VitalWear

Autonomous Assessment of Pressure Ulcer Risk

VitalWear uses optical fiber sensing technology to monitor relevant parameters for non-invasive medical applications. Photonic measurement technology is integrated into textiles such as bed sheets, mattress covers or clothing, which enables continuous and autonomous patient monitoring with high patient comfort and with low effort for the care providers.

VitalWear initially focuses on pressure ulcer prevention, via improving patient-specific risk assessment and facilitating early detection. Its solution significantly reduces the time that the nursing staff needs to spend on prevention protocols and helps to achieve lower pressure ulcer prevalences.

PROBLEM

Pressure ulcers are a significant global health problem of increasing importance. Especially older people are affected when they become immobilized for various reasons. Prolonged pressure on tissue on the bony areas of the body can lead to cell damage and cell death, and to open wounds that can become very serious and even life-threatening.

Pressure ulcers are very painful for patients, require long and labor-intensive treatment and are very costly for the healthcare sector. The development of a pressure ulcer is very different for each individual patient, and early detection is difficult and often not possible.

Pressure ulcers can in principle be avoided by frequently inspecting and repositioning at-risk patients, but, mostly due to the shortage of trained nursing staff, care institutions often are not able to operate an optimal pressure ulcer prevention protocol.

TECHNOLOGY

Optical fibers with integrated Fiber Bragg Grating sensors measure form changes on nanometer level with a very high sensitivity and reliability.
These form changes correspond to relevant measurement parameters, such as mechanical force (pressure, strain, shear), temperature or humidity, which can, in combination with smart algorithms, be used to draw conclusions about the condition of a patient.

The optical fibers can be integrated into textiles to create sensor surfaces with a suitable resolution of sensor points, which can be easily deployed in various care environments.

As the sensors are sensitive to a variety of influences at the same time, the separation of the different measurement parameters from the measured signal is a critical competence.

SOLUTION

The VitalWear solution consists of textile bed sheets or clothing with integrated optical fiber sensors. The continuously and autonomously acquired measurement data is algorithmically translated into an assessment of the patient's current risk for the development of a pressure ulcer.

IMPACT

By continuously and autonomously monitoring the pressure ulcer risk of patients, the required effort that the nursing staff needs to allocate to pressure ulcer prevention is significantly reduced.
The early detection of developing pressure ulcers enables interventions at an early stage, which helps to reduce the prevalence of pressure ulcers, especially for the more harmful and more costly higher-level pressure ulcer categories.

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