

## Implantable Technologies



Around the world, healthcare costs are rising and healthcare systems are under more and more pressure. With increasing populations and higher demand for healthcare services, increasing efficiency is key to improving patient services. At the centre of these efficiency increases is the use of technology, which is used in various ways across the healthcare system, with one method being that of implantable technology. There are a number of reasons why implantable technologies in healthcare are needed: the need to move patients from hospitals as quickly as possible to free up bed space, the demand from patients to live an ordinary lifestyle, and the rising cost of assisted living, to name but a few. However, this gives rise to two questions: if having technology placed on or inside us removes the strain from healthcare systems and improves lives, is it inevitable that we will start to replace all of our failing “components” with technology, and where does this lead to?

The first part of this question can be answered by considering what exists already. Implantable technology can enable people with health issues to lead a normal lifestyle. Patients who suffer from cardiac arrhythmias (abnormal heart rhythms) can have a pacemaker fitted to ensure that their heart operates normally. In more severe cases, an Implantable Cardioverter Defibrillator (ICD) will send electrical impulses of varying sizes to the heart to attempt to maintain rhythm and can even restart the heart.

For diabetic patients, blood glucose monitoring is a constant concern, and semi-implantable sensors are now available to track blood glucose levels. Another use is for patients with chronic pain, who can have nerve stimulators fitted to their spinal cord to interfere with the pain signal which reaches the brain, thus allowing patients to perform daily activities with up to 70% less pain than before.

Patients who are on long term medication for mental health issues such as schizophrenia, can take new “digital-pills”. These are like any other medication, but with the difference that they contain small sensors and communicate with either a smartphone application or with a wearable patch. It can show if the patient is taking their medication properly and the effect it is having on them.

Technologies such as those which have been mentioned often send or store patient data (although not all are capable of this). This can then be made available to the patient themselves but also to doctors. The advantage of this is that the doctor can remotely monitor their patient, saving time. However, the controversy is that this can become a healthcare 'big brother'.

The second part of the question is perhaps more philosophical. There is, in many of us, a drive to exceed our potential. In some, this can be on a mental level, but in others on a more physical plane. There are limits to what the human body can achieve and there are those who wish to alter themselves physically beyond the existing human abilities. The possibilities might include enhanced communication, enhanced senses and increased strength. There are already implants for the ear, and research for retinal prosthesis systems for the eyes is progressing. There are also implants for the nervous system, which allow the control of prosthetic limbs.

There is no denying that there are many who do benefit from implantable technologies. Healthcare systems can reduce costs and improve efficiency, while allowing patients to lead normal and healthy lifestyles. However, there may come a time when technological implants overtake our natural physical abilities, at which point we have to ensure that our drive for improved physical abilities does not outweigh our drive for mental improvement.