Home Sleep Testing Made Simple
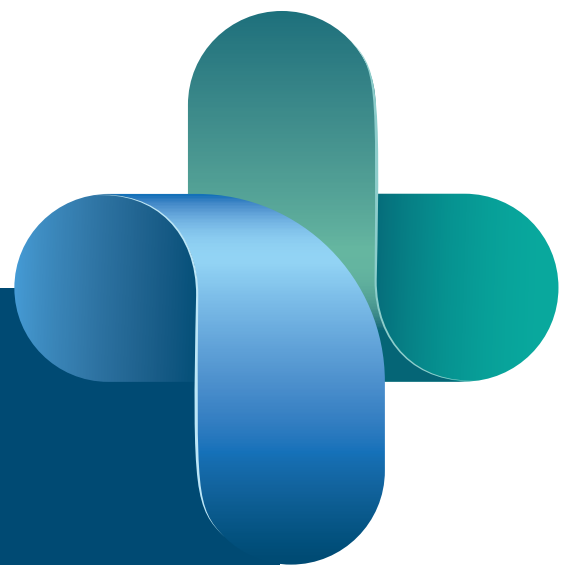
WatchPAT™

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Made Simple

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✚ Complete Sleep Architecture

The WatchPAT advanced zzzPAT software provides a clinically validated algorithm that measures all sleep stages: light, deep, and REM sleep[3-6].
The Complete Sleep Architecture provides information on sleep quality including sleep efficiency, sleep latency and REM latency. It also provides added value of detecting REM related sleep apnea with REM and non-REM AHI. REM sleep is associated with considerable attenuation of the PAT signal coupled with specific variations in the PAT amplitude and pulse rate. Based on this specific variability in the PAT and pulse rate signals, REM sleep stage differs from non-REM sleep stages.

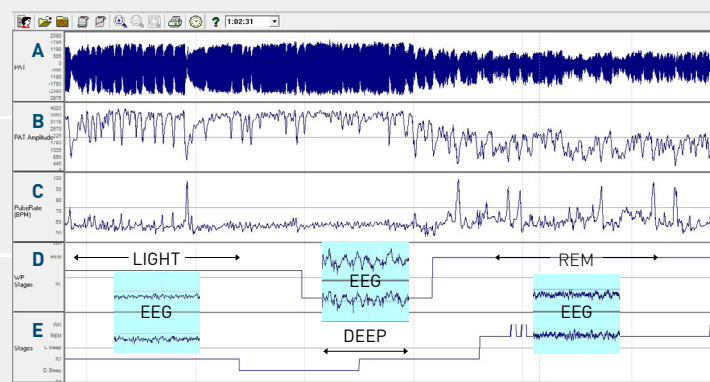## Sleep stages on WatchPAT report vs. PSG-EEG channel

Light sleep

High PAT amplitude variability, high pulse rate variability

Deep sleep

Low PAT amplitude variability, low pulse rate variability

REM sleep

Very high PAT amplitude variability, very high pulse rate variability, attenuated PAT amplitude

✚ True Sleep Time™

While most HST devices calculate AHI based on total recording time, which has shown to lead to a misdiagnosis and misclassification in up to 20%[7] of patients tested, WatchPAT calculates AHI based on the patient's True Sleep Time (TST). Undiluted respiratory events enable the WatchPAT to perform a more sensitive and accurate diagnosis.

Sleep Summary	
Start Study Time:	9:43:01PM
End Study Time:	6:04:59AM
Total Study Time:	8 hrs, 21 min
Sleep Time	**6 hrs, 7 min**
% REM of Sleep Time:	21.4 hrs

True Sleep Time improves the accuracy of the respiratory indices, test sensitivity and specificity.

✚ Understanding The Sleep Study

Sleep Study Report

Sleep Summary
- Recording start and end time
- Total recording time and total sleep time

Respiratory Indices
- pRDI – PAT respiratory disturbance index
- pAHI – PAT apnea and hypopnea index
- ODI – oxygen desaturation index

Oxygen and Pulse Information
- Oxygen saturation statistics
- Oxygen desaturation %
- Oxygen desaturation
- Pulse rate statistics

Hypnogram
- All respiratory events
- Snore / Body position
- Oxygen / Pulse rate
- Sleep stages

Sleep Summary

Start Study Time:	11:09:35PM
End Study Time:	5:48:33AM
Total Study Time:	6 hrs, 38 min
Sleep Time	**4 hrs, 50 min**
% REM of Sleep Time:	14.4

Respiratory Indices

	REM	NREM	All Night
pRDI:	47.1	22.0	**25.6**
pAHI:	47.1	14.0	**18.8**
ODI:	35.7	7.5	**11.6**

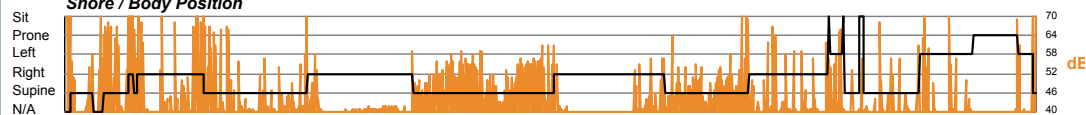*Indices are calculated using valid sleep time of 4 hrs, 50 min.*
pRDI/pAHI are calculated using oxi desaturations ≥ 3%

Oxygen Saturation Statistics
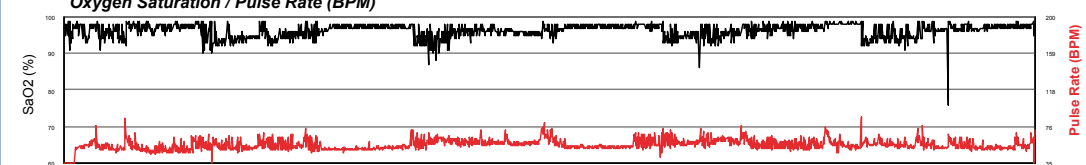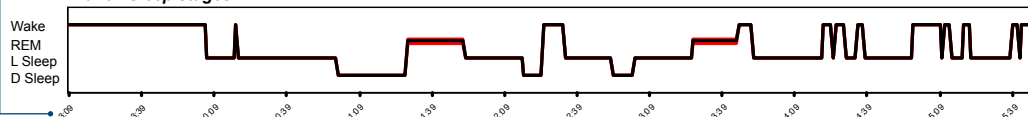
Mean:	96	Minimum:	86	Maximum:	99
Mean of Desaturations Nadirs (%):					93

Oxygen Desatur. %:	4-9	10-20	>20	Total
Events Number	55	1	0	56
Total	98.2	1.8	0.0	100.0

Oxygen Saturation	<90	<88	<85	<80	<70
Duration (minutes):	0.8	0.3	0.0	0.0	0.0
Sleep %	0.3	0.1	0.0	0.0	0.0

Pulse Rate Statistics during Sleep (BPM)

Mean:	55	Minimum:	N/A	Maximum:	75

PAT Respiratory Events

Snore / Body Position

Sit / Prone / Left / Right / Supine / N/A

70 64 58 52 46 40 — dE

Oxygen Saturation / Pulse Rate (BPM)

SaO2 (%) — Pulse Rate (BPM)

Wake / Sleep stages

Wake / REM / L Sleep / D Sleep

23:09 23:38 00:09 00:39 01:09 01:39 02:09 02:39 03:09 03:39 04:09 04:39 05:09 05:39

Sleep Study Report

Body Position Statistics

Position	Supine	Prone	Right	Left
Sleep (min)	150.3	17.0	114.7	9.0
Sleep %	51.7	5.8	39.4	3.1
pRDI	33.6	0.0	19.4	N/A
pAHI	28.8	0.0	10.0	N/A
ODI	18.4	0.0	5.2	N/A

Snoring Statistics

Snoring Level (dB)	>40	>50	>60	>70	>80	>Threshold (45)	Mean:	42 dB
Sleep (min)	95.5	21.3	1.5	0.0	0.0	39.8		
Sleep %	32.8	7.3	0.5	0.0	0.0	13.7		

Sleep Stages Chart

Sleep/Wake States

Wake 27.07%
Sleep 72.93%
Total: 100.00%

Sleep Stages

REM 14.43%
Light 68.89%
Deep 16.67%
Total: 100.00%

Sleep Latency (min): 56
REM Latency (min): 83
Number of Wakes: 12

Respiratory Indices Chart

pRDI 25.62 — 124
pAHI 18.80 — 91
ODI 11.57 — 56

Total Events

pAHI=18.8

Mild | Moderate | Severe
5 | 15 | 30

* Reference values are according to AASM guidelines

- Body Position and Snoring Statistics

- Sleep Stage Information
- Sleep Efficiency, Sleep Latencies and Sleep Stage Percentages
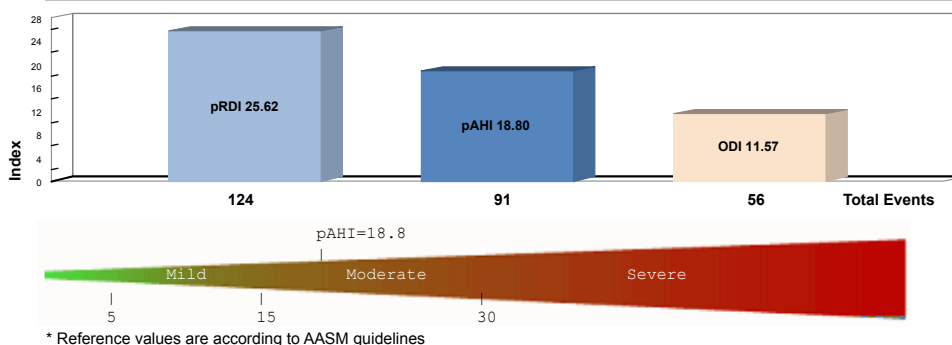
- Respiratory Indices Graph

"The WatchPAT has proven to be a useful tool in our home sleep testing program. Patient set-up and teaching is straightforward and data failure rates are low. More recently, we have utilized these devices in our telemedicine program, allowing many Veterans far from our medical center to be diagnosed for sleep apnea.

Barry G. Fields, MD, MSEd Sleep Medicine Atlanta VA Sleep Medicine Center

✚ PAT Signal Explained

The proprietary PAT signal is a non-invasive measure of the arterial pulsatile volume changes at the fingertip. PAT signal is a surrogate of changes in the sympathetic nervous system that are associated with Sleep Disordered Breathing (SDB) events and specific "signatures" of sleep stages. In addition, the WatchPAT has an embedded advanced actigraphy that when coupled with PAT signal enables the separation between sleep and wake periods and thus provides accurate True Sleep Time.

PAT signal attenuation, and accelerated pulse rate, directly reflect immediate digital arteries vasoconstriction and increased heart rate both of which are direct indicators of arousals and micro-arousals that are part of the SDB underlying mechanism and present in each such event.

When further enhanced with oxygen blood desaturations and resaturations measured with the embedded pulse oximeter sensor, the proprietary algorithm accurately calculates the SDB clinical parameters such as AHI, RDI and ODI that utilize True Sleep time and Complete Sleep Architecture (Deep, Light and REM), providing the physician with a full comprehensive assessment of the patient. [1,6]
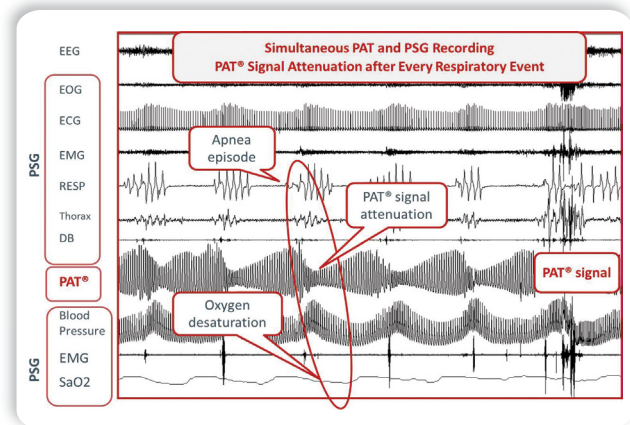
✚ The zzzPAT® Software

The zzzPAT is a proprietary user friendly software used for the analysis of the WatchPAT data. The software's advanced algorithm is automatic, eliminating the need for scoring of respiratory events. If needed, the software also enables manual scoring for compliance with AASM standards.

The complete report of the study is generated within minutes after downloading the study data allowing patients to initiate treatment without delay.

✚ CloudPAT® Platform

CloudPAT is a HIPAA-compliant cloud based IT solution enabling interpretation services by a Board-Certified physician licensed in your state with a guaranteed turnaround of a signed diagnostic sleep study within two business days. This optional platform makes sleep diagnostics easier and more convenient and offers physicians the ability to access patients data anywhere, anytime, from any terminal.
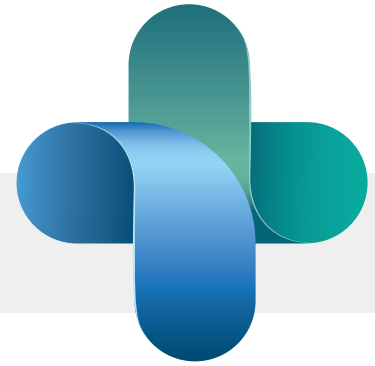

Upload sleep data from sleep study on secure CloudPAT site

Study interpretated by board certified sleep physcian

Signed sleep study is returned within 2 business days

WatchPAT™

WatchPAT is an innovative FDA-cleared wrist mounted device for diagnosis of Sleep Breathing Disorders (SBD), specifically Obstructive Sleep Apnea (OSA). It is a small wrist mounted device which allows testing in the comfort of the patient's own home.

WatchPAT has been clinically validated against the "Gold Standard", polysomnography (PSG), with a documented correlation of up to 89% to PSG.[1]

- **Simple and comfortable** for outstanding patient compliance
- **Clinically reliable** with less than 1% failure rate[2]
- **"True Sleep Time™"** for the most accurate AHI
- **Complete sleep architecture** for a comprehensive diagnosis
- **Scalable cost effective solution** for high volume workflow
- **Automatically generated report** for fast diagnosis and treatment turnaround
- **zzzPAT™ software with an advanced automatic algorithm** for scoring of respiratory events
- **CloudPAT™ cloud based IT solution** for convenient sleep diagnosis and secure patient data transfers

✚ Simple, Accurate and Reliable

WatchPAT is worn like a watch on the patient's wrist with a single biosensor mounted on the finger. Patients wear WatchPAT at night in the privacy of their own bedroom, ensuring optimal representation of the sleep environment.

WatchPAT's Clinical Parameters:

AHI	Wake / Sleep Detection
Apnea / Hypopnea Index	True Sleep Time
	REM / Deep / Light Sleep Stages
ODI	Complete Sleep Architecture
Oxygen Desaturation Index	**Body Position**
RDI	
Respiratory Disturbance Index	**Snoring**

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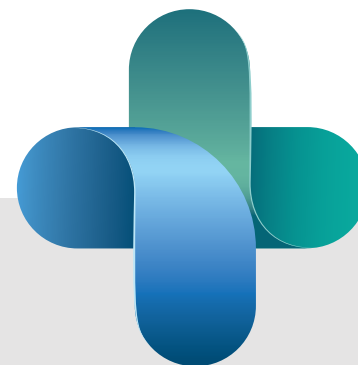
Itamar Medical is a leading medical device company that develops, manufactures and markets diagnostic products based on its proprietary PAT® technology which provides an innovative solution to diagnosing Sleep Breathing Disorders. The company has pioneered an approach offering solutions to practices for complete sleep apnea management and optimal patient care. Itamar's solutions include the products, education and services.

Itamar Medical has offices and distribution channels around the world.

[1] Yalamanchali S, Farajian V, Hamilton C, Pott TR, Samuelson CG, Friedman M. Diagnosis of obstructive sleep apnea by peripheral arterial tonometry: meta-analysis. JAMA Otolaryngol Head Neck Surg. December 2013;139(12):1343-1350

[2] Data on file

[3] Hedner J. et al. A Novel Adaptive Wrist Actigraphy Algorithm for Sleep-Wake Assessment in Sleep Apnea Patients. SLEEP, Vol. 27, No. 8, 2004 :1560-1566

[4] Hersocivi S. et al. Detecting REM sleep from the finger: an automatic REM sleep algorithm based on peripheral arterial tone (PAT) and Actigraphy. Physiol Meas. 2007 Feb;28(2):129-40. Epub 2006 Dec 12.

[5] Bresler M. et al. Differentiating between light and deep sleep stages using an ambulatory device based on peripheral arterial tonometry. Physiol Meas. 2008 May;29(5):571-84.Epub 2008 May 7

[6] Hedner J. et al. Sleep Staging Based on Automimcal Signals: A Multi-Center Validation Study. JCSM. Journal of Sleep Medicine, Vol. 7, No. 3, 2011: 301 - 306

[7] Comparison of AHI using recording time versus sleep time Schutte – Rodin et al., J Sleep Abs supl 2014, p. A373

REF OM198680 Edition 3