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# Sexual Activity and Sleep in Humans

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*Polysomnographic recordings were obtained in 10 subjects (5 men and 5 women) for three conditions: following masturbation with orgasm, following masturbation without orgasm, and after reading neutral material. The analysis of several sleep parameters did not reveal any effect of masturbation on sleep. These results suggest that physiological changes that occur during masturbation, with or without orgasm, have no major effect on sleep organization. Other factors associated with sexual activity and potentially responsible for sleepiness after orgasm are discussed, and further strategies to study the interrelationship of sexual activity and sleep are proposed.*

## Introduction

Much empirical evidence suggests that sexual activity followed by orgasm has a facilitatory effect on human sleep (Kaplan 1974; Dement 1976), and masturbation is often included in the list of sleep-inducing maneuvers. This popular notion also implies that such a hypnotic effect is more prominent in males than in females; it is most often referred to in terms of women's complaints about men's sexual behavior. In more structured studies (Kinsey et al. 1953; Hite 1975), relaxation, quiescence of the body, sleepiness, and sleep are recognized as aftereffects of orgasm, but this topic is never addressed directly. In one animal study (Boland and Dewsbury 1971), sexual activity was followed by substantial increases in sleep, but no study has ever been published on the effect of sexual activity on human sleep.

The importance of studying the effect of sexual activity on sleep goes beyond the simple verification of an empirical concept. If one can demonstrate, for instance, the hypnotic effect of orgasm, an attempt should be made to determine the nature and specificity of psychological and/or physiological factors facilitating sleep.

The aim of the present study is to measure the effects of masturbation on sleep latency and structure in men and women. It is hypothesized that masturbation without orgasm may result in an increase of sleep latency, whereas masturbation leading to orgasm will reduce sleep latency.

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## Methods

### *Subjects*

Ten volunteers, 5 men and 5 women, 21–35 years old (mean 25.1), were selected for this study. Psychopathology and sexual dysfunction were ruled out by the Minnesota Multiphasic Personality Inventory and a structured interview with a physician specializing in sexual therapy. Another inclusion criterion was the ability to reach orgasm by masturbation as verbally reported during this initial interview. At all times, anonymity and confidentiality were carefully maintained.

### *Experimental Design*

Each subject spent four consecutive nights in the laboratory. All were instructed not to engage in extralaboratory sexual activity or napping throughout the study. The first night (not included in the analysis) allowed subjects to adapt to recording equipment and procedures used on the following experimental nights. On that first night, the anal probe was withdrawn and the lights turned off after 15 min.

Subjects arrived at approximately 9:00 PM. At 11:00 PM, after placement of the electrodes and thermistors, subjects retired to their room and the anal probe was inserted. The same male experimenter was responsible for probe insertion in all male subjects, and a female experimenter inserted the probe in all female subjects. After the adaptation night, one of the following three procedures was carried out.

Night A: The subject was instructed to read, while sitting in bed, for 15 min, after which the probe was withdrawn and the lights turned out.

Night B: The subject was asked to masturbate manually for 15 min, without reaching orgasm. If orgasm became imminent the subject was instructed to stop or to reduce momentarily the pace of masturbation. After the 15-min masturbation session, the probe was withdrawn and the lights turned out.

Night C: The procedure was similar to that of night B, except that the subject was allowed to reach orgasm after a minimum of 15 min of stimulation. Orgasm occurred in all subjects after 13–30 min (mean 18.3) of masturbation.

Five subjects followed an A-B-C night sequence, whereas the other five followed a C-B-A night sequence. This inversion of sequences allowed control for the effect of habituation to experimental conditions. The time elapsed between the withdrawal of the probe and the onset of sleep recording was kept as short as possible.

### *Recordings*

Sleep was recorded and scored according to the standard method (Rechtschaffen and Kales 1968) using 20-sec epochs. Contractions of the pelvic muscles were monitored according to a methodology derived from Bohlen and Held (1979, 1980); an anal probe transmitted pressure changes in the anal canal to a transducer connected to a DC amplifier. In addition, electrical sensors placed along the shaft of the probe were used to monitor electromyogram (EMG) activity originating from several muscle groups, mainly internal and external anal sphincter. The use of this anal probe gave an objective account of the orgasm in both men and women. Figure 1 shows the recording obtained by this method during orgasm in one male subject.

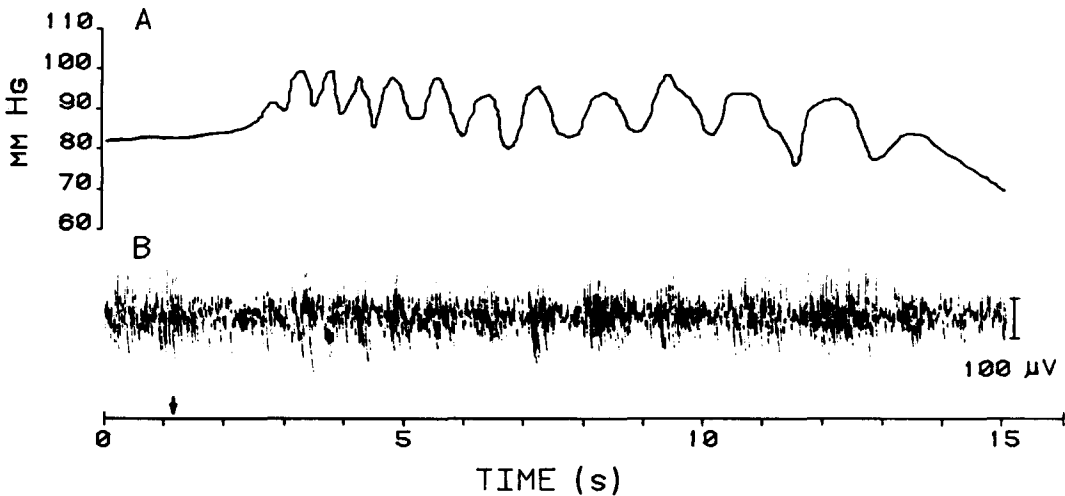


Figure 1. Patterns of anal contractions during orgasm in a male subject. Arrow points to onset of orgasm. (A) Contraction pressure recorded by anal probe; (B) EMG recording from electrical sensors placed along the shaft of the anal probe.

Heart rate was recorded by electrodes placed in the upper thoracic region. It was scored in 10-sec epochs, and the mean expressed in beats per minute for baseline (over 5 min), masturbation with and without orgasm, and postmasturbatory period (over 5 min), as shown in Figure 2. The ratio between mean heart rates during masturbation over baseline level served as an index of autonomic activation. Epochs unscorable because of muscle artifact or removal of the probe were left as blanks and did not influence calculation of means. Respiratory rate was also recorded through mouth and nose thermistors, which provided us with evidence that the pressure changes recorded through the anal probe did not reflect variations in the abdominal pressure during respiration.

The subjects were required to press an event marker linked to the polygraph at the beginning and end of orgasm.

## Results

Table 1 shows that paired *t*-tests could not disclose any statistical differences between the three experimental nights for any sleep parameters.

Sleep latencies were slightly longer than normal values reported by others (Williams et al. 1974). This is partly due to the experimental condition, namely, the presence of an anal probe. However, analysis of individual values revealed that two subjects, one man and one woman, had elevated sleep latencies on each of the four nights and contributed largely to the high mean values. These subjects could not be considered as "poor sleepers," as the total sleep time, the number of awakenings, the time awakened after sleep onset (WASO), and, consequently, the sleep efficiency were normal.

Analyses were carried out to assess possible sex differences. No statistical differences could be found between results obtained in men and women. A comparison of nights according to the order in which they occurred, i.e., independently of experimental conditions, was also carried out and did not show significant differences.

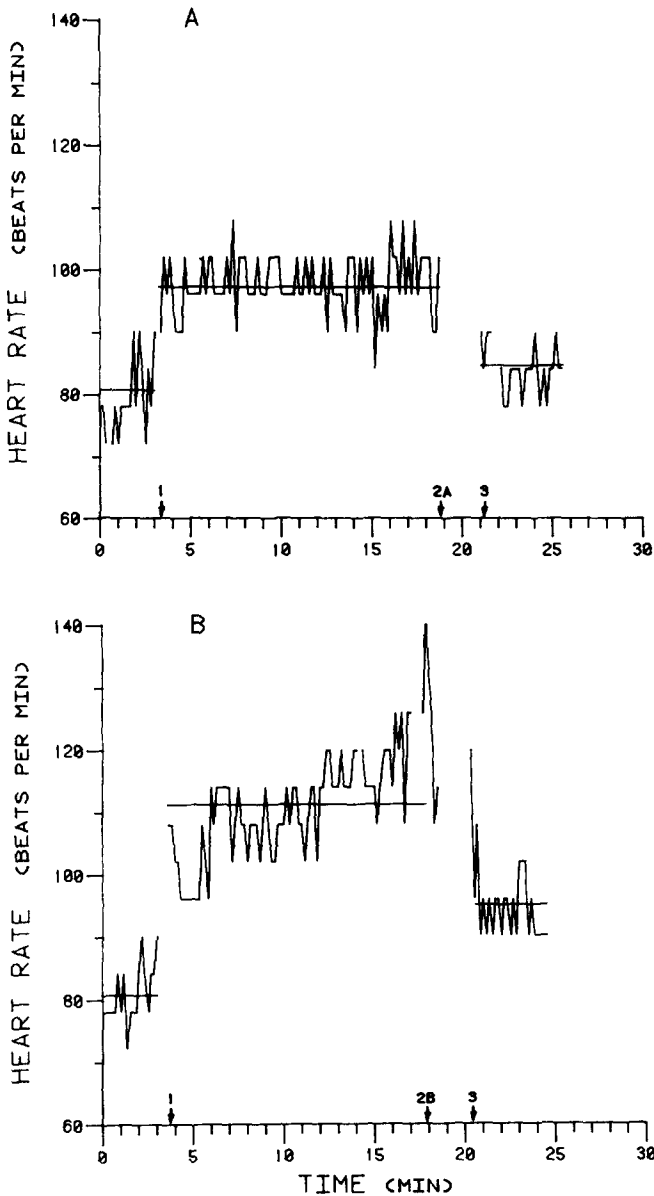


Figure 2. Heart rate changes during masturbation only (A) and masturbation followed by orgasm (B) in a female subject. Arrows indicate onset of masturbation (1), termination of masturbation without (2A) or with (2B) orgasm, and onset of sleep recording (3). Horizontal bars pass through mean heart rate for each condition.

As seen in Figure 2, masturbation induced an increase of heart rate that reached a plateau shortly after the onset of masturbation. An additional increase was seen at the time of orgasm (Figure 2B).

In order to determine whether or not the presumed hypnotic effect resulted from an increase in autonomic functioning, several calculations were made to evaluate the cor-

Table 1. Sleep Data (Means  $\pm$  SD) for the Three Experimental Nights

Sleep parameter	Night A <sup>a</sup>	Night B <sup>a</sup>	Night C <sup>a</sup>
Latency (min)			
Stage 1	34.63 $\pm$ 26.08	36.00 $\pm$ 33.96	37.63 $\pm$ 24.50
Stage 2	36.43 $\pm$ 26.09	38.50 $\pm$ 33.78	40.47 $\pm$ 24.64
REM	64.47 $\pm$ 13.10	68.67 $\pm$ 16.05	82.23 $\pm$ 34.69
Total sleep time (min)	457.73 $\pm$ 36.88	436.30 $\pm$ 39.61	459.47 $\pm$ 43.34
Number of awakenings	6.20 $\pm$ 5.27	6.00 $\pm$ 7.92	5.20 $\pm$ 4.69
WASO (min)	11.00 $\pm$ 8.79	11.16 $\pm$ 13.24	13.90 $\pm$ 14.28
Percentage			
Stage 1	5.65 $\pm$ 3.30	5.06 $\pm$ 2.04	5.71 $\pm$ 2.80
Stage 2	47.49 $\pm$ 6.73	45.81 $\pm$ 4.27	48.94 $\pm$ 9.87
Stage 3	6.71 $\pm$ 2.83	7.17 $\pm$ 1.66	9.37 $\pm$ 7.37
Stage 4	12.49 $\pm$ 4.97	13.78 $\pm$ 3.60	10.48 $\pm$ 2.83
REM	27.66 $\pm$ 4.96	28.18 $\pm$ 3.14	25.50 $\pm$ 7.88
Sleep efficiency (%) <sup>b</sup>	97.59 $\pm$ 2.06	97.66 $\pm$ 2.70	97.18 $\pm$ 2.68
Number of REM fragments per minute of REM sleep	0.147 $\pm$ 0.59	0.133 $\pm$ 0.041	0.134 $\pm$ 0.81

<sup>a</sup>Night A: without sexual stimulation; night B: after sexual stimulation without orgasm; night C: after sexual stimulation with orgasm.

<sup>b</sup>Sleep efficiency = (total sleep time/total recording time after sleep onset)  $\times$  100.

relations between heart rate changes and sleep parameters listed in Table 1. Simple linear regression provided the values of correlation between the index of autonomic activation and each of the sleep parameters. These correlations, for all subjects across each experimental condition, failed to reach significance. Finally, five subjects presented an acute peak of heart rate (>30% over mean value) at the time of orgasm (Figure 2B). Comparing their three nights to one another did not yield any significant differences between sleep parameters either.

## Discussion

Our results show that masturbation with or without orgasm at bedtime has no effect on nocturnal sleep that follows, and therefore do not support the hypothesis of a hypnotic effect of orgasm. This does not mean, however, that sleepiness does not occur after masturbation or coitus in more natural conditions. Nevertheless, masturbation in the laboratory shared several similarities with the same activity occurring in normal life: subjects were left alone in a sound and light attenuated room, they showed no evidence of anxiety, and all reported ease in experiencing orgasm in this situation. In addition, physiological changes that usually occur during masturbation and orgasm did take place during this experiment.

There are other limitations related to the experimental design. For instance, this study was limited to a small number of young normal sleepers. It is possible that insomniacs or older subjects would have shown sleep changes, as they tend to be more sensitive to any changes in sleep environment (caffeine, temperature changes, noise, etc.). There is also some evidence from the literature (Kinsey et al. 1953; Wise 1981) about major individual differences, especially in women, in which some individuals report sleepiness and others hyperalertness after orgasm. The level of tension or anxiety before masturbation may also play a role, as masturbation with orgasm may have a relaxation or anxiolytic

effect. It is possible that some individuals use masturbation to initiate sleep when they feel more tense or anxious at night.

The duration and the type of sexual activity may have influenced the outcome of this study. Sleepiness may be more evident after sexual activity of longer duration or after coitus. Coitus shows physiological and psychological differences from orgasm obtained by masturbation. For instance, coitus usually involves more somatic activity and an affective relationship with the partner. These variables may strongly influence the after-effects of orgasm.

The hypnotic effect of orgasm may also be obscured in the present study by the choice of reading as a control activity, as reading may have a hypnotic effect of its own. However, there is no activity that can be done in bed that would be completely neutral. Consequently, a conservative conclusion would be that masturbation, with or without orgasm, does not have more effect on sleep than reading a newspaper for 15 min.

A last question raised by the experimental design is the presence of the experimenter in the room for a few minutes after reading or masturbation in order to remove the anal probe. It is possible, for instance, that the hypnotic effect of orgasm is transient and of short duration, with the result that the presence of the experimenter at this moment is critical. The only way to eliminate this factor would be to avoid using a probe in further research.

This is the first attempt to study the influence of sexual activity on human sleep. No major simple or direct interaction could be detected. These results emphasize the importance of conducting a large survey before instituting any other experimental approach. The aim of such a survey would be to determine the extent of individual differences among men and women, as well as the importance of age, type of sexual activity, mood, and other previously mentioned factors to postorgasmic sleepiness.

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