Prosthetic devices

Health & Medicine

Prosthetic Devices A prosthetic is an artificial body part that replaces a missing or non-functioning body part such as an arm, heart or breast. Humans have been making prosthetic limbs since the Ancient Egyptians to replace limbs lost during battle, work or just by mistake. Evidence has been found of Egyptians trying to replicate toes with copper ones. Although these were very impractical as they were solid and so were mostly for aesthetic purposes. In the 1400s, prosthetics arms made out of iron were available to wealthy Knights and lords.

These arms had a relatively useful function as they were made to hold shields, allow them to open their purse and/or sign their name. As well as for function, prosthetic limbs are also developed for aesthetic purposes as people want to look normal and not attract stares or whispers. Prosthetic Arms Modern prosthetic devices have advanced a great deal since ancient times. Now, some very complicated robotic limbs are available that can detect the electrical impulse that would normally move your arm and replicate this movement robotically.

Robotics in prosthetic devices is seen mostly in robotic arms because of the nature of the movement of fingers and the thumb. Advancements in the processors used in myoelectric (robotic) arms has allowed for artificial limbs to make fine-tuned movements with the prosthetic. This is extremely significant as previously robotic arms had only one or two movements such as closing the thumb to the hand to hold things. Modern fine-tuned arms can have up to 7 movements and it is likely that they will advance to have even more movements than a human hand.

A future advancement that is being researched and developed is the addition of a sense of touch that would be able to detect, and then relay to the brain the amount of pressure being applied. It is currently being experimented to add small pods filled with a highly compressible liquid at the end of each finger. Inside each of these pods would be a pressure sensor that would compress as force is added with the robotic finger. The pressure sensor would then sense the amount of force being applied and relay this to the central processor which would translate this to an impulse to send to the brain.

An alternative to relaying it to the brain is to have a small display or other indicator that shows the amount of force being applied by each finger. Although this is easier to develop, most people wouldn’t like the indicator over each finger or on the wrist as it wouldn’t look at all natural. Although there have been many advancements in robotic arms, they are still very much a crude replacement to a real arm. They have to be replaced every 3-4 years, there function is still much slower than real arms and fingers, and the intricacy and delicacy possible by real fingers is currently far superior than the robotic replica.

Bionic Eye The Bionic Eye was developed to restore the vision of people that lived in total blindness, or very low vision. The first prototypes are now developed but they are researching ways to improve them as although they are functional and can convey an image to the brain of blind patients they only send an extremely low quality image in greyscale to the brain that is only useful to avoid walking into large objects such as buildings, cars and

tables. The reason for this low quality image is because there are 98 electrodes in the chip that connects to the optic nerve.

This is a very small amount when you compare it to over 120 millionphoto-receptor cells. The chip developed has about 1 000 000 wires connecting it and is one of the most complicated neuro-stimulation chips ever designed. Although it seems as though good vision will not be possible with the bionic eye for a long time to come you can have far less receptors than that to have adequate vision to love independently. Researchers are hoping to include about 1000 electrodes in the next generation of the bionic eye and believe that this is enough to allow people to recognise faces and read large print.