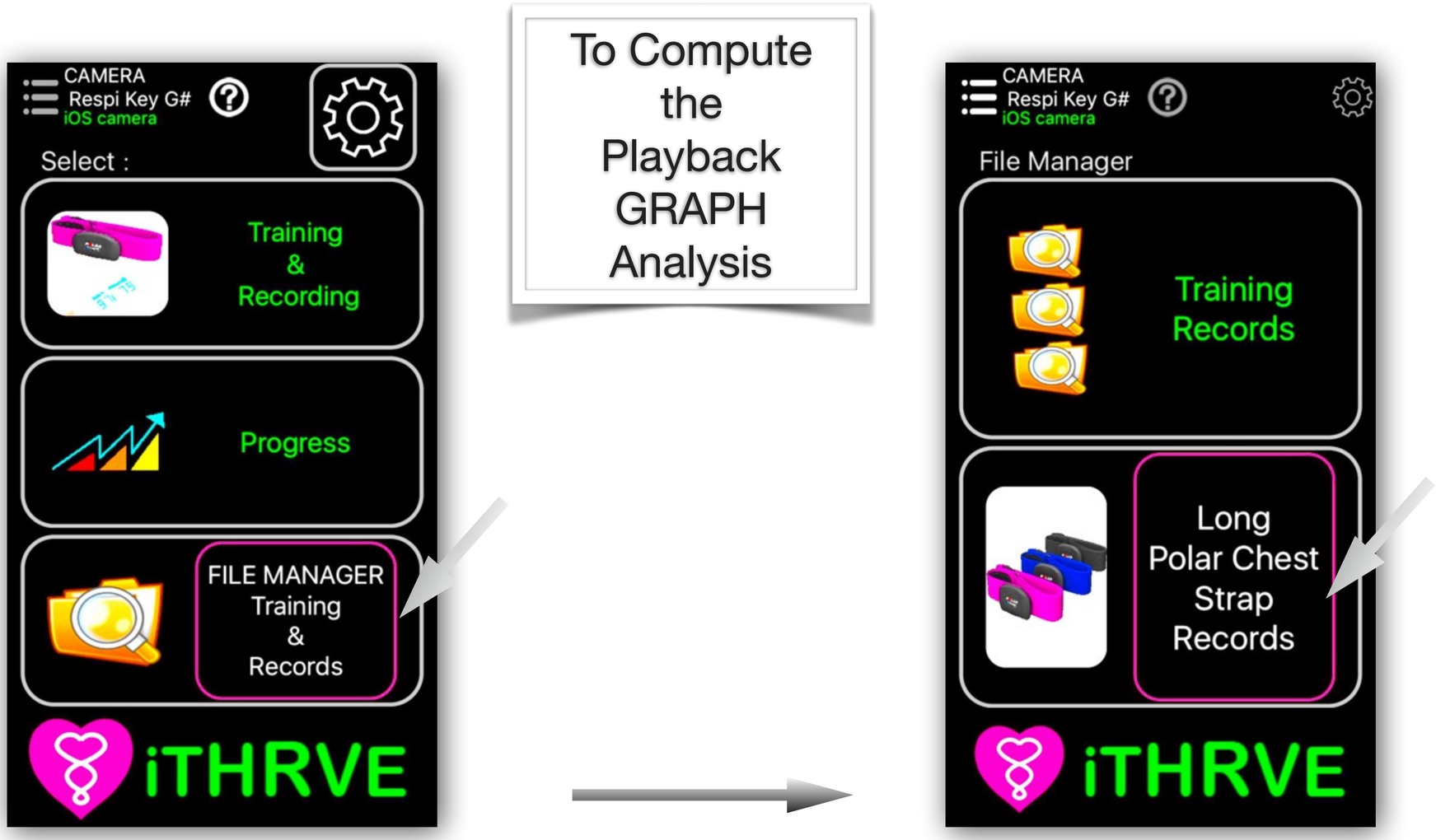
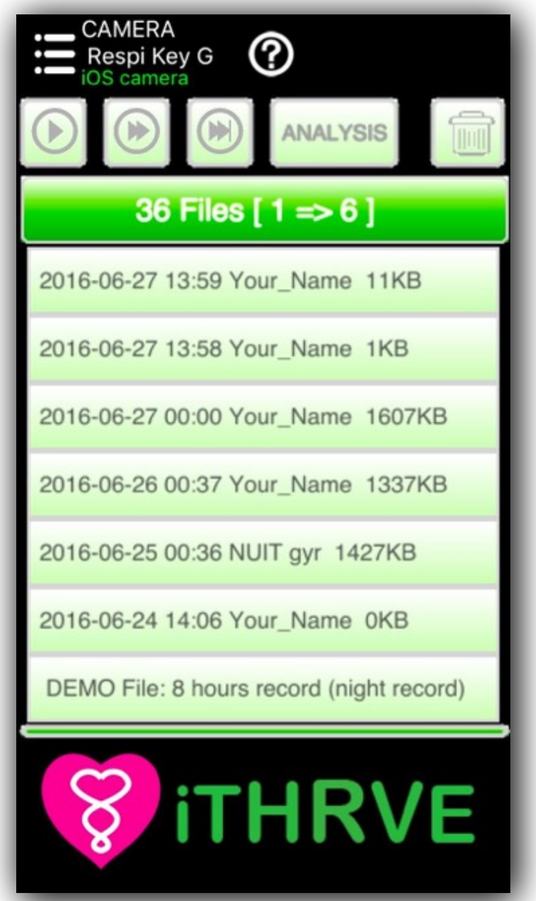
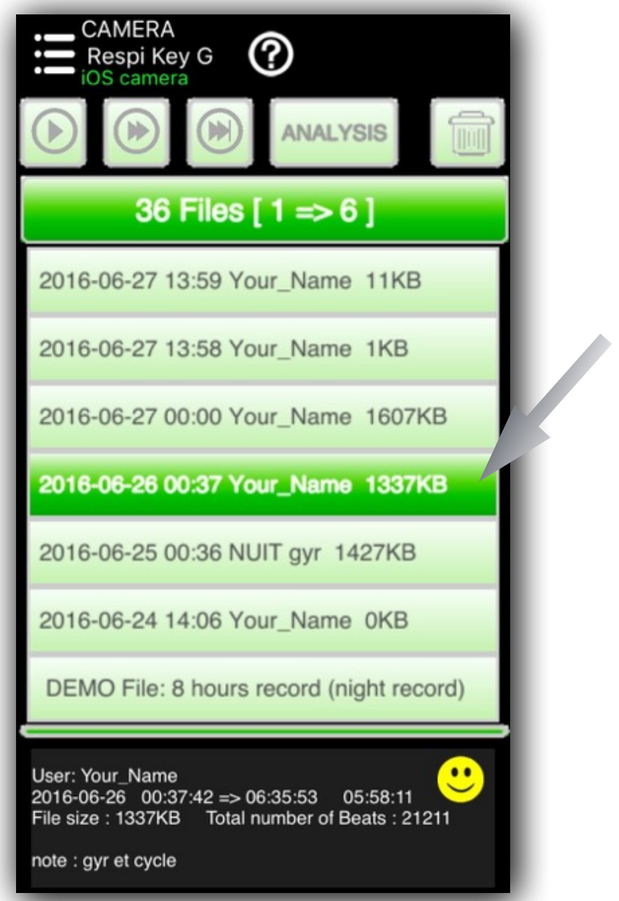
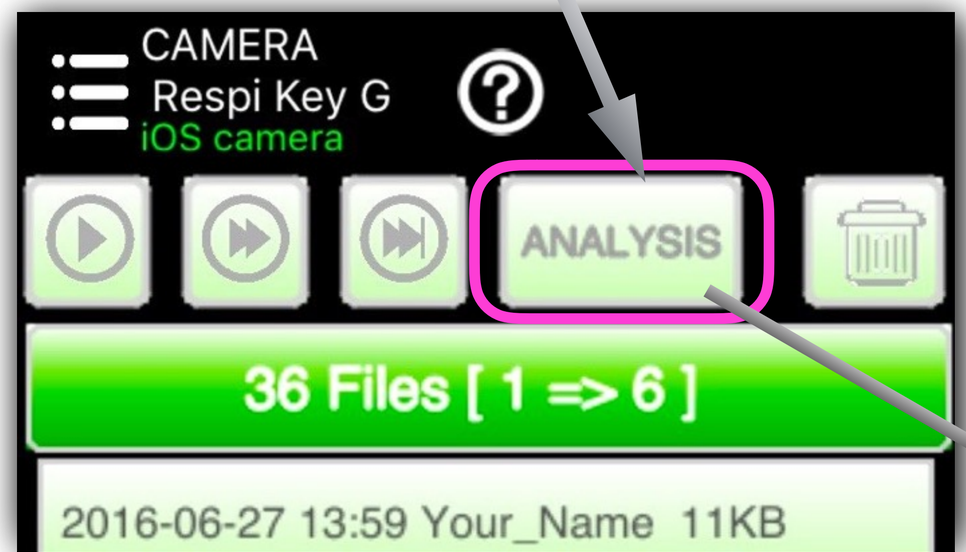

CAMERA
Respi Key G#
iOS camera
Select :
Training
&
Recording
Progress
FILE MANAGER
Training
&
Records
iTHRVE
To Compute
the
Playback
GRAPH
Analysis
CAMERA
Respi Key G#
iOS camera
File Manager
Training
Records
Long
Polar Chest
Strap
Records
iTHRVE

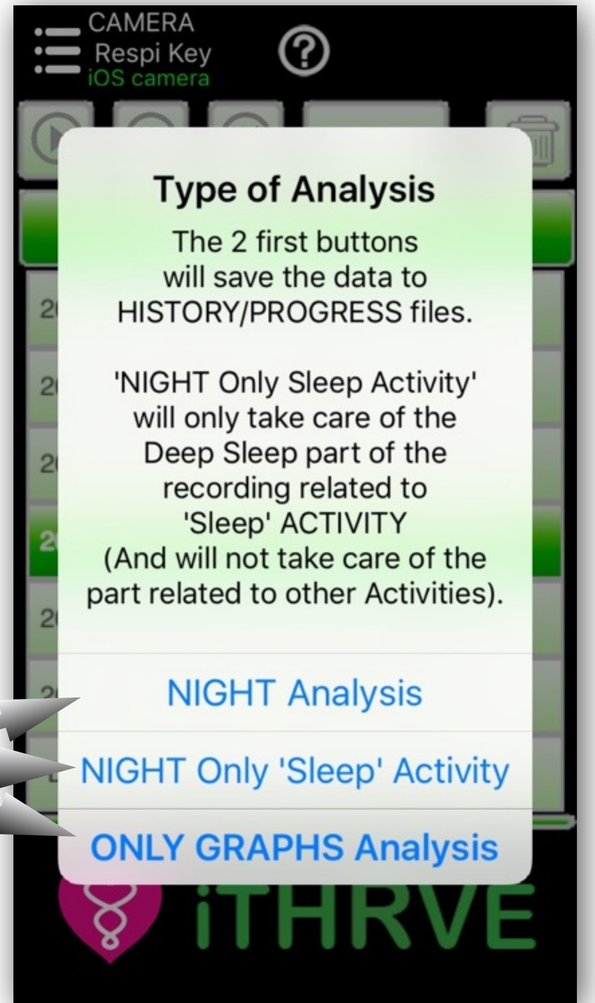


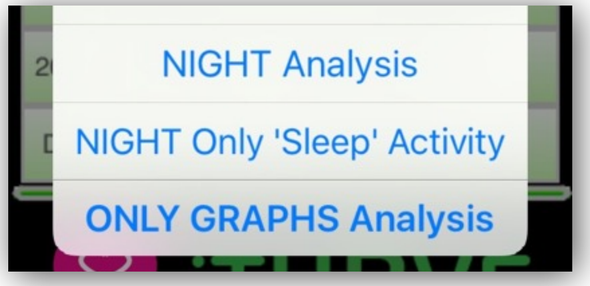
Select
a file

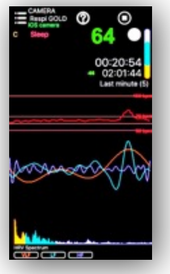


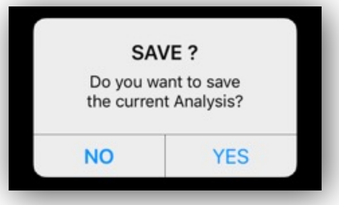
Select
Analysis











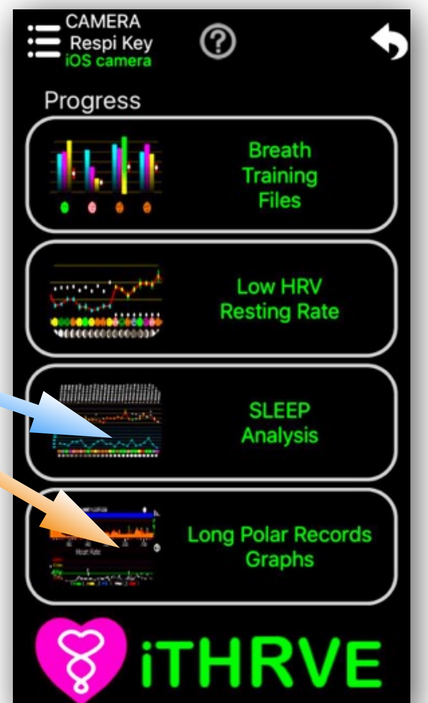
If you have SAVED the analysis,
Go to PROGRESS
to display previous analysis

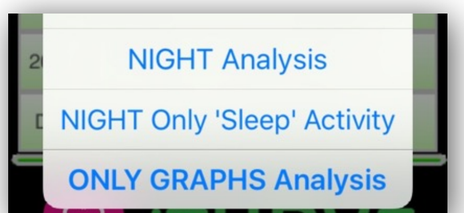
« NIGHT Analysis » & ***« NIGHT Only 'Sleep' Activity »***
will save data and update HISTORY/PROGRESS files.

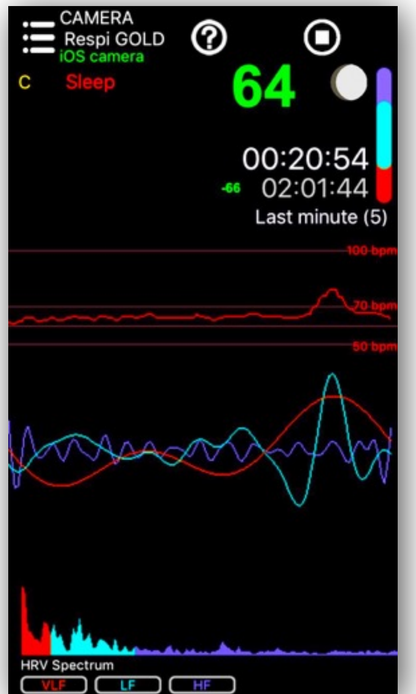
« NIGHT Only 'Sleep' Activity » will only take care of the
Deep Sleep data of the recording related to 'Sleep' Activity.
(Do not select this option if you forgot to select
activities during recording).

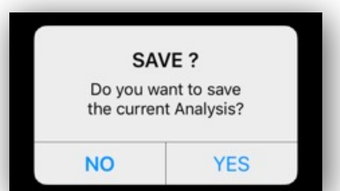
« ONLY GRAPHS Analysis »
will only compute the graph analysis
and save the data in the
Long Polar Record Graphs File Manager.

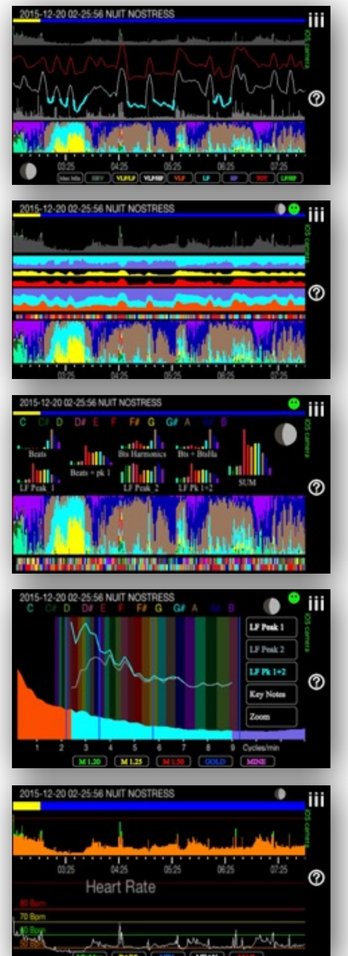
If you do not SAVE the current analysis, you will have access to the
graphs only ones and can not recover them later
from the File Managers



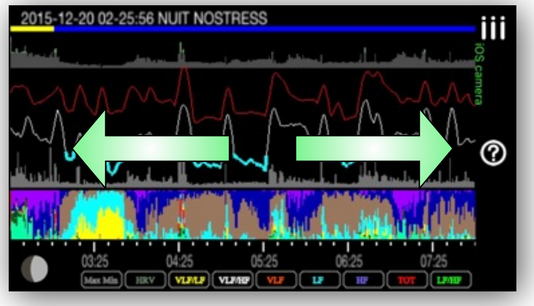


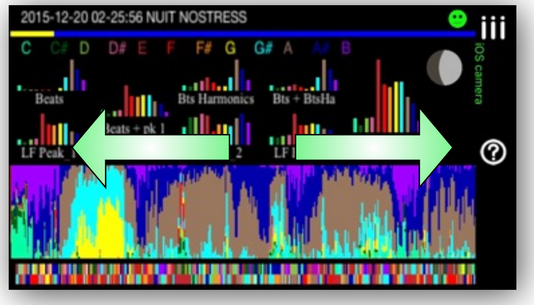


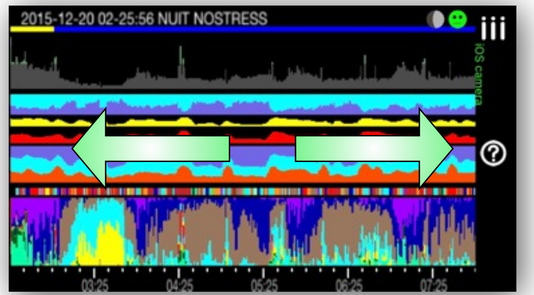


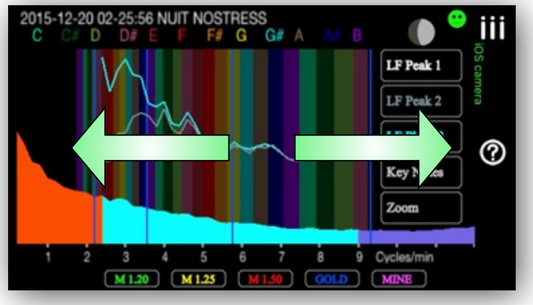


5 minutes => . . . 10 seconds
8 hours => . . . 16 minutes
to watch & wait… for graphs





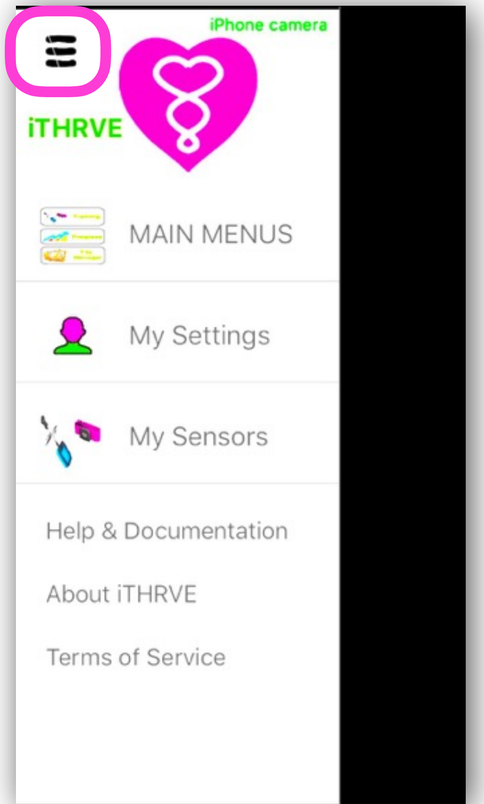


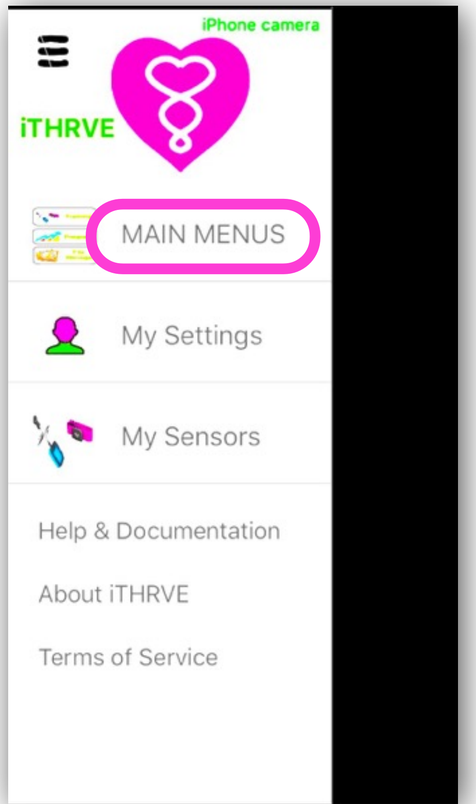


Slide left or right

to switch between these graphs

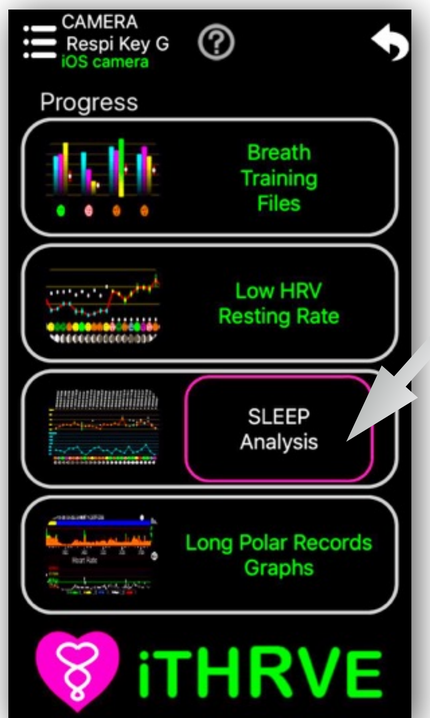
If playback analysis has already been done

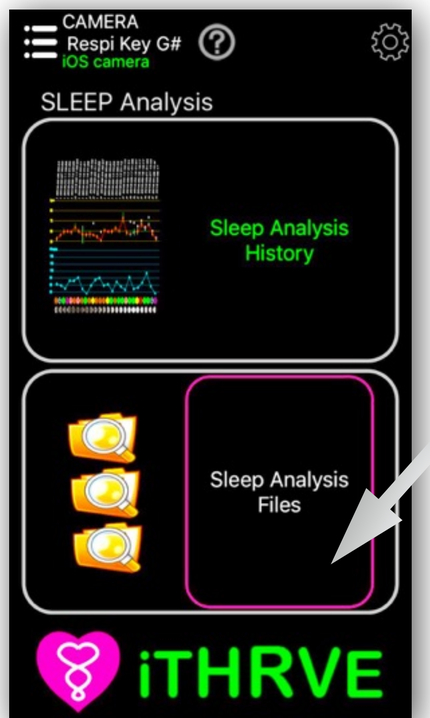


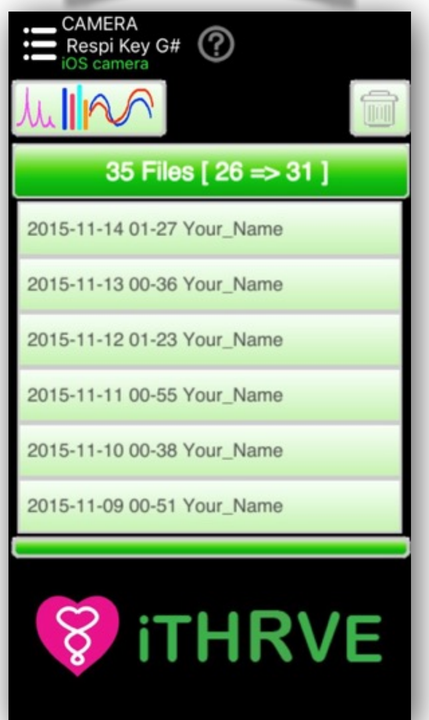


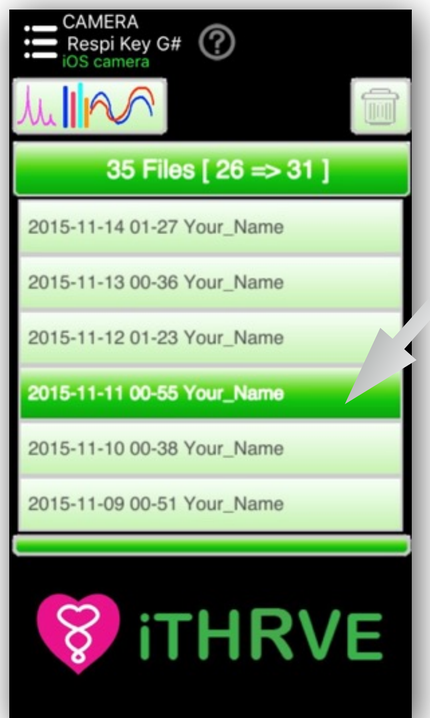
For Night records

Select a file



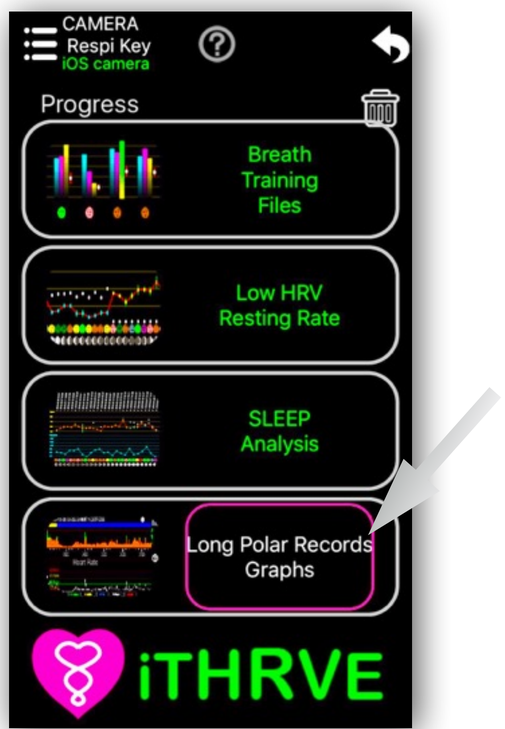






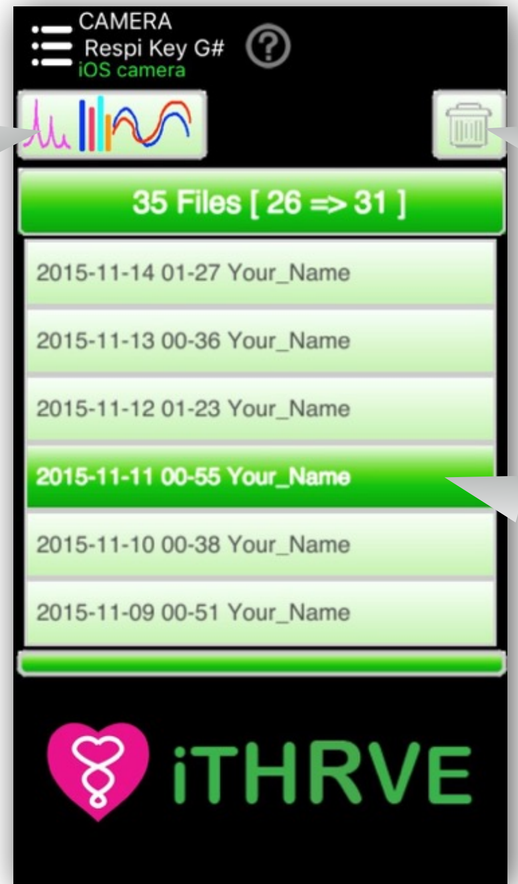
For all long term records
(including night records)

Select
a file



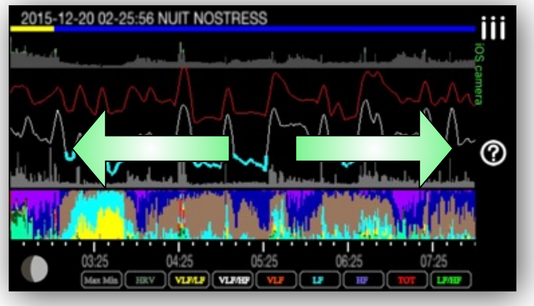
Night records
are displayed
in blue

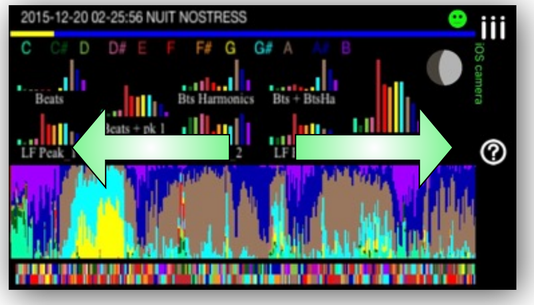
Launch
Graphs
Displays

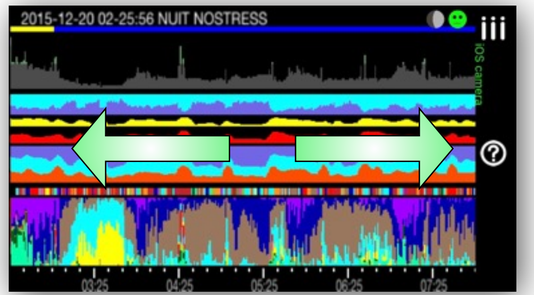


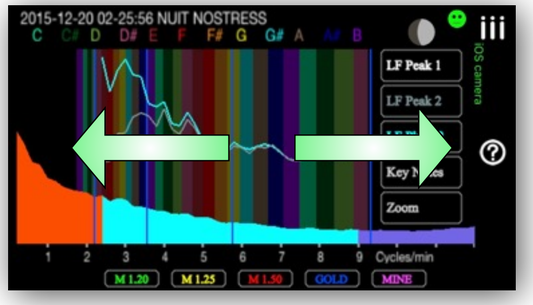
Delete
the file

Select
a file









Slide left or right

to switch between these graphs

Check Accuracy of the recording

Deselect

Select

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

Good recording

Spikes

Night Heart Rate Analysis

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

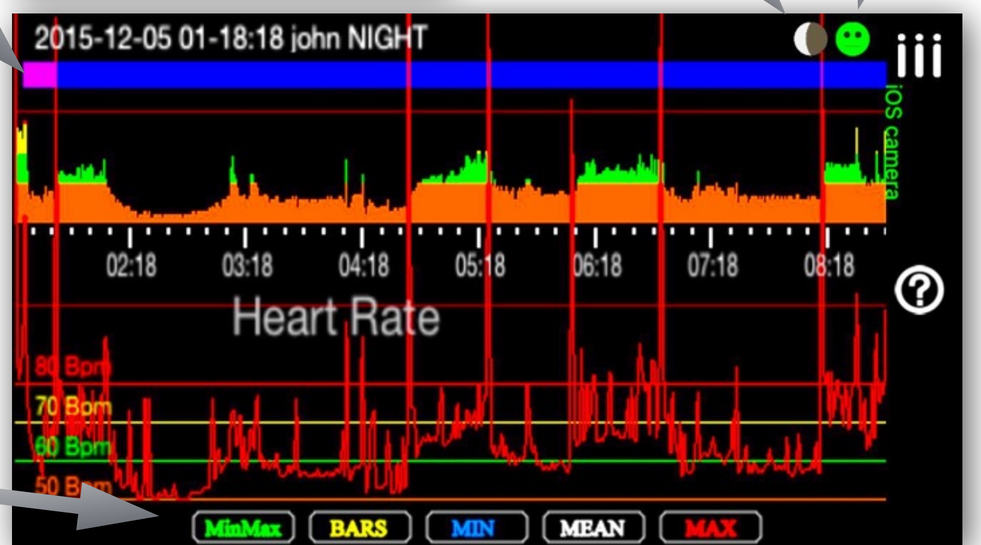
Moon Phase

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

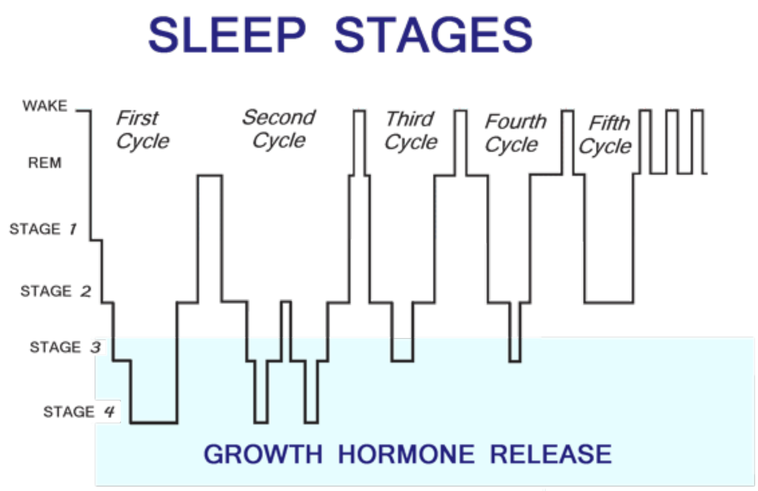
The deep sleep stage (or slow-wave sleep) is a period of the night where the EEG activity is synchronized, producing slow waves within a frequency of 0.5-3Hz. This is a period when the neocortical neurons are able to rest. The deep sleep is related to States 3 & 4 of the sleep stages.

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)

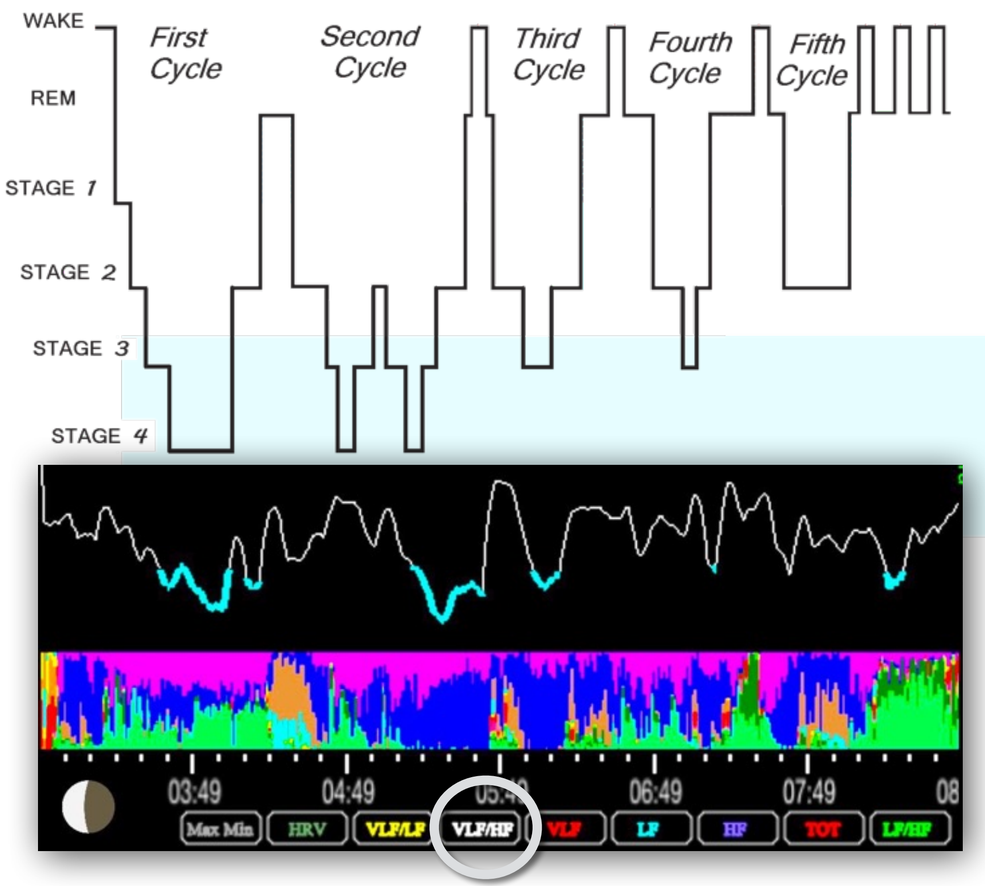
This Slow-Wave Sleep helps to :

- 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 OíDonnell, 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

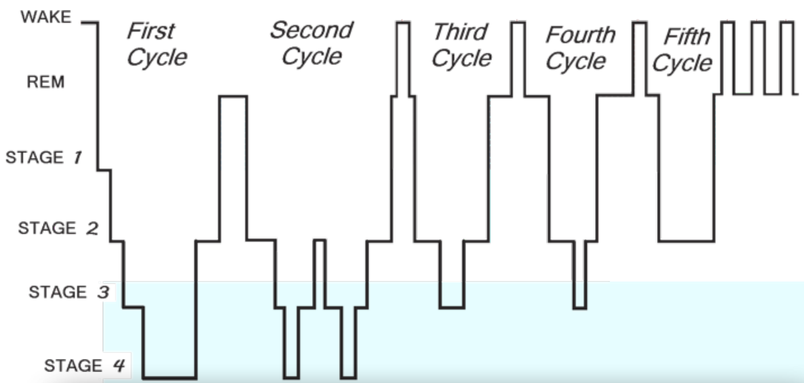


Deep sleep and VLF/HF ratio

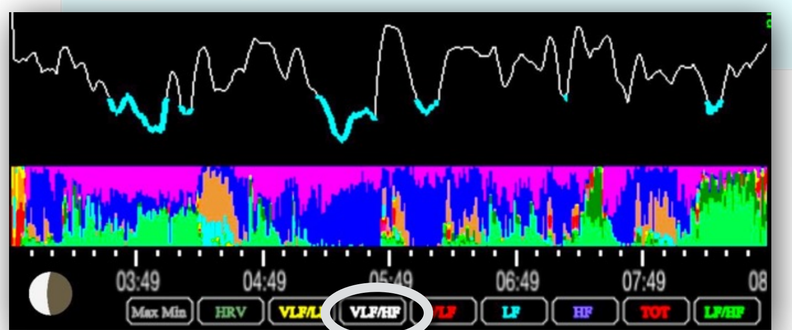
There is a good relationship between VLF/HF ratio and the deep sleep phase:
During deep sleep phase, VLF is significantly lower than in the other sleep stages; and HF is significantly higher (1)

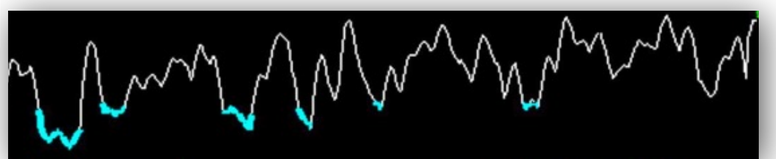
(1) **Spectral Analysis of Heart Rate Variability in Sleep** P. BUŠEK, J. VAŇKOVÁ, J. OPAVSKÝ , J. SALINGER, S. NEVŠÍMALOVÁ
Physiol. Res. 54: 369-376, 2005
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.621.9994&rep=rep1&type=pdf&rep=rep1&type=pdf

SLEEP STAGES

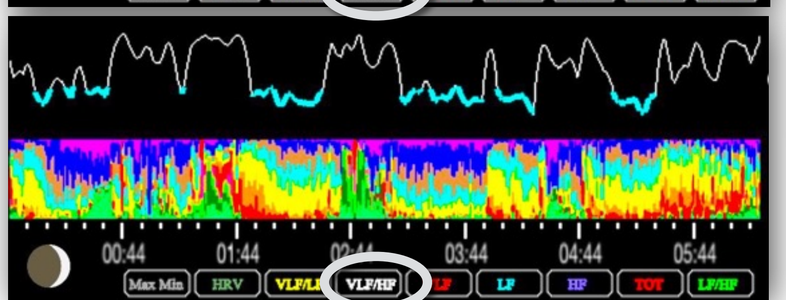


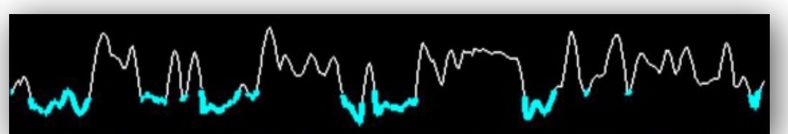
Deep sleep and VLF/HF ratio





Less Deep sleep





Much Deep sleep

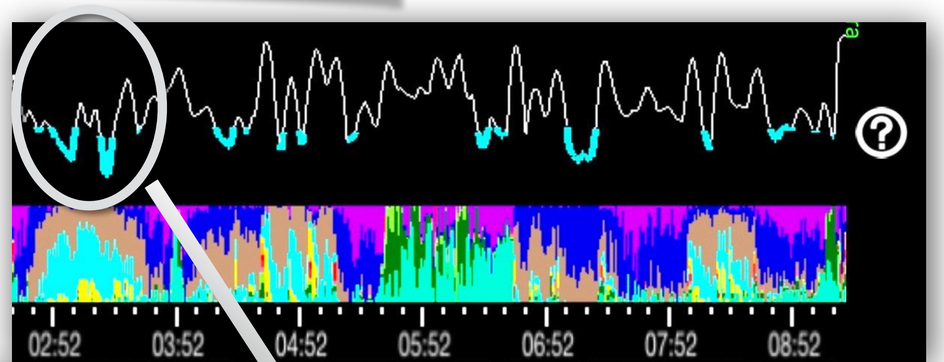
Deep Sleep & Lucid Dreams - Deep Meditation State

Slow-Wave Sleep can also be achieved through deep meditation state

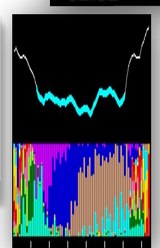
« *Subjectively deep sleep is a time of nearly complete disengagement from the environment… There is a more subtle state of awareness that may be developed through meditation and can be thought of as being more subtle and like that of the dreaming state of consciousness. The deepest level of consciousness, in this scheme, is the one in which it is possible to become aware of the emptiness in which all phenomenon are thought to occur. According to the integral philosopher Ken Wilber, it is possible, with training in advanced meditation, for people to be aware of the subtler states of consciousness, including the states of dreaming and even deep sleep.* »*

* https://www.psychologytoday.com/blog/sleepless-in-america/201010/the-mysterious-benefits-deep-sleep

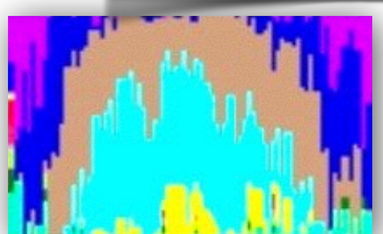
Night analysis

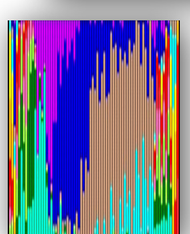


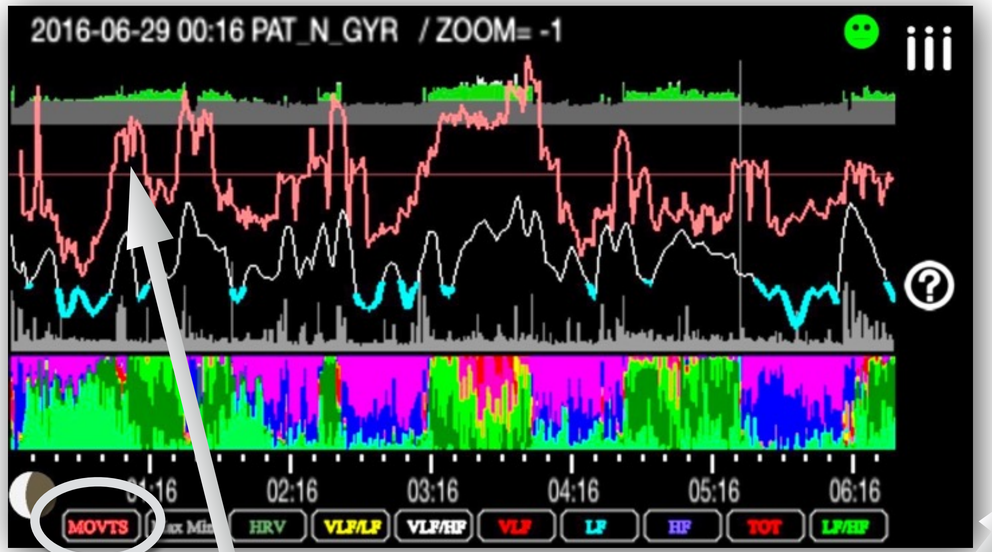
Deep meditating state (yoga nidra)



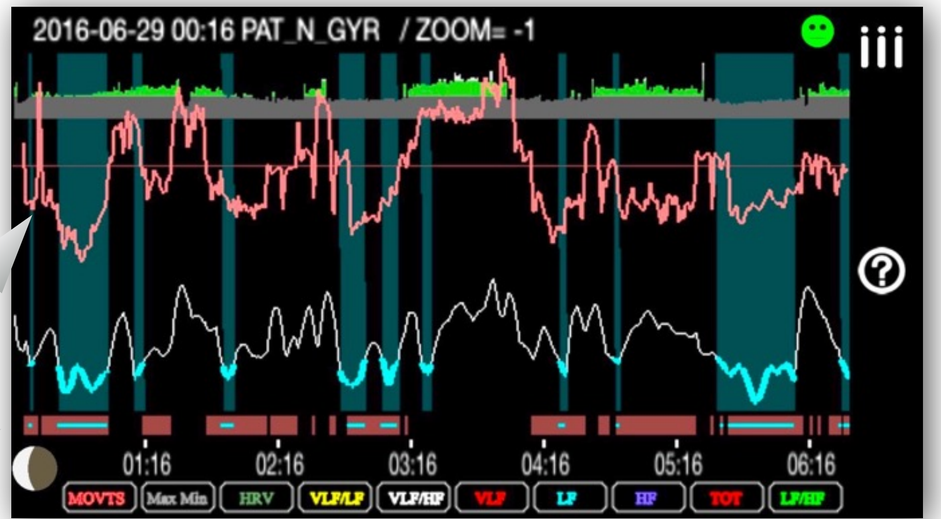
First deep sleep phase

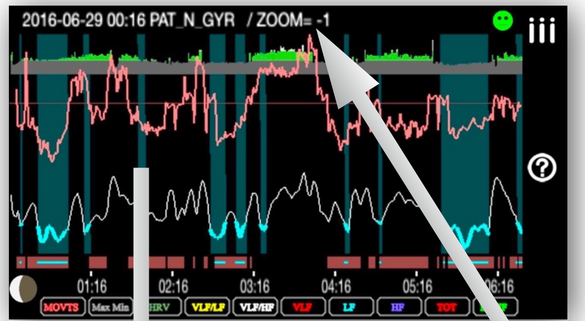


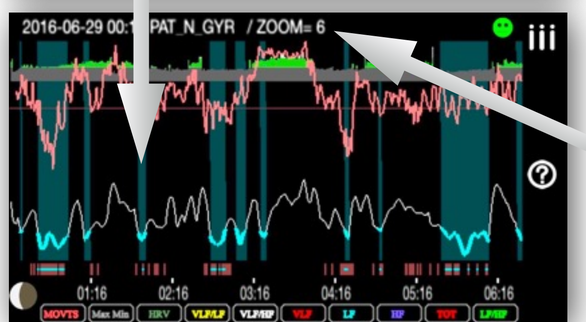




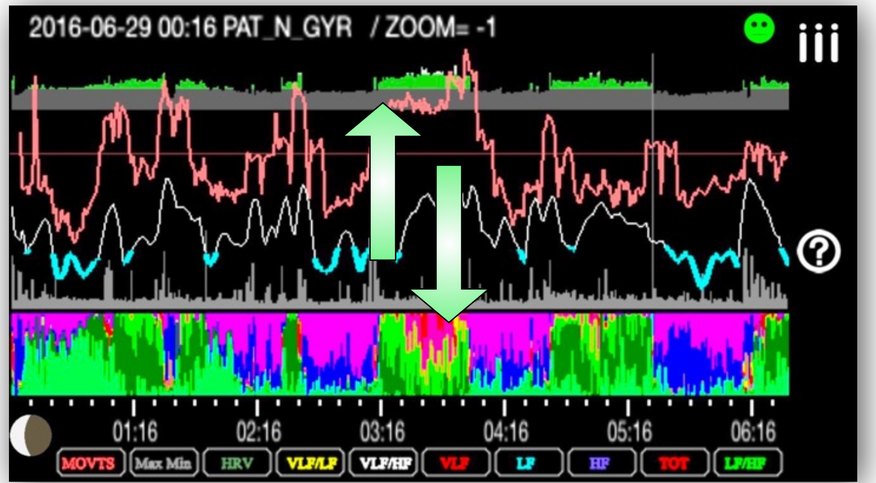
Analysis of the movements during the night



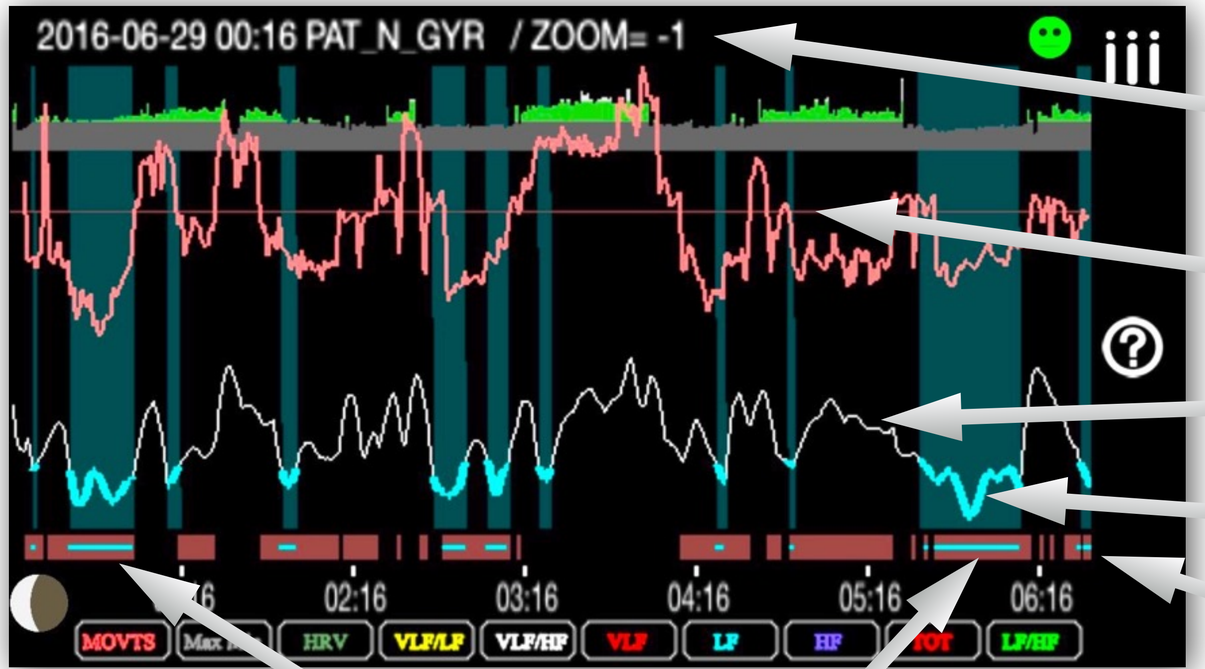




ZOOM factor



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



ZOOM factor

movements

VLF/HF ratio

Lower VLF/HF
Deep Sleep

Lower movements

Fit between
Lower movements
&
Lower VLF/HF