

**CPAP TITRATION REPORT**

<b>Patient Name:</b>	Tanner, Michael	<b>Study Date:</b>	9/6/2021
<b>Sex:</b>	Male	<b>Subject Code:</b>	Rm 4
<b>Date of Birth:</b>	1/2/1954	<b>Age:</b>	67
<b>Height:</b>	72.0 in	<b>Referring Physician:</b>	Joseph Krista MD
<b>Weight:</b>	160.0 lbs	<b>Sleep Specialist:</b>	Meer Ahmed, MD
<b>B.M.I:</b>	21.7	<b>Recorded by:</b>	Gloria Maness RPSGT
		<b>Scored by:</b>	Yuta Bogomolny,RPSGT

Michael Tanner, who is a 67 year-old male patient, was evaluated for sleep related breathing disorders in an all-night polysomnogram on 9/6/2021. The patient has been told that he stops breathing at night.

**PAST MEDICAL HISTORY:** Not indicated.

**PAST SURGICAL HISTORY:** Patient has had: appendectomy.

**MEDICATION:** Patient's current medications include: Nexium

**EPWORTH SLEEPINESS SCALE:** Patients Epworth sleepiness scale score was 1 Values > 9 is suggestive of excessive daytime sleepiness).

**STUDY PARAMETERS:** The study was performed with a sleep technologist in attendance for the entire test period. Video monitoring was carried out throughout the study, and the patient's clinical testing parameters according to laboratory protocol including EEG, EOG, EMG, EKG, NASAL PRESSURE (AIRFLOW), PULSE OXIMETRY AND CHEST AND ABDOMINAL EFFORT BELTS.

**SLEEP ARCHITECTURE & STAGING:** Testing began at 10:26:55 PM and ended at 5:10:38 AM, for a total recording time (TRT) of 403.7 minutes. The sleep period lasted 392.3 minutes and the total sleep time (TST) was 269.5 minutes, which resulted in a sleep efficiency (TST÷TRT) of 66.8%. The sleep latency (SL) was 11.4 minutes, and the latency to the first occurrence of Stage R was 86.0 minutes. There were 2 Stage R periods observed on this study night, 11 awakenings (i.e. transitions to Stage W from any sleep stage), and 36 total stage transitions.

Wake after sleep onset (WASO) time accounted for 122.8 minutes, while the time spent in each sleep stage was 7.5 minutes (Stage N1); 174.5 minutes (Stage N2); 40.5 minutes (Stage N3); and 47.0 minutes (Stage R). The percentage of Total Sleep Time in each stage was: 2.8% (Stage N1); 64.7% (Stage N2); 15.0% (Stage N3); and 17.4% (Stage R).

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**RESPIRATORY:** The patient experienced 7 apneas in total. Of these, 7 were identified as obstructive apneas, 0 were mixed apneas, and 0 were central apneas. This resulted in an apnea index (AI) of 1.6 apneas/hour of sleep. The patient experienced 35 hypopneas in total, which resulted in a hypopnea index (HI) of 7.8 hypopneas/hr. The overall apnea-hypopnea index (AHI) was 9.4 events/hr, while the AHI during Stage R sleep was 17.9 /hr. AHI results by body-position showed: supine AHI = 9.2 /hr; right-side AHI = N/A /hr; left-side AHI = N/A /hr; and prone AHI = N/A /hr.

For other respiratory disturbances, there were 0 occurrences of Cheyne Stokes breathing, and 0 respiratory effort-related arousals (RERAs). The RERA index was 0.0 events/hr, and the total respiratory disturbance index was 9.4 events/hr.

**OXIMETRY:** Analysis of continuous oxygen saturations showed a mean SpO<sub>2</sub> value of 95.4% throughout the study, with a minimum oxygen saturation during sleep of 84.0% and a mean value of 95.0% for the same period. Oxygen saturations were below ≤ 88% for 2.2 minutes of the time spent asleep.

**AROUSAL:** The patient experienced 6 arousals in total (time in bed), for an arousal index of 1.3 arousals/hour. Of these, 1 were identified as respiratory-related arousals (0.2 /hr), 0 were PLM-related arousals (0.0 /hr), and 5 were spontaneous (1.1 /hr) --- the result of no identifying cause.

**CARDIAC:** Analysis of electrocardiogram activity showed the highest heart rate during the recording was 93.0 beats per minute. The average heart rate during sleep was 63.2 bpm, while the highest heart rate for the same period was 86.0 bpm.

**LIMB MOVEMENTS:** There were a total of 0 periodic limb movements (PLMS) during sleep, of which 0 were PLMS arousals. This resulted in a PLMS index of 0.0/hr and a PLMS arousal index of 0.0/hr.

**CPAP TITRATION DATA:** Patient was started on CPAP @ 4 cm H<sub>2</sub>O and increased as high as 13cm H<sub>2</sub>O to eliminate events and snoring. At a pressure of 13cm H<sub>2</sub>O almost all events were eliminated. AHI before CPAP was 38.4/hr. AHI at final pressure of 13 cm H<sub>2</sub>O was 2.6/hr. Over all, patient did well on CPAP @ 13cm H<sub>2</sub>O utilizing a nasal mask with headgear and heated humidification.

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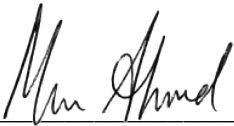
**PHYSICIAN INTERPRETATION**

**IMPRESSION, ICD 10 DIAGNOSIS**

Severe Obstructive Sleep Apnea (AHI 38.4 )(G 47.33)

**RECOMMENDATION:**

1. CPAP with pressure set at 13cm of H2O.
2. Patient should be advised against use of alcohol, sedatives, or narcotic medications due to their myorelaxant effects of the upper airway which could make sleep disordered breathing worse.
3. Patient should be advised against driving or operating heavy machinery if tired or until excessive daytime sleepiness is adequately treated.
4. Patient should be advised about proper sleep hygiene.
5. Avoid sleeping in the supine position unless using CPAP.
6. Suggested CPAP re-titration study if there is more than 10% change in body weight.
7. Follow up with physician to discuss findings.



Meer Ahmed, M.D.,  
Board Certified in Sleep Medicine

09/09/2021

Date

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<b>B.M.I.:</b>	21.7	<b>Scoring Tech:</b>	Yuta Bogomolny, RPGT
<b>Study Type:</b>	CPAP Titration		

**Channel information Chart**

Channel Input Label	Channel Name	Channel Type	Frequency
Right Leg (Amp 1)	Leg-R	Legs,Right	250
EKG (Amp 1)	EKG	EKG	250
Left Leg (Amp 1)	Leg-L	Legs,Left	250
Snore (Amp 1)	Snore Sensor	Snore,1	250
M1 (Amp 1)	M1	EEG,A1	250
C3 (Amp 1)	C3	EEG,C3	250
M2 (Amp 1)	M2	EEG,A2	250
C4 (Amp 1)	C4	EEG,C4	250
O2 (Amp 1)	O2	EEG,O2	250
E1 (Amp 1)	E1	Ocular,Left	250
E2 (Amp 1)	E2	Ocular,Right	250
O1 (Amp 1)	O1	EEG,O1	250
ChinA (Amp 1)	Chin-A	EMG,Base,1	250
ChinR (Amp 1)	Chin-R	EMG,Base,2	250
ChinL (Amp 1)	Chin-L	EMG,Base,3	250
F3 (Amp 1)	F3	EEG,F3	250
F4 (Amp 1)	F4	EEG,F4	250
Nasal Pressure (Amp 1)	Pressure	Nasal Canula	250
Snore_DR (Amp 1)	Snore DR	Snore,2	250
Thorax (Amp 1)	Thorax	Chest	50
Abdomen (Amp 1)	Abdomen	Abdomen	50
Thermistor (Amp 1)	Thermistor	AirFlow	50
Auxiliary 2 (Amp 1)	CPAP Pressure	CPAP (Pressure)	4
Auxiliary 8 (Amp 1)	CO2 Wave	EtCO2 Trend	25
Auxiliary 1 (Amp 1)	CPAP Flow	CPAP (Flow)	25
Auxiliary 3 (Amp 1)	CPAP Leak	CPAP (Leak)	25
Auxiliary 7 (Amp 1)	EtCO2	EtCO2	25
SpO2 (Amp 1)	SpO2	SaO2	10
Plethysmogram (Amp 1)	Pleth	Pleth	100
Pulse (Amp 1)	Pulse	Pulse	10

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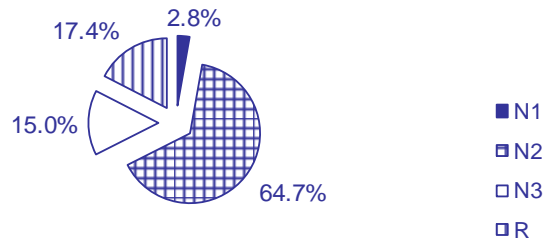
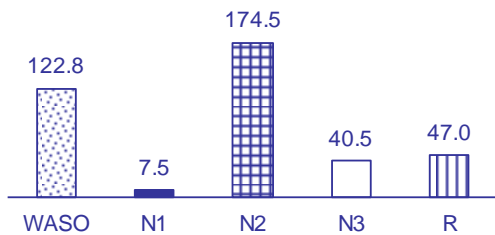
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**Sleep Architecture**

Lights out clock time (hr:min):	10:26:55 PM
Lights on clock time (hr:min):	5:10:38 AM
Total Recording Time (TRT; in min.):	403.7
Sleep Period Time (SPT; in min.):	392.3
Total Sleep Time (TST; in min.):	269.5
Sleep Efficiency:	66.8%
Sleep latency (SL; in min.):	11.4
Total Stage Changes (after sleep onset):	36
Awakenings (after sleep onset):	11
WASO (min.):	122.8
REM Periods:	2
REM Latency (in min.):	86.0
REM Latency (less Wake time; in min.):	68.0



Stage Distribution (in min.)

Sleep Stage (%TST)

Sleep Stage	Duration (Min)	% TST	Latency (min)
N1:	7.5	2.8%	0.0
N2:	174.5	64.7%	2.0
N3:	40.5	15.0%	82.0
R:	47.0	17.4%	86.0

Stage Latency = 0.0 denotes start of sleep.

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**Hypopnea with 3% Desaturation (AASM)**

RESPIRATORY EVENTS	Cen. Apnea	Obs. Apnea	Mxd. Apnea	Total Apnea	Cen. Hyp	Obs. Hyp	Mxd. Hyp	Hyp w/Ar	Total Hyp	Apnea + Hyp	Obs. A+H	Cen. A+H	RERA	RDI
Count:	0	7	0	7	0	35	0	0	35	42	42	0	0	42
Index (events / hr):	0.0	1.6	0.0	1.6	0.0	7.8	0.0	0.0	7.8	9.4	9.4	0.0	0.0	9.4
Mean Duration (s):	N/A	25.3	N/A	25.3	N/A	32.2	N/A	N/A	32.2	31.0	31.0	N/A	N/A	31.0
Longest Event (s):	N/A	29.0	N/A	29.0	N/A	61.5	N/A	N/A	61.5	61.5	61.5	N/A	N/A	61.5
REM Count:	0	4	0	4	0	10	0	0	10	14	14	0	0	14
Non-REM Count:	0	3	0	3	0	25	0	0	25	28	28	0	0	28
REM Index:	0.0	5.1	0.0	5.1	0.0	12.8	0.0	0.0	12.8	17.9	17.9	0.0	0.0	17.9
Non-REM Index:	0.0	0.8	0.0	0.8	0.0	6.7	0.0	0.0	6.7	7.6	7.6	0.0	0.0	7.6

RESPIRATORY EVENTS (by Body-Position)	Supine Count	Sleep Index	Prone Count	Sleep Index	Left-Side Count	Sleep Index	Right-Side Count	Sleep Index	Upright Count	Sleep Index
Duration (min):	268.8		0.0		0.0		0.0		0.0	
Obstructive Apneas:	7	1.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Central Apneas:	0	0.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mixed Apneas:	0	0.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hypopneas:	33	7.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RERAs:	0	0.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total*:	40	8.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

\* Note: Does not contain Cheyne Stokes Breathing, Hypoventilation, or Periodic Breathing.

OTHER RESPIRATORY	Count	Duration	Occurred
Hypoventilation:	0	0.0	NO
Cheyne-Stokes Breathing:	0	0.0	NO
Snore:	0	0.0	NO

Body Position	Duration (Min)	% TST
Supine:	268.8	99.7%
Prone:	0.0	0.0%
Left:	0.0	0.0%
Right:	0.0	0.0%
Upright:	0.0	0.0%

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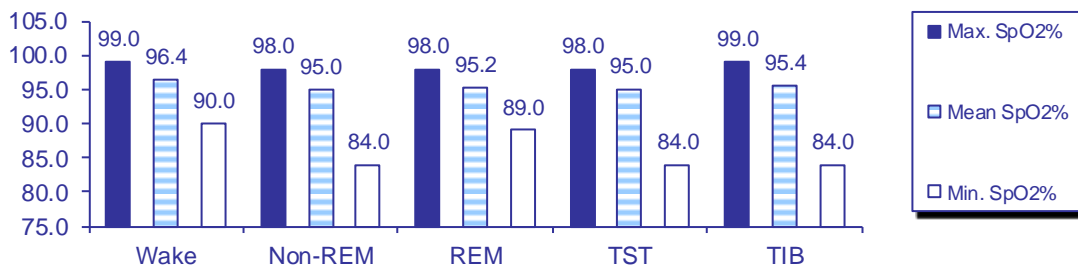
<b>AROUSALS</b>	<b>Resp. Count</b>	<b>Resp. Index</b>	<b>Spontaneous Count*</b>	<b>Spontaneous Index*</b>	<b>Total Count</b>	<b>Total Index</b>	<b>Index (TIB)</b>
**Total Arousals:	1	0.2	5	1.1	6	1.3	0.9
Non-REM	1	0.3	3	0.8	4	1.1	-
REM:	0	0.0	0	0.0	0	0.0	-
Wake:	0	0.0	2	1.0	2	1.0	-

\* EEG Arousal activity not associated with Respiratory or PLM events.

\*\* Includes Wake. Index based on Total Sleep Time (except last column based on time in bed).

<b>LIMB MOVEMENTS (by sleep stage)</b>	<b>LM w/ Arousals</b>		<b>LM w/o Arousals</b>		<b>Total LMs</b>		<b>PLM Series</b>	
	Count	Index	Count	Index	Count	Index	Count	Index
Total Sleep Time:	0	0.0	0	0.0	0	0.0	0	0.0
N1:	0	0.0	0	0.0	0	0.0	0	0.0
N2:	0	0.0	0	0.0	0	0.0	0	0.0
N3:	0	0.0	0	0.0	0	0.0	0	0.0
REM:	0	0.0	0	0.0	0	0.0	0	0.0

<b>OXYGEN DESATURATION EVENTS</b>	<b>Count</b>	<b>Index</b>
Total Recording Time:	39	5.8
Total Sleep Time:	39	8.7
Wake (after sleep onset):	0	0.0
Non-REM:	25	6.7
REM:	14	17.9



**Oximetry Trend Graph**

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<b>OXYGEN SATURATION</b>	<b>Wake</b>	<b>Non-REM</b>	<b>REM</b>	<b>TST</b>	<b>TIB</b>
Max. SpO2%:	99.0	98.0	98.0	98.0	99.0
Mean SpO2%:	96.4	95.0	95.2	95.0	95.4
Min. SpO2%:	90.0	84.0	89.0	84.0	84.0
SpO2% <= 88% (min.)	0.0	2.2	0.0	2.2	2.2
<b>% Time in range</b>					
90 – 100%:	95.7%	98.3%	97.8%	98.2%	97.4%
80 – 89%:	0.1%	1.7%	2.2%	1.8%	1.2%
70 – 79%:	0.0%	0.0%	0.0%	0.0%	0.0%
60 – 69%:	0.0%	0.0%	0.0%	0.0%	0.0%
50 – 59%:	0.0%	0.0%	0.0%	0.0%	0.0%
< 50%:	0.0%	0.0%	0.0%	0.0%	0.0%
<b>% Artifact / Bad Data:</b>	<b>4.1%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>1.4%</b>

<b>HEART RATE</b>	<b>Wake</b>	<b>Non-REM</b>	<b>REM</b>	<b>TST</b>	<b>TIB</b>
Max. HR (bpm):	148.5	122.0	118.1	122.0	148.5
Mean HR (bpm):	67.1	62.6	64.7	63.0	64.3
Min. HR (bpm):	0.0	35.5	36.8	35.5	0.0

<b>CARDIAC EVENTS</b>	<b>Brady.</b>	<b>Asystole</b>	<b>Tachy.</b>	<b>Narrow Complex Tachy.</b>	<b>Wide Complex Tachy.</b>	<b>Atrial Fibrillation</b>	<b>Accel.</b>	<b>Decel.</b>
Count:	0	0	0	0	0	0	0	0
Shortest Event (min:sec):	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Longest Event (min:sec):	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sum Duration (min:sec):	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
Absolute Max. Rate (bpm):	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Absolute Min. Rate (bpm):	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A



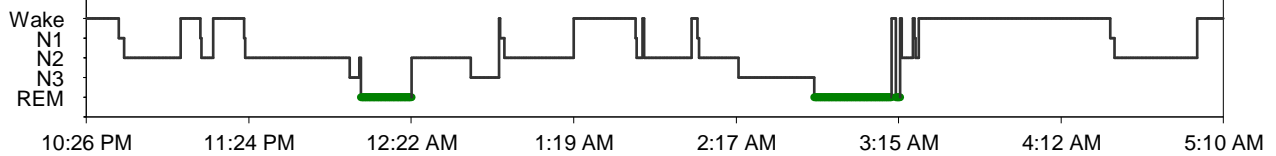
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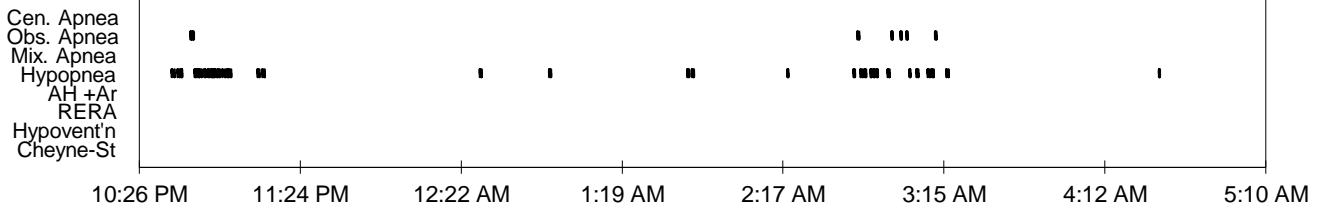
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**Hypnogram**



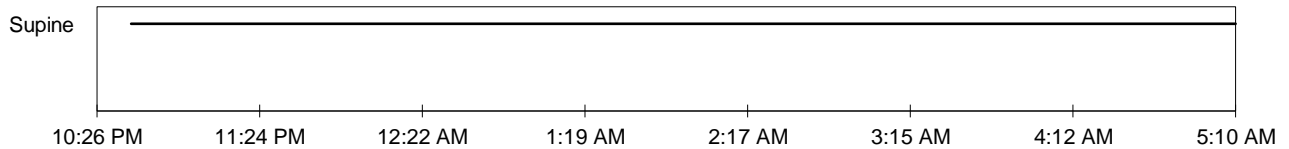
**Respiratory Events**



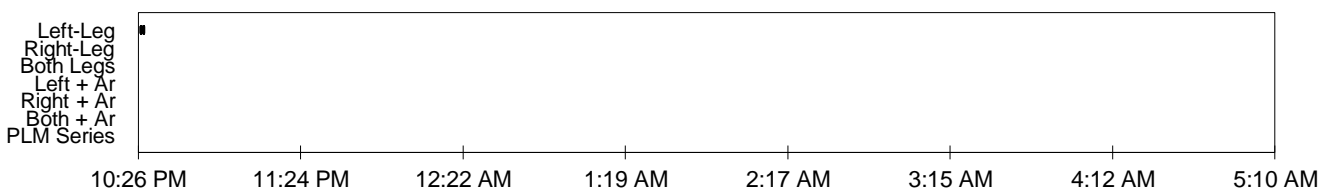
**SpO2%**



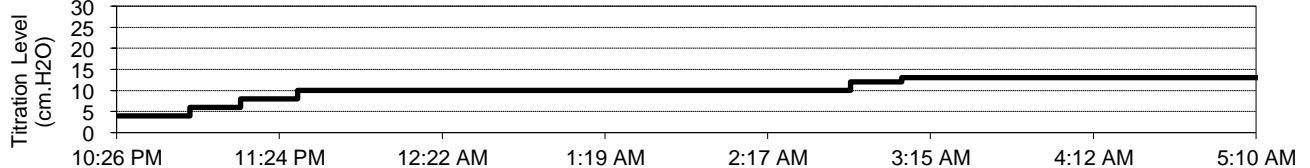
**Body Position**



**Limb Movement Events**



**CPAP / BiLevel & BiLevel AC (IPAP / EPAP) / APAP / ASV / VAUTO**



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**Therapy Device Titration Chart**

Treatment Level (cm. H2O)	TIME			(AASM) APNEA & RERA				AASM 3% Desat			CMS 4% Desat			OXIMETRY		
	TIB	REM	Non-REM	Obs. Apnea	Cen. Apnea	Mixed Apnea	RERA	Total Hyp	AHI	RDI	Total Hyp	AHI	RDI	Below 88%	Min. SpO2%	Mean SpO2%
CPAP 4	0:25:29	0:00:00	0:14:36	2	0	0	0	9	45.2	45.2	6	32.9	32.9	0.6	85.0	93.7
CPAP 6	0:17:48	0:00:00	0:10:48	0	0	0	0	7	38.9	38.9	6	33.3	33.3	1.3	85.0	92.8
CPAP 8	0:20:21	0:00:00	0:09:21	0	0	0	0	1	6.4	6.4	0	0.0	0.0	0.1	84.0	94.5
CPAP 10	3:15:51	0:19:35	2:31:15	1	0	0	0	7	2.8	2.8	2	1.1	1.1	0.2	88.0	95.3
CPAP 12	0:18:09	0:18:09	0:00:00	3	0	0	0	6	29.8	29.8	2	16.5	16.5	0.0	89.0	94.5
CPAP 13	2:05:33	0:09:16	0:36:30	1	0	0	0	5	7.9	7.9	1	2.6	2.6	0.0	92.0	95.2

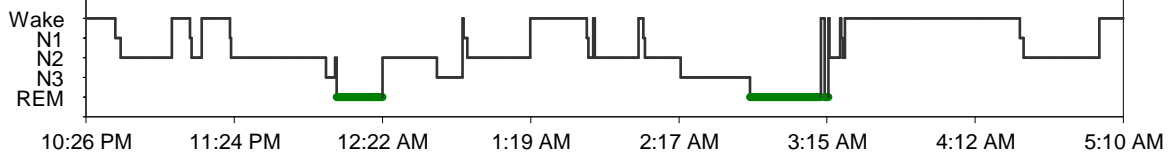
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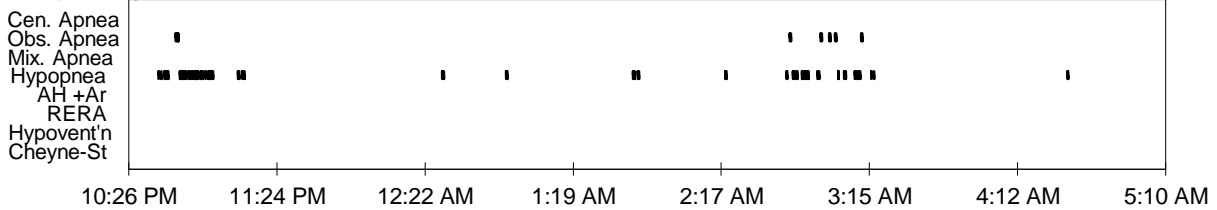
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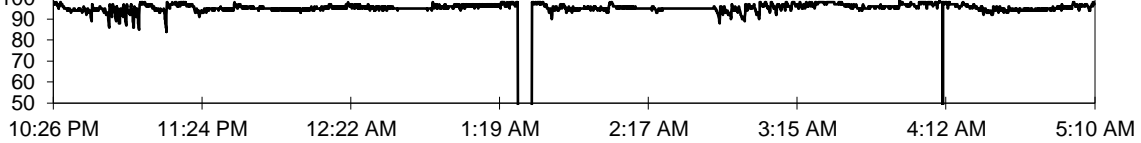
**Hypnogram**



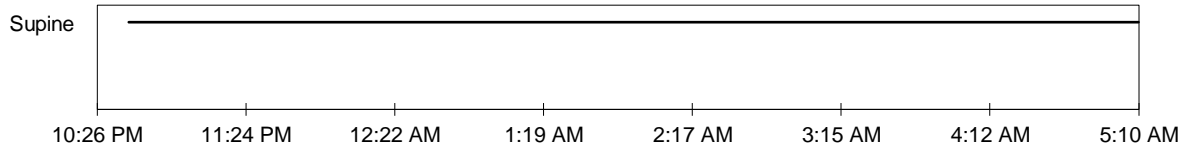
**Respiratory Events**



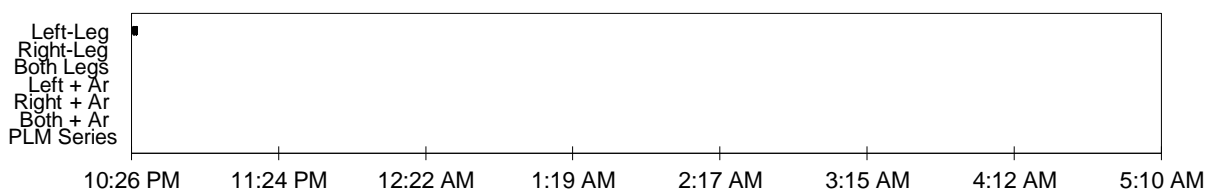
**SpO2%**



**Body Position**



**Limb Movement Events**



**CPAP / BiLevel & BiLevel AC (IPAP / EPAP) / APAP / ASV / VAUTO**

