

Integrative Trichotillomania Therapy

A Brief Manual

Editors:

Randerath, J.

Leibinger, K.

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A brief manual

1st Edition

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Randerath, J.

Leibinger, K.

Editors:

Privatdozentin Dr. Jennifer Randerath

Head of Clinical Neuropsychology Research Group
Academic Staff at the Outpatient Unit for Research, Teaching and Practice
University of Vienna
jennifer.randerath@univie.ac.at

&

Guest Scientist University of Konstanz
Head of Motor Cognition & Rehabilitation Group
Clinical Neuropsychology/Zukunftskolleg/Lurija Institute
Universität Konstanz
Universitätsstraße 10
78467 Konstanz
jennifer.randerath@uni-konstanz.de, j_randerath@hotmail.com

M.Sc. Konstantin Leibinger

Psychotherapeut in Ausbildung
Universitätsmedizin Mainz

&

Member, Motor Cognition & Rehabilitation Group
Universität Konstanz
Universitätsstraße 10
78467 Konstanz

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1. Material

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A: Central issue and goals

Trichotillomania is a body-focused repetitive behavior (BFRB) characterized by recurrent hair pulling at any bodily region with hair, with the scalp being the most common site. In DSM-5 and ICD-11 it is listed as one of the body-focused repetitive behavior disorders subordinated to obsessive-compulsive or related disorders [1, 2]. Trichotillomania affects about 0.6% - 15.3% of all people [3]. The symptoms can lead to hair loss, feelings of reduced attractiveness, or impairments in different areas of functioning e.g. in personal or work life [4-6], or other health problems such as trichobezoar [7]. Two out of three people who suffer from Trichotillomania report other mental health disorders, such as ADHD, depression, or anxiety [8, 9]. The BFRBs occur amplified in stressful situations.

A recent review [10] reported that there is no particular medication class, yet, that could serve as an effective treatment of Trichotillomania. Instead, a behavioral approach, the Habit-Reversal Training (HRT) has the strongest evidence for treating Trichotillomania effectively [11]. The behavioral training includes Awareness Training that comprises taking note of the movements of the BFRB [12] and a Competing Response Training. The Competing Response Training implements an alternative behavior that is appropriate to replace the BFRB (e.g. clenching hands into fists or rolling a massage ball) [13]. The competing response does not have to be physically compatible to the BFRB. For example, for individuals affected by thumb sucking, clenching the knees together (instead of making fists) turned out to be an effective competing response [14]. Further, the acceptance of the competing response by the participants and their social environments plays an important role. It has been recommended to identify suitable competing responses for different social contexts and to

leave the final choice of the competing response to the participant [15].

However, maintaining awareness of a BFRB can be particularly difficult while attending to and performing daily life tasks, such as computer-related work or studying. It therefore could be helpful to implement wearable technologies that can increase the awareness of BFRBs by warning the participant each time the behavior occurs (e.g. via vibration alert). Previous studies using customized wearable devices have demonstrated that the reduction in hair pulling was detectable from the first session in which the wearable technology was activated [16, 17] or within a few minutes of using the wearable technology [18].

The advances in wearable technology offer new opportunities for the treatment of Trichotillomania. To date, few studies have focused on the applicability and use of wearable technology as a therapeutic element in naturalistic settings.

In a single-case experimental design, we applied a purchasable wristband in combination with habit-reversal training. The participant suffered from Trichotillomania and typical comorbidities, such as ADHD and related problems with response inhibition as well as examination phobia. With these comorbidities, it appears particularly problematic to become aware of their behavior and stop it, while being busy with another task. We aimed to use an integrative multimodal approach to account for the above-described complexity.

This brief manual illustrates a simplified habit-reversal training augmented by a sensor wristband for the treatment of BFRBs. While previous work mostly relied on custom-made devices, the current device was purchased via an online store. This is important because it makes treatment options more accessible. We purchased a "keen" bracelet from HabitAware Inc. (2020),

which looks like a common, user-friendly, and unobtrusive fitness watch, thereby reducing stigmatization. It is possible to program the device to vibrate when particular movements are carried out. The wristband uses a gentle vibration. Thus, the device supports becoming aware of the unwanted behavior, and it can serve as a reminder to use an alternative behavior instead of the body-focused repetitive behavior.

Please note, for our purposes the Keen device was purchased in 2020 via <https://habitaware.com/>. At this point the used device has not yet been cleared by the US FDA (or TÜV i.e. comparable regulatory body in Germany).

Thus far only one case-report has been assessed with the procedure detailed in this manual. The participant showed good acceptance and adherence to wearing the wristband. The participant experienced only a low number of false alarms by the device, which may be critical for adherence. Our case demonstrated a significant reduction in the daily episodes of hair pulling and a visible recovery of her hair splendor. A brief checking in with the participant 12 months after the intervention revealed that she continued wearing the wristband. Our submitted case report (Leibinger, Murray, Aschenbrenner & Randerath. *Short-term intervention complemented by wearable technology improves Trichotillomania – a naturalistic single-case report*) suggests that the here applied intervention has the potential to effectively treat Trichotillomania in individuals with comorbid disorders in psychotherapeutic outpatient care. Stiede, Woods [19] used a similar approach and implemented the “keen” device [HabitAware Inc. (2020)] and HRT-app with predefined alternative actions for 4 weeks in 10 individuals and reported high usability, acceptability, and perceived efficacy of the system with respect to increasing awareness and reducing hair pulling.

However, reliability with respect to false alarms appears to vary across individuals.

A specific emphasis should be placed on the adaptation and fit of the approach to the individual’s needs because this could influence usability and adherence to the therapy. When implementing the here described intervention, we recommend specifically considering the individual’s preferences for alternative behaviors for the HRT as well as high specificity and sensitivity of the device’s alarm (low false-alarm-rates and high hit rates for unwanted behavior). The latest developments in purchasable sensor wristbands should be checked.

Further studies on the effectiveness of this intervention and refinement of procedural recommendations still need to follow.

B: Structure and implementation

1. Conditions

The *Integrative Trichotillomania Therapy* was created for individuals suffering from Trichotillomania. It comprises a simplified habit-reversal training [12] combined with the use of a sensor wristband. The treatment approach potentially could also be useful for persons suffering from other BFRBs, like skin picking or nail biting. However, the amount of false alarms by the sensor wristband might be higher, depending on the specific movement trajectory of the respective BFRB.

Instructions about how to implement the treatment approach can be carried out in one single session taking about 1.5 h.

In this manual, we will illustrate the Integrative Trichotillomania Therapy tested in our laboratory. Please note, the therapy approach can be – and sometimes might need to be – supplemented by follow-up sessions

re-introducing the most important concepts of habit-reversal training or explaining / adapting the functions of the sensor wristband.

Note: For simplicity reasons, the following text is written exclusively using male pronouns. The instructions apply to all gender forms, and the pronouns used should be adapted respectively in the training situation.

2. Material

- App „Original Keen“ (HabitAware Inc., 2020b)
- iPad Air 1 (or any other mobile device that allows for downloading apps and taking screenshots).
- sensor wristband for treating BFRBs; we chose „Keen“ from HabitAware Inc. (2020a)
- bag or box with different objects for executing the competing response (we provided the ones depicted in the picture in [Section E](#))
- daily log to capture further variables associated with the BFRB; we created the daily log online using Lab.js [20]. Please see [Section E](#) for a template of a daily log.

Please note and consider: Study-Data (e.g. daily log) was only exchanged via lab-owned devices, identifiable subject demographic data / participant names were not entered at any time.

3. Implementation

Participants should show symptoms of Trichotillomania or other BFRBs like nail biting or skin picking. Potential comorbid ADHD and related problems with response inhibition can be assessed using standard tests (e.g. HASE [21], TAP [22]).

The here applied simplified habit-reversal procedure is characterized by two compo-

nents. One component refers to the awareness training, which requires to define the individual BFRB and to use the sensor wristband. The second component refers to the competing response that should be performed after each interruption of the BFRB. Participants should be motivated to apply the Competing Response after each occurrence of the BFRB and wear the sensor wristband during all BFRB-relevant situations.

Starting Phase: In order to get used to the sensor wristband, we suggest programming the device to vibrate only when one particular movement of the BFRB occurs. The starting phase for the current approach takes 10 days.

Treatment Phase: After the period of ten days, the participants can fully activate the sensor wristband by adding four additional movements of their BFRB to the motion detection.

Awareness Training

Participants and therapists need to work on a precise definition of the BFRB. A possible description of the BFRB by a person with Trichotillomania could be: "Two or more fingers touch a strand of hair and pull on it." Participant and therapist should work on the definition until it clearly captures the BFRB. Since there are no criteria for defining individual BFRBs, the therapists should rely on their own clinical judgement.

A precise definition helps the participant to better distinguish "false alarms" of the sensor wristband from "true alarms". In addition, a precise definition of the BFRB is an important prerequisite for further data collection and evaluation of the treatment. The therapist finally documents the jointly elaborated definition.

Identification of relevant situations: The therapist explores situations in which the

defined BFRB occurs. The participant is asked to wear the sensor wristband consistently in identified situations.

Instructions for using the sensor wristband

For introducing the participant to the different functions of the sensor wristband the therapist/researcher may find the following from German adapted instructions helpful for guidance:

General information about the sensor wristband: "Please, always attach the wristband tightly to your (right or left: dominant pulling) wrist with its button pointing towards your fingers. Charge the batteries before going to bed. The charging process takes about 3 hours. The LED light inside the wristband changes from a flashing to a constant glow when the batteries are charged."

Adaptation of the gesture recognition sensor: "In order to use the sensor wristband or to add a new gesture, the gesture recognition sensor must be adapted to one specific movement of the BFRB. For this purpose, please open the app "Original Keen" on your tablet/iPad. Wear the sensor wristband as described before and keep your body in the position you usually perform the BFRB. Now tap on the "bracelet" symbol in the lower menu bar, and tap on the green "manage" button afterwards. Now tap on the green "add an area" button. Select the body area where your BFRB is directed to. Tap on "next", then on "start training". Now move your right hand to the respective body area, then tap "OK". As soon as you feel the vibration, perform the movements of your BFRB. Continue until the app shows you a green window ("Let's check it"). Tap on "got it", then on "start". This way you check whether your sensor wristband actually recognizes your behavior. If vibration occurs when having executed the repetitive

behavior, tap "Yes", otherwise press "No" and repeat the adaptation process of the movement sensor."

Vibration alarms: "In case of a "true alarm", (the bracelet vibrates for the BFRB) press the button of the sensor wristband once. This serves to record the frequency and exact time of occurrence of the BFRB. Consider the vibration of the sensor wristband as a "friendly hint"/"a hug"/something positive. A "false alarm" is a vibration of your bracelet while the BFRB is not being performed. Only take note of that. "False alarms" can help you to become more aware of different positions of your hand. You may also be able to identify different precursor behaviors that occur before you usually perform the BFRB. Too many "false alarms" can be counteracted by adjusting the settings of the sensor wristband. In order to do this, tap on the "wristband symbol" in the lower menu bar of the "Original Keen" app. Now tap on the green "manage" button and then on the arrow button (>>) to the right of the respective gesture. Using the "Motion Sensitivity" and "Body Position Sensitivity" scales, you can change the sensitivity of the gesture recognition of your sensor wristband. The further you move the button on the scales to the left, the lower the sensitivity. (And the less often the sensor wristband will vibrate). If necessary, the vibration of your wristband can be deactivated temporarily (7 minutes) by keeping the button pressed until the second vibration. This can be useful for instance when combing hair."

Retrieving and saving the collected data: "If you follow the instructions I gave you before, the iPad will collect data on how frequently the BFRB occurred. To view these data and make them available to our study/your therapist, please follow these steps at the end of each day: Open the app "Keen" on the designated iPad. Press "Me" in the bottom menu bar. Now you see a line graph of the frequency

of your BFRB over the course of the current week. By tapping on the arrow button (>>) to the right of the line graph, you will get a more detailed overview of how often the BFRB has occurred over the course of the day. To record this data, take a screenshot of this line graph. If the displayed times do not all fit on one screenshot, scroll down and take another screenshot. The screenshots then could be accessed by the therapist via password protected iCloud. Furthermore, we would like to encourage you to use the daily log at the end of each day. It can be accessed via the link on your handout.” Please see [Section E](#) for an example handout.

Competing Response Training

The therapist assists the participant in generating ideas about different ways to perform the competing response. In order to strengthen treatment compliance, the participant then is encouraged to make the final decision about which responses to use [15]. Acceptance of the competing response by the social environment is essential, too. It is therefore recommended to identify appropriate competing responses for various social situations [15]. Consequently, we offered the participant a variety of objects for executing the competing response illustrated in [Section E](#). Rolling a massage ball is a suitable competing response while being at home alone. During an important meeting at work, it might be more appropriate to clench hands into fists under the table.

After the therapist and the participant determined the competing response, the therapist should teach the correct way to perform it as follows:

The therapist emphasizes that the competing response serves as a substitute for the BFRB. By using the competing response, the participant will find it easier to reduce the occurrence of the BFRB. The therapist points out that the competing response needs to be performed immediately after each occurrence of the BFRB for the length of one minute [15, 23, 24].

The therapist should then demonstrate how to correctly implement a competing response when using the sensor wristband. The therapist starts to mimic the participant's BFRB, interrupts the behavior after vibration of the sensor wristband, and presses the button once to record the BFRB. Then, the therapist performs the competing response for one minute. After clarifying any possible questions regarding the correct application of the competing response, the participants have to wear the sensor wristband and are required to perform the BFRB by themselves.

Summarized the steps are as follows: After vibration of the wristband, the participant stops the BFRB, records it by pressing the button and then performs the alternative behavior for one minute.

The sensor wristband, the objects for carrying out the competing responses, the iPad and the Handout (see [Section E](#)) are given to the participant for the duration of the entire treatment.

C: Study data

Thus far (2023), the here described *Integrative Trichotillomania Therapy* approach has been fully tested in one participant with Trichotillomania and comorbid examination phobia and ADHD. In addition, one person with Dermatillomania was enrolled, but dropped out before starting with the intervention period due to a high rate of false alarms when implementing the wristband. Our Trichotillomania case report has been described and discussed in K. Leibinger, E. Murray, S. Aschenbrenner & J. Randerath “*Short-term intervention complemented by wearable technology improves Trichotillomania – a naturalistic single-case report*” (Frontiers in Psychology, 2023).

Further studies on effectiveness of this training still need to be conducted.

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E: Example Evaluation Sheets & Material

1. Material: Illustrations



Objects for executing the competing response

The objects consisted of (from top left to bottom right): A sandalwood hand massage tool, massage rings for fingers, magnetic acupressure balls, a fidget cube, rounded pebbles, an anti-stress spinner, and a massage ball. All of those objects were put into a carry-on box and handed to the participant.



Sensor wristband

The picture above depicts the sensor wristband. The red arrow indicates the button for recording the occurrence of the BFRB.

2. Handout

Handout

Definition of your habit:

Situations triggering your habit:

1. Instructions for using the sensor wristband:

1.1. **General information:**

You received a sensor wristband and an iPad. The sensor wristband helps to enhance the awareness of the habit through vibration, whereas the iPad collects and displays data about the habit.

Please, always attach the wristband tightly to your (right or left: dominant pulling) wrist with its button pointing towards your fingers. Charge the batteries before going to bed. The charging process takes about 3 hours. The LED light inside the wristband changes from a flashing to a constant glow when the batteries are charged. If necessary, the vibration of your wristband can be deactivated temporarily (7 minutes), which may be helpful for instance when combing hair. To do this, you should keep the wristband's button pressed until it vibrates a second time.

1.2. **Adapting the movement detection to your habit:**

In order to use the sensor wristband or to add a new gesture, the gesture recognition sensor must be adapted to one specific movement of the BFRB. For this purpose, please open the app "Original Keen" on your tablet/iPad. Wear the sensor wristband as described before and keep your body in the position you usually perform the BFRB. Now tap on the "bracelet" symbol in the lower menu bar and on the green "manage" button afterwards. Now tap on the green "add an area" button. Select the body area where your BFRB is directed to. Tap on "next", then on "start training". Now move your right hand to the respective body area, then tap "OK". As soon as you feel the vibration, perform the movements of your BFRB. Continue until the app shows you a green window ("Let's check it"). Tap on "got it", then on "start". This way you

check whether your sensor wristband actually recognizes your behavior. If vibration occurs when having executed the repetitive behavior, tap "Yes", otherwise press "No" and repeat the adaptation process of the movement sensor.

1.3. Vibration of the sensor wristband:

In case of a "true alarm", (the bracelet vibrates for the BFRB) press the button of the sensor wristband once. This serves to record the frequency and exact time of occurrence of the BFRB. Consider the vibration of the sensor wristband as a "friendly hint"/something positive. A "false alarm" is a vibration of your bracelet while the BFRB is not being performed. Only take note of that. "False alarms" can help you to become more aware of different positions of your hand. You may also be able to identify different precursor behaviors that occur before you usually perform the BFRB.

Too many "false alarms" can be counteracted by adjusting the settings of the sensor wristband. In order to do this, tap on the "wristband symbol" in the lower menu bar of the "Original Keen" app. Now tap on the green "manage" button and then on the arrow button (>>) to the right of the respective gesture. Using the "Motion Sensitivity" and "Body Position Sensitivity" scales, you can change the sensitivity of the gesture recognition of your sensor wristband. The further you move the button on the scales to the left, the lower the sensitivity. (And the less often the sensor wristband will vibrate). Furthermore, we would like to encourage you to use the daily log at the end of each day. It can be accessed via the link on your handout.

1.4. Saving data and editing the daily log:

Use the following link to access your daily log:

[insert the link to access the daily log here]

If you follow the instructions above, the iPad/tablet collects data about the occurrence of your habit. In order to view these data and supply them to the researchers, follow this procedure *at the end of each day*:

If you follow the instructions I gave you before, the iPad/tablet will collect data on how frequently the BFRB occurred. To view these data and make them available to our study/your therapist, please follow these steps at the end of each day:

Open the app "Keen" on your iPad. Press "Me" in the bottom menu bar. Now you see a line graph of the frequency of your BFRB over the course of the current week. By tapping on the arrow button (>>) to the right of the line graph, you will get a more detailed overview of how often the BFRB has occurred over the course of the day. To record this data, take a screenshot of this line graph. If the displayed times do not all fit on one screenshot, scroll down and take another screenshot. The screenshots then could be accessed by the therapist via password protected iCloud.

IMPORTANT: Please always keep the sensor wristband close to the iPad before taking screenshots! Otherwise, the data on the iPad/tablet might be incomplete.

3. Daily log

Welcome!

Welcome to your daily log!

Important note:

You will be asked about aspects of your behaviour and sensations at different times of the day. Please keep in mind the pre-defined times of a day:


Morning = the first 4 hours after getting up

Middle of the day = the middle 4 hours of the day


Afternoon = the last 4 hours of the day, including the time before going to bed

Daily log


Please indicate the day for which you fill in the daily log (e.g. 03.08.2023):



Please indicate at which time you got up today (e.g. 08:45):



Please indicate the time you go to bed today (e.g. 21:45):



I've been doing the following activities during the different times of the day:

Morning:

Took a shower, had breakfast, called a friend, went to a cafe in order to meet with this friend and discuss study assignments

Middle of the day:

Went shopping, ate together with a friend, continued to study

Afternoon:

Continued to study; finally solved 10 out of 12 assignments

Daily log

How was your mood this morning?:

- very bad
- bad
- neutral
- good
- very good

How was your mood during the middle of the day?:

- very bad
- bad
- neutral
- good
- very good

How was your mood this afternoon?:

- very bad
 - bad
 - neutral
 - good
 - very good
-

Daily log

**Please indicate the
tension or relaxation of
this morning:**

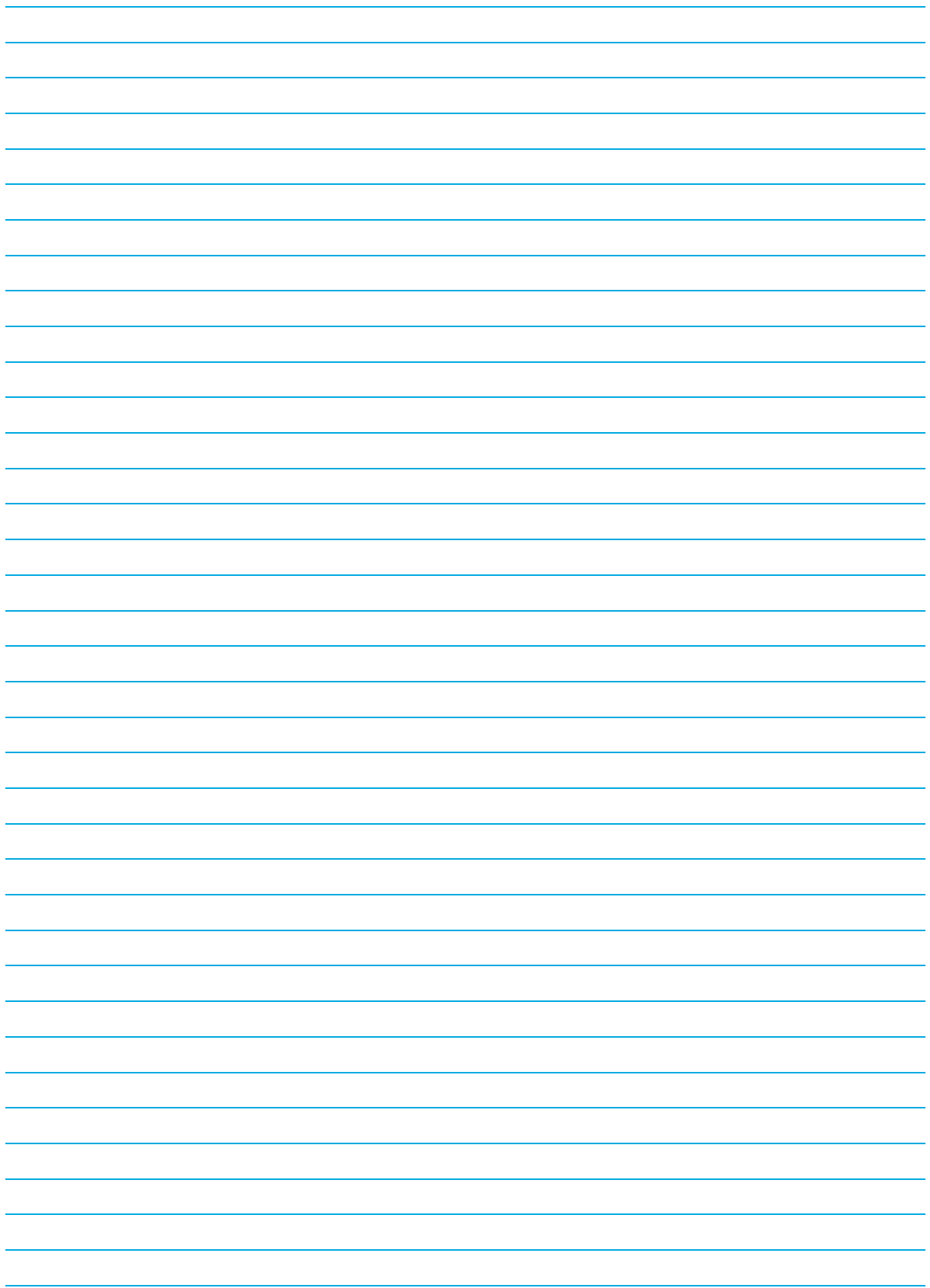
- very tense
- tense
- neutral
- relaxed
- very relaxed

**Please indicate the
tension or relaxation of
the middle of the day:**

- very tense
- tense
- neutral
- relaxed
- very relaxed

**Please indicate the
tension or relaxation of
this afternoon:**

- very tense
- tense
- neutral
- relaxed
- very relaxed



Randerath J. & Leibinger K.

Integrative Trichotillomania Therapy –

A brief manual

This brief manual illustrates a simplified habit-reversal training combined with a purchasable sensor wristband that vibrates when certain movements are produced. The approach could be helpful in treating body-focused repetitive behavior such as trichotillomania.