

Better clinical management  
of the patient with  
Parkinson's disease



**PD-WATCH MEDICAL DEVICE**  
SYSTEM FOR RECORDING AND PROCESSING  
PARKINSONIAN PATIENTS' MOVEMENT DATA



## AN AID FOR THE HEALTHCARE PROFESSIONAL

The PD-Watch, acronym for Parkinson's disease watch, is a medical device that allows the recording and processing of data regarding the body movements of adult patients with motor symptoms of Parkinson's disease. Recording is continuous and long-term, with a maximum duration of 72 hours, substantially similar to a "holter". At the end of the recording, the PD-Watch provides data on the motor status of these patients, including information about tremor and dyskinesia. This way, the doctor can assess the severity of symptoms and motor signs and study how they vary throughout the day and from day to day.

The PD-Watch has been designed and developed to provide medical personnel with an aid to refine the patient's treatment plan in order to reduce symptoms and motor complications, ensuring that the patient spends more time in a normal motor state.



## CONVENIENT FOR THE PATIENT AND FOR THE HEALTHCARE PERSONNEL



The PD-Watch can be worn for 24 hours a day and does not interfere with the patient's normal daily activities.

The PD-Watch has small size, low weight and can be used in a hospital or home environment. The interface of the PD-Watch device is intuitive and very easy to use. Data processing takes place automatically through a dedicated cloud platform.

### Global results (numerical values)

The overall duration of tremor is **1.3 hours** in the acquisition interval.

The overall duration of dyskinesia is **4.0 hours** in the acquisition interval.

**TREMOR INTENSITY SCORE**  
**2.828**  
B<sub>p</sub> Index

**TREMOR DURATION (h)**  
**1.3**  
L<sub>p</sub> Index

**TREMOR DURATION (% of day)**  
**5.4**  
L<sub>p,%</sub> Index

**TREMOR INTENSITY + DURATION SCORE**  
**0.152**  
BL<sub>p</sub> Index

**DYSKINESIA INTENSITY SCORE**  
**82.752**  
B<sub>d</sub> Index

**DYSKINESIA DURATION (h)**  
**4.0**  
L<sub>d</sub> Index

**DYSKINESIA DURATION (% of day)**  
**16.8**  
L<sub>d,%</sub> Index

**DYSKINESIA INTENSITY + DURATION SCORE**  
**13.918**  
BL<sub>d</sub> Index

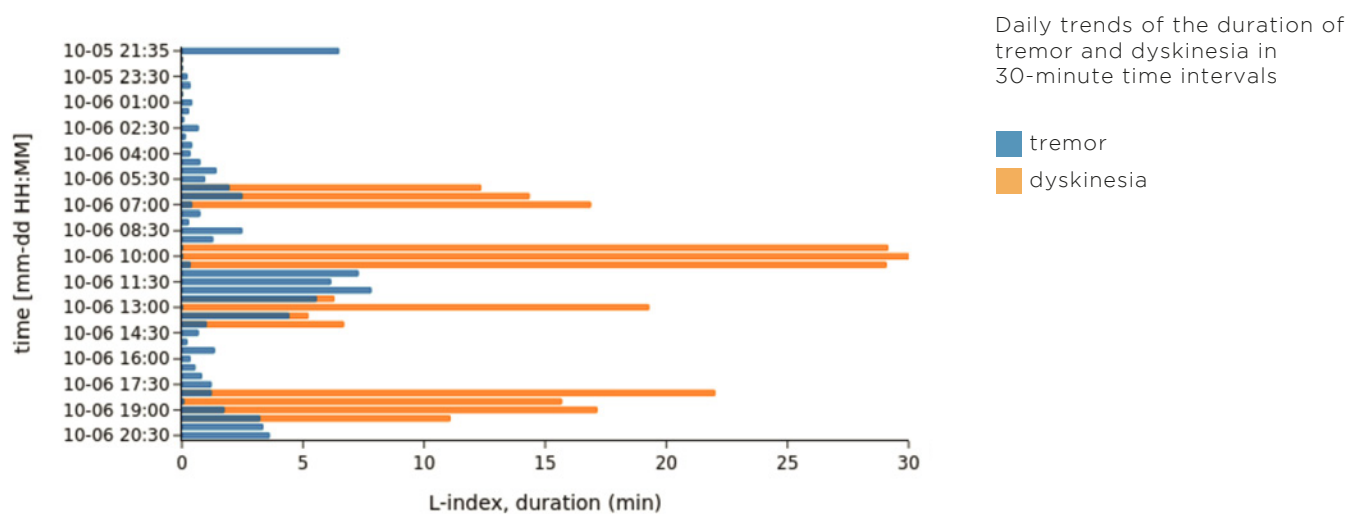
## GENERAL DESCRIPTION OF THE MEDICAL DEVICE

The PD-Watch allows you to record the patient's body movements through the use of a wearable system, set up similarly to a wristwatch, which includes a triaxial accelerometer and a memory support; this recording takes place at any time of the day and during the patient's daily activity. However, the recorded data includes both movements of physiological origin and those of pathological origin; therefore, at the end of the recording, the data stored by the wearable system are processed with the exclusive processing method of the PD-Watch, which was designed and developed to provide the doctor with an instrument and support to distinguish the two different types of movements. At the end of this processing, a report is generated containing the main information on the recording, including the overall duration of the tremor and dyskinesia during the entire recording, as well as the trend of tremor and dyskinesia during the entire recording.

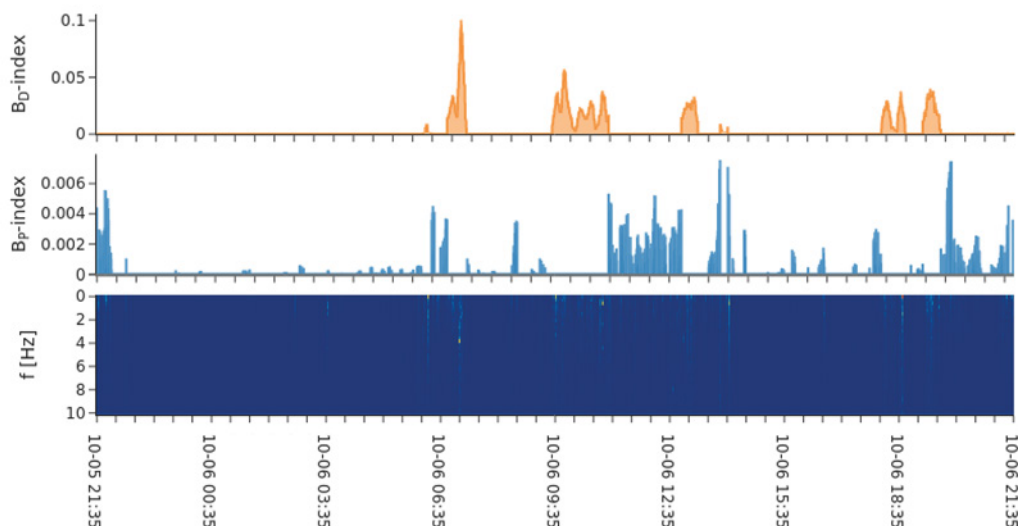
## MEDICAL DEVICE PROCESSING METHOD

Symptoms and motor complications can occur with frequency values that can be superimposed on those of voluntary movements, making it very difficult to distinguish one from the other with only frequency analysis. Therefore, in order to reduce the probability of error in the distinction between physiological and pathological movements, the PD-Watch processing method, besides verifying that the frequency of the movement falls within the characteristic frequency values of tremor and dyskinesia, also performs an analysis of the movement pattern to verify that it is actually due to a pathological movement.

For example, in the case of the assessment of tremor, the PD-Watch processing method, in addition to verifying that the frequency of the movement is that typical of Parkinsonian tremor, also checks that the movement occurs with the pronation-supination pattern characteristic of tremor at rest.



- graph with time course of the BD index on the intensity of dyskinesia during the day (in orange);
- graph with time trend of the BP index on the intensity of the tremor during the day (in blue);
- color image of the spectrogram with time-frequency analysis.



# Main Technical Features

## General features

Device model	PD-Watch Medical device compliant with EU Regulation no. 745/2017 (MDR)
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## Physical and mechanical features

Dimensions of the GENEActiv wearable registration system (watch case without strap)	43mm x 40mm x 13mm
Mass of the GENEActiv wearable registration system (watch case without strap)	16 g
GENEActiv main envelope material	PC/ABS
GENEActiv transparent window material	PC
Contact material for physical connection to the 4-way station	Gold plated
Strap material	PU resin

## Characteristics related to the protection from the external environment

IP protection degree	IP67
Operational temperature	5-40 °C
Mechanical impact	1m drop resistance

## Electrical data

Rechargeable lithium polymer battery	Power supply voltage: 3.7V Capacity: 190mAh (typical)
Battery charging time	2 hours to reach 90% of the total charge 3 hours to reach 100% of the total charge
Battery charging mode	Through 4way station connected to PC with BLsuite
Number of devices that can be recharged at the same time	4

## Input

Accelerometer	MEMS triaxial accelerometer Measuring range: -8g to 8g Resolution: 3.9 mg
Switch	Membrane

## Performance related to configuration, recording and storage

Recording duration settings	24 h, 48 h, 72 h
How to start recording	When the switch is pressed, When disconnecting from the 4-way station, At a set time
Percentage of battery used during recording (typical values)	5% for a 24 h recording starting from a fully charged battery

## Key information on tremor and dyskinesia provided at the end of the execution of the processing method

<p>Tremor:</p> <ul style="list-style-type: none"> <li>✓ Tremor duration index: <math>L_p</math> index</li> <li>✓ Tremor duration index expressed in percentage terms: <math>L_p, \%</math> index</li> <li>✓ Tremor intensity index: <math>B_p</math> Index</li> <li>✓ Index concerning the combination between the duration of the tremor and the intensity of the tremor: <math>BL_p</math> index</li> </ul>	<p>Dyskinesia:</p> <ul style="list-style-type: none"> <li>✓ Duration index of dyskinesia: <math>L_D</math> index</li> <li>✓ Duration index of dyskinesia expressed in percentage terms: <math>L_D, \%</math> index</li> <li>✓ Intensity index of dyskinesia: <math>B_D</math> index</li> <li>✓ Index concerning the combination between the duration of dyskinesia and the intensity of dyskinesia: <math>BL_D</math> index</li> </ul>
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The images shown in this manual are purely illustrative.

The decision to use the PD-Watch to record and process patient data is made exclusively by or by order of a physician.

The PD-Watch medical device can only be used by healthcare professionals as described in the user manual.

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