Dutch researchers develop technology for pain monitoring

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Ten of thousands of patients suffer chronic pain as a result of operations, and this continues even after the wounds caused by the operation have healed. Researchers from the MIRA research institute - the University of Twente's Research Institute for Biomedical Technology and Technical Medicine - have now developed a portable system that can be used to measure patients' sensitivity to pain. The readings show which patients are likely to suffer chronic post-operative pain.

Some 10 to 25 per cent of all patients who undergo a minor operation, such as for a hernia or breast enlargement, are subsequently affected by chronic pain - in other words, tens of thousands of people are forced to endure pain on a daily basis after operations of this kind. In the case of more serious operations, the proportion is as high as 30 to 50 per cent. Chronic pain is defined as pain that can still be felt six months after an operation; that is, after the wound caused by the operation has healed.

It is still not entirely clear what causes chronic pain, although it is known that hyperalgesia (heightened sensitivity to pain) plays a key role. In cases where post-operative pain becomes chronic, hyperalgesia spreads slowly from the area of the operation to other parts of the body. If it is possible to establish whether or not the increased sensitivity to pain will spread, it can be determined more quickly whether or not the pain will become chronic.

Scientists from the MIRA research institute at the University of Twente have now devised a mobile system that can measure sensitivity to pain

simply and objectively. Thanks to their system, it will soon be possible to measure the spread of hyperalgesia and so discover whether or not pain will become chronic.

The system designed by the Twente researchers, which they have dubbed NociTRACK, consists of three parts: a device the size of a large mobile phone, which measures pain sensitivity, a PDA for collecting the data, and a central database that compares the data from individual patients with previous measurements from the same and other patients.

The device that takes the readings contains two electrodes, which are placed onto the skin. As soon as the patient presses a button on the device, it starts to emit weak electric pulses. These gradually become stronger and stronger, and once the patient finds the pain too uncomfortable, he lets go of the button and the pulses stop. This is registered as the patient's pain threshold and by comparing it to earlier readings, it is possible to determine whether he has become more or less sensitive to pain, or whether there has been any change at all.

There is also the option of using the system for measuring the pain detection threshold, where the patient stops pressing the button as soon as he starts to feel the pulses, and the pain tolerance threshold, in which case he releases the button when the pain is too great to bear.

With the help of larger localized facilities, the possibility of conducting measurements of this kind already existed. However, what makes NociTRACK unique is that a large number of patients can be monitored at any time and in any location, not just in a single examination room or with a fixed piece of equipment.

The NociTRACK system can be used for measuring pain sensitivity objectively. The researchers believe it will reveal at an earlier stage than is now the case whether the post-operative pain being felt by any given

patient will become chronic. In turn, this means that any relevant therapy can be started much earlier. Another feature of the system is that it can assess objectively how effective pain medication is, something that will be useful in the development of new medicines.

A patent for the system has now been applied for. As soon as it has been granted, the system will be developed further, either in an existing firm or a new spin-off company. The researchers are currently in the process of forming a group of researchers and clinicians who will be using the device.

Provided by University of Twente (news : web)