4. What is the ECG abnormality in the epoch shown in Figure 4-A?

A. Nonconducted premature atrial contractions
B. Third-degree (complete) heart block
C. Mobitz type I second-degree heart block
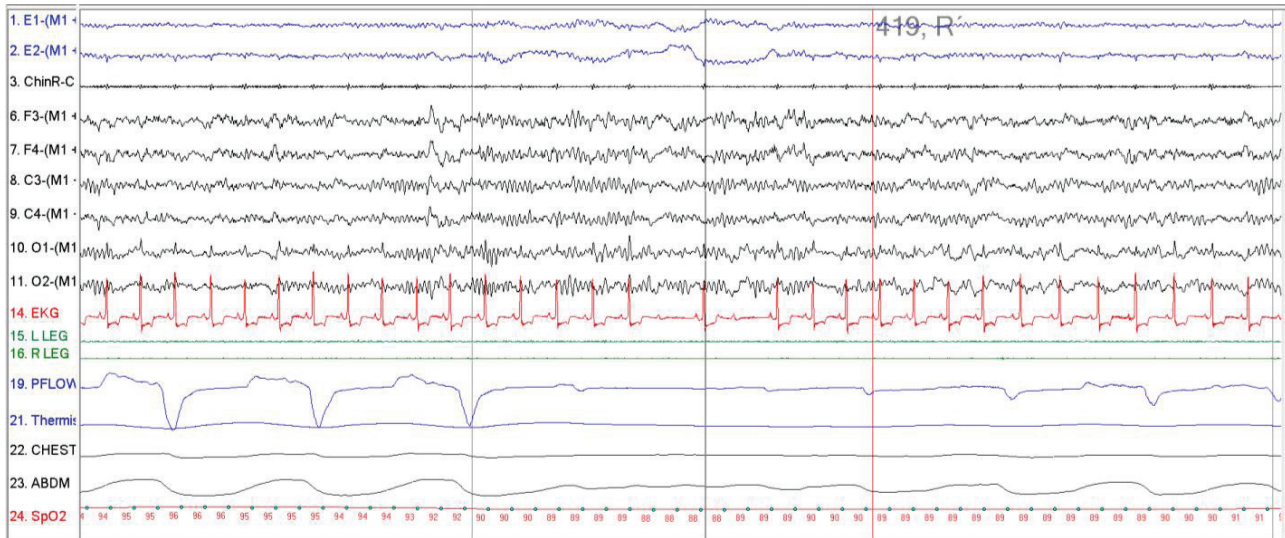D. Mobitz type II second-degree heart block

Figure 4-A A 30-s epoch from a diagnostic sleep study.

5. A 58-year-old woman has the chief complaint of difficulty maintaining sleep, a condition that has been going on for several years with no recall of any specific precipitating event. She usually takes 1 mg lorazepam 2 times per week as prescribed by her primary care physician. Her bedtime routine is as follows: she watches TV in the living room for 2 h before bedtime, goes to bed at 10 PM when she feels sleepy but reads in bed for 30 min, then falls asleep in 10 to 15 min. She will sleep until 1 AM to 2 AM, then wakes up for an unknown reason and has difficulty going back to sleep. She describes herself as "just lying there, thinking about anything." She may doze off into light sleep and finally gets up at 6 AM. She estimates average total sleep time of 6 to 7 h per night. She denies snoring or witnessed apnea, but has not had a bed partner recently. Upon waking up, she does not feel well rested and sometimes has a mild headache. She may experience dozing off if inactive and rarely take naps. She drinks one caffeinated beverage in the morning, does not smoke, and rarely drinks alcohol. She has a history of hypothyroidism and is on replacement therapy. Her Epworth Sleepiness Score is 9. Her BMI is 27 kg/m^2, and the results of her physical examination are unremarkable except for mild retrognathia and Mallampati class 2 airway assessment.

A summary hypnogram of the sleep study night of this patient is shown in Figure 5-A. Which of the following is true about this patient's insomnia?

A. It is common in postmenopausal women who complain of chronic insomnia.
B. It responds better to cognitive behavioral therapy (CBT) for insomnia than to treatment of sleep-disordered breathing (SBD).
C. The anatomy of the upper airway is not relevant in the pathogenesis of this insomnia.
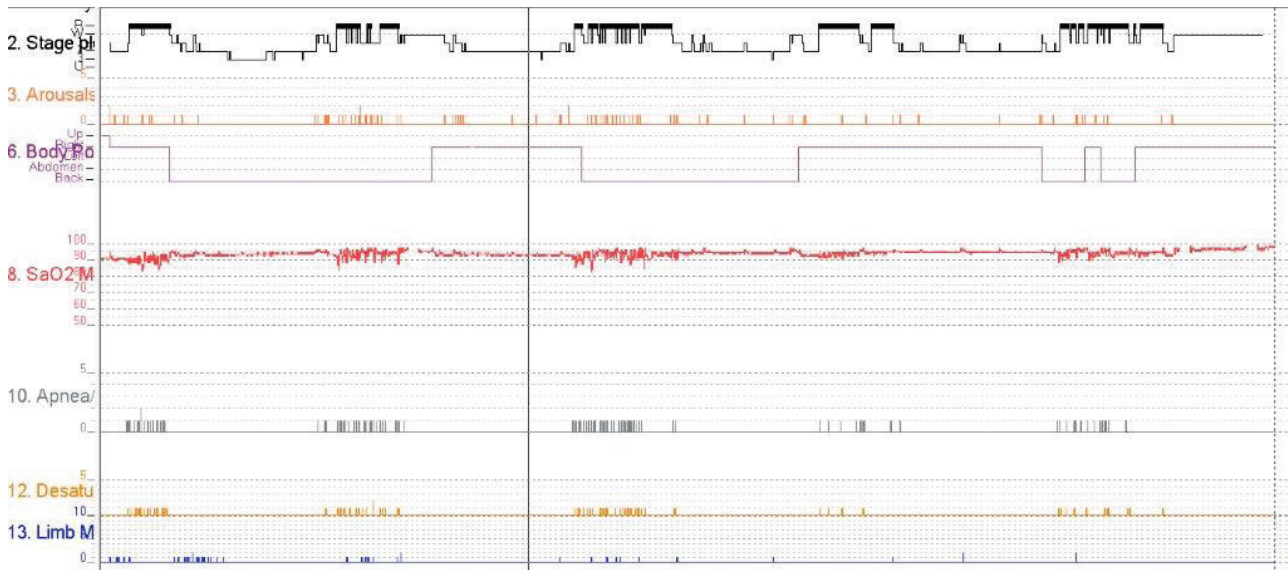D. The apnea-hypopnea index (AHI) is commonly in the moderate to severe range.

Figure 5-A Sleep study night summary.

6. A healthy adult man who maintains a typical nighttime sleep schedule has been awake for 40 h. At how many hours awake is he most vulnerable for a drowsy-driving crash?

A. Eight hours awake
B. Seventeen hours awake
C. Twenty-four hours awake
D. Thirty-eight hours awake

7. The respiratory abnormality seen in the compressed 5-min epoch in Figure 7-A is likely to be least severe during which of the following sleep stages?
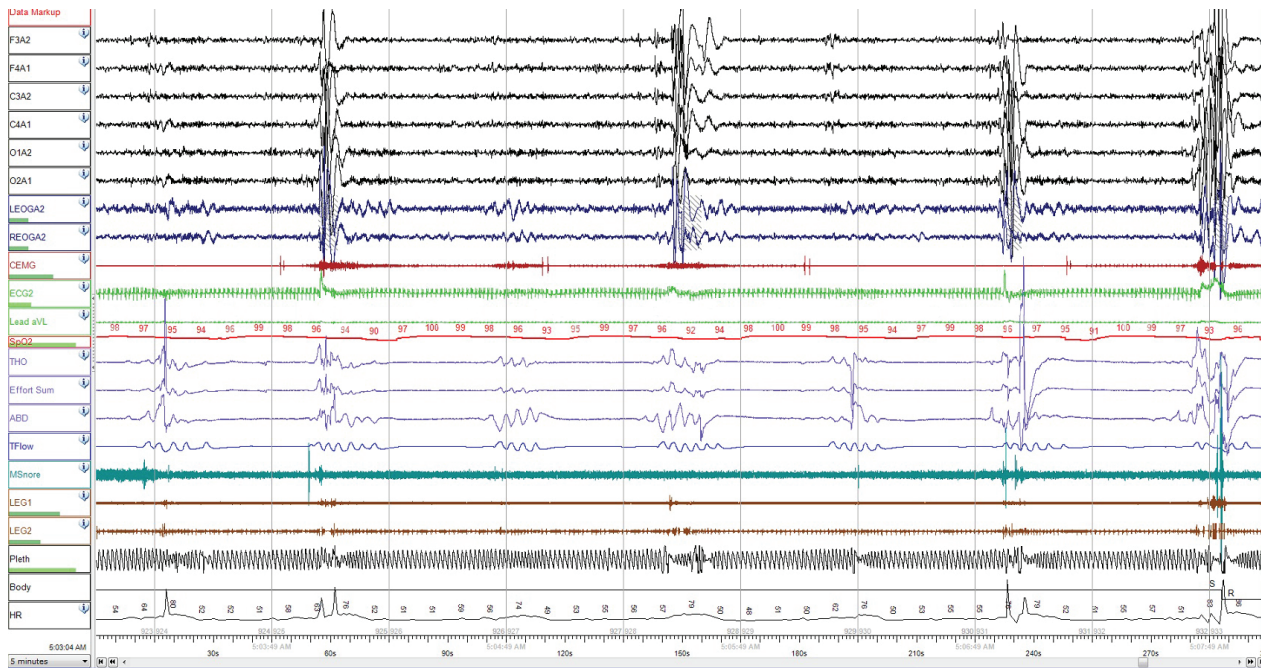
A. N1
B. N2
C. N3
D. R

Figure 7-A 5-min, compressed epoch on polysomnogram.

8. Which area of the brain promotes NREM sleep?

A. Basal forebrain
B. Reticular formation
C. Pontine tegmentum
D. Preoptic area

9. For 5 years, you have been seeing a 54-year-old woman for management of restless legs syndrome/Willis-Ekbom disease. She was doing well until 3 months ago, when, because of worsening symptoms occurring earlier in the evening, you increased her dose of pramipexole from 1.0 mg to 1.5 mg orally 2 h before maximal symptoms. Six weeks later, because of symptoms now occurring while at work, she began to take an extra half-dose in the mid-afternoon. Symptoms improved for a few weeks, but she now returns with spread of restlessness to her arms.

Which of the following is true about the management of her condition?

A. At this stage, there is no role for assessment of iron stores.
B. Other dopamine agonists should be avoided.
C. There are no head-to-head trials to inform the choice of therapeutic agents.
D. A reduction in pramipexole dose is indicated.

10. A 62-year-old man with a history of multiple system atrophy, depression, diabetes mellitus, and hypertension complains of hitting his wife and falling out of bed. He reports dreaming that he was being attacked. He has had six episodes over the past 3 months and has given his wife a black eye. The events typically occur during the second half of the night. His medications include nifedipine, midodrine, and bupropion. He reports drinking one beer with lunch each day. He does not smoke.

Which of the following is most likely associated with this patient's sleep symptoms?

A. Diabetes mellitus
B. Alcohol use
C. Treatment of his depression with buproprion
D. Multiple system atrophy

11. Figure 11-A, Figure 11-B, and Figure 11-C show three consecutive 30-s epochs recorded during a polysomnogram. Which sleep stages should be scored for the second and third epochs, respectively?

A. Major body movement, stage N1
B. Major body movement, stage N2
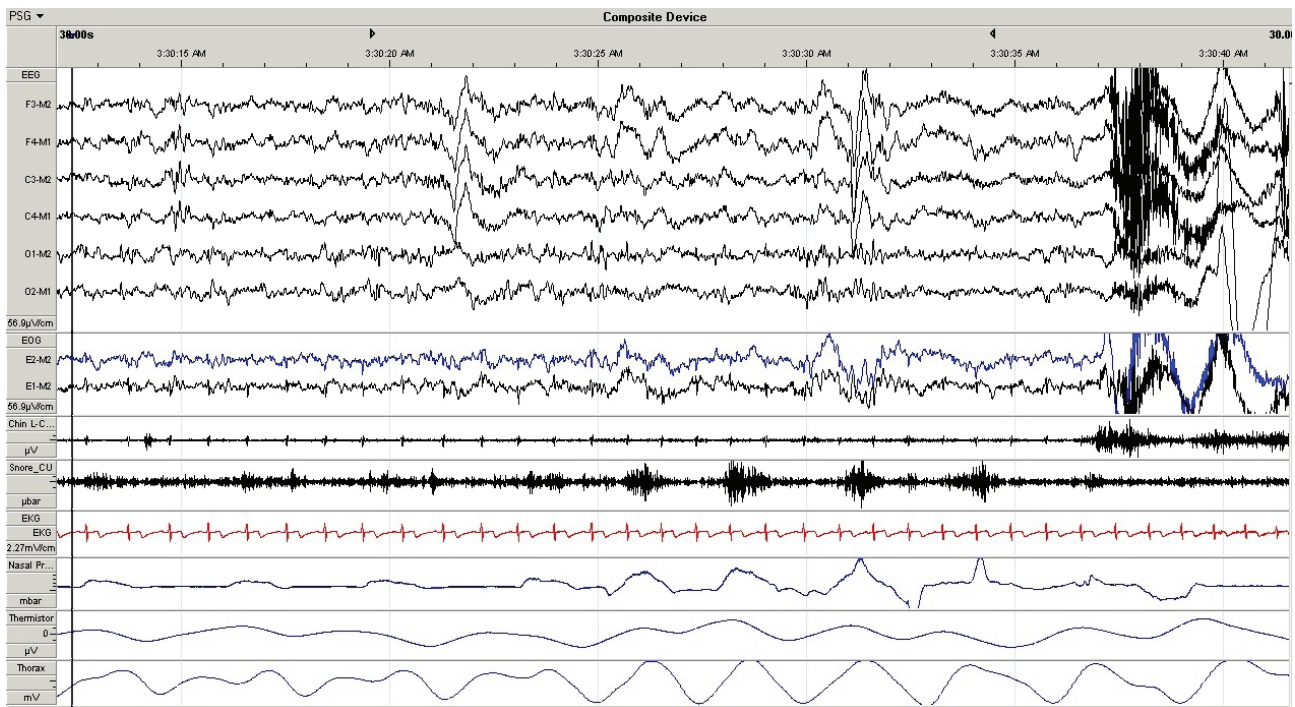C. Stage W, stage N1
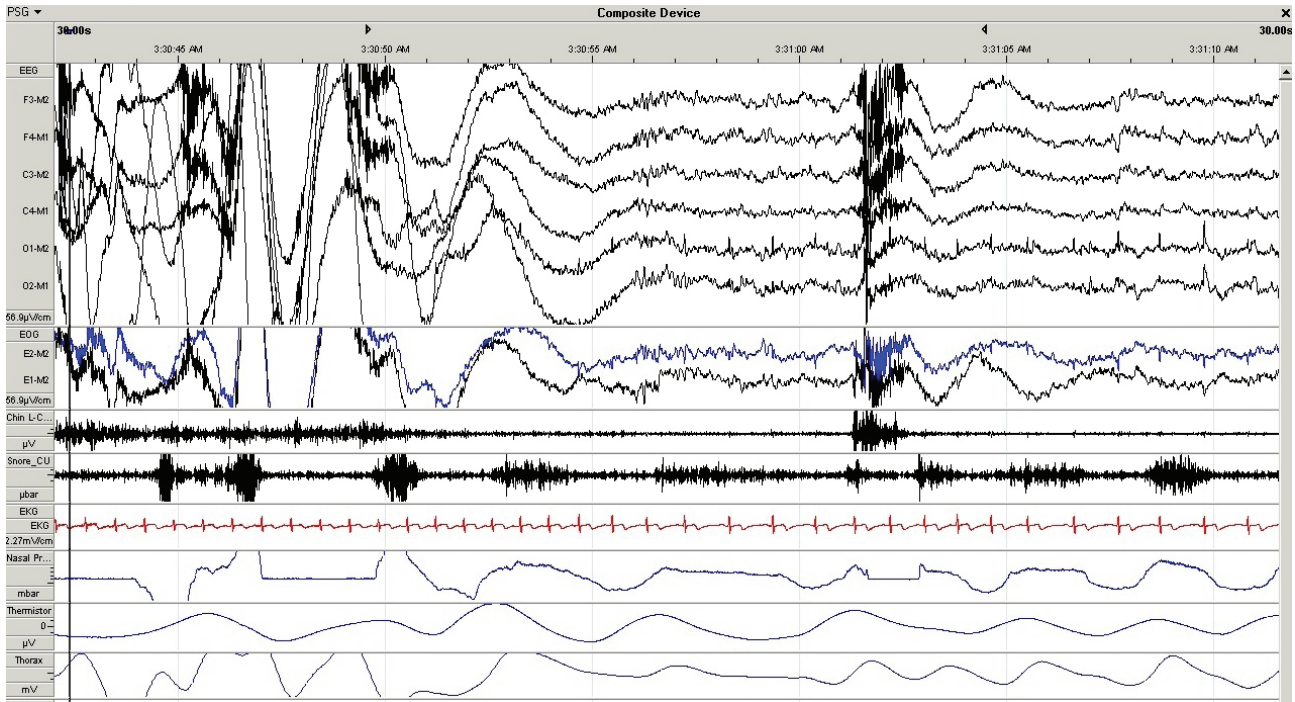D. Stage W, stage N2

Figure 11-A First 30-s epoch.

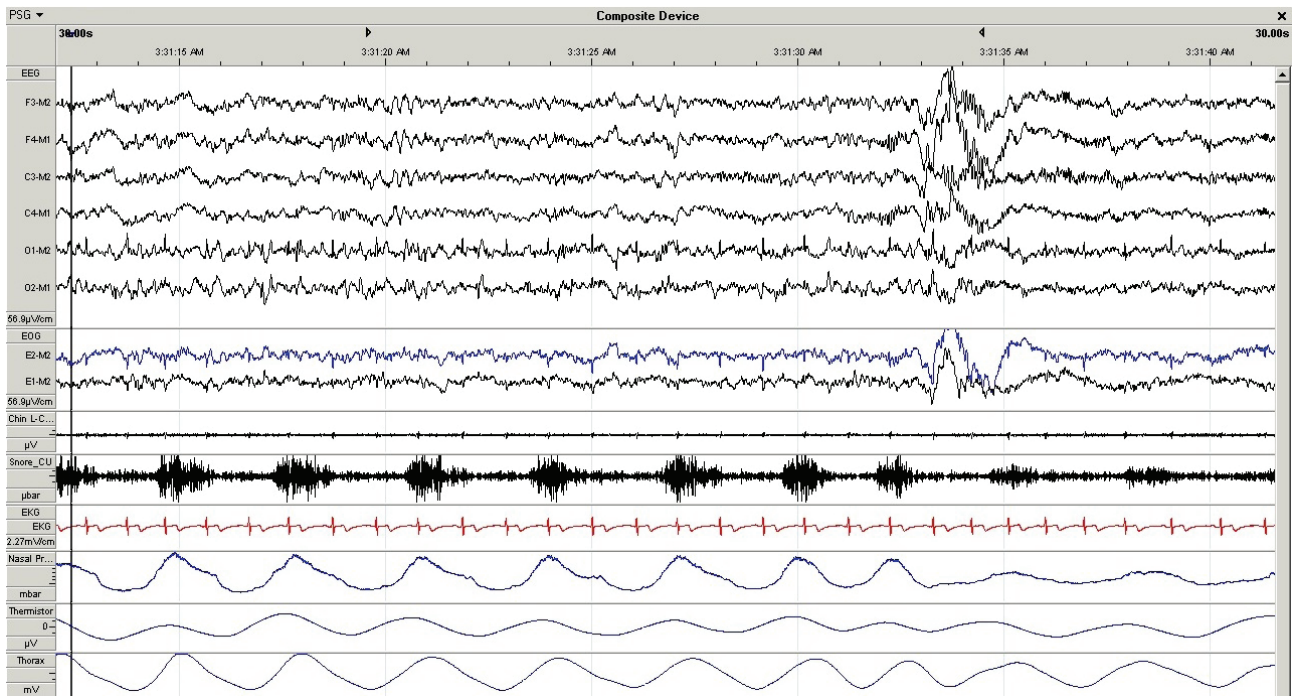**Figure 11-B** Second 30-s epoch.

Figure 11-C Third 30-s epoch.

12. Figure 12-A and Figure 12-B show 120-s epochs revealing the behavior of a 66-year-old man under different body position and sleep-stage conditions during a diagnostic polysomnography (PSG) with an overall apnea-hypopnea index (AHI) of 35/h. The 300-s (5-min) epoch (Figure 12-C) shows the patient's response to a bilevel PAP therapy device without a backup rate during this split-night study, whereby this pattern persisted throughout treatment with an AHI of 58/h. You are faced with a discussion with the patient and further decision-making including an outpatient trial of auto-titrating PAP (APAP), bilevel therapy with a backup rate (BPAP ST), or return to the laboratory for a trial of adaptive servo-ventilator (ASV).

The most correct statement or recommendation you can report to him about his sleep-disordered breathing abnormality is which of the following:

A. An outpatient trial of APAP should be recommended before repeated retitration PSG.
B. The respiratory event differences between Figure 12-A and Figure 12-B are best explained by body position and sleep stage.
C. Home ASV will likely show better reduction in AHI and higher compliance than will CPAP, upon follow-up.
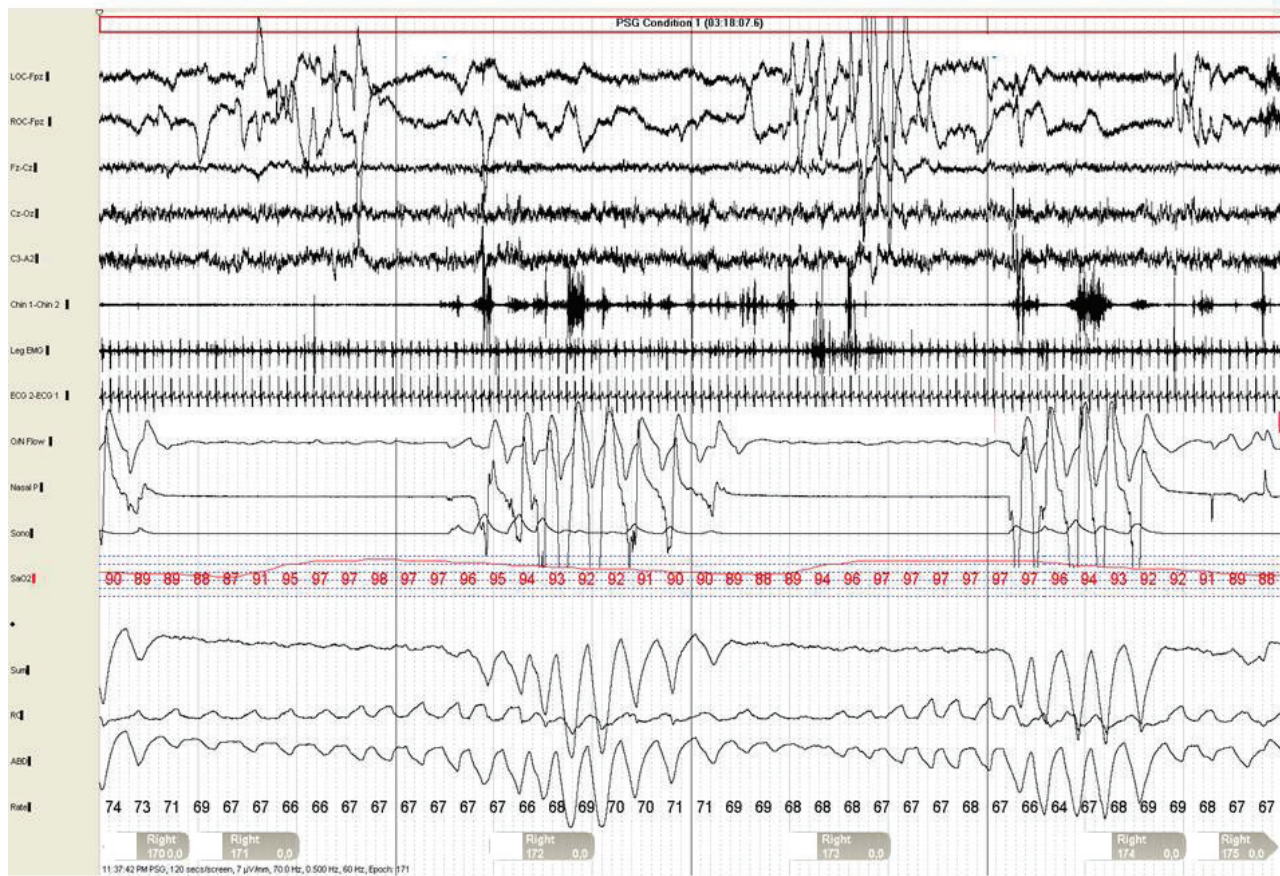D. ASV is likely to show superior benefit over BPAP ST in supporting ventilation during apneic events.

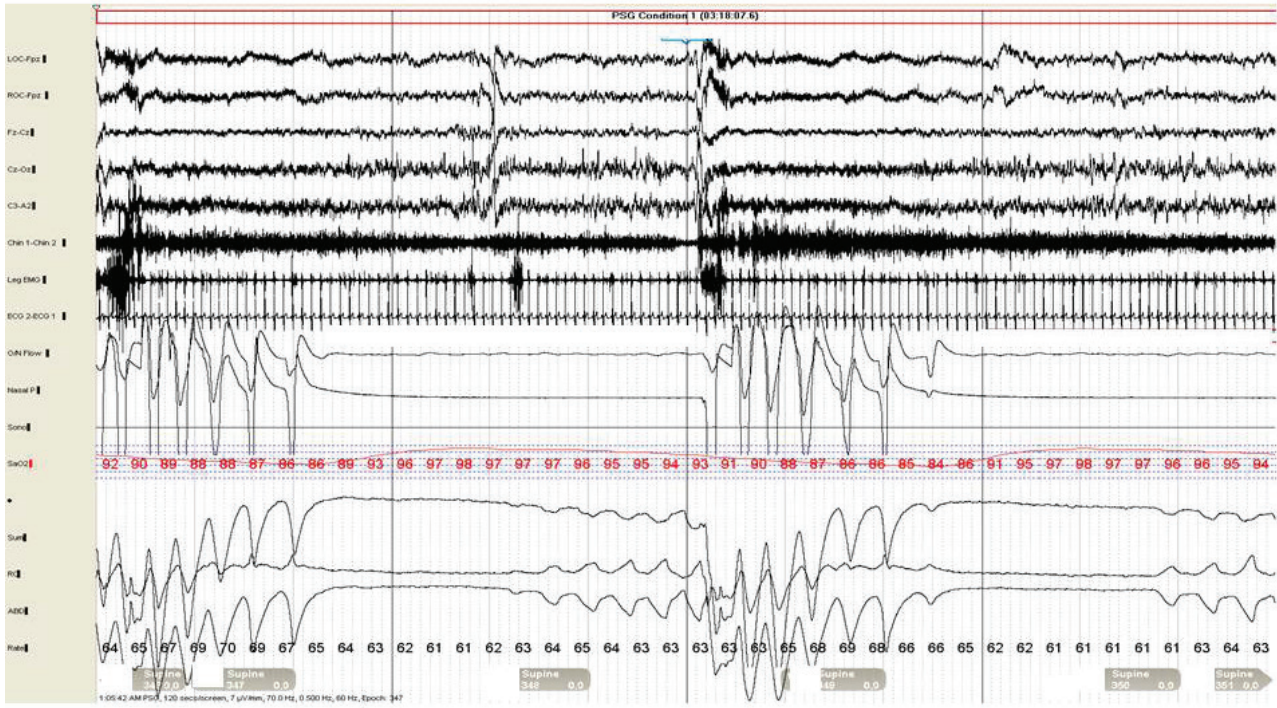**Figure 12-A** A 2-min epoch of sleep during the diagnostic PSG study with patient on his side.

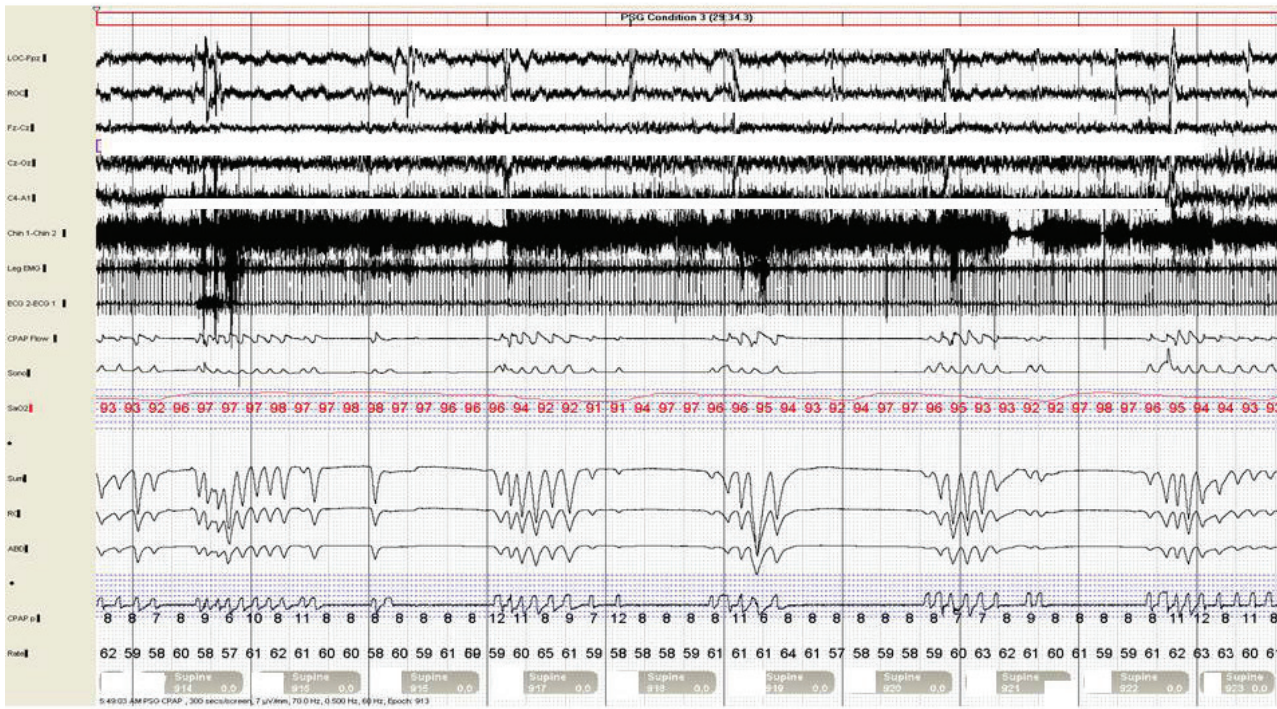**Figure 12-B** A 2-min epoch during the diagnostic PSG study with patient on his back.

Figure 12-C A 5-min epoch during the BPAP titration PSG study with patient on his side.

13. A patient with severe OSA returns for follow up of PAP treatment. A home sleep-apnea study indicated a respiratory disturbance index of 47/h. An auto-PAP device was prescribed with a range of 5 to 15 cm H_2O with a full face mask. The patient indicates regular PAP use, 7 nights per week and 9 h nightly. He is still aware of mild sleepiness despite his time in bed. There has been more recent snoring, but apnea is denied. The patient reports dry mouth but denies other side effects. The patient's mask fit was reassessed during the visit and was satisfactory. The adherence report (Figure 13-A) and raw data were reviewed with the patient. Which of the following is the best response to these findings?

A. Adjust the pressure range to 8-15 cm H_2O.
B. Refit the patient with a nasal mask.
C. Reset the pressure range to 8-18 cm H_2O.
D. Teach the patient how to use a chin strap.

Compliance Report

Usage	09/16/2014 - 12/14/2014
Usage days	**90/90 days (100%)**
>= 4 hours	89 days (99%)
< 4 hours	1 days (1%)
Usage hours	876 hours 58 minutes
Average usage (total days)	9 hours 45 minutes
Average usage (days used)	9 hours 45 minutes
Median usage (days used)	9 hours 32 minutes

S9 AutoSet	
Serial number	23141574692
Mode	AutoSet
Min Pressure	5 cmH2O
Max Pressure	15 cmH2O
EPR	Fulltime
EPR level	2

Therapy						
Pressure - cmH2O	Median:	12.9	95th percentile:	14.9	Maximum:	15.0
Leaks - L/min	Median:	2.2	95th percentile:	12.9	Maximum:	148.4
Events per hour	AI:	6.3	HI:	1.2	AHI:	7.5
Apnea Index	Central:	0.3	Obstructive:	5.6	Unknown:	0.3

Figure 13-A Adherence report: 90-d compliance download.

14. A 28-year-old man with a history of narcolepsy with cataplexy and a recent diagnosis of early-onset Parkinson disease complains of late-afternoon sleepiness on his current dose of 200 mg modafinil. He also notes three recent episodes of slurred speech and leg weakness associated with laughter. His other current medications include carbidopa-levodopa, 25 mg/100 mg tid; selegiline, 5 mg bid; and venlafaxine, 75 mg daily. A urine toxicology screen is positive for amphetamine and methylamphetamine.

What is the most appropriate intervention for this patient?

A. Discontinue venlafaxine.
B. Address positive toxicology screen with patient.
C. Prescribe sodium oxybate.
D. Increase the morning modafinil dose.

15. A patient complains that he experiences terrible jet lag. He is a frequent business traveler and flies once per month between Chicago, Illinois, and Frankfurt, Germany, for about 2 weeks each trip. The following is the flight he often takes: Depart 6:05 PM Chicago and arrive 9:35 AM. Frankfurt is seven time zones from Chicago. The patient is 40 years old, has no medical conditions, and maintains a habitual 11:00 PM to 6:00 AM sleep schedule (Figure 15-A). Which is the best recommendation to assist the patient in adopting his circadian clock to the new time zone?

A. Maintain a sleep-wake schedule that is on Chicago time the entire trip, as there is no reason to adapt to the new time zone for such a short period of time.
B. Recommend that the patient drinks a few glasses of wine/beer on the plane and at night in the new time zone to help him sleep and avoid jet lag-induced sleep loss.
C. When they are serving breakfast on the plane, raise the shade to be exposed to light and then i mmediately adapt all activities to the new time zone.
D. Avoid sunlight exposure until after 12 noon local Frankfurt time, then be exposed to sunlight and go to bed at the desired local time.
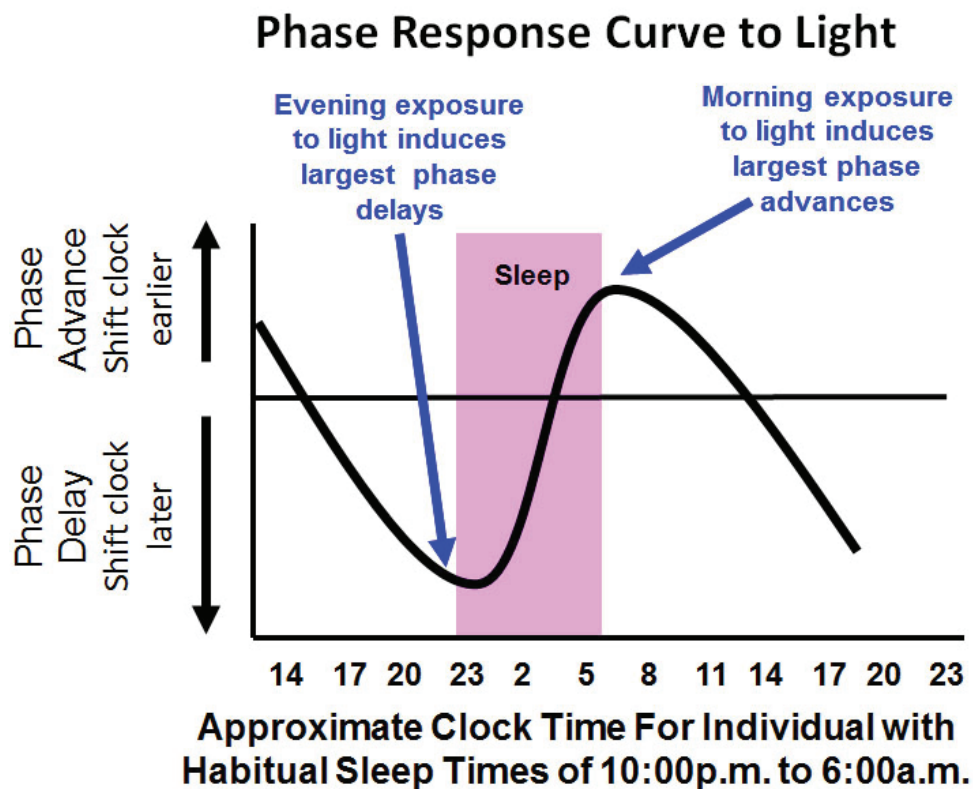

Figure 15-A A phase-response curve to light illustrates the change in circadian phase (black line) depending upon the internal circadian timing of light exposure. The x axis indicates approximate clock time and habitual sleep time. Above the horizontal line are shown phase advances and below the line are phase delays.

16. It is estimated that >80% of patients with multiple sclerosis (MS) report problems with chronic fatigue, with more than one-third of patients rating fatigue as the most disabling daytime symptom of MS. Periodic limb movements are also reported to be increased in patients with MS. Which other sleep disorder is well characterized as being more prevalent in patients with MS compared with the general population?

A. Insomnia
B. OSA
C. Narcolepsy
D. REM behavior disorder

17. A 29-year-old graduate student complains of falling asleep inadvertently while studying at night, but waking between 2:00 AM and 3:00 AM with a dry mouth and difficulty going back to sleep. When he finally does fall back to sleep, he has intense dreams and nightmares. Which of the these is the most likely culprit?

A. Caffeine
B. Alcohol
C. Marijuana
D. Nicotine

18. A 49-year-old woman with history of depression and hypertension complains of daytime sleepiness. She is taking narcotics and comes for a sleep evaluation with her husband, who notes that she has mild snoring and awakens very frequently during the night with interrupted breathing. A sleep study is done. Her overnight oximetry did not show significant desaturation <90% throughout.

Based on the 1-min polysomnography epoch shown in Figure 18-A, which is the best treatment recommendation?

A. Implementation of CPAP
B. Reduction or discontinuation of narcotic medications
C. Administration of supplemental oxygen
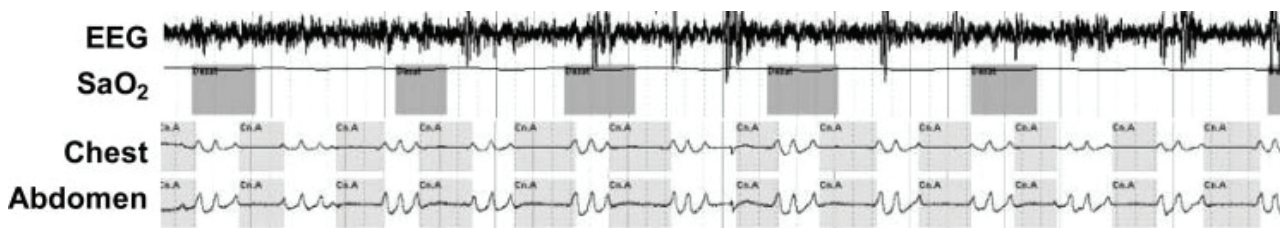D. Addition of a benzodiazepine to the patient's medications

Figure 18-A

19. A 58-year-old man with a history of atrial fibrillation, hypertension, and obesity is prescribed CPAP after polysomnography indicates OSA. He returns for follow-up in 5 weeks, and reports that he feels quite a bit better, but is still fatigued. CPAP download shows use on 98.2% of nights, with an average use of 7.2 h/night. Graphics from this download are seen in Figure 19-A.

What is the most appropriate next step?

A. Reassurance and modafinil.
B. Switch to adaptive servoventilation, 18/8 cm H_2O.
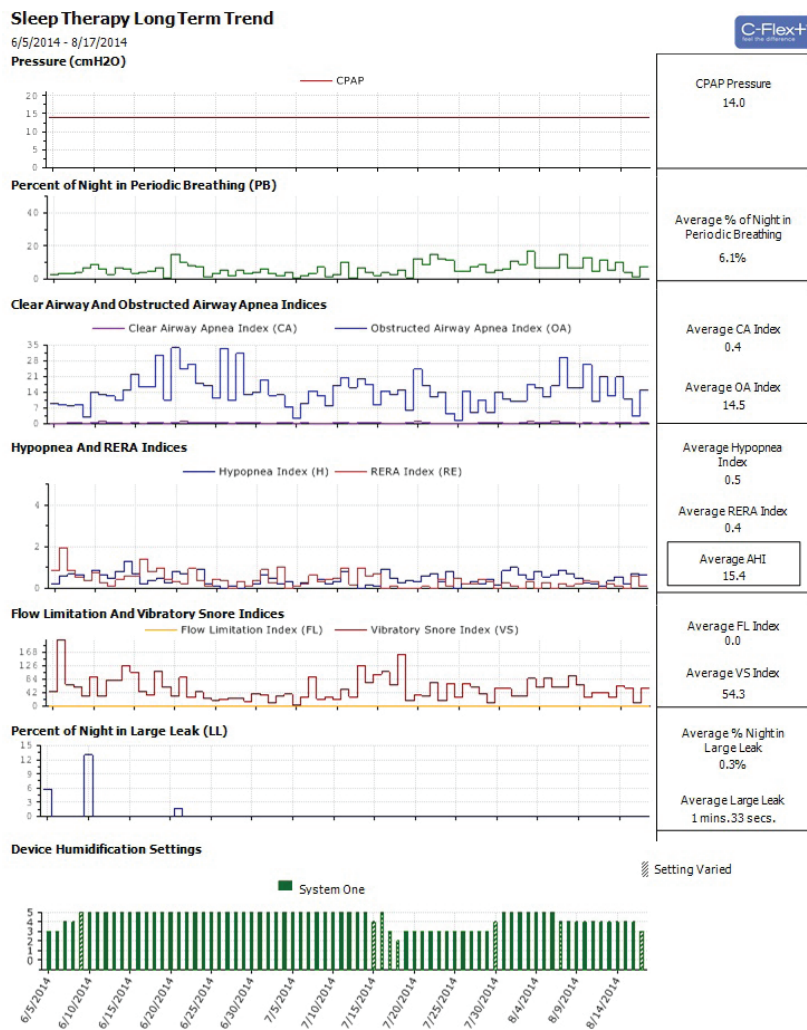C. Recommend changing to a full face mask.
D. Increase CPAP pressure to 16 cm H_2O.

Figure 19-A CPAP download data.