual, since stress might predispose, trigger, and exacerbate headache, but headache might as well aggravate stress. A contributing factor to the difficulty in understanding the pathophysiology and establishing effective treatments might be that TTH is not a homogeneous disorder. History and physical examination of patients fulfilling the criteria of TTH can reveal a wide diversity of findings.<sup>7,8</sup>

Behavioral medicine in physiotherapy considers medical, physical, behavioral, cognitive, and social environmental factors in the analysis and treatment of pain-related disability.<sup>9</sup> The behavioral medicine treatment in physiotherapy is individually tailored and based on functional behavioral analysis (FBA).<sup>10</sup> The FBA has the purpose of

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exploring and defining the variables that have an impact on a person's problem behaviors contributing to disability. With this analysis as a base, the individual's skills that need improvement can be determined, whether these are physical, behavioral, cognitive, or social skills.<sup>11</sup>

The FBA is highly based on the ideas of operant conditioning, described by Skinner,<sup>12</sup> explaining how a behavior is controlled by the consequences of the individual's behavior. An important theory for behavioral medicine in physiotherapy is also the social cognitive theory (SCT), described by Bandura.<sup>13</sup> SCT describes interdependence between the individual, the behavior, and the environment. Any of these three factors could be the target for change in order to reach a specific goal. Self-efficacy is a central concept in SCT, referring to the strength of one's beliefs in the ability to complete tasks with a specific behavior in order to achieve specific goals.<sup>14</sup> Self-management that refers to how a person deals with the diversity of tasks related to their condition is accordingly dependent on the person's self-efficacy for these tasks.<sup>15</sup>

Different treatments, including over-the-counter drugs, antidepressants, physiotherapy, and cognitive behavioral therapy, have been tried without a consensus of optimal treatment. An individually tailored behavioral medicine treatment in physiotherapy that targets both physical and psychosocial impairments has not to our knowledge been studied in patients with TTH and could be an appropriate choice of treatment due to the complex nature and heterogeneity of TTH.

The purpose of this study with an experimental case design was to describe and evaluate the effect of an individually tailored behavioral medicine treatment in physiotherapy for patients with TTH.

## Patients and methods

### Ethics statement

Ethical approval was not required for this study. According to Swedish law (Act [2003: 460]), studies performed for scientific experimental or theoretical work to gain new knowledge, and developmental work on scientific grounds, but not such work performed at undergraduate level at universities are exempted. The present study was based on the data collection for a master-level thesis. The ethical standards of the Declaration of Helsinki for pain research in humans were applied in the study. Participation in the study was voluntary. The conditions were clarified before each patient approved to be a part of the study, and written informed consent was obtained.

### Design and content of the phases

Two case A1-A2-B-A3 design with nonconcurrent multiple baselines across subjects was used.<sup>16</sup> During Phase A1

baseline, when the patients were not exposed to any part of the intervention, data for headache parameters were collected for ~1 week. Phase A2, the second baseline, was started with discussing behavioral factors – feelings, thoughts, and behaviors – of the patient's everyday life that might have effect on the headache. The patient then filled in an individually tailored diary with focus on behaviors possibly influencing the headache, as well as scores regarding the influence of daily life by the headache. Headache parameters were also collected during A2. Phase B started with an FBA. After the FBA, the treatment (intervention) regarding basic skills' acquisition, applied skills' acquisition, and generalization of skills was conducted. During Phase A3, the intervention was withdrawn except for two follow-up visits. This study is based on a data collection for a thesis.<sup>17</sup>

### Patients and setting

Three patients were recruited among ordinary patients seeking physical therapist care in primary health care. Adult persons with frequent or chronic TTH according to ICHD-2 were included.<sup>3</sup> The patients filled in a previously used Diagnostic headache diary<sup>18</sup> during Phases A1 and A2. The final inclusion was made after these two baseline phases to ensure that the headache was actually classified as TTH. Two of the three cases are reported chosen by being examples of the complexity of the condition.

### Behavioral medicine intervention in physiotherapy for TTH

The intervention consisted of an implementation of a structure for analysis and behavioral medicine treatment in physiotherapy (detailed in steps 1–7 subsequently).<sup>19,20</sup> A modification was made since the connection between headache and specific activities is not usually as apparent as for other musculoskeletal pain, and when tried it was shown to be difficult to start by choosing only one target activity as the model suggests.

#### 1. Identifying problematic situations and activities.

The patient was asked to list activities or situations when the headache was problematic or in some other way connected to the headache. The patient then was asked to describe his/her thoughts and feelings that were usually associated with these activities or situations.

#### 2. Self-monitoring with a diary.

The patient recorded notes of activities as well as feelings and thoughts related to these activities at the end of each day. This was done with a diary specifically made for this purpose.

### 3. Individual FBA and goal setting.

The information from steps 1 and 2 was drawn to a hypothesis of causal relationships leading to and maintaining the patient's behavior that was supposed to affect the headache. Antecedents, responses, and consequences of the behavior were identified; the components that were possible to change were discussed; and goals were determined regarding target behaviors. The hypothesis and goals were subject to recurrent reevaluation during the forthcoming stages.

### 4. Basic skills' acquisition.

The components identified in the stages 1–3 were targeted with preferably home exercises, and occasional manual treatments, to increase the physical, psychological, and social capabilities to reach the goals for the target behaviors. The physical therapist used different techniques to support the subject's behavioral change, such as self-monitoring, feedback, goal re-evaluation, pacing, shaping, and fading. To strengthen the patient's self-efficacy in behavioral change by reinforcement of the gradually reached treatment goals was an essential part of the treatment.

### 5. Applied skills' acquisition.

During this stage, the exercises were more complex and several basic skills were combined. The exercises were also to be performed in the target behaviors in daily situations and activities.

### 6. Generalization.

When the first goal was met regarding the first target behavior, the procedure was repeated with other target behaviors listed at the first stage. The FBA was complemented and additional basic skills as well as applied skills were rehearsed.

### 7. Maintenance and relapse prevention.

This stage included two follow-up sessions to prevent relapse, at ~1 and 3 months after the treatment. These sessions aimed to coach the patients in maintenance of the new behavior and to prevent relapse.

## Measures

Headache frequency, headache index, and behavior of consumption of analgesics were measured with a Headache diary through A1, A2, B, and 1 week before each follow-up session in A3. In the Headache diary, the patient scored the headache intensity on an 11-point (0–10) numerical rating scale (NRS) and the consumption of analgesics four times a day. Headache frequency is a recommended outcome variable in studies of behavioral treatments for TTH.<sup>21</sup> Headache index is an outcome variable that takes frequency, intensity, and

duration into account and, therefore, sometimes can reflect the overall suffering better than headache frequency.<sup>22</sup> The headache index was in this study defined as mean of intensity scores NRS (0–10) per week, that is the sum of all 28 scores for 1 week divided by 28.

Disability and feelings of loss of happiness were measured with an Activity diary through A2, B, and 1 week before each follow-up session in A3. The patient scored on NRS (0–10) at the end of every day how much impact the headache had on the ability to participate in daily activities (disability) and the feelings of loss of happiness because of headache in activities with family and friends.

Self-efficacy for headache management was measured with Headache Management Self-efficacy Scale (HMSE).<sup>23</sup> It was filled in before A1, before B, immediately after B, and at the two follow-up sessions of A3. HMSE is a scale with 25 items rated on a 7-point scale that ranges from 1 = strongly disagree to 7 = strongly agree. The statements provide information about the patient's confidence in their ability to prevent headache episodes and manage headache-related pain and disability. It is a brief self-efficacy measure that has proved to have a high level of internal consistency as well as construct validity.<sup>23</sup>

## Data analyses

Self-rated scores of headache frequency, headache index, consumption of analgesics, disability, and loss of happiness are presented with graphs, each data point representing scores for 1 week. Headache frequency is presented as number of days per week. Headache index, disability, and loss of happiness are presented as means per week. Analgesics consumption is presented as number of units taken per week (one unit representing prescribed adult dose of over-the-counter analgesics). The graphs were analyzed visually for observed level, trend, and variability within and between the phases. The visual inspection is a subjective mode of analysis and offers no formal criteria for evaluation.<sup>16</sup> Results of HMSE are presented with descriptive data.

## Results

The data for the FBA were collected through clinical history, physical examination, HMSE, Headache diary, and Activity diary. The individually tailored treatment was based on the FBA. The FBA is described shortly for each patient prior to the outcomes.

### Patient I FBA

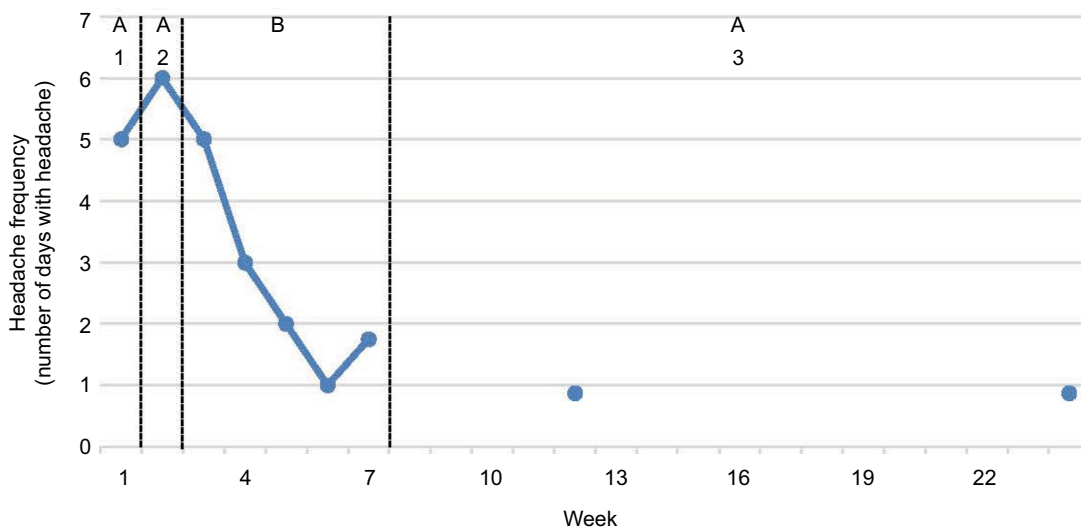
The first patient (P1) was a 68-year old female, retired from work, and living with her husband. A few years ago she had

had problems with her right jaw when chewing. Ever since then she had felt that her jaw was tense. At some point, she started to have light headaches now and then that accelerated to headaches almost every day. The headache was usually present already when she woke up in the morning. It seemed to get somewhat worse during days when she was stressed. She perceived her jaw muscles as tense and tender. She had low-intensity headaches most of the days (Figures 1 and 2), with no perceived disability but affecting feelings of happiness in activities with family and friends (Figure 4). Her self-efficacy for managing headache (HMSE) was low (Table 1). She used analgesics but not that much that it would be a primary problem behavior (Figure 3).

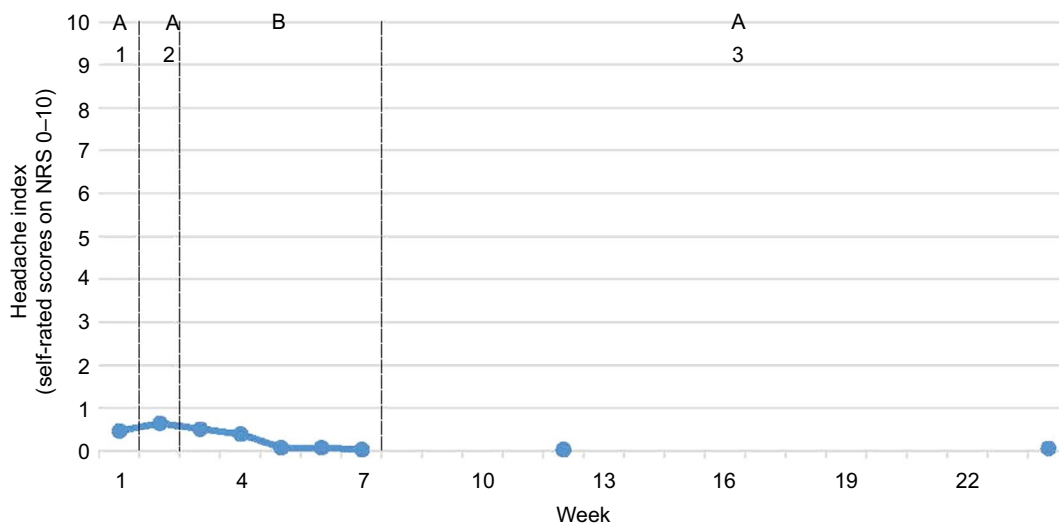
In the FBA, it was hypothesized that the behavior that would have most effect on her headaches was her continuous contracting of jaws. Therefore, the behavior of contracting

the jaw muscles was analyzed in order to understand the function of the behavior. The behavior seemed to be going on almost all the time, even during nights, and in that way it had become more or less automatic. The antecedents and consequences of this behavior were therefore hard to identify. However, it could be concluded that the behavior was intensified in situations with psychological stress, for example, worrying about family members being ill. She was motivated for changing her behavior.

The long-term goal was set to no headache more than twice a week. It was concluded that the primary purpose of the treatment would be to find a way for her to increase the control of tension of the jaw during the daytime activities. It was hypothesized that the jaw muscles would continue to be relaxed during the nights if they were relaxed during the days.



**Figure 1** Patient I: headache frequency in days with headache per week.  
**Notes:** A1 was the first baseline, A2 was the second baseline, B was an intervention phase, and A3 was the follow-up phase.



**Figure 2** Patient I: headache index presented as mean of intensity scores NRS (0-10), 4 times a day.  
**Notes:** A1 was the first baseline, A2 was the second baseline, B was an intervention phase, and A3 was the follow-up phase.  
**Abbreviation:** NRS, numerical rating scale.

**Table 1** Patient 1: HMSE scale 0-176, higher scores indicating higher self-efficacy

Week	HMSE
1 (before A1)	131
3 (before B)	125
9 (after B)	170
14 (follow-up 1, A3)	161
26 (follow-up 2, A3)	169

**Notes:** A3 consisted of two follow up visits.

**Abbreviation:** HMSE, Headache Management Self-efficacy Scale.

### Individually tailored treatment

The treatment consisted of eight visits with home exercises in between, including two follow-up visits.

Basic skills targeted were to know and feel what is a neutral relaxed position of the jaw, to be able to control

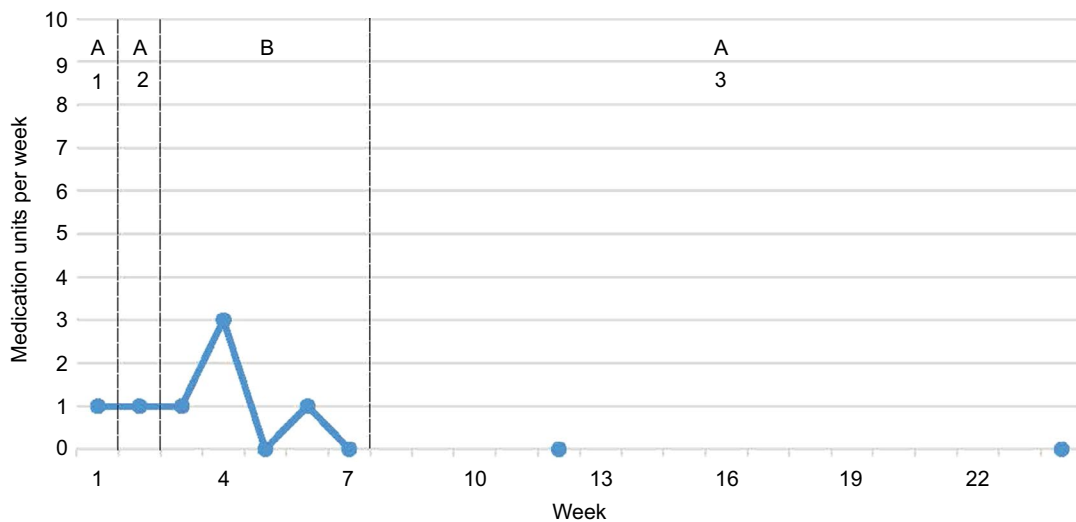
the muscular tension, and to do her exercises regularly. Applied skills targeted were to recognize when her jaw gets tense in the activities and to do the exercises when necessary to decrease tension. Generalization of the skills was not needed.

The behavior change techniques of self-monitoring, feedback, reevaluation of goals, shaping, and fading were used, and the physical therapist aimed to strengthen the patient's self-efficacy for behavior change through reinforcement of every progress during all treatment stages.

### Outcome

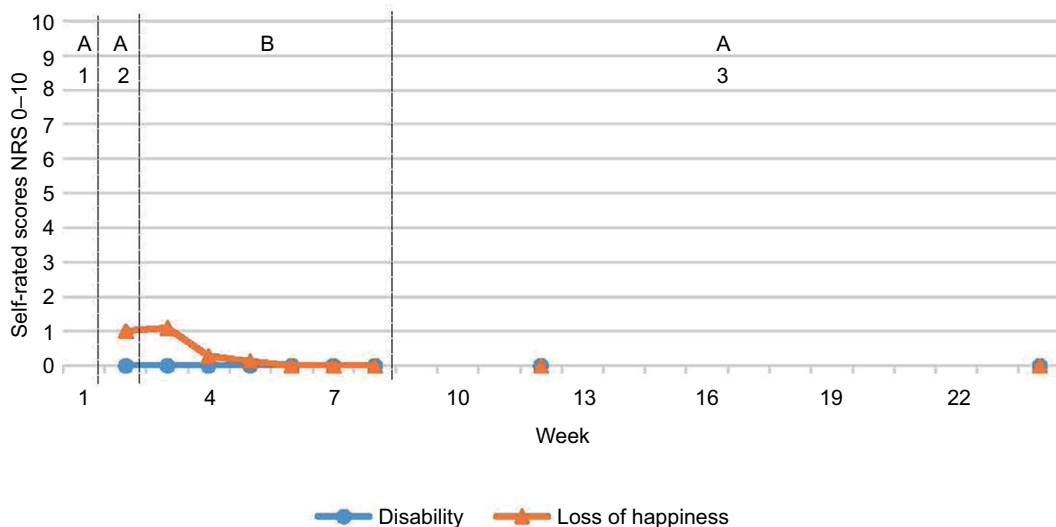
All outcomes were considered as proxy measures for increased control of the tension of jaw muscles.

The goal of no headache more than twice a week was met.



**Figure 3** Patient 1: consumption of analgesics in units per week (1 unit = 500 mg paracetamol or 400 mg ibuprofen).

**Notes:** A1 was the first baseline, A2 was the second baseline, B was an intervention phase, and A3 was the follow-up phase.



**Figure 4** Patient 1: disability and loss of happiness presented as mean per week on the NRS (0-10).

**Notes:** A1 was the first baseline, A2 was the second baseline, B was an intervention phase, and A3 was the follow-up phase.

**Abbreviation:** NRS, numerical rating scale.

Headache frequency and headache index are presented in Figures 1 and 2. During baseline, she had headaches at 6 out of 7 days and during the two follow-up visits these figures were 1 and 2 out of 7 days, respectively.

The behavior of consumption of analgesics is presented in Figure 3 and was reduced to zero at the follow-ups.

Disability and feelings of loss of happiness: she reported no disability in activities during any of the phases. Loss of happiness was reduced to zero after treatment and was stable through follow-up (Figure 4).

HMSE score increased considerably from baseline to directly after the treatment and was stable through follow-up (Table 1).

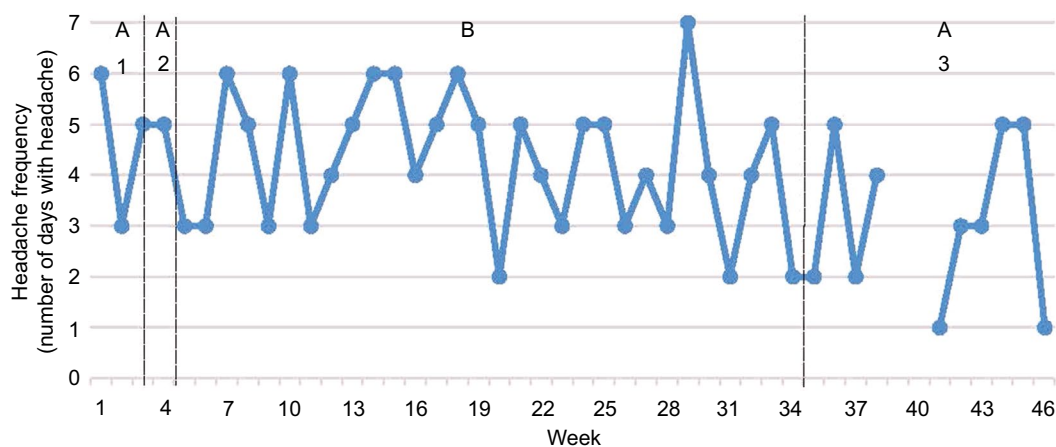
## Patient 2

### FBA

The second patient (P2) was a 30-year old female with headache (TTH or migraine) several days a week. She was

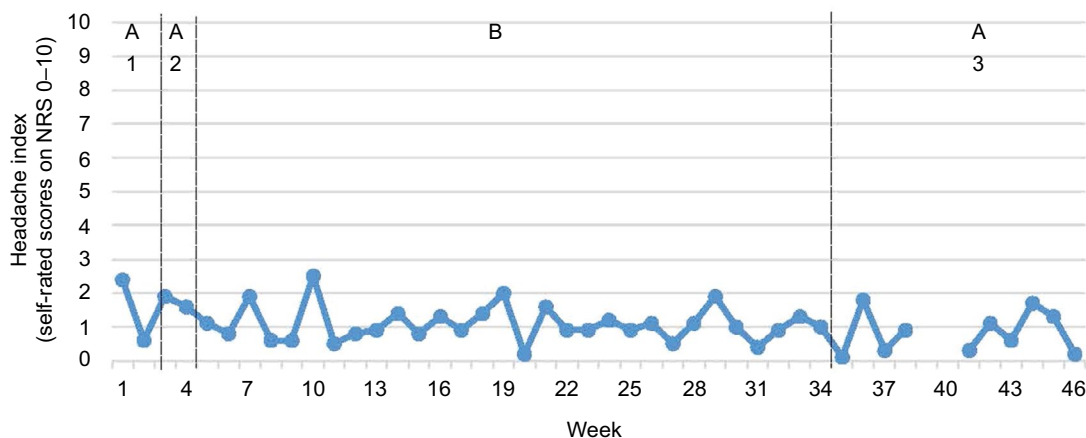
living with her boyfriend and working in primary care clinic. The patient had experienced headaches since she was a little girl and had migraine since she was 15 years old. She had tried lots of medication and had at last found one medicine that had at least some effect – if taken early it could stop an oncoming migraine attack.

According to the baseline data, she had headaches every other day with intensity varying from low to very high (Figures 5 and 6) and sometimes she could not tell if it was migraine, TTH, or something else. The patient had marks around her tongue indicating that she had behavior of pressing her tongue against the teeth. She had negative thoughts about the headache destroying her daily life and became stressed from having headache. The patient did not exercise regularly although she thought she should. This made her feel unsatisfied with herself. She was taking her migraine medicine several times a week (Figure 7), more often than she thought was healthy. Her perception of disability and



**Figure 5** Patient 2: headache frequency in days with headache per week.

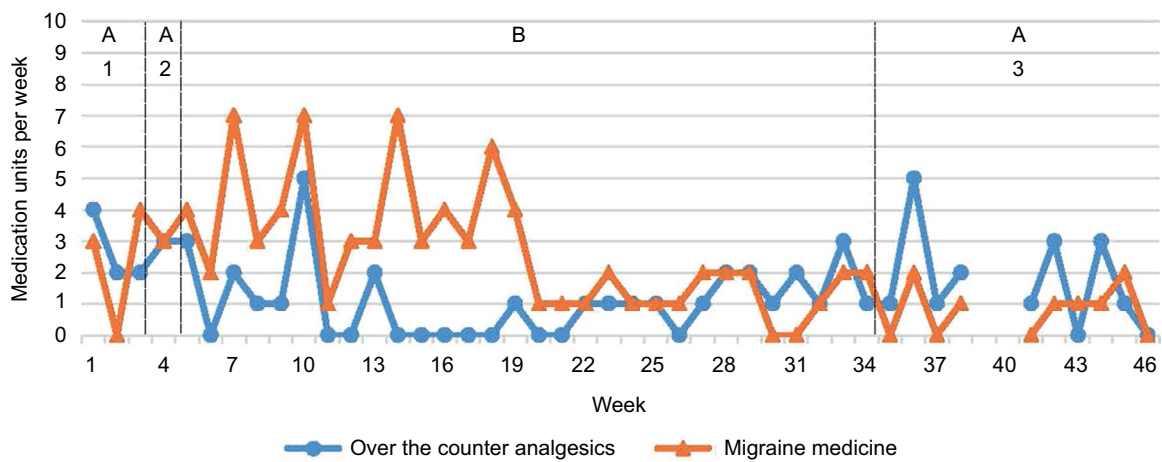
**Notes:** A1 was the first baseline, A2 was the second baseline, B was an intervention phase, and A3 was the follow-up phase.



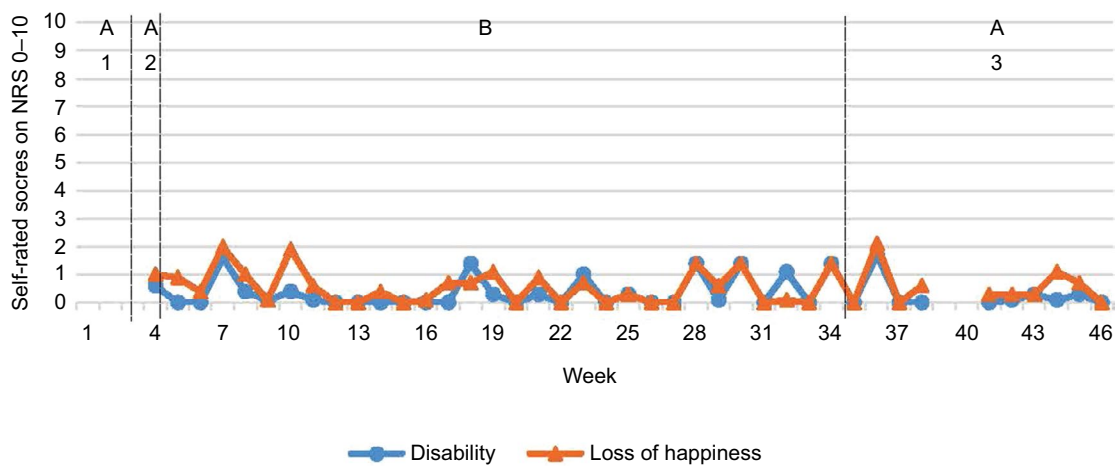
**Figure 6** Patient 2: headache index presented as mean of intensity scores NRS (0–10), 4 times a day.

**Notes:** A1 was the first baseline, A2 was the second baseline, B was an intervention phase, and A3 was the follow-up phase.

**Abbreviation:** NRS, numerical rating scale.



**Figure 7** Patient 2: consumption of migraine medicine and analgesics in units per week (1 unit = 500 mg paracetamol or 400 mg ibuprofen).  
**Notes:** A1 was the first baseline, A2 was the second baseline, B was an intervention phase, and A3 was the follow-up phase.



**Figure 8** Patient 2: disability and loss of happiness presented as mean per week on NRS (0-10).  
**Notes:** A1 was the first baseline, A2 was the second baseline, B was an intervention phase, and A3 was the follow-up phase.  
**Abbreviation:** NRS, numerical rating scale.

**Table 2** Patient 2: HMSE scale 0-176, higher scores indicating higher self-efficacy

Week	HMSE
1 (before A1)	132
5 (before B)	127
35 (after B)	148
39 (follow-up 1, A3)	147
47 (follow-up 2, A3)	153

**Notes:** A3 consisted of two follow up visits.  
**Abbreviation:** HMSE, Headache Management Self-efficacy Scale.

feelings of loss of happiness were highly varying depending on how much headache she had (Figure 8). She had a low self-efficacy for managing her headaches (Table 2).

There were several behaviors that were supposed to contribute to her headaches, which led to several intertwined FBAs. Contracting her muscles of shoulders, neck, and jaw was a behavioral response primarily in situations when she felt psychological stress. This physical reaction was hypothesized to be a conditioned response to situations that resembled

earlier stressful situations and thereby occurred more frequently. She perceived the stress in situations when she was feeling not in control, often because of not only headache but also work-related tasks. Automatic negative thoughts were common in these situations. The consequence was tension and headache and even more stress of not being in control, which positively reinforced her automatic negative thoughts. Her feeling of anxiety for getting headaches was also in close connection with psychological stress. This behavior had the antecedent of knowing that it would not be a good time for having headache, for example, when she knew that she had important things to do that would be difficult to call off. Her low self-efficacy for managing her headaches was thought to be an important factor for maintaining the behavior of physical tension, automatic negative thoughts, and feelings of anxiety.

Sometimes her headache or fear of headache made her take migraine medicine. This operant response had the short-term positive reinforcing consequence of a feeling that she

had done something to prevent the worst scenario of migraine headache. At the same time, it made her in the long run feel even less in control over her headache and worried that the medicine would not be healthy and that she would get even more headache from taking them.

Another behavior targeted was her physical activity level. Her headaches made her tired and she was not able to be physically active as much as she would like to. She had tried to go to classes at the gym. If she had a headache when she started, the consequence would often be worse headache afterward, a punishment that made it difficult for her to plan the activities. In the long run, her low physical activity might lead to more physical and psychological stress and more headache.

In summary, the interrelationship of stress and headache was obvious, and her feeling of not being in control was important for maintaining her behaviors. The short-term goals were that she would feel that she had tools to break behavioral chains earlier and, for example, start to do her exercises instead of getting tense when she felt worried. The long-term goal was set to a maximum of headache 2 days per week.

### Individually tailored treatment

The treatment consisted of 14 visits with home exercises in between, including baseline and follow-up visits.

Basic targeted physical skills were to learn to activate the deep muscles of the neck and to increase the endurance and blood circulation of neck and shoulder muscles in order to be able to control muscle tension. Cognitive basic targeted skills were to recognize negative thoughts, be aware of the reasons for taking medication, and to use support from her boyfriend to be physically active. Applied skills were better posture in everyday activities, to recognize and replace negative thoughts in activities, questioning medication intake, and to be physically active on a regular basis.

First focus was set on physical skills (i.e., muscular endurance and posture), then cognitive skills (i.e., negative thoughts), after that medication overuse, and finally physical activity.

Through all the treatment stages, the physical therapist used techniques to support the patient's behavior change, with self-monitoring, feedback, shaping, pacing and fading. To strengthen the patient's self-efficacy in ability to influence the headache and to succeed in the behavior change was important.

### Outcome

All outcomes were considered as proxy measures for increased control over muscular tension, psychological stress, and medication overuse.

The goal of headache a maximum of two days a week was not met.

Since the variability of the outcome in diaries through the baseline and treatment phases proved to be high, it was decided that the patient would fill in the diary continuously through the follow-up period (A3) and not only at 1 week before the follow-up visits. The diary for weeks 39 and 40 was lost by the patient.

Headache frequency and headache index are presented in Figures 5 and 6. The variability is high and makes it difficult to draw conclusions, although the trend is that both headache frequency and index reduced slightly from baseline, through intervention, to follow-up.

The behavior of migraine medicine consumption reduced considerably when this was targeted in treatment and was stable on a lower level through follow-up, although the variability was high (Figure 7).

The behavior of over-the-counter analgesics' consumption varied through the phases with no certain difference from baseline through treatment to follow-up (Figure 7).

For the disability and feelings of loss of happiness the variability was high and no trends could be observed (Figure 8).

HMSE increased considerably, from baseline to after treatment and through follow-up, indicating that her self-efficacy for managing headache did increase during the treatment (Table 2).

## Discussion

Both patients in this study were categorized as having TTH according to the International Headache Society classification, however, the FBAs led to different conclusions regarding the individualized treatment. For P1 the FBA was rather uncomplicated with one factor more important than others, her behavior of contracting the jaw muscles. When this was focused on, all scores changed to the better and were stable through follow-up. For P2, the FBA was multifaceted. She had migraine as a diagnosis aside of TTH and the headaches had a major impact on her daily life. There seemed to be a slightly lowering trend for the headache frequency and headache index through the treatment phase. But the high variability through all phases makes it hard to draw conclusions. The consumption of migraine medicine decreased in close temporal connection to when this behavior was targeted, however, with no demonstrable effect on headache frequency or headache index. Disability and feelings of loss of happiness were highly varying through the study and no conclusions could be drawn.



Self-efficacy for headache management increased significantly from baseline to after treatment for both patients. A higher self-efficacy for being able to prevent headaches has been shown to be related to lower levels of depression and anxiety, fewer somatic symptoms, and better adjustment to their headache-related problems.<sup>24</sup> For patients with chronic conditions, higher self-efficacy in symptom management has been associated with higher quality of life.<sup>25,26</sup> Although the causal relationships are not clear, this suggests that even if the headache would not change at all from the treatment, the treatment could still be justified if it leads to higher self-efficacy in headache management.

To the authors' knowledge, no earlier study has evaluated a behavioral medicine treatment in physical therapy for TTH with the intention to target physical, psychological, and social behavioral factors. Different kinds of physical therapy treatments as well as behavioral treatments have been evaluated,<sup>27-29</sup> but the evidence is not summarized easily since the results are unclear. One way of interpreting the rather modest evidence of the effectiveness of these treatments for TTH is that the heterogeneity of the patients with TTH might be too vast for the use of a more standardized treatment. If some patients have mostly physical impairments whereas others have more of psychosocial impairments, they would most probably not benefit from the same treatment. It seems logical that when diagnoses are wide and the classification is under constant revision,<sup>4</sup> it is even more important to individually tailor the treatment.

For the experimental single-case design to be strong in causality, it is important to see that the changes in the dependent variable appear in near temporal contact with the introduction of treatment targeting that specific dependent variable.<sup>16</sup> This requires a stable baseline, and the more the variability, the longer the baseline needed. Longer baseline and follow-up phases for P2 could have elucidated differences in the levels between the phases. Longer baseline and follow-up could also have given evidence if the slight trend toward fewer days with headache and lower headache index was random or a depicted reality. According to the guidelines of behavioral treatments for headache, baselines of a minimum of 4 weeks and preferably 5 weeks to capture monthly hormonal changes are recommended.<sup>21</sup> However, the ethics of longer baselines and patients having to wait even longer for the treatment in a clinical context could be questioned.

The individually tailored behavioral medicine treatment in physical therapy has been used for patients with musculoskeletal pain and pain related to whiplash-associated disorders in earlier single-case studies, with multiple baselines across situations design.<sup>19,20</sup> Although most patients with TTH are aware of activities or behaviors that might elicit or enhance

the headache, for example being stressed or sitting in certain positions, these behaviors might elicit headache one day and not the other day. Also, the headache often turns out afterward and not during the activity. Therefore, in this study the decision was made not to focus on situations but on behaviors in all kinds of situations that were supposed to affect the headaches. It is expected that the treatment effect on headache could be delayed, since the headache is presumed to be connected to several behaviors in several activities. However, it would have been preferable to evaluate the behaviors that were targeted more directly. To, for example, measure tension of jaw muscles with surface electromyography or register negative thoughts continuously could have been an option.

Self-report through diary four times a day is recommended for evaluating headache.<sup>21</sup> The headache diary has proved to be socially valid, meaning that improvements detected from headache diary are noticeable by a close relative.<sup>30</sup> Measuring pain intensity concurrently with NRS has proved to be valid and sensitive to changes.<sup>31</sup> However, the validity of measuring disability and feelings of loss of happiness with NRS retrospectively for one day is more uncertain since these outcome measures were constructed for the present study. A limitation of the study is also that the analysis of data was performed solely through visual inspection. Smaller changes could perhaps have been discovered if a quantitative analysis had been used in addition to visual inspection.

The experimental single-case study design has the advantage of not being dependent on homogeneous study groups. In many group trials, P2 would have been excluded, since she could not always discriminate if she was having migraine or TTH.<sup>21</sup> To suffer from both TTH and migraine is common,<sup>32</sup> as it is that the patient cannot always identify which type of headache that is present.<sup>33</sup> It is important that patients with two headache diagnoses are subject to research as well, and for that the experimental single-case design is most suitable. The disadvantage of single-case studies is the limited external validity, and the results of this study should not be generalized beyond the study. Future controlled studies with high number of participants as well as longer observation periods are needed.

For evaluating psychosocial and other complex interventions, that is treatments that have several interacting components, a rigid randomized controlled trial (RCT) has been questioned.<sup>16,34</sup> Ruggeri et al<sup>34</sup> proposed a new era with pragmatic RCTs for evaluating psychosocial interventions. In short, their view is that it is inherent in the psychosocial treatment that it needs to be individually tailored, which leads to challenges regarding study design that would not be encountered in, for example, pharmacological studies. If

this difference is not dealt with, the outcome of the complex treatments might be undervalued in trials and the goal of finding the best treatment for each patient cannot be reached.<sup>34</sup> This reasoning is highly valid also for the individually tailored behavioral medicine treatment in physical therapy.

## Conclusion

It can be concluded that the FBA can be a tool for identifying potential factors with impact on a person's TTH. An individually tailored behavioral medicine treatment in physiotherapy targeting physical and psychological skills, and social/environmental factors, seems to have impact on a person's self-efficacy for managing headache. However, future controlled studies are needed.

## Disclosure

The authors report no conflicts of interest in this work.

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