



MARKET CHALLENGES

Back pain is accelerated by a sedentary lifestyle. Indeed, employees can spend until 8 hours seated in front of their computer. Lumbago and neck pain, which can ensue from it, could be partially avoided thanks to a better global posture.

Treating back pain constitutes a real medical economic stake:

- 80 % of the French population will once be affected by back pain at least once in their lives
- Back pain is the 2nd cause of doctors consultation in France (9 % of the consultations)
- Back pain represents 7 % of the sick leaves
- Prevalence of neck pain oscillates between 12 and 34 %
- Prevalence of dorsodynia oscillates between 9 and 18 %
- 50 000 people invalidated by back pain per day

Thus, solutions must be developed to prevent and handle this pathology. The existing devices present limitations slowing down their use. Indeed, they **do not give an accurate feedback taking into account an appropriate muscular activity**. Furthermore, their use is **not followed by a healthcare professional**.



INNOVATIVE SOLUTIONS

This project concerns the development of a wearable technology in the form of ergonomic shirt combined with sensors and an embedded system. This connected device is a smart textile allowing to maintain or to recover a good posture by a voluntary and rehabilitative gesture.

Sensors positioned on the back and the thorax of the patient are used to measure the skeleton position and the electric activity of some muscles. The "**Biofeedback**" device measures the patient posture to warn him, via an alarm system, of a possible bad situation in order to correct it. If a **bad compensation strategy** is adopted, the device warns the patient by the same actuator. On the other hand, the device is capable of deducting the progressive installation of a **muscular fatigue** to invite the user to rest, to stretch or to move.

Feedback is introduced according to margins around calibration values (concerning the good personalized posture) defined, during the first use, **by a qualified healthcare professional**.



SUGGESTED APPLICATIONS

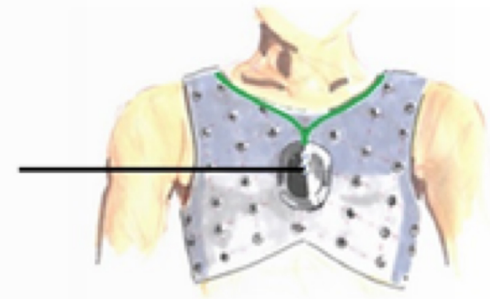
To maintain or get back a good posture to decrease back pain



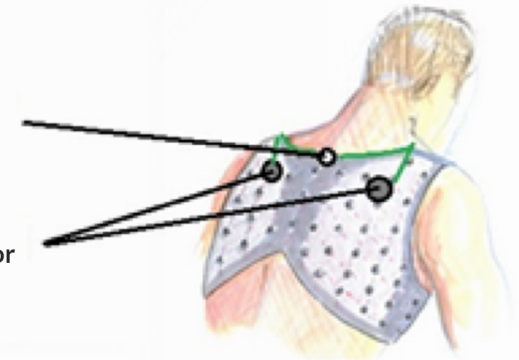
DEVELOPMENT STATUS

A functional prototype is under development.

Control electronics, battery,
position sensor, bluetooth



Position sensor at C7



Muscular activity sensor



COMPETITIVE ADVANTAGES

- Measurement of muscular activity and installation of the muscular fatigue
- Personal data protection
- Light, simple and discreet device
- Autonomous device
- **Adaptable:** detection of a bad situation can be made in **static position** (seated and standing) but also **dynamically** during movement and during positions changes
- Follow-up by a healthcare professional

