

Vivago® VITA activity curves and their practical use

Movement and activity

The Vivago system measures the movement and activity of the patient with the Vivago watch, both the amount and strength of the movements have an effect on the measurement results. A value representing activity, ranging from 0 – 100, is calculated for each minute, this value tells us the patient's activity during the period of one minute. The activity curve shows the patient's average movement and activity. Based on the graph we can make conclusions about the state and well being of the patient.

Activity curves in the analysis of circadian rhythm and sleep

Circadian rhythm and sleep can be analysed with the aid of activity curves derived from activity measurement (figure 1). A person's circadian rhythm and sleep quality, as well as daily activity reflect their state of health and well being. A person with poor health sleeps restlessly and is tired during the day. Many changes in state of health or functional ability can be detected from changes in circadian rhythm and sleep, and thus also on the measured activity curve. Continuous observation is important because it enables the detection of changes in the activity curve. Necessary care can then be given immediately and its effectiveness can be evaluated. The activity curve is effective in detecting general health problems, and evaluating the effectiveness of care when the ailment has already been identified.

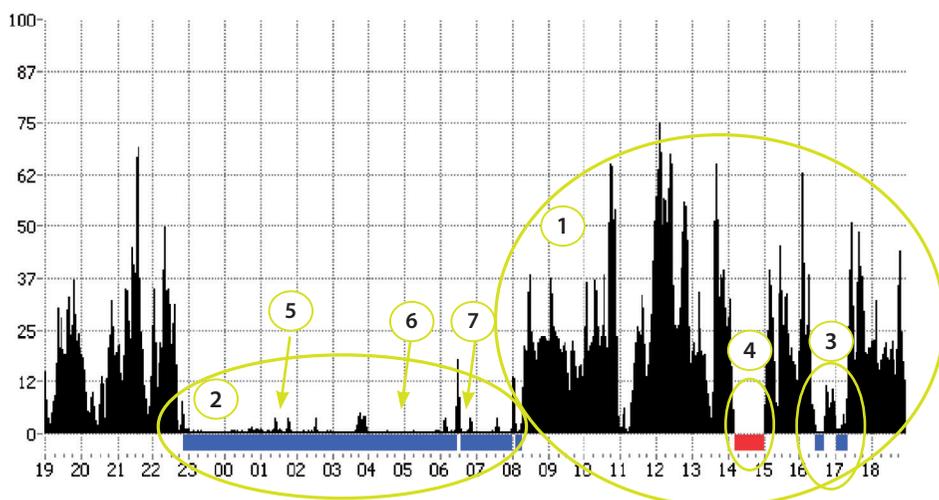


Figure 1. Activity curve depiction of a healthy person's sleep-wake rhythm.

One of a person's most important circadian rhythms is the variation of sleep and wakeful states, in other words the sleep-wake rhythm. A healthy person should naturally move sufficiently during the day and sleep peacefully during the night. Daytime activity curve values are large, and activity levels also fluctuate greatly (1). During the night, while the wrist unit's user is asleep the activity curve hardly moves, the curve has markedly smaller values than during the daytime (2). Activity levels also fluctuate during sleep. Sleep time differs, for this reason, clearly from the daytime wakeful state. With a glance then, we can determine when a person is asleep or awake based on the amount of their movement. Regular events during the 24-hour period can also be observed with the help of the

activity curve. For example a nap can be noticed as a short period of little movement in the afternoon (3). The user may be in the habit of taking a daily stroll at a certain time of day during which the wrist unit is out of signal range. There is a break in the activity curve at this time (4). During sleep time a person also moves from time to time. Sleep time movement can be seen as low activity (5), which is, however, markedly smaller than that during this person's wakeful time. During deep sleep, a person is usually still, and their activity curve can show zero (6). Night-time awakenings can be seen as periods of high activity during night hours (7). Good sleep should be sufficiently long, regular, continuous, and should include periods of deep sleep.

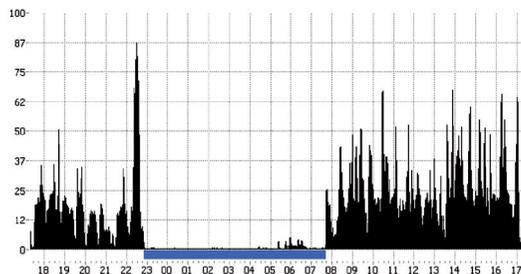
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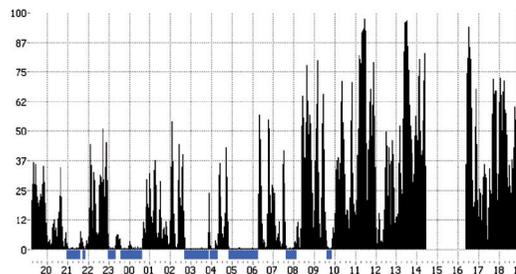
Comparison of a good and bad situation

1. SLEEP: awakenings, sleep time, regularity, and the time where sleep situates during a 24-hour period.

The blue line depicts sleep time estimated on the basis of the curve.

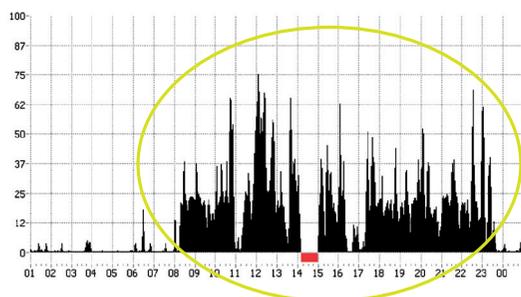


Good sleep: sufficient in length, occurs during night hours, no awakenings, several periods of deep sleep.

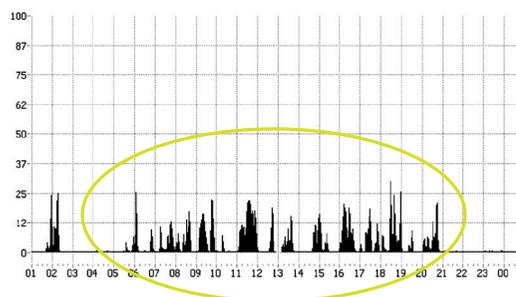


Poor sleep: several awakenings, long periods of wakeful time during night hours, the duration of sleep is short and fragmented.

2. WAKE: the level of daytime activity



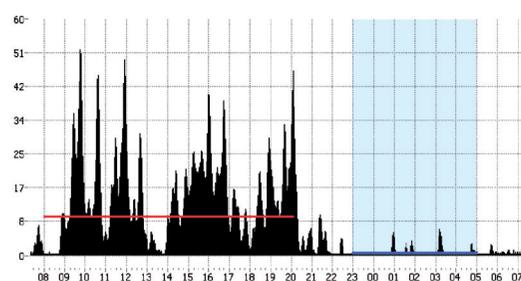
Good daytime activity: physically active with periodic rest breaks, outside in the afternoon (red line).



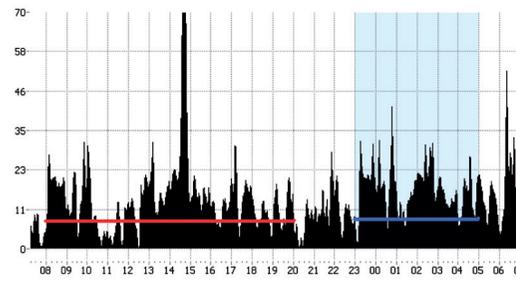
Poor daytime activity: low physical activity and also rests frequently during the day

3. RHYTHM: The relationship between night and daytime activity

In these diagrams the blue line depicts average nighttime activity and the red line average daytime activity



Good rhythm: night and daytime activity levels differ markedly.



Poor rhythm: night and daytime activity levels are similar.

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