Electro Diagnostics Unit

Document No.	**ED/LAB/05**
Title	**Electrode Application and Removal Procedure**
Effective Date	
Review date:	
Revision History	**First version**

Training Requirements	**A** ✓	**B**	**C**	**D**

A = New procedure requiring documented assessment of competence

B = Modified procedure requiring documented reassessment of competence

C = Familiarity with new procedure required (no assessment of competence necessary)

D = Familiarity with changes required (no assessment of competence necessary)

	Signature	**Name (print)**	**Date**
Prepared by			
Reviewed and approved by			

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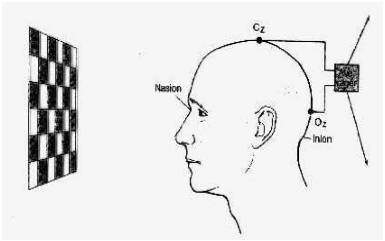
1. INTRODUCTION

The purpose of this statement of procedure is to describe the general practices for the preparation, application and removal of visual evoked potential (VEP) and electroretinogram (ERG) electrodes which are used in the visual electrodiagnostic testing of patients.

Visual Electrodiagnostic Testing involves the recording of electrical signals that are produced by the eye and the brain in response to flashes of light or changing patterns. The recording of these electrical signals allow us to ascertain whether different nerve cells and their connections in the eye and brain are working normally. During Visual Electrodiagnostic Testing we record the following:

Visual Evoked Potentials (VEPs) - VEPs are electrical signals that originate in the brain and occur in response to visual stimulation. The signals are recorded from disposable electrodes (5-10 mm diameter - see figure 1a) that are placed on the surface of the skin using a water soluble conductive paste, on the forehead and at the back of the head above the inion (see figure 1b below).

1a



1b

Electroretinograms (ERGs) - ERGs are a measure of electrical activity from the retina. The signals are recorded from small electrodes placed on or near the eyelids. In addition, the clinician may record the signals by placing a very fine thread (Dawson-Trick-Litzkow (DTL) fibre) along the inside of the lower eyelid or in some cases a sticky pad placed below the eye is used (see figure 2).

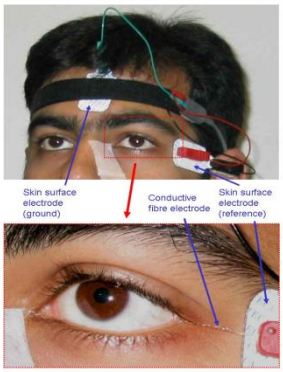


Fig 2

Fig 3

Electro-oculograms (EOGs) - EOGs measure electrical activity from the eye and can be used to assess the function of the retinal pigment epithelium within the eye. Usually, pairs of electrodes are placed to the left and right of the eye and during the recording of these signals (see figure 3) the patient is asked to move their eyes to the right and left following a spot stimulus

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2. SCOPE

This SOP covers all of the stages of electrode application that are involved in a visual electrodiagnostic referral.

3. RESPONSIBILITIES

All EDU are responsible for ensuring that patient safety and comfort is maintained throughout the whole process.

The Director of the Visual Electrodiagnostic Testing Service is responsible for:

ensuring that the unit has the required materials for patient testing.
the correct and proper application of testing electrodes
training of any staff member in the correct procedure.
cleaning and maintenance of electrodes and other consumables

Mr Xxxxxx Xxxxx (*BSOVS Technician*) is responsible for the proper disposal of the electrode clinical waste.

4. RELATED DOCUMENTS

- Patient Information Form *(VETS 004)*
- Equipment, Maintenance & Calibration Procedures *(ED FAC07)*
- Patient Management and Referral Procedure *(ED FAC04)*
- Corneal Abrasion *(COL GUID 003)*
- Hazardous Waste Registration *(UoB 013)*

5. PROCEDURE

5.1. Patient Preparation.

In advance of the appointment a *Patient Information Form* (*VETS 004)* is posted to the patient. This document describes the general procedures to be undertaken, what preparation is required on the part of the patient, and who to contact if they have any specific questions (see also: *Patient Management and Referral Procedure, ED FAC04*)

Upon arrival at the EDU the patient is shown round and is then provided with a verbal explanation all of the tests and procedures that will be performed during the consultation.

The patient is then seated in the testing chair.

Accompanying persons can remain with the patient throughout the whole process.

5.2. Skin Preparation.

The recording electrodes are typically placed at positions on the head that are defined by various anatomical features (e.g. inion, nasion). The required positions are measured and marked with a water soluble marker pen.

In order to optimise electrical contact the skin at these predefined points is cleaned using *Nuprep* skin preparation gel. This gel is mildly abrasive and is applied using a cotton bud and is not used on or near skin sites that are injured, including open wounds, bruised skin, or skin that is weakened because of injury or the medical condition of the patient.

Following this cleaning procedure excess gel is removed using a *Steret* skin cleaning swab.

5.3. Placement of Skin Electrodes

10 mm Silver/Silver Chloride electrodes are used top record VEP, EOG and ERG signals from the eye and brain. They are single use electrodes which are disposed of after use.

Details: Disposable electrodes (cat no: M0833/10 from *Biosense Medical*)

Ten-20 Conductive Paste is used to fix the electrode on to the previously prepared region of skin.

Micropore tape is then used to keep the electrode in place during the testing procedure.

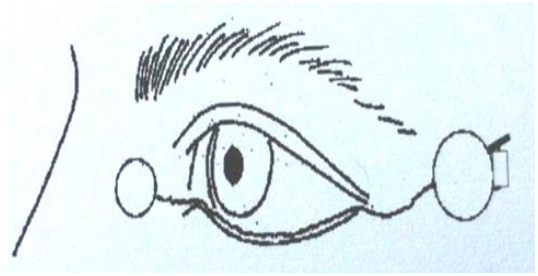
5.4. Placement of DTL Electrodes.

Silver thread DTL electrodes are used for the detection of corneal/sclera potentials in electro-retinography (see figure 2 above and 4 below).

(Details: DTL Electrodes from Dept of Medical Physics & Clinical Engineering, University of Liverpool).

These DTL electrodes are single use electrodes. They are stored in sterile packs which should remain unopened before use, opened packs should be discarded.

Fig 4 Standard placement of silver thread DTL electrode



Gold pin

To place the electrode the smaller of the two sticky pads is placed on the medial canthus as shown in figure 4. The larger pad is placed approximately 10 mm from the outer canthus.

The patient is instructed to look upwards and the thread is placed in contact with the sclera just below the lower limbus.

An electrical connection to the electrode is then made by a push-fit between the socket of an attaching lead and the gold plated pin on the larger pad.

5.5. Electrode Removal.

After the testing procedures have been carried out the EEG electrodes are removed from the skin with is then cleaned with water to remove traces of the gel from skin and hair.

To remove the DTL fibre electrode the patient is instructed to look up and the sticky pad on the medial canthus is removed and the thread carefully detached from the sclera.

Due to the placement of DTL electrodes on the bulbar conjunctiva in close proximity to the cornea, there is a possible risk of corneal abrasion upon either insertion or removal of the electrode. Procedures for the management of corneal abrasions can be found in the document entitled: *Corneal Abrasion, College of Optometrists Clinical Guidelines COL GUID 003.*

5.5. Electrode Storage & Maintenance.

The electrodes are stored sealed sterile packs at room temperature.

VEP/ERG/EOG skin electrodes are single use devices and disposed of after use as clinical waste.

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The DTL electrodes come in sealed sterile packs that should be stored in a dry area at room temperature.

The DTL electrodes are single use and discarded after use as clinical waste.

All electrodes are disposed of in the yellow sealable clinical waste containers located in the EDU. When the containers are full they are sealed and the BSOVS technician Mr Xxxxxx Xxxxxx removes them for appropriate disposal.