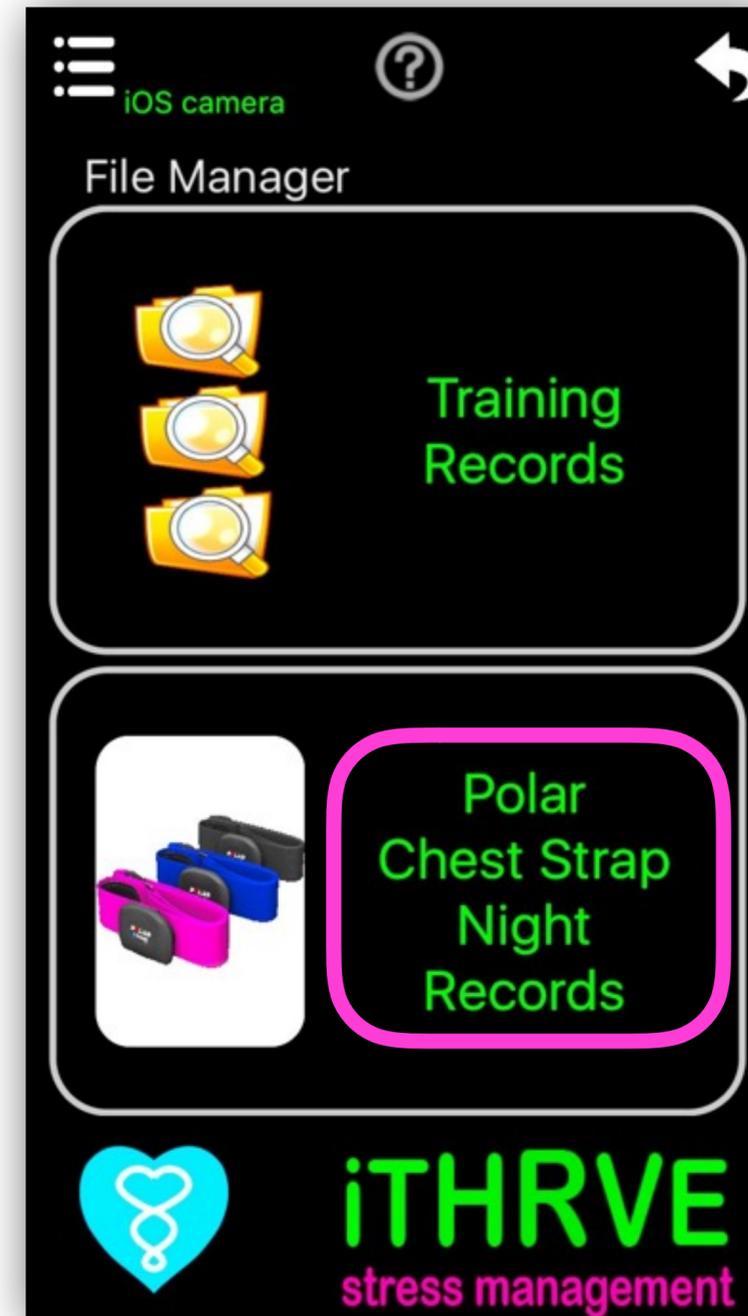
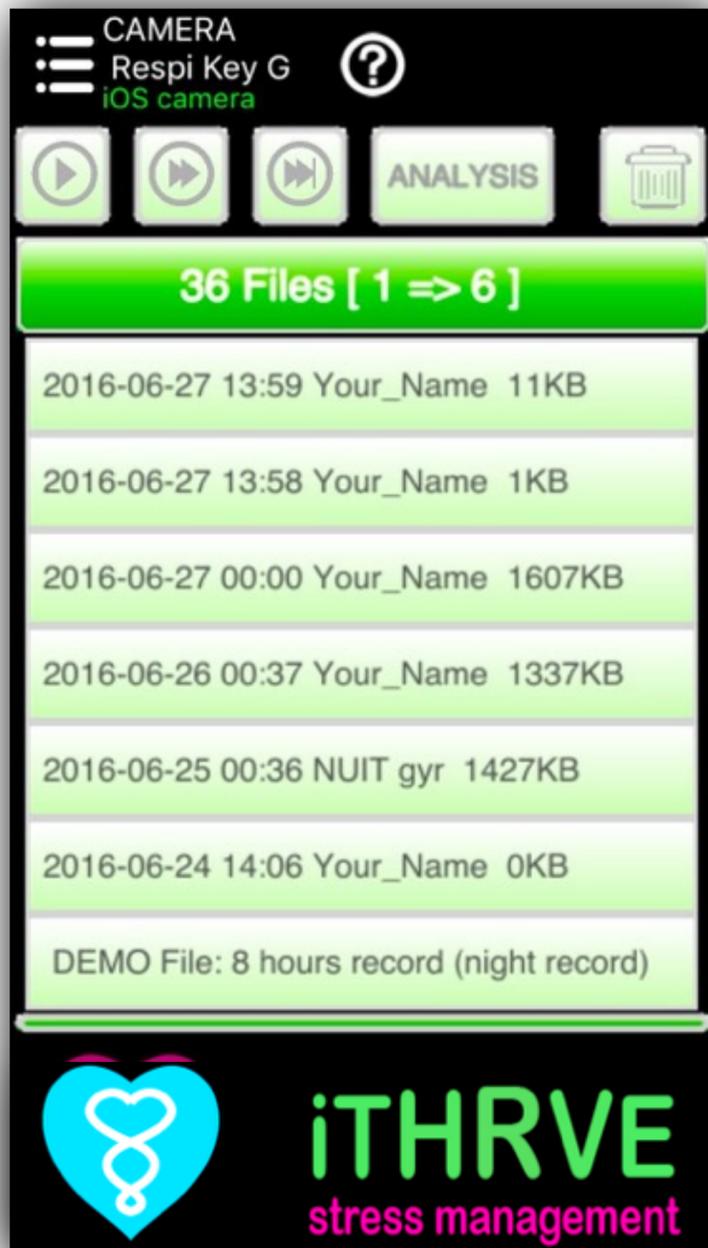


To Compute
the
Playback

GRAPH
Analysis

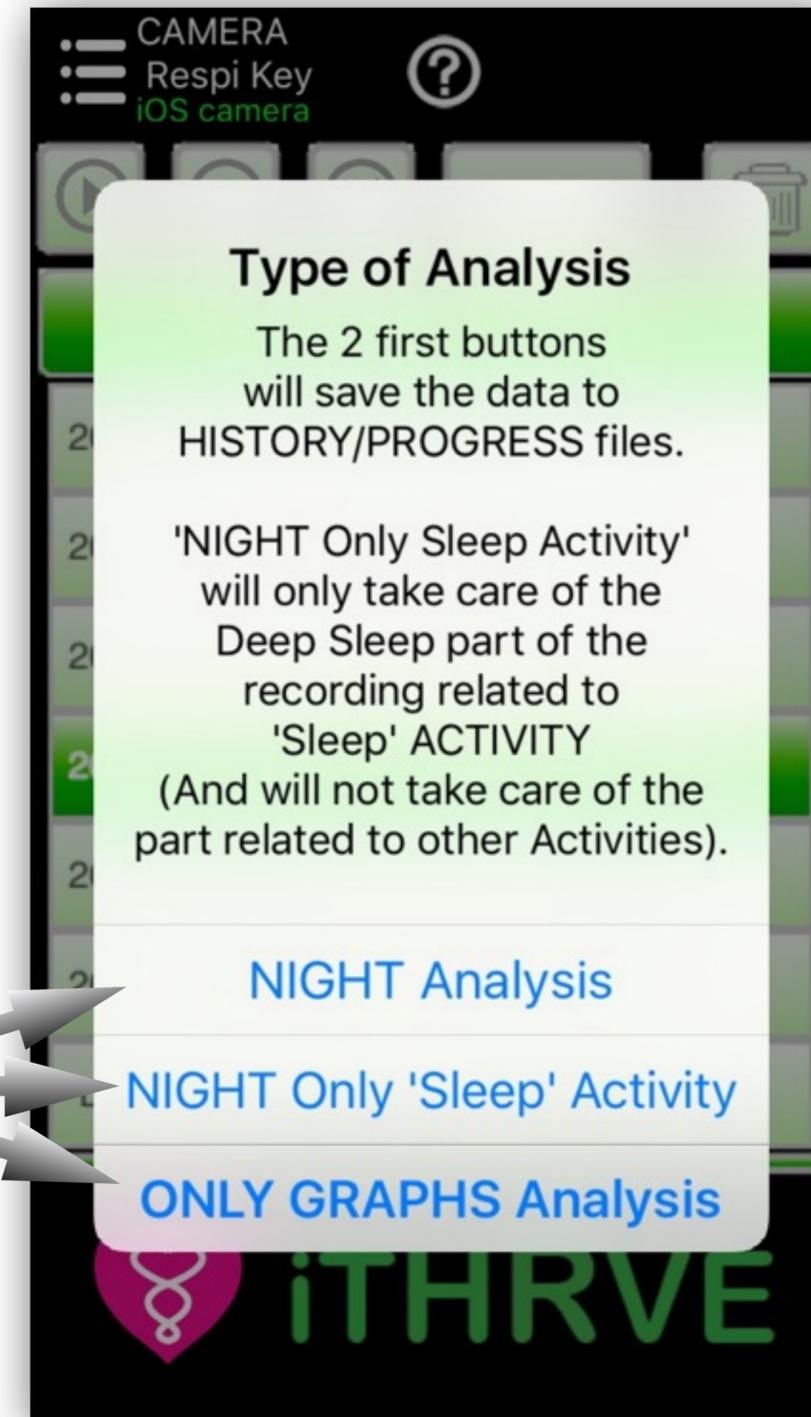
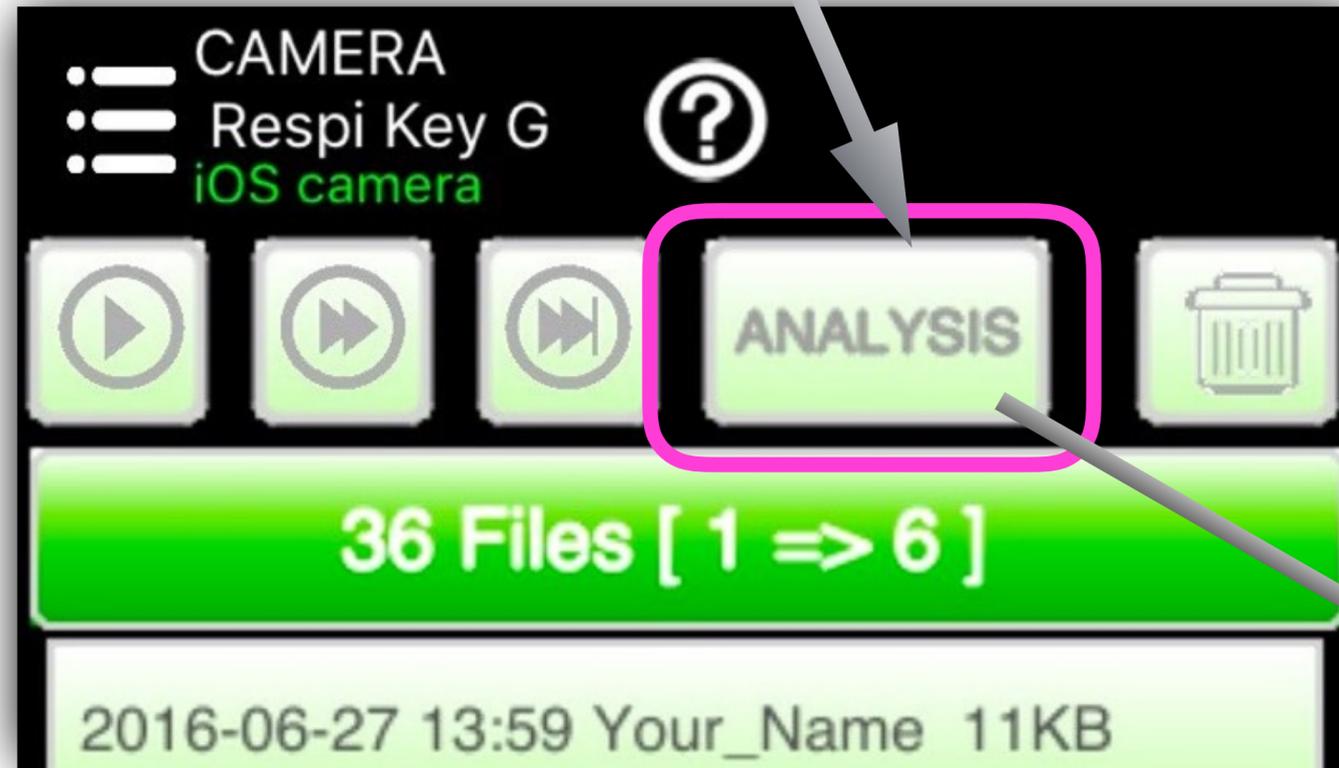


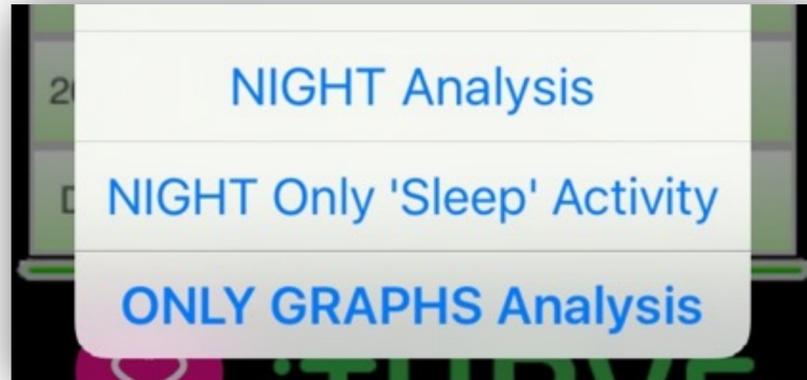


Select
a file



Select Analysis



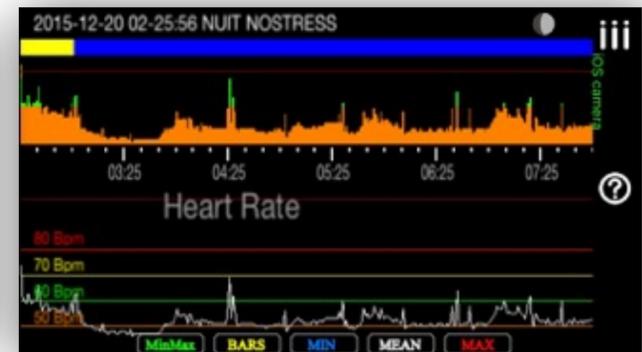
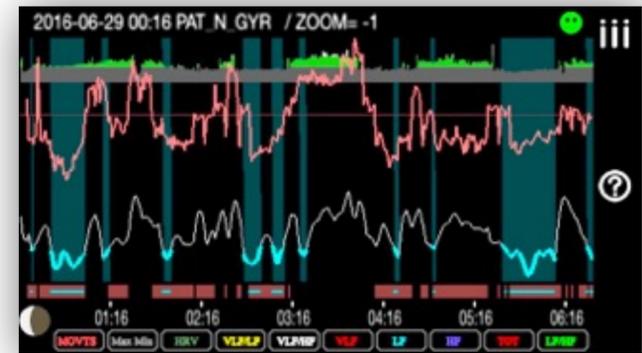
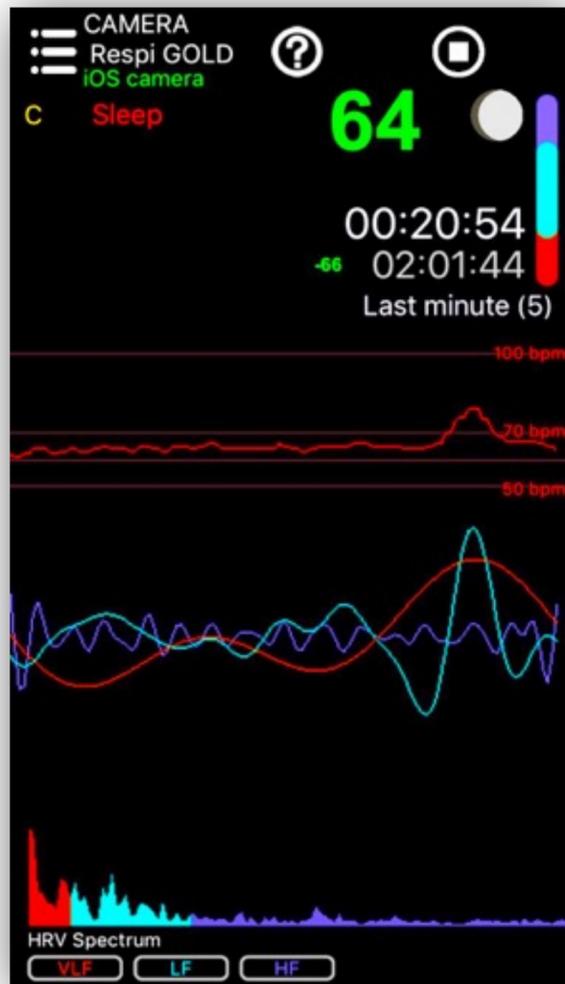
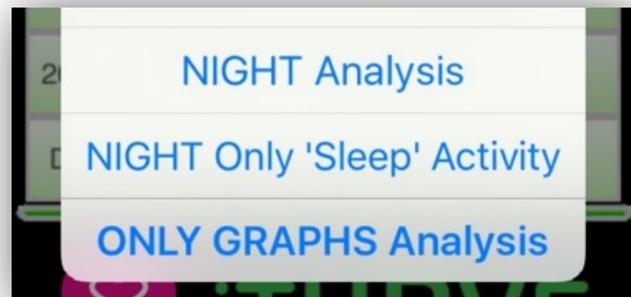


« ***NIGHT Analysis*** » & « ***NIGHT Only 'Sleep' Activity*** »
will save data and update HISTORY/PROGRESS files.

« ***NIGHT Only 'Sleep' Activity*** »
will only take care of the Deep Sleep data of the recording related to 'Sleep' Activity.
(Do not select this option if you forgot to select activities during recording).

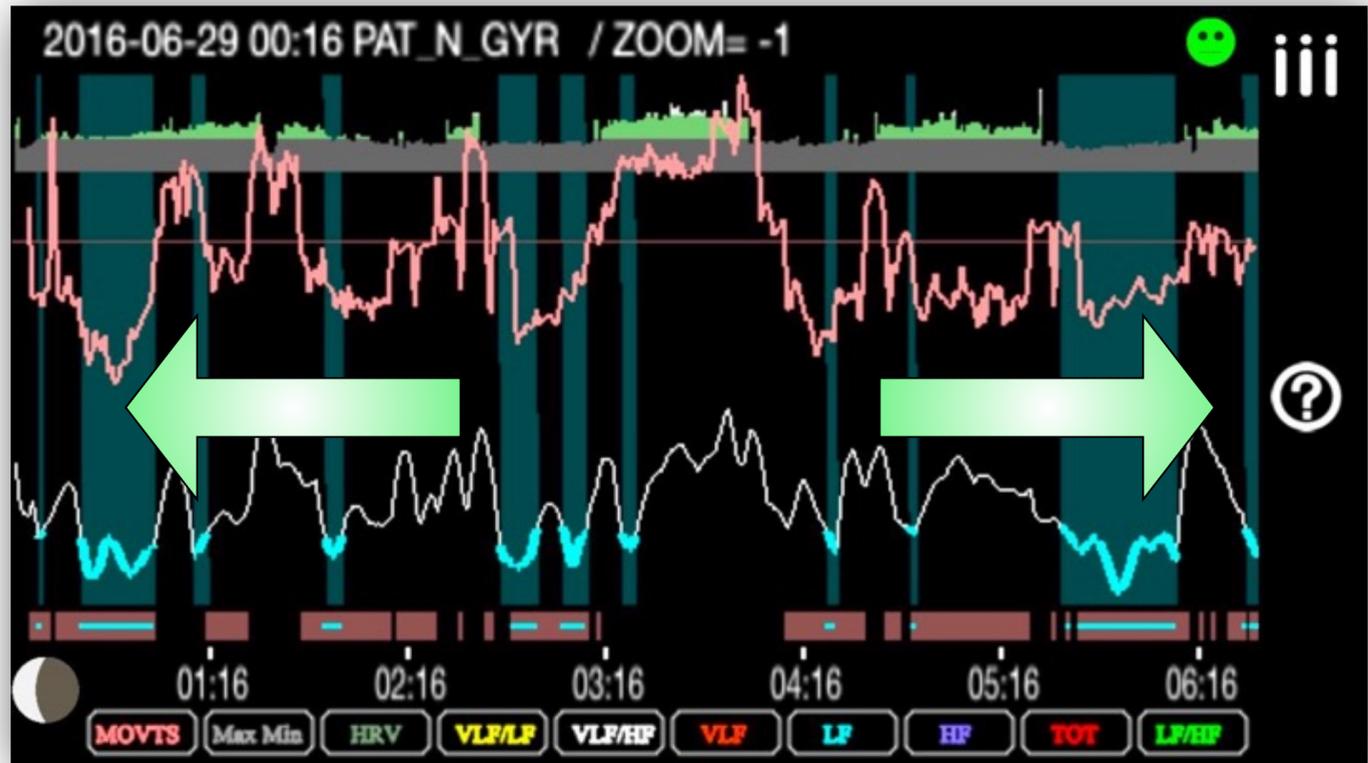
« ***ONLY GRAPHS Analysis*** »
will only compute the graph analysis and save the data in the File Manager.

If you do not SAVE the current analysis, you will have access to the graphs only ones
and can not recover them later from the File Manager

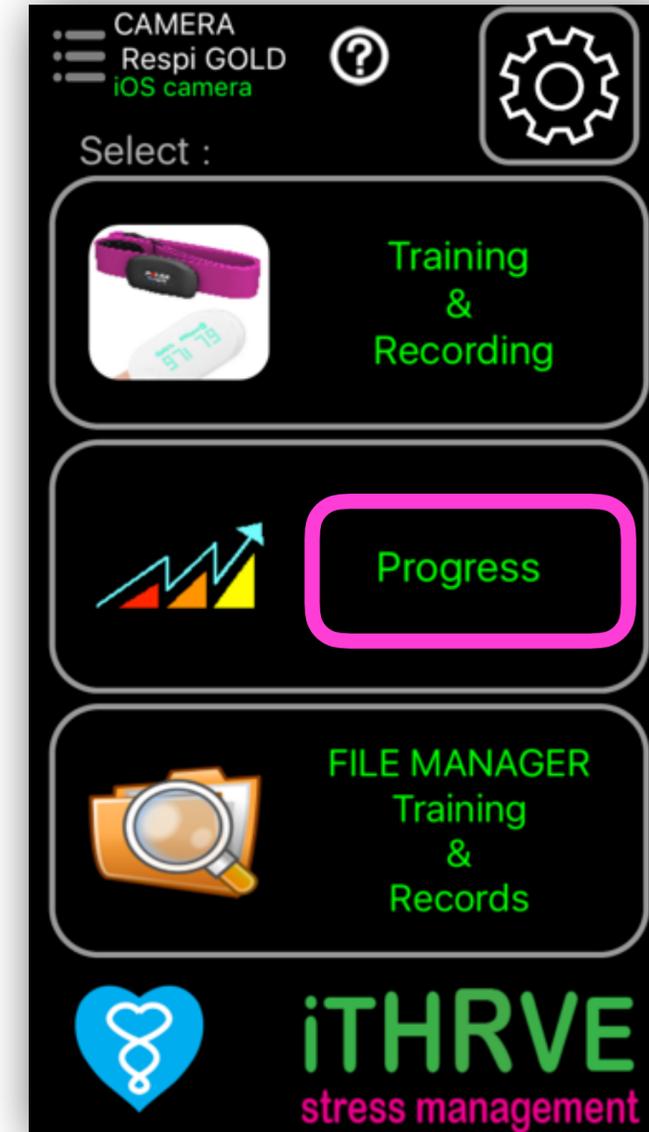
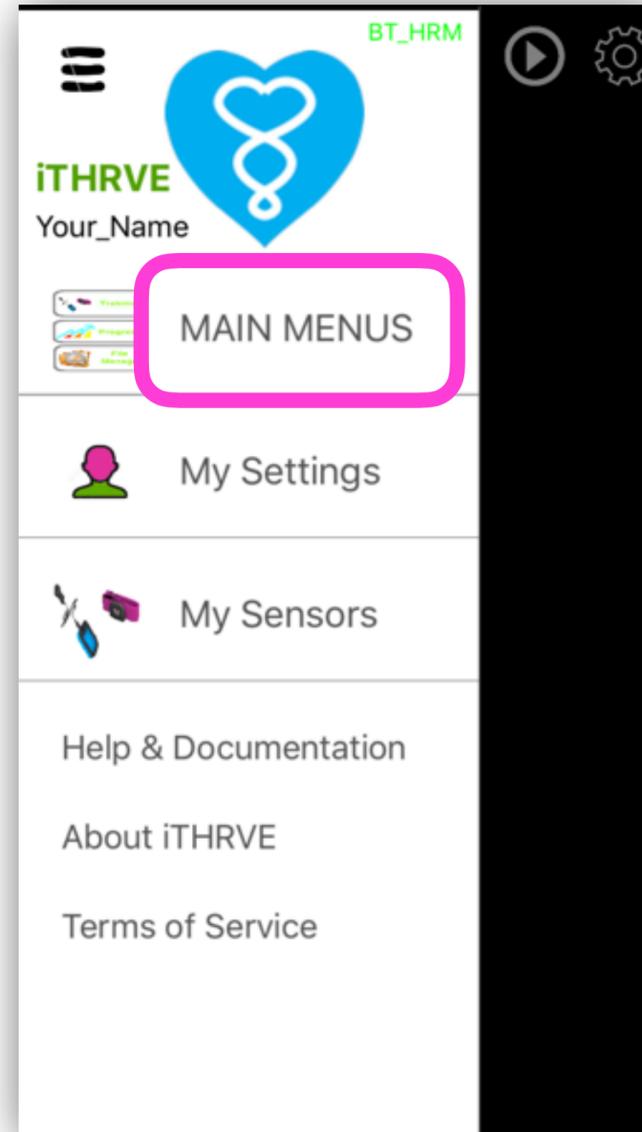
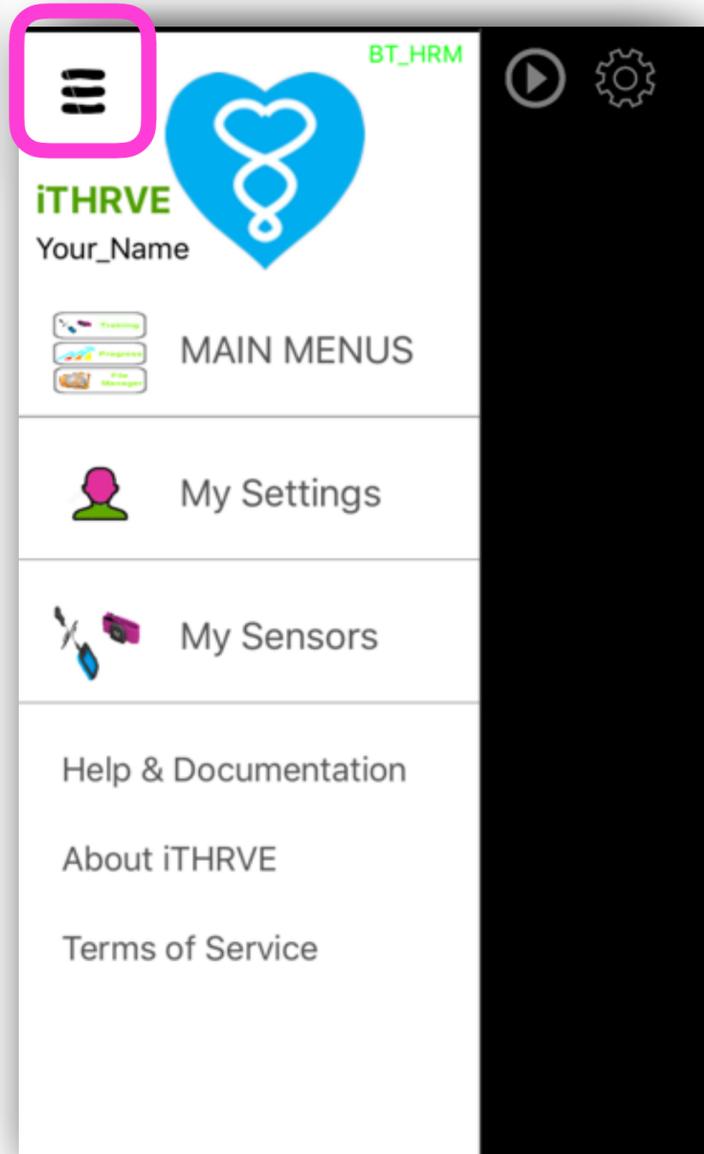
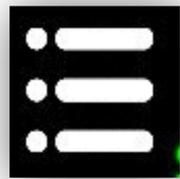


5 minutes => ... 10 seconds
8 hours => ... 16 minutes
to watch & wait... for graphs

Slide left or right
to switch between the graphs

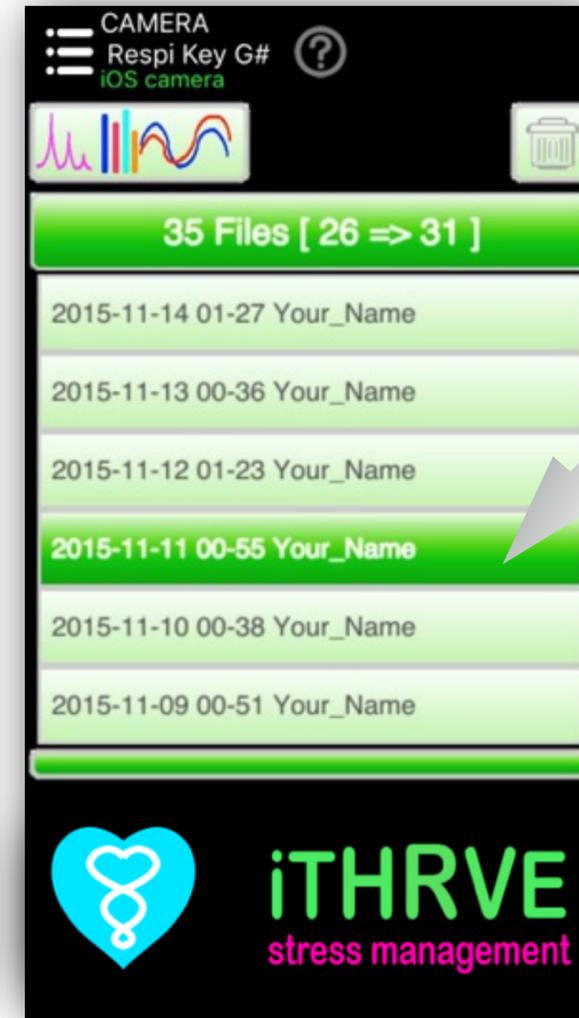
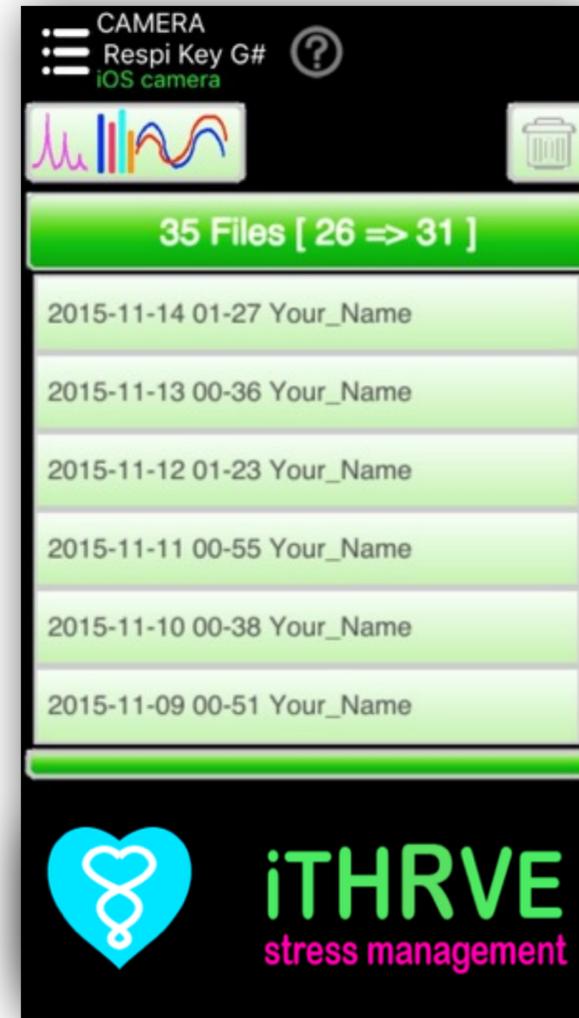
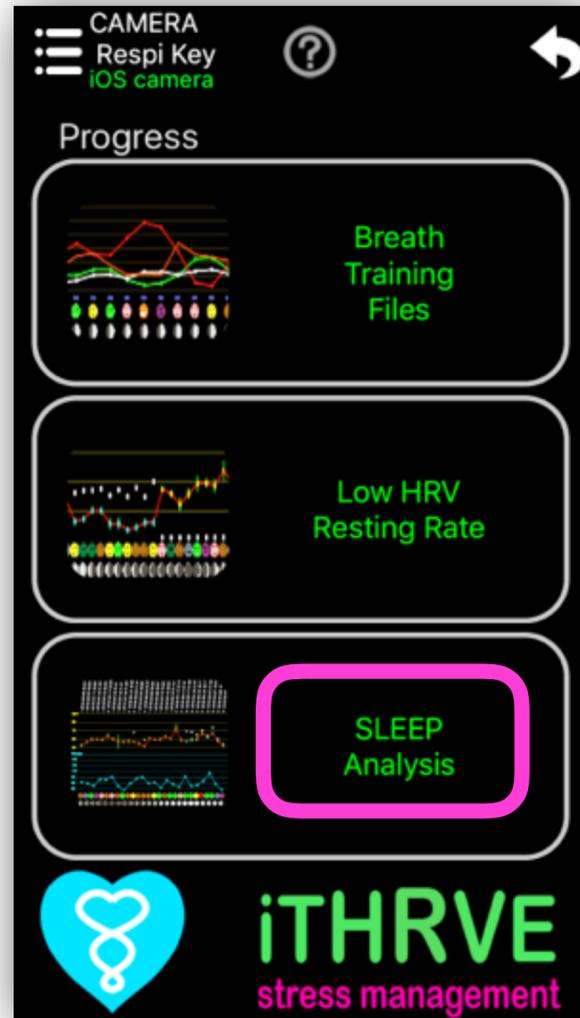


If playback analysis has already been done



For Night records

Select a file



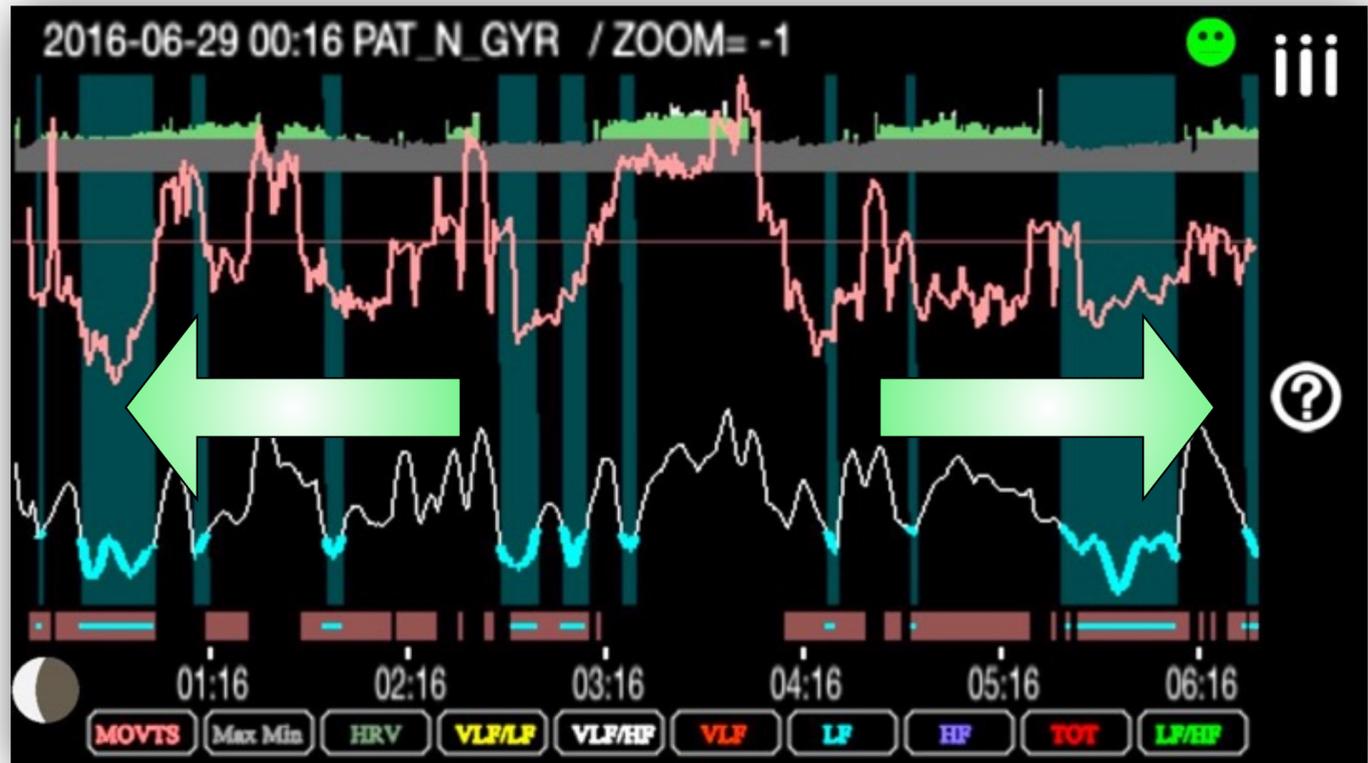
Launch
Graphs
Displays



Delete
the file

Select
a file

Slide left or right
to switch between the graphs



Check Accuracy of the recording



Deselect

Select

Good recording



Spikes

Bad record

Too many spikes (artifacts) !!!

Bad fit of the chest strap
or

Your skin is not wet enough.

You can use gel for a better contact
of the chest strap



Night Heart Rate Analysis

The top bar displays the colours related to the selected activities during the running time of your recording.

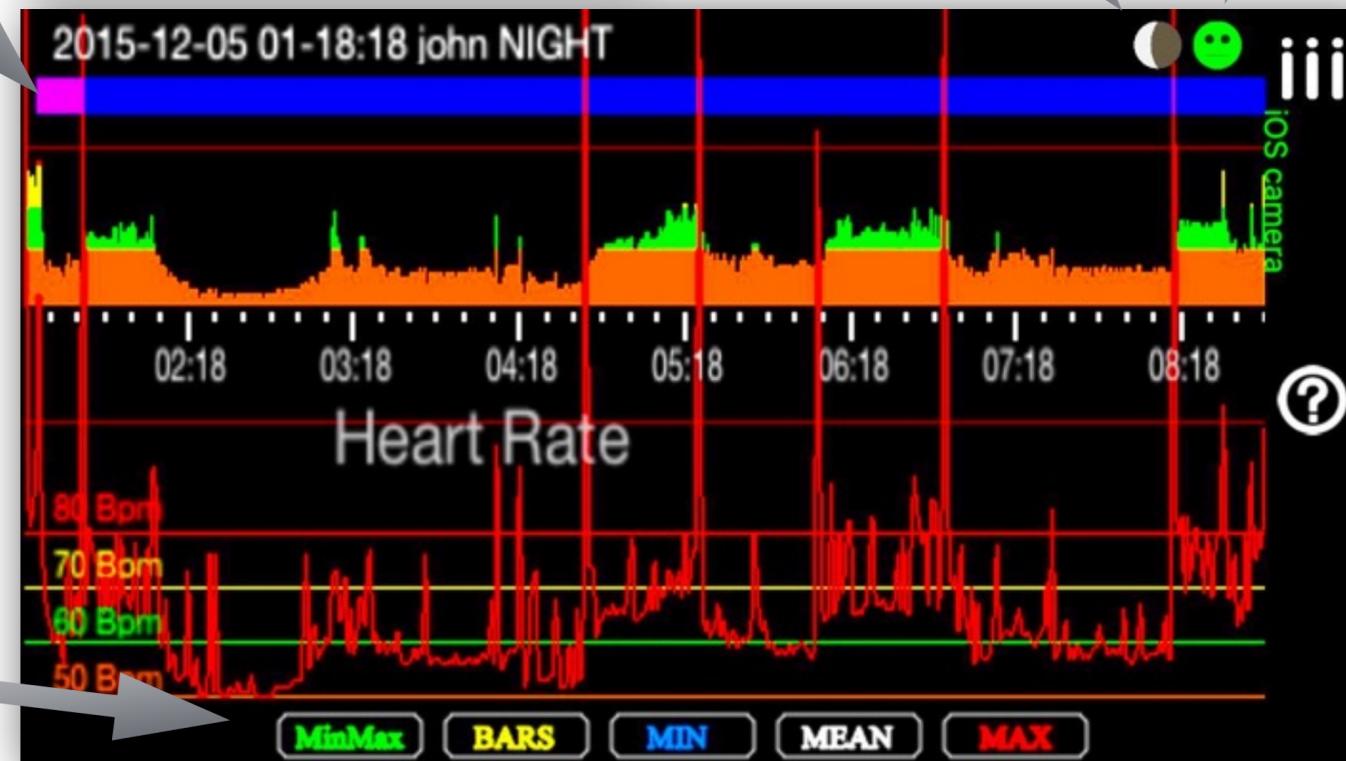
Pottering about	Watching TV
Moving	Intellect Work
Walking	Rest Sitting
Running	Rest Lying
Sport	Sleep
Manual Work	Meditation

Moon Phase

Your Mood

Two ways of HRV display :

- orange: below 60
 - - green: between 60 & 70
 - - yellow: between 70 & 80
 - - red: above 80 (beats /minute).
-
- BARS: Show/Hide top heart rate bar display.
 - MIN: Minimum heart rate
 - MEAN: Mean heart rate
 - MAX: Max heart rate
 - MinMax: Minimum to Maximum heart rate



Night Heart Rate Analysis

MinMax

MinMax(Minimum to Maximum heart rate) shows the amplitude of the HRV

Deep HRV amplitude:
Young & healthy

Lower HRV amplitude:
Old, less healthy or stressed



Deep Sleep phases are good indicator of recovering quality of sleep and stress management

The deep sleep stage (or slow-wave sleep) is a period of the night where the EEG activity is synchronized, producing slow waves within a frequency of 0.5-3Hz.

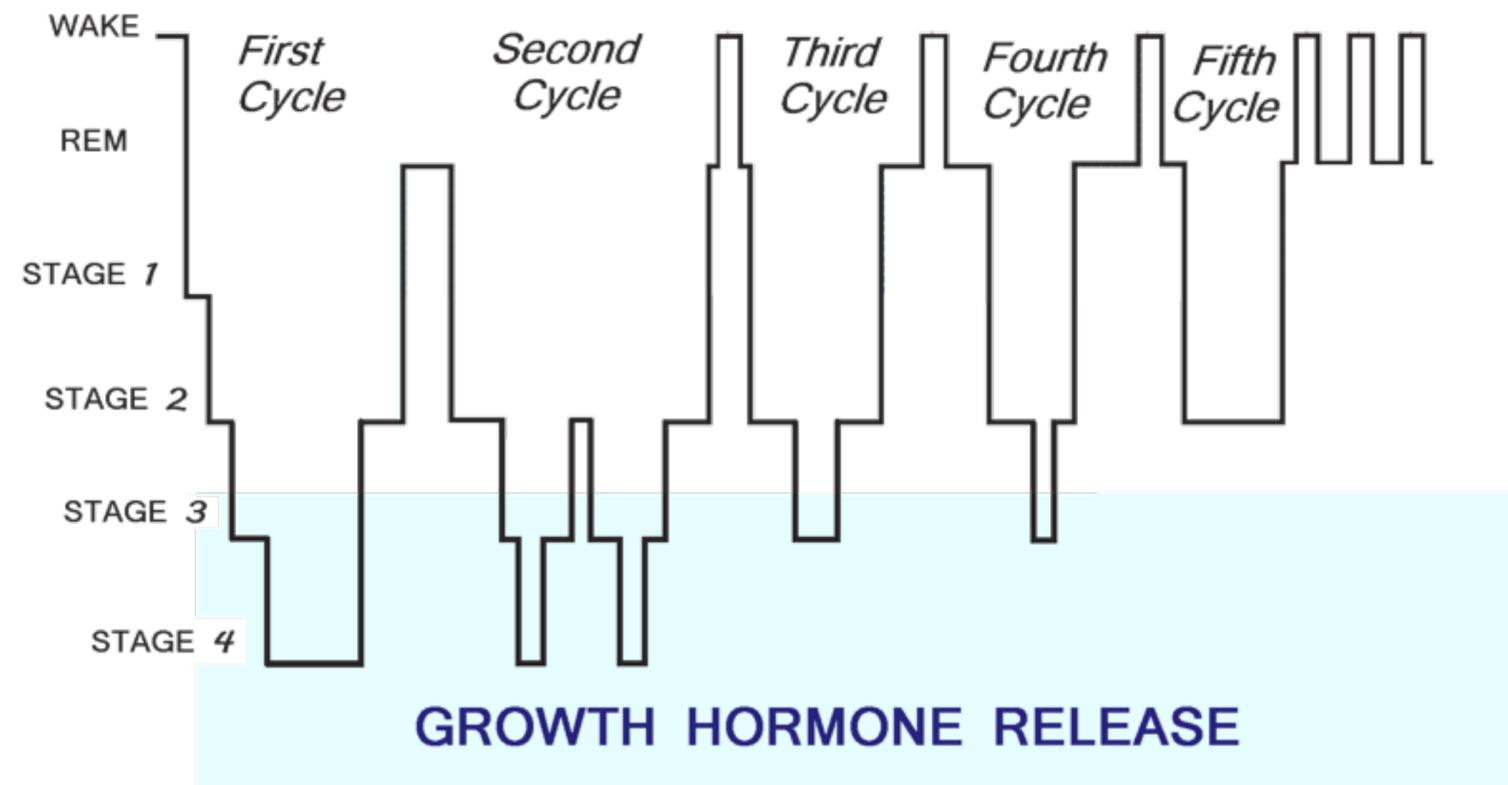
This is a period when the neocortical neurons are able to rest. The deep sleep is related to States 3 & 4 of the sleep stages.

Deep sleep should represent about 25% of sleep duration in young adults. This percentage decreases up to about 10% with aging (5). When we are depressed, less healthy or stressed, this deep sleep phase is reduced.

Slow-wave sleep is the constructive phase of sleep for recuperation of the mind-body system in which it rebuilds itself after each day.

(https://en.wikipedia.org/wiki/Slow-wave_sleep)

SLEEP STAGES



This Slow-Wave Sleep helps to :

- consolidate new memories (1)
- allow the brain to recover from its daily activities
- induce the secretion of growth hormone (2)
- allow a decrease in sympathetic and increase in parasympathetic neural activity (2)
- reduce blood pressure (Reduced deep sleep may predict high blood pressure (3)
- relax our muscles and the blood supply to muscles increases
- our tissues to growth and repair
- restore energy
- restored sugars to our glial cells (to provide energy for the brain) (4)
- allow toxin clearance from the Brain (7)(8)
- feel less depressed (9)

(1) <http://www.nytimes.com/2013/01/28/health/brain-aging-linked-to-sleep-related-memory-decline.html>

(2) **Slow-Wave Sleep: Beyond Insomnia.** Wolters Kluwer Pharma Solutions. ISBN 978-0-9561387-1-2.

(3) http://www.brighamandwomens.org/about_bwh/publicaffairs/news/pressreleases/PressRelease.aspx?sub=0&PageID=942

(4) <http://www.hgi.org.uk/archive/sleepanddream1.htm#.U2kpm8fhjys>

(5) **Age-Related Changes in Slow Wave Sleep and REM Sleep and Relationship With Growth Hormone and Cortisol Levels in Healthy Men**

Eve Van Cauter, PhD; Rachel Leproult, MS; Laurence Plat, MD <http://jama.jamanetwork.com/article.aspx?articleid=192981>

(6) **Growth hormone secretion during sleep** Y. Takahashi, D. M. Kipnis, and W. H. Daughaday <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC297368/>

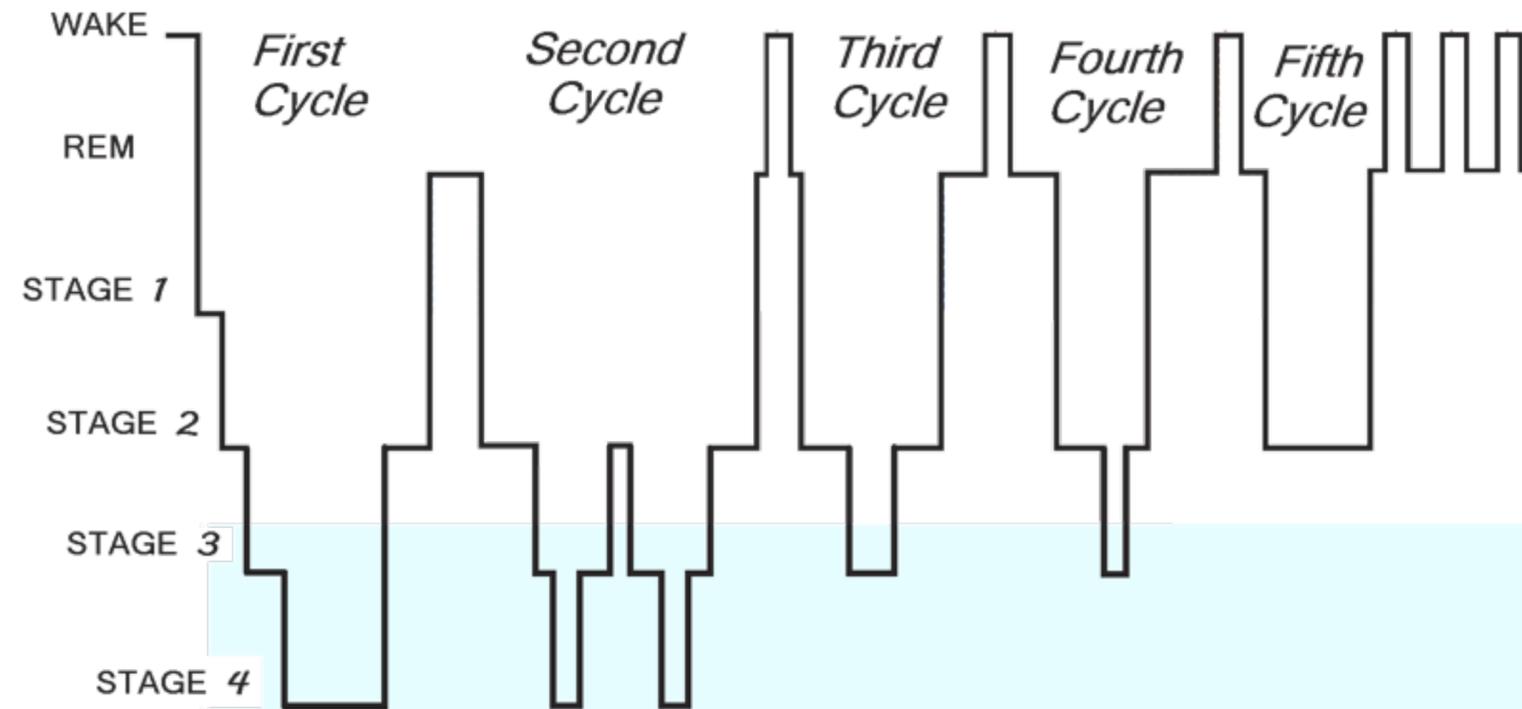
(7) **Sleep Drives Metabolite Clearance from the Adult Brain**

Lulu Xie,* , Hongyi Kang , Qiwu Xu, Michael J. Chen, Yonghong Liao, Meenakshisundaram Thiyagarajan, John O'Donnell, Daniel J. Christensen, Charles Nicholson, Jeffrey J. Iliff, Takahiro Takano¹, Rashid Deane, and Maiken Nedergaard,Ü <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3880190/pdf/nihms540586.pdf>

(8) <https://www.nih.gov/news-events/news-releases/brain-may-flush-out-toxins-during-sleep>

(9) **Regulation of Sleep and Growth Hormone in Adolescent Depression** <http://www.sciencedirect.com/science/article/pii/S0890856709640764>

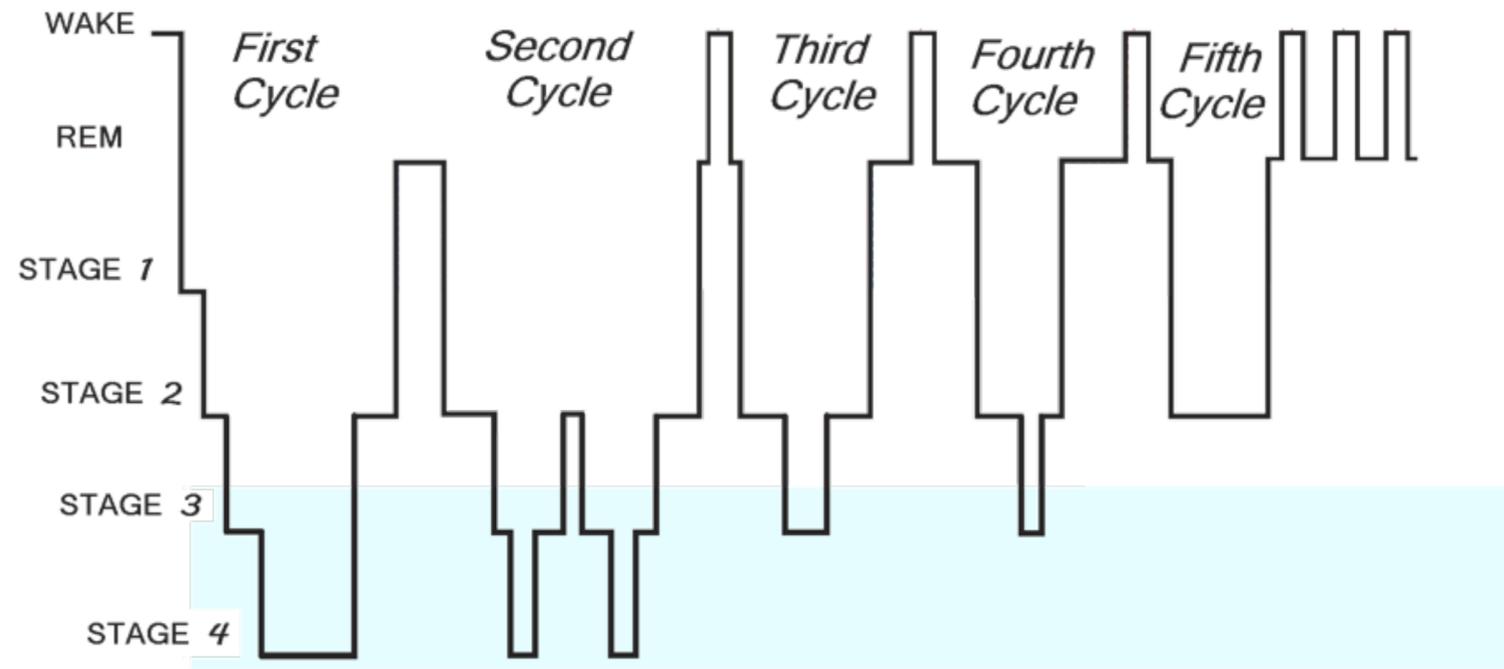
SLEEP STAGES



Deep sleep and VLF/HF ratio

There is a good relationship between VLF/HF ratio and the deep sleep phase: During deep sleep phase, VLF is significantly lower than in the other sleep stages; and HF is significantly higher (1)

(1) **Spectral Analysis of Heart Rate Variability in Sleep** P. BUŠEK, J. VAŇKOVÁ, J. OPAVSKÝ, J. SALINGER, S. NEVŠÍMALOVÁ
Physiol. Res. 54: 369-376, 2005
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.621.9994&rep=rep1&type=pdf&rep=rep1&type=pdf>



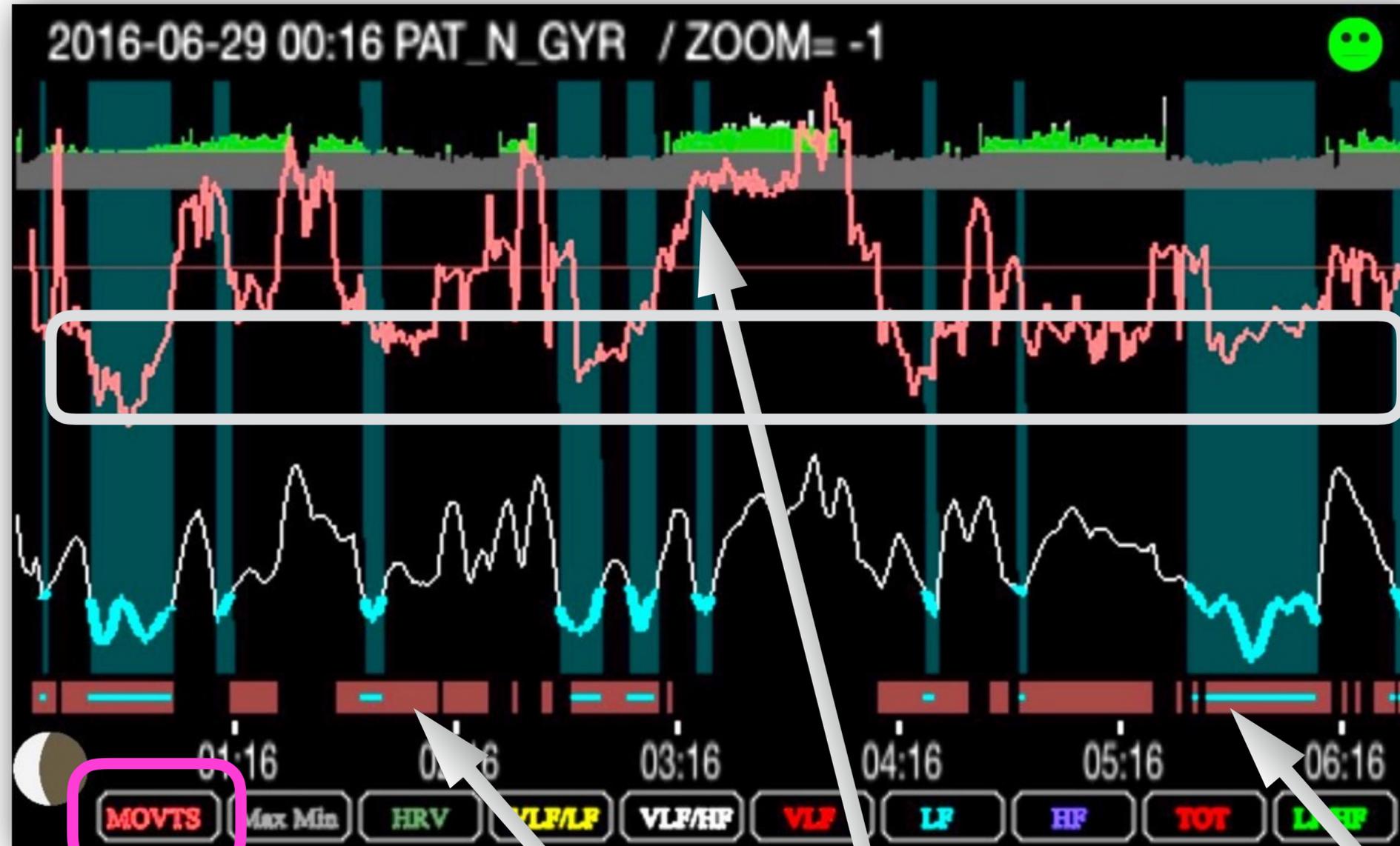
Deep sleep & VLF/HF ratio



Less Deep sleep



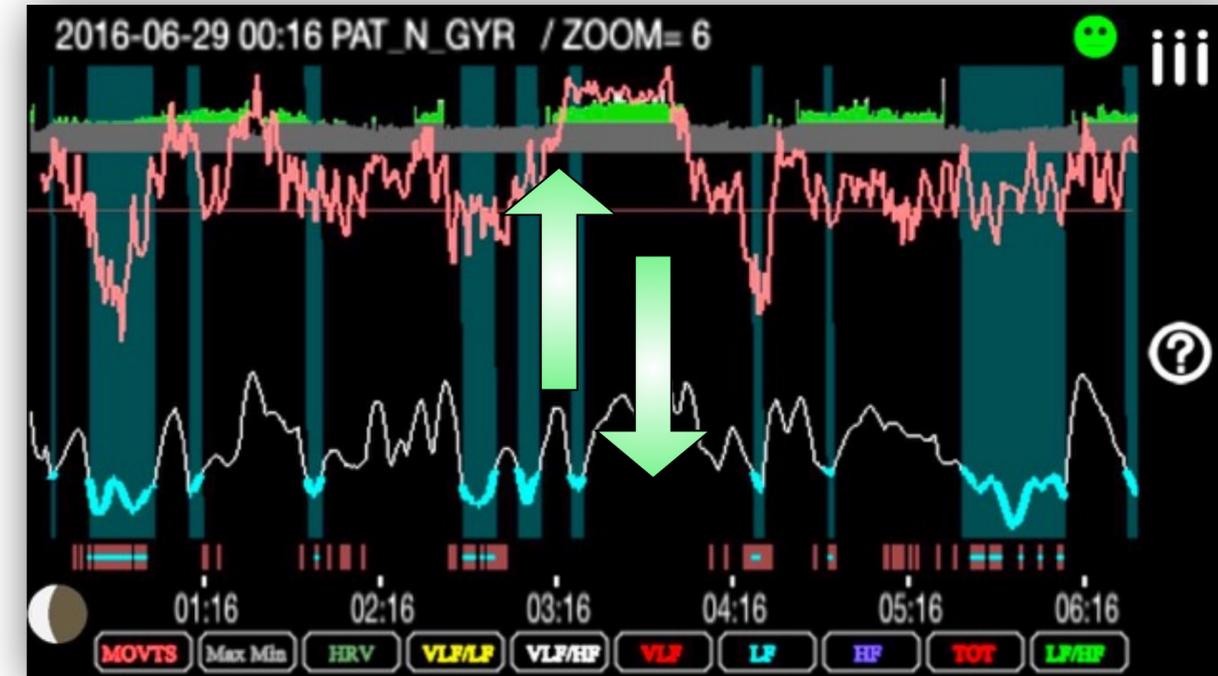
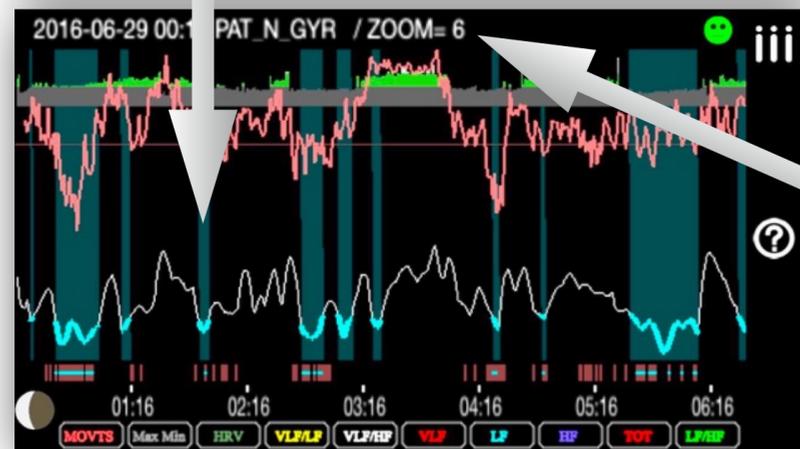
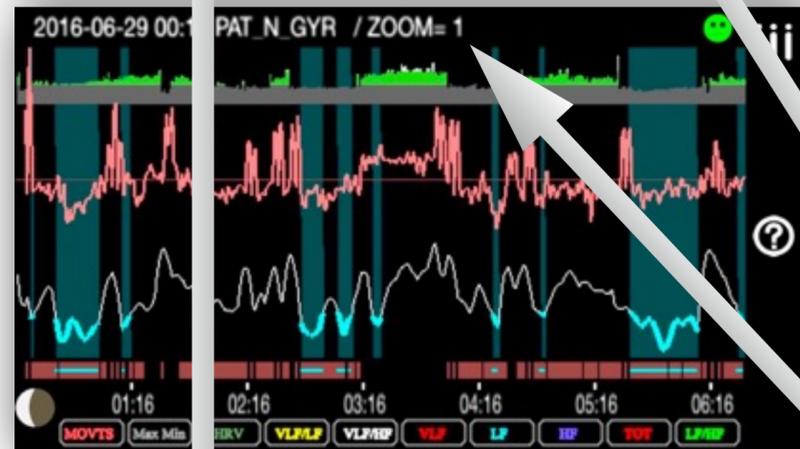
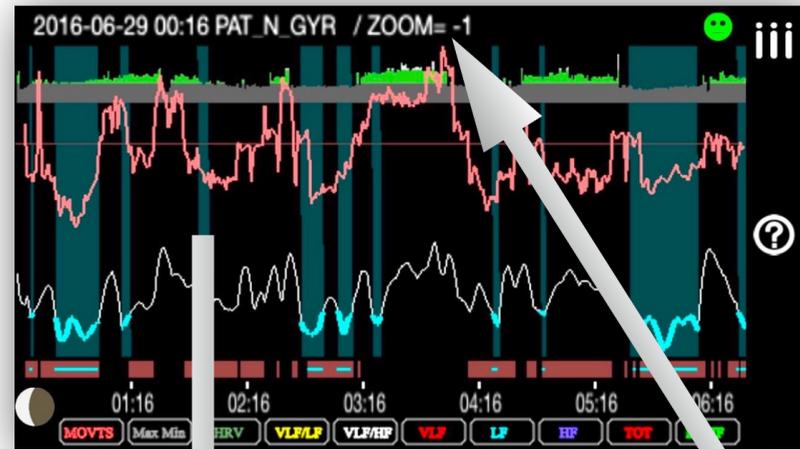
Much Deep sleep



lowest movements of the body

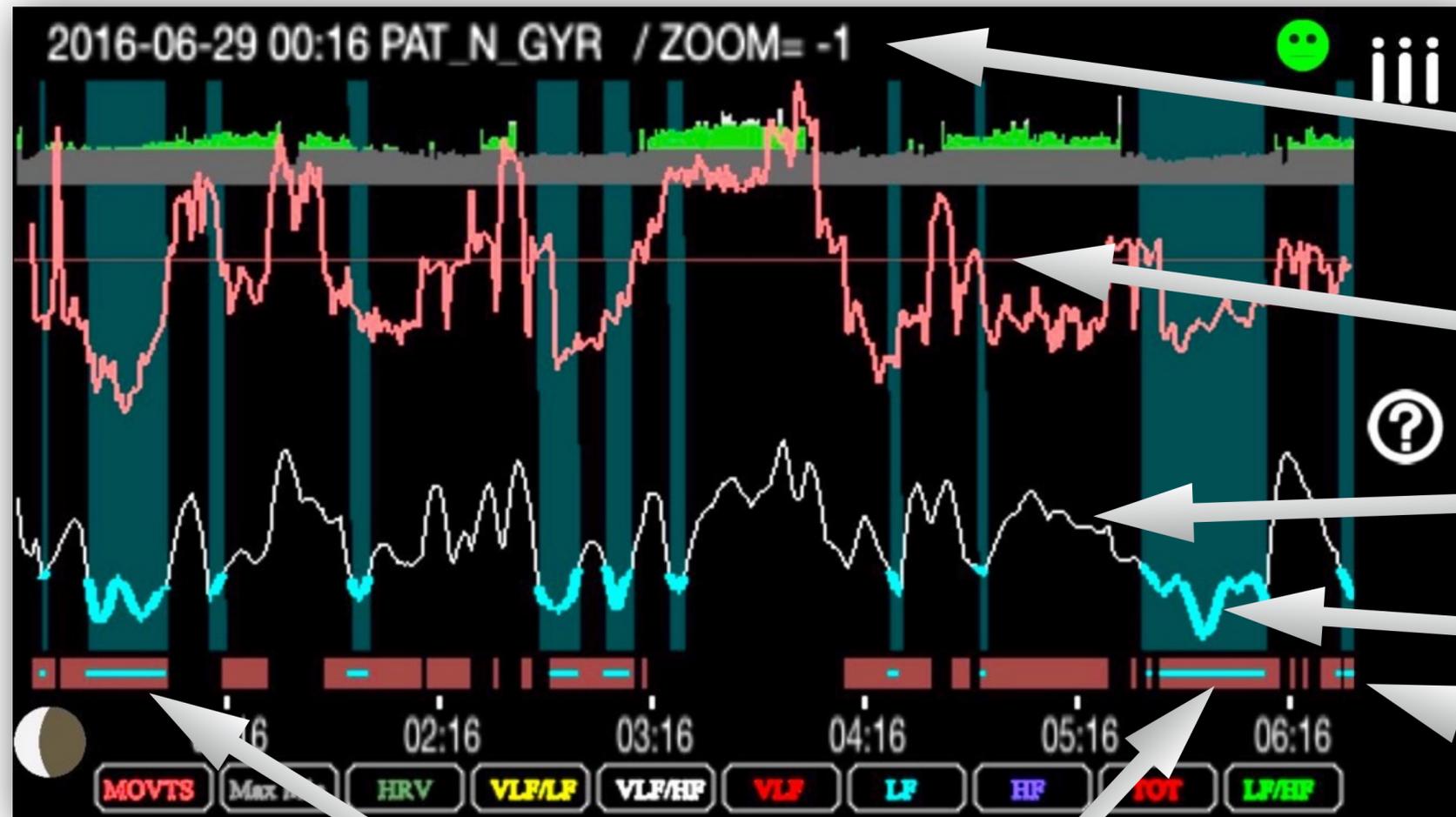
Analysis of the movements during the night

Deep sleep are related to **very low movements** of the body



SWIPE UP or DOWN
to zoom in the lower part
of night movements

ZOOM factor



ZOOM factor

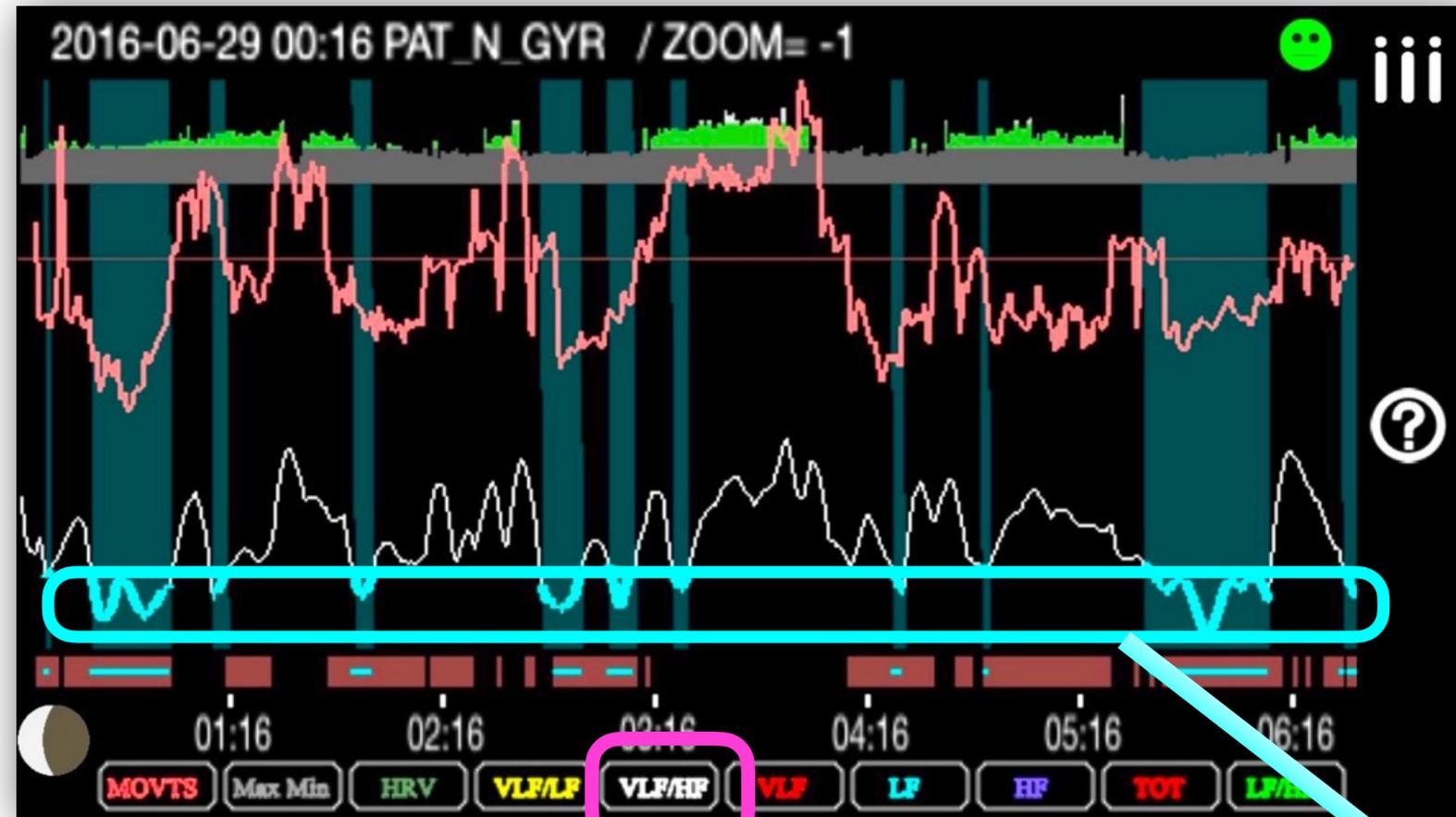
movements

VLF/HF ratio

Lower VLF/HF
Deep Sleep

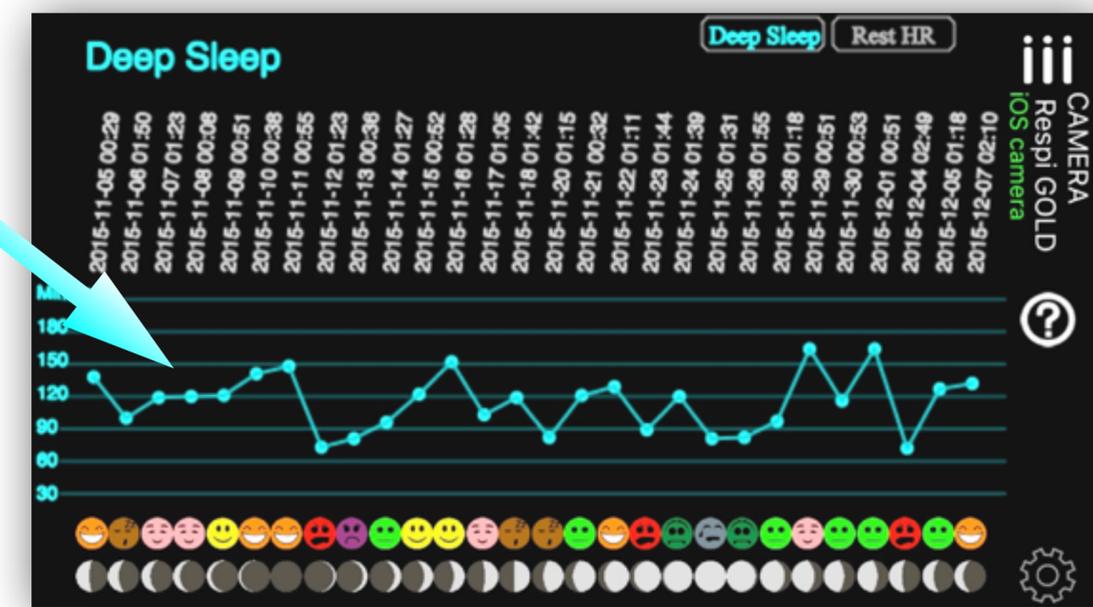
Lower movements

Fit between
Lower movements
&
Lower VLF/HF



The light blue part (deep sleep - lower VLF/HF) of the night graph analysis will be updated in the Progress/History graph.

Progress / History



CAMERA
Respi GOLD
iOS camera

Select :

Training & Recording

Progress

FILE MANAGER
Training & Records

iTHRVE
stress management

CAMERA
Respi Key
iOS camera

Progress

Breath Training Files

Low HRV Resting Rate

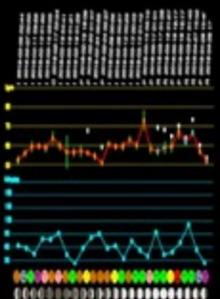
SLEEP Analysis

iTHRVE
stress management



 iOS camera  

SLEEP Analysis



Sleep Analysis History



Sleep Analysis Files

 **iTHRIVE**
 stress management

