deep brain stimulation therapy (DBS)

There are several ways to treat epilepsy, and how well each treatment works varies from one person to another. DBS therapy aims to reduce seizures which are not controlled with medication, and where surgery to treat the cause of seizures is not possible.

what is deep brain stimulation therapy?

Deep brain stimulation (DBS) therapy may be used for people whose epilepsy is difficult to treat, and who cannot have surgery to separate or remove the part of the brain that causes seizures to happen. So DBS therapy aims to reduce seizures but not necessarily to cure epilepsy. DBS therapy involves implanting electrodes into specific areas of the brain, and then stimulating these areas with small, regular electrical impulses.

the current situation in the UK

DBS therapy is a fairly new treatment for epilepsy and has been shown to be helpful for some people whose seizures cannot be controlled with other treatment.

As with all new treatments, DBS therapy is being researched. The National Institute for Health and Care Excellence (NICE) has looked at evidence on DBS therapy to make sure that it is both effective and safe. NICE does not make decisions about whether the NHS should fund a treatment.

Currently, there is no NHS funding for DBS therapy in the UK, but individual specialist doctors can make special arrangements with their Clinical Commissioning Group (CCG), if they want their patient to be offered DBS therapy.

what NICE says about DBS

NICE recognises that difficult to treat epilepsy can cause serious disability and distress and, for some people, a risk of dying. NICE says that any treatment that can help to reduce seizures, lower risks, lower the amount of medication needed or otherwise improve quality of life is a welcome option.

However NICE also says the following about DBS.

• There is currently not much good evidence on how well DBS works for difficult-to-treat epilepsy.
• Evidence on the safety of DBS surgery shows risks that include bleeding in the brain, infections at the site of the implant, depression and memory problems. These problems may be treatable.

what is the aim of deep brain stimulation?

DBS therapy aims to control excess electrical activity in the brain using regular electrical impulses to reduce the frequency and severity of seizures. Trials show that for some people their seizures become much less frequent, for others it may reduce their seizures a little, and for others it has no effect.

The effects of DBS therapy may not happen straight away; it can take up to two years for it to have an effect on someone’s seizures. It is used alongside anti-epileptic drugs (AEDs) not instead of them. If the treatment works, it may be possible to reduce a person’s AEDs over time.
**how does it work?**

A battery-powered device called a ‘neurostimulator’ sends electrical impulses to the brain. The electrical impulses travel through leads to electrodes, which are implanted (placed) in the anterior nucleus of the thalamus (ANT), a part of the brain that is involved in the spread of seizures.

**how is the system implanted?**

Surgery for DBS therapy is done under general anaesthetic by a neurosurgeon (who specialises in treating conditions of the nervous system).

During the first part of the surgery, two leads are placed deep inside the brain through small holes made in the skull. The neurosurgeon uses imaging techniques such as magnetic resonance imaging (MRI) to map the brain and place the leads in the correct position. The leads are connected to wires that run under the skin behind the ear, and down inside the skin of the neck where they are attached to the neurostimulator.

Secondly, the neurostimulator is implanted under the skin in the upper chest (under the collar bone). The neurostimulator is a bit like a heart pacemaker. It contains a small battery and a computer chip programmed to send electrical impulses to the brain.

**after surgery**

After surgery the stimulator is programmed by a doctor or nurse using a small hand-held computer. This sets the amount (strength and length of time) of the electrical stimulation given. It can take several months to find the right level of stimulation as this varies from person to person. During this time the doctor or nurse will monitor the person’s progress very carefully. The person is also given their own programmer (about the size of a mobile phone) to help them to manage the neurostimulator themselves.

**what if a seizure happens?**

Some people have a warning or aura: a simple focal (simple partial) seizure that tells them that they are likely to have a further seizure. When this happens, they can use their programmer to activate DBS therapy immediately to try to stop a seizure from happening.

**are there any risks or side effects?**

For any surgery, there are possible risks relating to how the person responds to anaesthetic or to any complications that happen during the operation. Possible risks of DBS surgery are listed over the page.

Side effects can happen with any treatment but may not happen for everyone. Side effects after surgery for DBS can include paresthesia (pins and needles), memory problems and depression.

**what happens if it does not work?**

DBS therapy may not work for everyone. If there is no improvement in the frequency of seizures after two years, the specialist may consider turning the stimulator off or having the battery system removed, but the electrodes are likely to stay in place.

**can I have an x-ray or a scan?**

If you have DBS therapy and need a scan it is important that everyone involved with the scan is aware, so that they can decide if it can be done.

Magnetic Resonance Imaging (MRI) uses strong magnetic fields to take images of the brain. The MRI’s magnetic fields can cause the leads to overheat, which may cause burns to the areas of the brain or skin near to the electrodes or leads. Risks depend on the MRI machine used and the type of scan you need. It may be possible to scan the brain with an MRI scanner that has a very specific strength setting.

DBS therapy is not affected by normal x-rays. This is because they do not produce enough radiation to cause damage to the neurostimulator. However, extra care may be needed, or the neurostimulator may need to be switched off for radiation therapy. It is recommended that the neurostimulator is switched off during a CT scan.

**other organisations**

**Medtronic UK Ltd** (suppliers of the DBS therapy system)

[www.medtronic.co.uk](http://www.medtronic.co.uk)

**NICE (National Institute for Health and Care Excellence)**

0300 323 0140

[www.nice.org.uk](http://www.nice.org.uk)

Sets standards for care and produces guidelines on treating medical conditions.

© Epilepsy Society April 2015

Epilepsy Society, Chesham Lane

Chalfont St Peter, Bucks SL9 0RJ

Epilepsy Society is the working name for The National Society for Epilepsy, registered charity number 206186

Every effort is made to ensure that all information is correct. Please note that information is intended for a UK audience and may change after printing. This information is not a substitute for advice from your own doctors. Epilepsy Society is not responsible for any actions taken as a result of using this information.