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Effect of Morning and Afternoon Naps on Mood After Sleep Deprivation in Depressives

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According to some anecdotal reports, a nap during the day following successful total sleep deprivation (TSD) can provoke a mood setback in depressive patients (1, 2, 3). In a previous study (4), we systematically examined the effect of daytime naps at 1300 h subsequent to TSD in drug-free depressive patients. About 50% of the naps caused a relapse, sometimes even a dramatic worsening. In a separate analysis of hourly mood ratings before and after the naps, we additionally found a delayed mood setback even in those TSD responders who had not worsened immediately after the nap (5). Our data did not allow definite conclusions to be made on the relationship between nap sleep characteristics and mood changes, but pointed to the roles of longer nap sleep duration and the occurrence of REM sleep as crucial factors involved in mood worsenings.

In a study on patients treated with antidepressants, Giedke (6) observed mood changes in both directions after naps beginning between 1330 h and 1430 h. Gillin et al. (7) studied the effects of brief (10 minutes) morning vs. afternoon naps (0830 h vs. 1500 h) and did not observe mood worsenings. On the contrary, mood tended to improve after morning naps in responders to TSD. The aim of the present study was to validate our previous findings concerning the mood worsening properties of naps and to study the influence of nap timing.

Methods

26 inpatients (8 male, 18 female) with a major depressive disorder (DSM-III) participated in the study (mean age 49.1 ± 12.3 years, mean Hamilton Depression Scale – 21 item version score: 27.2 ± 5.4). After a washout period of at least seven days, and an adaptation night in the sleep laboratory, a baseline sleep EEG was recorded. During the following night, the patients were totally sleep deprived. On the subsequent day, they took a daytime nap at 0900 h or 1500 h (randomly assigned) with sleep EEG recording, and terminated by spontaneous awakening. Depressive symptomatology was assessed by means of the Hamilton Depression Scale – 6 item version (HAMD-6) at 0800 h and 1500 h on the days before and after TSD. After TSD,

additional ratings were obtained at 1000 h (or 30 min after morning nap) and 1700 h (or 30 min following afternoon nap). The response to TSD was defined as a reduction of at least 30% in the score of the morning HAMD-6 ratings.

Results and Discussion

Of the 26 patients, 17 (= 65,4%) responded to total sleep deprivation. There were no differences between responders and nonresponders with respect to age, sex, baseline psychopathology and baseline sleep variables, except for a tendency towards shorter REM latencies in responders (36.5 ± 26.6 min as compared with 74.6 ± 59.3 min in nonresponders, $p < 0.10$, Mann-Whitney U-test, two-tailed). The **morning nap group** comprised of 8 responders and 5 nonresponders. One patient in each group did not fall asleep, and one responder did not wake up spontaneously within three hours and had to be awakened (according to the design). These patients were excluded from the present analysis. The **afternoon nap group** comprised of 9 responders and 4 nonresponders, all of whom woke up spontaneously.

Regarding nap sleep EEG variables, there were no significant differences between TSD responders vs. nonresponders and morning vs. afternoon naps. Total sleep time, however, tended to be longer in afternoon naps. Only a small number of patients exhibited REM sleep during the nap.

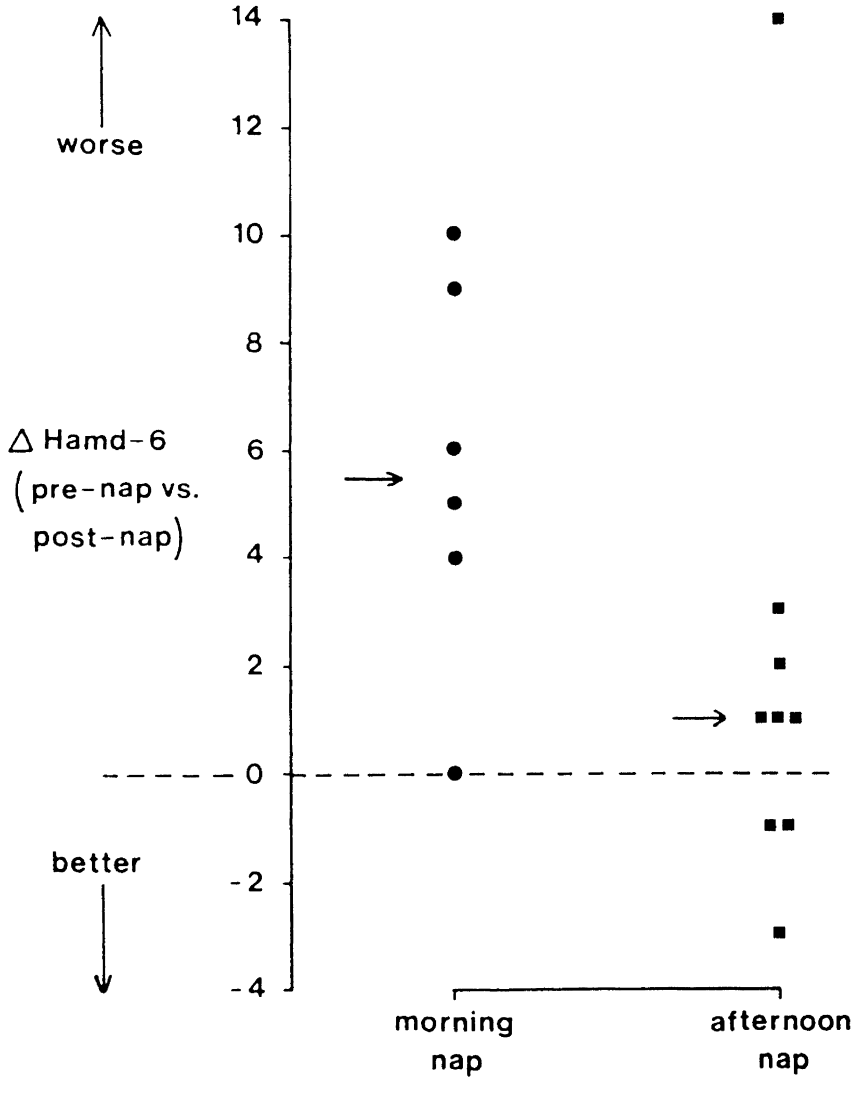

Fig. 1: Mood changes during morning vs. afternoon naps in responders to TSD.

During the day after TSD, the nonresponders' mood ratings exhibited only minor variations. In TSD responders, the mean scores reflected a clear relapse into depression after a morning nap. In contrast, an afternoon nap did not lead to a significant change in the mean mood score.

In morning naps, a worsening of mood appeared to be positively correlated with total sleep time. On the other hand, even long afternoon naps led only to minor mood changes. Under both conditions, there was no relationship between worsenings and the amount of SWS. REM sleep only occurred in three naps, without any consistent effect on mood.

Following successful sleep deprivation, morning naps lead more frequently to a relapse into depression than afternoon naps. The degree of worsening after a morning nap appears to be correlated with the duration of nap sleep. In the afternoon, even long naps do not lead to distinct worsenings. The presence of REM sleep does not seem to be the crucial factor involved in mood worsenings. In our previous study (4), the data had not allowed this conclusion, because the effects of REM sleep and nap sleep duration could not be separated.

In the light of the S-deficiency hypothesis of depression (8), our findings can be explained by a higher level of process S in the afternoon, leading to a lower risk of relapse into depression due to a longer period of prior wakefulness. However, our data show no clear relationship between mood changes and the amount of SWS during the nap. Alternatively, circadian factors may account for the varying risk of relapse.

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