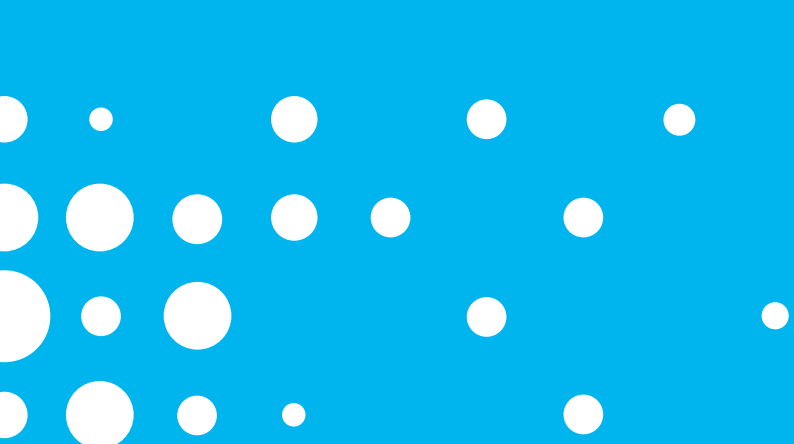




Life in motion

Fesia Walk, the new concept of Functional Electrical Stimulation (FES) for **DROP FOOT** patients

 fesia



The problem

Neurological diseases can affect motor control capability or, in severe cases, may cause a complete absence of muscular function; but the **nerve conductivity and the excitability of the muscles remain**. Because of this, Functional Electrical Stimulation (FES) technology, using electrical current to activate the nerves can, as a result, activate the muscle.

The actual **incidence of stroke is between 1.254.000 and 708.000** (27-EU).

Approximately **20%** of stroke survivors present **pathologic steppage gait**.

The new **potential users** of FES technology each year are **between 250.000 and 141.000**.

The average life expectancy after stroke is 8 years, so there are **between 1 and 2 million potential users in EU** right now.

Our solution

Fesia Technology

Our **Fesia Technology**-based devices enhance the capacity of FES by applying it through a multipad electrode. They all have some common elements and are based on a modular concept:

A flexible garment that adopts the shape of the extremity/body segment where it is placed.

A multipad electrode attached to a plastic socket.

A stimulator.



The stimulator communicates with a PC, tablet or smartphone using serial communication over **Bluetooth**, a wireless interface. It can modulate the electrical impulse in **frequency, amplitude, pulse width and pulse compensation**. Each one of the pads is **fully controllable** and thus **asynchronous activation of motoneurons** is possible, which is important for **fatigue reduction**.

Asynchronous activation also **improves the muscle selectivity**. The multipad electrode is designed specifically for each muscle group and therefore reinforces the selectivity and also includes sensor elements, which **facilitates the assessment of the user's movement**.

fesia



Fesia Walk

Patented Product for Drop Foot Patients

fesia

Fesia Walk



Our **Fesia Walk** patented product for drop foot patients has a **16 pad electrode** attached to the garment. The garment embraces the shank just below the knee. The system also includes an Inertial Measurement Unit (IMU) sensor located and tied to the users shoe laces that **continuously monitors** the gait movement of the leg and **determines the right point of time when the stimulation for dorsiflexion should be applied.**

fesia

Competitive advantages

HIGHER AUTONOMY OF THE PATIENT

No external help is needed. The system donning and doffing can be done using the healthy and paretic hand (to hold, not to grasp). Single handed donning and doffing has been proven in real patients.



REHABILITATION AT HOME

The use of **Fesia Walk** at home will give autonomy, independence and improve the quality of life for chronic patients. This advantage will also mean a substantial reduction of waiting lists, health costs, number of physician office visits, and third party dependence.

OPTIMISED GAIT REHABILITATION

Gait speed is increased up to 35% as well as improved gait symmetry. The number of falls is reduced up to 90% and use increases the total number of steps per day (up to 18%).



BETTER PATIENT MONITORING

The system's data logger monitors its use (swing phase duration, stand phase duration, stride length, clearance and others) and generates reports that are useful for the doctor to optimize future treatments.

BETTER SELECTIVITY OF STIMULATION

Using a multipad electrode enables selective activation of desired muscles, improving the quality of induced movements (dorsiflexion, plantar flexion, inversion and eversion).



REAL-TIME ADAPTATION

The system is able to dynamically modify active stimulation patterns for maintaining or improving the quality of induced movement.

FAST SYSTEM SETUP

The muscle twitch based calibration significantly reduces Fesia Walk setup duration. The automated algorithm uses IMU subsystem feedback as a reference for deriving a transfer function between selected stimulation pattern and elicited movement.



LESS FALSE POSITIVES

Thanks to the gait phase detection algorithm, and sensor information there are fewer muscle activation errors.

Fesia is a technology-based company launched by the applied research center TECNALIA, through its FIK initiative, aiming to develop a new approach to Functional Electrical Stimulation (FES) products for people affected by neurological diseases.

Fesia takes Functional Electrical Stimulation to a higher standard, enabling better functioning and assessment during rehabilitation therapies and bringing added value to all healthcare actors: patients, doctors, hospitals and insurance companies.



Company powered by **FIK**



Parque Científico y Tecnológico de Bizkaia
C/Geldo, Edificio 700 (T4)
E-48160 Derio (Spain)
T. 902 760 000*
T. +34 946 430 850 (International Calls)
info@fesiastechnology.com
www.fesiastechnology.com