

mHealthySleep: Early detection, assessment, and personalised management of sleep disorders at home

Challenge

In recent years, **sleep epidemiology** has become a rapidly growing field. **Obstructive sleep apnea (OSA)** is one of the most common sleep disorders, with a prevalence ranging from 9% to 38%, more present among the elders. It induces intermittent hypoxia and microarousals, producing sleep fragmentation, generating daily fatigue and sleepiness. When left undiagnosed nor treated, it boosts the risk of cardiovascular and cerebrovascular morbidity and mortality, representing a challenging medical issue.

Current **diagnostic techniques** leave most patients undiagnosed and thus untreated. The diagnostic gold standard, polysomnography (PSG), is an overnight multi-signal recording technique which requires very specific equipment and patient hospitalisation. Its high cost and complexity, the discomfort for the patients, and the rely on a single night acquisition limits its use for screening, in-parallel patient evaluation and monitoring. The relative low cost, ubiquitous availability, and high quality of **smartphone sensors** have led to their extensive use in mHealth applications, including **sleep medicine**.

Market

Remote patient monitoring (RPM) market is predicted to **reach \$760M by 2030**, up from \$548.9M in 2020. Trends such as management of **chronic diseases and aging population** urge for decrease of healthcare costs. The global sleep apnea devices market size was valued at USD 4.2 billion in 2022 and is expected to expand at a compound annual growth rate (CAGR) of 6.2% from 2023 to 2030. Integration of enabling technology for RPM in the healthcare system has the potential of a huge social impact in patient care. Furthermore, following COVID-19 pandemic, **patients** have become more used and **comfortable in using RPM system**, being more aware, as taxpayers, of the overall importance for these solutions in terms of efficiency and cost reduction.

Asset

A new mobile health (mHealth) system for the diagnosis, monitoring and treatment of OSA and sleep disorders at home. Main strengths of our technology are:

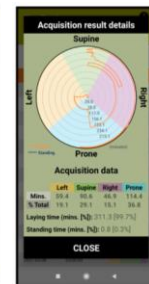
- A **diagnostic algorithm** that integrates audio and accelerometer signals coming from a mobile phone device with the aid of simple wearables (optional use of an oximeter)
- A personalised and high-resolution sleep position monitoring, by calculating the sleep angle, and its correlation with apnea events (current methods consider just 4 classical positions)
- **Positional therapy** based on programmable vibration of the mobile phone. It can be delivered from the app to avoid sleeping in apnea-inducing angles, thus reducing obstructive events.

Asset Value

- ❖ Use of **mobile phone sensors** for OSA diagnosis and monitoring
- ❖ **Ultra-precise report of sleep angles**
- ❖ Delivery of personalised **positional therapy** to avoid resting in apnea-inducing angles
- ❖ **Implementable** as a mobile application for OSA, SCI, sleep disorders



OSA detection and positional therapy within a mobile phone



Uses

- ❖ Patients with Obstructive Sleep Apnea (OSA)
 - Easy at-home diagnosis/monitoring
 - Personalised positional therapy
- ❖ Patients with Spinal Cord Injury (SCI) and Sleep Disorders
 - Early diagnosis/monitoring
- ❖ Healthy subjects / snore disorders
 - Monitoring of sleep quality
 - Personalised positional therapy

Team

Raimon Jané - Scientific Leader
Martina Giovannella - Tech Transfer Manager
Eduardo Salas - Head of Tech Transfer

Stage of Development

TRL 4/5: small-scale studies on healthy subjects and patients, at hospital and at home

- Test of the algorithm of audio or accelerometer vs PSG to detect apneas and hypopneas (13 subjects)
- App use during a whole night in sleep position diagnosis mode (17 subjects)

What are we looking for in 2023-2025?

~450k € for technical development, validation in clinical settings, market study, stakeholder involvement, business plan, detailed regulatory roadmap assessment to reach the market through spin-off creation in 3-4 years.

Intellectual Property Status

A patent that protects the method and the system was filed with priority date in July 2022. The patent is owned by IBEC and UPC.

Exploitation Plan

Spin-off creation / Technical co-development

Contact

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