

Smart shirt aids lung patients

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A smart shirt can measure lung function with patients and coach the wearer on behavior. This project result is delivered by Kinetic Analysis B.V. and QUAD Industries who have worked together on this medical innovation for 15 months.

The two companies combined their expertise in data science and printed electronics. The challenges for the consortium were mainly in the field of technical innovations.

Maarten Gijssels, clinical health scientist and project initiator: "The goal was to create a total proposition in which a smart shirt is central to the data collection of vital functions."

The shirt is able to measure respiration and transmit the measured data to the patient via a mobile app. The caregiver and healthcare professional can also be given access to the daily collected data in order to create a safety net around the patient and to increase the feeling of safety and self-management.

To maintain wearing comfort, but also to send electrical signals reliably, Quad Industries focused on the integration of flexible, electronic conductors in the shirt. It was investigated which materials and processes were best suited to achieve a smart, comfortable and washable E-shirt. By screen printing stretchable conductive inks on thin films and then transferring them to the shirt, very little weight is added to the fabric and electrical connections are not felt, resulting in maximum wearing comfort. A smart connection is then made with the Kinetic Analysis diagnostic device that sends the data.

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Daily practice

The smart shirt can assist people with various lung diseases. Within this project a specific group was chosen, namely people with Chronic Obstructive Lung Disease (COPD). In the Netherlands and Belgium together, approximately 1.3 mln people suffer from COPD. COPD ranks sixth among diseases that cause the highest mortality. The World Health Organization (WHO) predicts that COPD will be the third leading cause of death by 2030.

People with COPD have difficulty breathing and have less energy. The patient simply has less oxygen. As a result, normal things can be difficult. Such as climbing stairs, shopping or getting dressed. Especially in these situations it is difficult to take measurements regarding breathing. With this smart shirt this is now possible in daily life. This will undoubtedly result to innovative insights.

Personal coach

All facets of the shirt have been thought through. For example, we examined with the target group which color and which design the shirt should have. Eg. opted for a low neck to avoid feeling constricted and specific textiles that can breathe under everyday clothing. Marell Talsma, nurse with a minor in health care technology and a student in Health Innovation: "The product must not only be functional, but also have real value for patients."

Less in the hospital

Several studies show that smart clothing can effectively help to reduce hospital stays. This project also shows that in addition to the positive impact on quality of life, economic gains can also be achieved. With a smart shirt, the patient can be discharged from the hospital more quickly and then monitored and coached remotely. Unfortunately, due to the COVID crisis during this project, this study could not go ahead. So, high on the wish list is a follow-up that helps guide patients after discharge from the hospital. In any case, the parties are satisfied with the result achieved in these special times. The developments have quickly made themselves known in the international circuit, as they have been invited to use the shirt for rehabilitation in people after a COVID infection.