BRIGHTNESS, COLOR COMPARISON AND PHOTOSTRESS RECOVERY TESTING

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INTRODUCTION

This chapter includes a review of:

- Brightness and colour comparison
- Photostress recovery

BRIGHTNESS AND COLOUR COMPARISON

Comparison of brightness and comparison of colour are usually performed when the function of the optic nerve or the visual pathway is questioned, especially in asymmetric cases. It is often used in complement to pupil testing, colour vision and other neuro-ophthalmological tests.

BRIGHTNESS COMPARISON

Material needed

Light source (penlight, torch, transilluminator, ophthalmoscope, etc.).

Procedure

- Patient wears best Rx
- Occlude 'affected' eye
- Hold light source in front of patient, at near (20 - 40 cm)
- Ask patient to always look at light source
- Quickly change occlusion to healthy eye. Continue alternating occlusion, every 1-3 seconds.
- Ask patient to compare brightness between each eye
- If there is a difference, determine in which eye the light appears brighter
- Place a value on the difference.

E.g. If the "brighter light" eye = 100, how much is the intensity of the light in the other eye worth?

COLOUR COMPARISON (AKA COLOUR DESATURATION, RED CAP TEST)

Material needed

- Red bottle caps (e.g. from mydriatic or cycloplegic drop bottle)
  OR
- Ishihara or other pseudoisochromatic plate (preferred, as reflections from bottle caps may cause erratic results).

Procedure

- Patient wears best correction
- Present the ishihara plate or a red bottle cap at 40cm
- Alternate occlusion of eyes
- Ask patient to compare the colour between each eye
- If there is a difference, determine in which eye the colour appears brighter
- Place a value on the difference as above.

CLINICAL RELEVANCE

Any disorder that damages a portion of the visual pathway has the potential to affect brightness and colour perception. The disorders include: inflammatory, infectious, vascular, neoplastic, idiopathic multisystem disorders and retinal disease or detachment. Reliability may be affected by patient's interpretation of the test and lighting conditions.

PHOTOSTRESS RECOVERY

Photostress recovery is usually performed when the integrity of the macula is in question. The test is used to **diagnose & monitor macular disorders** & **differentiate between macular and optic nerve (ON)disorders.**

The photostress recovery test measures the amount of time needed for the macula to return to normal functioning following exposure to an intense light source. When the macula is exposed to an intense light source, the photoreceptors are bleached and are temporarily impaired, because the rhodopsin in the photoreceptors decreases. If there is a disorder within the photoreceptors, RPE or choriocapillaris, the time it takes for the macula to regenerate rhodopsin and recover is extended.

Procedure

- Record best VA (BVA) – for best results, should be above 6/24
- Dim room illumination
- Dark adapt eyes for 1 minute
- Occlude non-tested eye
- Place light source (penlight, transilluminator, ophthalmoscope) 2-3 cm from eye
- Tell patient to directly view light source for 10 seconds
- Remove light source and isolate the line of letters **just above bva**
- Record the time in seconds that it takes for the patient to read 1/2 the letters within the line.

E.g. If BVA is 6/12, record the time it takes for the patient to read 1/2 of the letters of the isolated 6/15 line after photostress.

CLINICAL RELEVANCE

The average normal recovery is less than 30 seconds; abnormal eyes recovery is usually greater than 60 seconds. The test is an indication of macular function. Macular disorders may extend the time it takes to regenerate rhodopsin. Such conditions are: Central Serous Retinopathy (CSR), Macular Edema, Wet and Dry ARMD, Serous Detachment of RPE, Macular Cyst, Chloroquine Maculopathy, and various inflammatory or degenerative processes.

The test helps differentiate between loss of vision (LOV) that is due to ON causes from macular affections. **A macular disorder may impair recovery time. An ON disorder will not impair recovery time**. Reliability of the test may be affected by various factors. Patients over 40 will demonstrate a symmetric increase in their “normal” recovery time. Finally, the validity of the test markedly decreases when the initial BVA is < 6/24.