

# Polygraphic record

## Definition

In medical terminology, the term "polygraphy", means simultaneous recording of biosignals of different (physical) nature. Not to be confused with a term from the printing industry! The overall polygraphic record has the final form of a graph or table of values, which clearly and concisely expresses the data obtained.

## Polygraph

It is a device that records several psychological values at once. E.g. blood pressure, heartbeat and pulse, breathing, the electrical resistance of the skin (which is related to, for example, sweating), the size of the pupil of the eye, etc. Sometimes its use is accompanied by stimulation, an intentional stimulus (flashing lights, a physical action, a logical task). In a forensic context, this device is popularly referred to as a lie detector and can be part of forensic analysis.

## Practical use

The polygraphic recording is mainly used in cardiology, angiology, physiology and psychiatry; in non-medical fields as well. e.g. in criminology and psychology.

### 1. Sleep laboratory

Sleep is a complex physiological state, the processes of which can be monitored using the polygraphic recording for the purposes of sleep research or diagnosis of sleep disorders (insomnia, sleep apnea, etc.). Sleep has several phases, the most important of which is the so-called REM phase (rapid eye movement), during which there is rapid movement of the bulb under closed eyelids (measured by the electrooculography method), the pulse and breathing rate are irregular, sometimes even accelerated, and the body temperature drops. Muscle tone decreases, but the motor activity of the muscles in the form of twitches may still occur. Dreams typically occur in the REM phase. The second main stage is NREM sleep (non-rapid eye movement). During it, blood pressure, heart rate and breathing rate decrease. Muscle tone is also reduced. The REM phase serves primarily for mental relaxation and the NREM phase rather for tissue relaxation. Some patient discomfort associated with the examination is expected. A key physiological function is the electrical activity of the brain as measured by EEG.

### 2. Stress laboratory

They are widely used in sports medicine, diagnostics and practical medicine. It takes on great importance in stress tests required for certain occupations – firefighters, professional soldiers, etc. The polygraph record is (unlike a sleep laboratory) taken during physical stress. We monitor heart rate, and ventricular activity using EKG; also respiratory activity, lung vital capacity, energy consumption, thermoregulation, total body blood flow, etc. Based on these data, movement speed, expended force and overall performance can be measured.

### 3. Sexological laboratory

This type of polygraphic record is used mainly in forensic medicine or psychiatry. The recording mainly focuses on the change in the intensity between blood flow to the genitals and their volume and temperature changes. To measure the volume, a so-called sexological plethysmograph/phalometer is used, which can also contain temperature sensors. So-called stimulus sets, audio or visual media are used as stimulation signals, in which neutral stimuli gradually transition to erotic ones. The polygraph record is part of an objective expert opinion, which can determine the degree of guilt of the defendant in cases of rape, etc.

### 4. Psychophysiological laboratory

On the basis of the polygraphic record, psychosomatic and somatopsychic links of the psyche and biological functions can be assessed. This area has a wide range of uses, both in scientific analysis and clinical diagnostics. It examines "brain strain", activation of individual centers during various activities, and emotional stress. It is also used in forensic medicine. The key signal here is the EEG.



Polygraph1

## Links

## Related articles

- Biosignals from the point of view of biophysics

## External links

## Related articles

- HEŘMAN, Petr. *Biosignals from the point of view of biophysics*. 1. edition. Praha : Dúlos, 2006. 63 pp. ISBN 80-902899-7-5.
- eng.Wikipedia. *Sleep* [online]. [cit. 2012-12-27]. <<https://eng.wikipedia.org/w/index.php?title=Sp%C3%A1nek&oldid=9405286>>.