

# Sleep Compression

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## PROTOCOL NAME

Sleep compression.

## GROSS INDICATION

Sleep compression is ideal for those who exhibit sleep continuity disturbance but not substantial daytime deficits.

## SPECIFIC INDICATION

Poor sleep accompanied by little daytime impairment suggests that enough sleep has been obtained to satisfy biologic need. Decreasing wake time in bed, not increasing sleep, becomes the primary therapeutic goal.

There is insufficient experience with this method to recommend its preferred use with a type of insomnia (e.g., primary vs comorbid, midlife vs late life) or with a particular pattern of wakefulness (e.g., onset vs maintenance). However, sleep compression does use an incremental approach to decreasing time in bed, as compared to abrupt contraction in the method of sleep restriction, and sleep compression may be better tolerated by individuals who are experiencing daytime fatigue or mild sleepiness, or who may be sensitive to abrupt alteration of their time in bed pattern.

## CONTRAINDICATIONS

There are no serious contraindications for sleep compression. Temporary, increased daytime sleepiness that sometimes occurs with the introduction of the similar procedure of sleep restriction has not been observed with sleep compression.

## RATIONALE FOR INTERVENTION

Individuals may seek more sleep than they need when idiographic sleep needs are defined by nomothetic goals. Individuals gifted with a short need for sleep may create an insomnia sleep pattern when they strive for the common goal of 7 hours and 30 minutes of sleep, even when less sleep is needed to satisfy their biologic need. By their night-time sleep pattern, this insomnia subtype resembles individuals who do fail to obtain sufficient sleep, but may be distinguished by the absence of daytime sequelae expected to follow inadequate sleep.

## STEP BY STEP DESCRIPTION OF PROCEDURES

Neither research nor clinical experience has dictated a standard sleep compression protocol. What follows is how we typically do it.

Sleep compression begins by estimating total sleep time (TST) and time in bed (TIB). This is usually done by collecting a 2-week baseline sleep diary; longer or shorter baseline duration and other data sources, such as actigraphy, could be used instead. However, collecting data for much less than a week may mean that you will not get a representative sample of sleep (for example, including both weekend and weekdays). We have also found that sleep diaries have better utility for setting a sleep compression schedule, since they reflect patients' *perceptions* of their own sleep, and as a result patients are more likely to accept recommended changes than when baseline data are derived from an actigraphic device.

The baseline sleep assessment will yield mean TST and mean TIB. Atypical baseline nights producing unrepresentative TST or TIB values that might arise from factors such as illness or uncharacteristic socializing can be discounted. The therapeutic goal of sleep compression is to eliminate the TIB–TST discrepancy by cutting back TIB in incremental parts over the next several weeks. We will typically use about six sessions to shrink TIB to conform to TST. The number of treatment sessions may be adjusted according to the magnitude of the TIB–TST discrepancy that will be managed.

As an example, consider Jennifer, who averaged 6 hours of sleep a night during baseline but had 8 hours of TIB. The 2 hours of superfluous TIB will be cut by 120 minutes/six sessions, or about 20 minutes a week. As the sessions unfold, the pace of cutting TIB can be adjusted to accommodate changes in TST that may arise. If TST gradually increases, the number of minutes cut can slow, or the reverse if TST shrinks. Similarly, should the patient report waxing daytime impairment, the pace of reducing TIB should slow. We do not use a fixed formula, such as maintaining sleep efficiency within a specified range, in titrating TIB cuts. Typically, by the fourth or fifth session the therapist or patient may suggest that the rate of compression is too slow or too fast, and we will renegotiate the treatment course.

In the first session of sleep compression in this case example, prescribed TIB will be reduced to 7 hours, 40 minutes. Provider and patient will negotiate a fixed bedtime (e.g., 11:00 pm) and fixed wake time (e.g., 6:40 am).

We usually defer to the patient's preference in setting these TIB boundaries so long as they conform to the prescribed TIB duration. A week later, the second session will set a TIB of 7 hours and 20 minutes, and the bedtime (e.g., 11:10 pm) and/or wake time (e.g., 6:30 am) will be reset accordingly. Each of the next four weekly treatment sessions will reduce the TIB by 20 minutes, so that at the end of the sixth treatment session, the week following will see the TIB and the TST match at 6 hours.

### Adherence

Adherence with sleep compression is generally less problematic than with traditional sleep restriction recommendations that precipitously reduce a client's time in bed. The leisurely process of cutting back in-bed times allows patients time to become accustomed to changing their bedtime and rising time, and because the overall reduction in bed time is less abrupt, there is usually less initial reactance to the plan. Unlike the common injunction "Don't go to bed unless sleepy" characteristic of the stimulus control procedure, sleep compression instructions encourage patients to stick with the prescribed bedtime and wake time each week. We want the compression of TIB to proceed in an orderly, slow fashion. Some patients want to rush the process and are tempted to cut back at a faster pace. In our experience, this may excite side effects, such as increased daytime sleepiness and irritability, and invite unstable, disruptive circadian rhythms. Patients whose life circumstance dictates an inconsistent sleep schedule, such as rotating shiftwork, may be poor candidates for sleep compression treatment. Based on correlation with treatment outcome, greater consistency of time spent in bed per night and a more consistent arising time are aspects of adherence that should receive the most attention [1].

Though many of us would relish the newfound time liberated by compressed sleep, some patients rebel at the prospect of having to find something to do late at night or early in the morning, and this may fuel lapses in adherence. Therapists should assist patients in creating a menu of low-key activities for the evening and alerting activities for the morning. Another concern with adherence arises in the case of persons whose TST improves to match in-bed time before the full 6-week protocol is complete. For example, if Jennifer comes back at the end of the third week reporting that she was in bed every night for 7 hours and asleep for an average of 6 hours and 45 minutes per night, a decision must be made. Continuing to pursue the sleep compression schedule as planned may invite resistance, since the desired goal of a high nightly sleep efficiency has been achieved. In such a case, we would typically encourage the client to "hold the course" at 7 hours per night for the next few weeks to see whether the improvement is permanent or transitory. If, the following week, Jennifer's sleep has again deteriorated, then we would recommend reducing an additional 20 minutes per night, picking up where we left off with a target goal of 6 hours per night as originally set. Although in cases where one is following a standardized research protocol this kind of variation in procedure may not be permitted,

in the average clinical setting such flexibility empowers the patient and reduces the risk of the patient and therapist developing an adversarial relationship around the sleep scheduling program.

### **POSSIBLE MODIFICATIONS/VARIANTS**

There are few published modifications of sleep compression. The protocol just described is a modification from the protocol used in the initial case study, which was conducted weekly for 2 months and then biweekly for the final 6 months [2]. Subsequent studies have all been conducted using between four and six sessions, conducted once a week [3–6]. Two of these studies demonstrated the efficacy of sleep compression as an independent intervention [3,6].

Another variation regarding the timing of individual therapy, although no supporting publications exist, would be to decrease the time in bed more rapidly, thus reaching the target total sleep time at a quicker pace. However, as was cautioned earlier, reducing time in bed too rapidly may produce side effects. An extreme modification would be akin to sleep restriction [7], in which the time in bed is immediately cut to the total sleep time. A major difference between sleep compression and sleep restriction is that sleep restriction aims to increase total sleep time after time in bed is reduced. Therefore, sleep compression is better suited for individuals with reduced sleep need, whereas sleep restriction is better suited for individuals whose sleep need falls within the normal range. (See Chapter 1 in this volume for a more detailed description of sleep restriction.)

Another modification is the use of group treatment for the presentation of sleep compression. A study utilizing treatment groups consisting of five participants yielded positive outcomes for the use of sleep compression [3]. Subsequent studies utilized groups of three to six individuals. However, these studies combined sleep compression in a treatment package, making it difficult to separate out the specific treatment effects of sleep compression from the combined effects of the multi-component treatment package [4,5,8]. The McCurry package consisted of relaxation, sleep hygiene, stimulus control, sleep compression, and education for caregivers of parents with Alzheimer's disease, and demonstrated improvements in sleep during treatment and at a 3-month follow-up compared to wait list control [5]. These findings suggest that whether independent or as part of multi-component treatment, sleep compression presented via group therapy can be effective for insomnia and provides all the usual benefits of group treatment.

### **PROOF OF CONCEPT/SUPPORTING DATA/EVIDENCE BASE**

Sleep compression is a method of behavior modification for insomnia that includes the gradual, step-wise reduction of time in bed until the target total sleep time is reached. Sleep compression has been shown to be effective as

monotherapy [2,6] and as part of a multi-component treatment package [4,5]. Recently, sleep restriction/sleep compression was recommended as one of two evidence-based psychological treatments (EBTs) for insomnia in older adults [9]. The other recommended EBT is multi-component cognitive-behavioral therapy, which could include sleep compression.

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## RECOMMENDED READING

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