

ANS/BSCN Guidelines for Photic Stimulation during EEG Recordings

Photic stimulation (PS) is an activation technique used during EEG recording to elicit epileptiform abnormalities, and may in some cases result in seizures. It is considered to enhance the diagnostic sensitivity of the EEG and in laboratory conditions be reasonably safe; nevertheless it carries a small risk of inducing potentially 'adverse events', principally generalised tonic clonic seizures.

A prospective study of an unselected population of 5383 patients undergoing PS from a wide age group was performed by the National Audit Group in 2013. 0.7% had epileptic seizures elicited by PS including 0.04% who had a generalised tonic clonic seizure. 0.9% had non epileptic attacks. 1.5% had their only inter-ictal discharge elicited by PS i.e. a photoparoxysmal response consisting of generalised spike and wave discharges. Thus the total yield of helpful diagnostic information from PS was 3.1%.

These Guidelines have been informed by that Audit, other EEG Guidelines and a review of the literature on PS, with an emphasis on safety. Its principle role during EEG is in the diagnosis of epilepsy, and these Guidelines are intended for that application only.

Standard 1: PS is performed with consent in all age groups referred with a provisional diagnosis of epilepsy or non-epileptic attack disorder.

Guideline: PS is usually performed in all patients except for those who have had a generalised tonic clonic seizure earlier in the EEG.

Guideline: PS is performed in patients who have had a non-epileptic attack in the EEG prior to PS to encompass patients with both non-epileptic attacks and epilepsy.

Standard 2: The recording physiologist obtains a clinical history from the patient and/or from their accompanying carer, friend or relative. The physiologist enquires about seizure triggers and if there is a family history of seizures, or photosensitive epilepsy.

Standard 3: The information given to the patient or carer before consent is obtained states the value and likelihood of a positive response to PS. The approximate risk of provoking generalised tonic clonic and other seizures is also addressed in the patient information.

Standard 4: Properly informed consent is obtained, documented, and archived, for example on a written form or on the EEG system itself.

Guideline: Relatives/friends/carers are invited to look away or leave the room during PS unless they are essential to gain cooperation of the patient in which case they have a clear understanding of the risk and this is documented.

Standard 5: PS is performed at least 3 minutes after the cessation of hyperventilation.

Standard 6: The PS protocol is based on the methodology outlined in the 'IPS procedure on the basic level' part of Kasteleijn-Nolst Trenité et al. European consensus paper, *Epilepsia* 2012; 53:16–24; doi:10.1111/j.1528-1167.2011.03319.

Guideline: Additional tailored studies are performed to evaluate effect of non-pharmacologic treatment (which covered eye is most effective).

Standard 7: In all age groups, eye closure is attempted during each flash rate. (Eyes can be closed by the parent or physiologist or by the use of a paper diffuser in young or uncooperative patients).

Standard 8: Children suspected of progressive myoclonic epilepsies undergo ≤ 5 Hz flash frequencies. (These will be included when standard 6 is followed).

Standard 9: Reproducibility of the response is demonstrated with the minimum stimulus necessary (does not need to be at the same frequency). Non-self-sustaining generalised PPRs are as strongly associated with epilepsy as self-sustaining ones (Kasteleijn-Nolst Trenité et al., 2012) and so it is not necessary to repeat flash frequencies in an attempt to capture a PPR that outlasts the stimulus.

Standard 10: The department has a protocol for dealing with seizures.

Standard 11: If PS is not performed, it is clearly stated why it was not done. If PS is performed and there is an epileptiform change, the report states whether it is generalised or otherwise describes its distribution. Clinical events are documented and described.

Standard 12: At the patient's or carer's request PS is stopped at any point during the procedure.

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