Evoked Potentials (EP): information for families

The brain works by a series of nerve impulses, which cause electrical signals within the brain. When a part of the body is stimulated, for instance, the eyes by a flashing light, or the ears by a clicking sound, the brain responds to this stimulation. This response is called an ‘evoked potential’. This information sheet from Great Ormond Street Hospital (GOSH) explains the procedure for Evoked Potential (EP) tests and what to expect when your child has one. An Easy Read information sheet is included for your child.

The electrical signals within the brain (also called brainwaves) can be recorded through the scalp. The brain’s responses to those are often very small, but can be recorded using special techniques.

There are various types of evoked potentials, each with a different method of stimulation:

- **Visual evoked potential (VEP) tests** look at the pathway from the optic nerve to the part of the brain where images are interpreted and turned into pictures.
- **Brainstem auditory evoked potential (BAEP) tests** look at the pathway from the ear to the part of brain that interprets sound.
- **Somatosensory evoked potential (SSEP) tests** look at the pathway from the peripheral nerves in the arms and legs to the sensory part of the brain.

Why are EP tests used?

EP tests are a safe way of checking a variety of nerve pathways in the body without the need for sedation or an anaesthetic. All three tests are quick and pain-free but give good results before further testing or surgery. Children often have these tests at the same appointment as an electroencephalogram (EEG) or other neurophysiology tests.

Getting your appointment letter

If you are unable to keep this appointment, please inform the department as soon as possible beforehand. Sometimes, we can offer the appointment to another child on the waiting list.

As so many children and young people need to use our services, we have had to introduce a policy where if a child cancels or does not attend two appointments in a row, we will inform their GOSH consultant and close their referral.

The person bringing your child to the EP should have ‘Parental Responsibility’ for them. Parental Responsibility refers to the individual who has legal rights, responsibilities, duties, power and authority to make decisions for a child. If the
person bringing your child does not have Parental Responsibility, we may have to cancel the test.

**Getting ready for the test**

It is helpful if you could make sure that your child’s hair is clean before the test, with no mousse, gel, oil or hairspray. If your child is taking medicines, you should continue to give them as normal. If your child wears glasses, make sure they bring them.

**The day of the test**

Your child will come to the Department of Clinical Neurophysiology which is on Level 4, Southwood Building.

Once you are in the Department, check in with reception and soon there will be a Clinical Physiologist (CP) who will confirm your and your child’s details and take you to the recording room. They will explain in more detail how the test will take place, discussing any worries you may have.

Depending on the information needed by the doctor, your child may have all three types of EP tests or just one or two. This will be explained fully before testing starts.

**Students and trainees**

As we are a teaching hospital, on occasion we might ask you if you would agree for a trainee to perform the test under direct or indirect supervision. Sometimes other healthcare professionals or students might ask to observe the test as well. Refusing this will not affect your child’s treatment.

**What does the test involve?**

The CP will attach a few small silver discs (electrodes) to certain points on your child’s scalp and face using a soft paste. Sometimes, they will measure your child’s head beforehand and mark the points with a soft pencil before attaching the electrodes. Additional electrodes might be applied to the neck, shoulders, lower back and/or legs, if your child is doing a SSEP.

As each electrode is attached, the CP will clean the area of the scalp with a cotton bud and some cream. This does not hurt but some children do not like it. While all the electrodes are being applied, your child can sit on a chair, the bed or your lap, and can play with toys – we have many toys in the department but feel free to bring your child’s own favourite book, toy or comforter.

- **Visual evoked potential (VEP)**
  
  For this test, your child will need to look at a flashing light. Sometimes, a television screen that is displaying a checkerboard pattern that moves from side to side might be used instead. As light flashes or the pattern on the television screen moves, the brain responds to the stimulation and this is recorded as brainwaves.

- **Brainstem auditory evoked potential (BAEP)**
  
  For this one, we will put headphones over your child’s ears – if your child is not used to wearing headphones, you can prepare for the test with games as described on another information sheet available on our website at www.gosh.nhs.uk/conditions-and-treatments/procedures-and-treatments/helping-your-child-get-used-headphones-hearing-assessment. We stimulate one ear at a time by playing a clicking sound. As this happens, the brain responds to the stimulation and this is recorded as brainwaves.

- **Somatosensory evoked potential (SEP)**
  
  In addition to the electrodes on the head, your child will have another electrode or two attached to their wrist and/or ankle which will allow a small electric pulse to be applied to their skin – this will make their fingers or toes tingle and wiggle but does not hurt.
For all three EP, we repeat each stimulus a number of times so that plenty of responses are recorded and averaged to show how the nerve pathways are working. The brain’s response to this stimulation is recorded as brain waves.

**How long does the test last?**

The length of all three tests depends on how much a child cooperates and how much information is needed. We usually allow up to two hours for all three tests and individual tests will be much shorter.

**Are there any risks?**

No, the evoked potential tests are very safe. The procedure may be slightly uncomfortable but is usually painless. Only very rare minor skin irritation from the electrodes have been reported.

**After the test**

The CP will remove the electrodes from your child’s head. This will not hurt as the paste stays soft and is easy to remove. They will also clean your child’s hair but it may feel a bit sticky to the touch until you wash it. Once all the electrodes have been removed, you will be free to go if no other tests or appointments have been planned.

**Getting the results**

The team will analyse the results and write a detailed report of the test results. We will send this to your child’s consultant in time for their next appointment.

**Further information and support**

If you require more information about the test or have any questions, please contact the Department of Clinical Neurophysiology on 020 7813 8471, Monday to Friday between 9am and 5pm.

**How to find us**

Come in through the Main Entrance and walk through Main Reception. At the glass doors, turn right and then first on the left (you are entering Southwood Building). Walk through the corridor until you find the stairs and the lifts. Go up to Level 4 walk through the double doors and then down the corridor until you find another double doors. EEG Reception is on your right.

For more information about Traveling to GOSH, please visit our website on [www.gosh.nhs.uk/your-hospital-visit/travelling-gosh](http://www.gosh.nhs.uk/your-hospital-visit/travelling-gosh)
## Having an Evoked Potential test

You are coming to hospital for an evoked potentials test. This looks at how your brain works. This helps the doctors work out how to look after you.

Your brain works using signals. When the brain is made to react to something, the signals change. The evoked potential test records these changes.

First we will clean small areas of your head with a cotton bud. This will not hurt.

Next we will put some silver discs with stickers where we have cleaned on your head. We use sticky paste to hold them in place. This will not hurt.

We will join the stickers to the EP machine with wires. This will not hurt.

You may have to look at a flashing light. Sometimes, you look at a picture on a television screen.

You need to put on headphones for the next bit. Loud clicks are played through the headphones.

We will put another sticker on your hand. This will make your hand tingle.

When the test is finished, we will take off the stickers and wipe your head again.

If you are not having any other tests, you can go home.

Please ask us if you have any questions.