Researchers develop a new distance rehabilitation system for patients with heart pathologies

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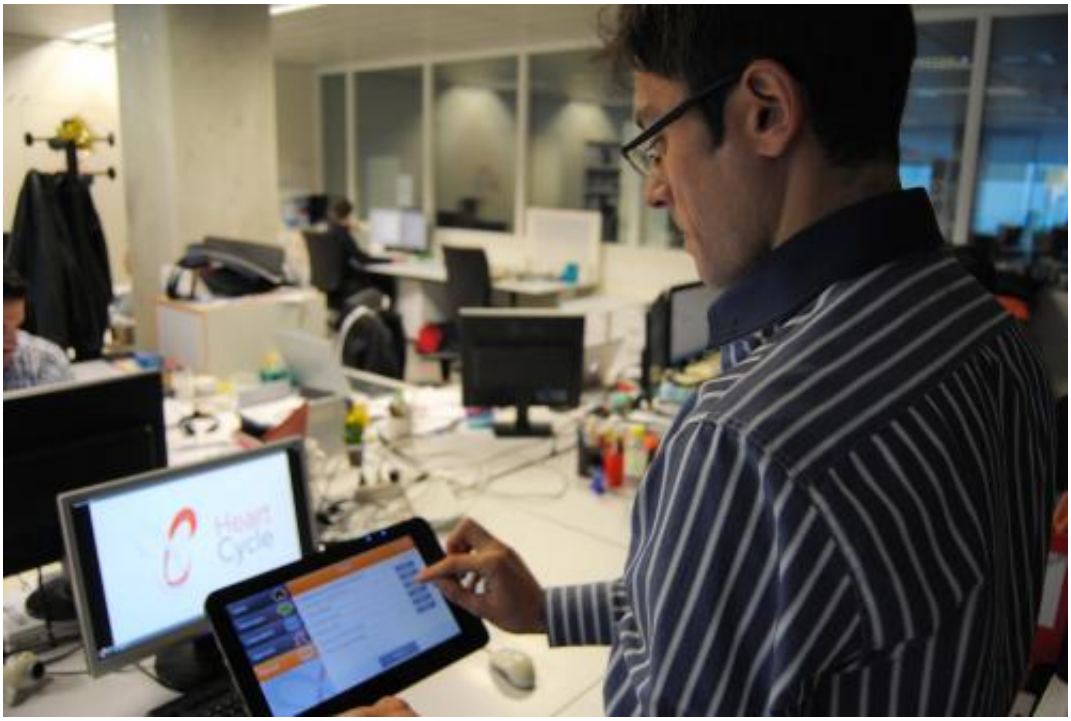


HeartCycle GEx. Credit: Instituto ITACA-UPV

A team of Spanish researchers has participated in the development of a new distance heart rehabilitation system based on physical exercise routines for people affected by heart pathologies.

The system is designed for both chronic patients and the recovery of

people who have suffered a heart event (for instance, a heart attack) or who have had heart surgery. In any of these cases, it helps patients to exercise and adopt a healthy lifestyle.

HeartCycle GEx has been developed within the European project HeartCycle. This system creates an online connection between the cardiologist in the hospital and the patients in their homes. The latter, equipped with sensorized t-shirts, do the rehabilitation exercises while their mobile telephones receive all the information about their heart and respiration rate, and messages to make more or less effort according to the doctor's instructions, etc.

Its main advantage is its ability to motivate patients; GEx helps patients follow the rehabilitation program in an easier and more entertaining way. To that end, GEx incorporates multimedia content, an avatar, as well as graphic information about the indicators related to the patient's performance (heart rate, effort level, etc).

"The Achilles' heel of heart rehabilitation is that patients abandon it in a few weeks, so its effect is watered down. If the user is motivated, the level of compliance will increase and their health will improve. The most important aspect is to improve adherence to the rehabilitation plan and maintain it over time, and this system does just that", explains Álvaro Martínez, researcher at the ITACA Institute of the Universitat Politècnica de València.

In addition, GEx will be connected to the hospital information systems in order to guarantee optimum, personalised health care for the patient. The system enables each user's condition to be monitored and the response to the instructed therapy assessed, so personalised plans can be created and any deterioration in health status that requires immediate intervention can be detected.

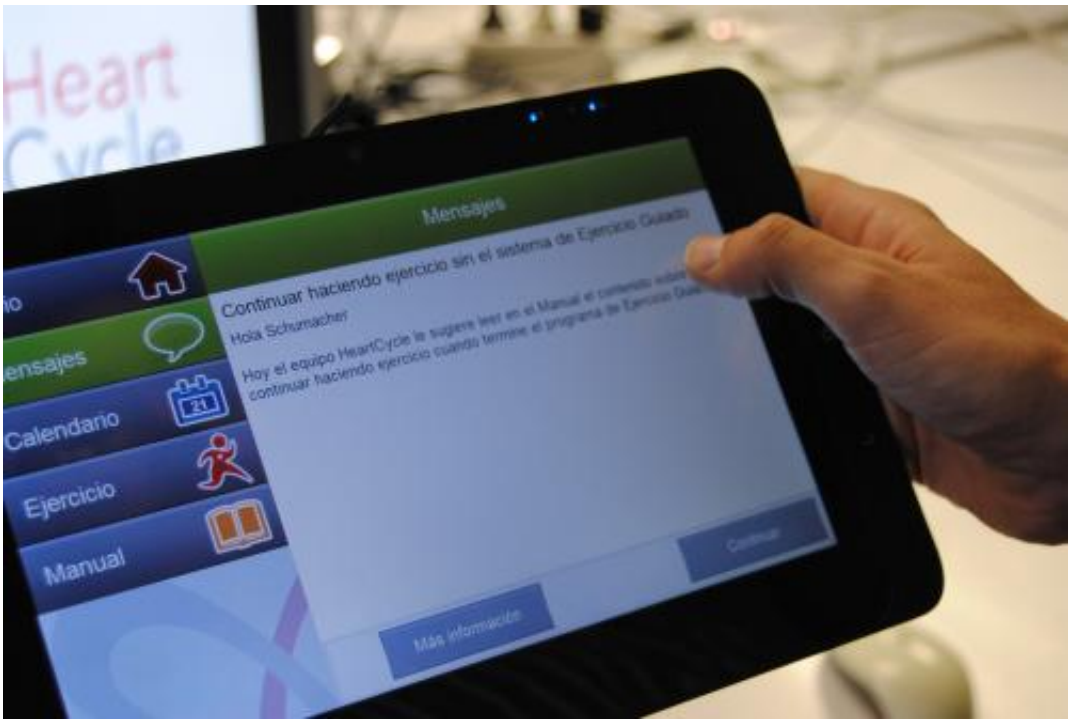
The doctor has a web application in which to program the personalised rehabilitation plan that is sent to the patient - the prescribed plan is adapted to the patient's physical condition, who performs an effort test - to design the most suitable prescription possible.

"Every time the patient does one of the exercises, the system sends new data, so the doctor can immediately determine whether the patient's effort meets the standard set and make adjustments to the prescription if necessary", adds Álvaro Martínez.

This doctor's web application was entirely developed at the ITACA Institute of the Universitat Politècnica de València.

"Today, the heart rehabilitation programs in Spain take place in hospitals or specialized centres. HeartCycle GEx is a different and convenient alternative to access to those programs since the patients can follow them anywhere, even at home, maintaining the level of health care that they receive", says Cecilia Vera, researcher at the Life Supporting Technologies Group of the Universidad Politécnica de Madrid.

Validation in hospitals



HeartCycle GEx. Credit: Instituto ITACA-UPV

GEx has been validated with 132 patients at three hospitals in Spain, Germany and the United Kingdom and, according to the tests performed, it provides better results than traditional rehabilitation programs, "This improvement is seen in the patient's functional capacity, as well as in weight loss and a reduction in cholesterol levels", says Álvaro Martínez.

"HeartCycle GEx is an initial step to the new heart rehabilitation systems of the future, providing personalised solutions, adapted to each patient and accessible from any location", adds Cecilia Vera.

The results have been released in the *European Journal of Preventive Cardiology.*

More information: Skobel E, Martinez-Romero A, Scheibe B,

Schauerte P, Marx N, Luprano J, Knackstedt C."Evaluation of a newly designed shirt-based ECG and breathing sensor for home-based training as part of cardiac rehabilitation for coronary artery disease." *European Journal of preventive cardiology*. Noviembre 2014. DOI: 10.1177/2047487313493227