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A NEW STEREO VEP SYSTEM: METHODS AND CLINICAL EVALUATION

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Methods: The right and left eyes stimulations are separated with ferroelectric shutters with a fast response time (1 msec). These shutters are synchronized with the high frame rate (120 Hz) of the Vision Monitor optoelectronic stimulator. 3 methods of stimulation are available: (1) dichoptic stimulation (or binocular beat) where each eye views a checkerboard reversing at a different frequency (10 Hz for right eye and 15 Hz for left eye) (2) correlogram stimulations using a dynamic random dot pattern with alternatively identical and inversed polarities for each eye (3) cyclopean stimulations using a dynamic random dot stereogram with alternating disparities. The VEP response from Oz is recorded during 20 seconds and a spectral analysis is performed.

Clinical evaluation: 24 subjects were submitted to this protocol, including 11 subjects with normal stereo vision and 13 patients with abnormalities. The age range was 5 months to 75 years.

In one case, the patient (5 months old) rejected the goggles with ferroelectric shutter. In 2 other cases, the recorded signal could not be interpreted because of the poor quality of recorded signals. In all other cases, the responses to dichoptic stimulations could easily be interpreted. The 3 components of the response (right eye, left eye and binocular) were in complete agreement with the clinical data. Responses to correlogram stimulations were also easy to interpret but provide information only about binocular activity. Responses to dichoptic stimulation showed important inter individual variations.

Conclusions: Stereo VEP using dichoptic stimulations do provide useful clinical information. They allow a fast and reliable way to assess simultaneously the response from both eyes and from binocular vision.
一种新型双眼（或立体）VEP 系统：方法和临床评价

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方法：左右眼刺激由快速闪闭铁电隔板（ferroelectric shutters）分开，隔板（shutters）闪闭速度与刺激仪显示器的高帧频（120Hz）同步。刺激方式有 3 种：
(1) 双重视刺激（或双眼性刺激）是让两眼各注视以不同频率翻转的棋盘格（右眼 10Hz, 左眼 15Hz）。
(2) 相关图刺激采用交替同向或异向变换的动态随机点图对每眼进行刺激。
(3) 镶嵌式刺激采用视力交替变换的动态随机点立体图作为刺激。由 Oz 处记录 VEP 反应共 20 秒，并对波形进行分析。

临床评价：24 例受测试者包括 11 例立体视觉正常者及 13 例立体视觉异常的患者。年龄由 5 个月至 75 岁。其中 1 例患者（5 个月）拒绝戴有铁电隔板的风镜。另有 2 例，由于记录信号差而无法识别。其余受试者对于双重视刺激均产生了易于识别的反应波形，反应的 3 个部位（右眼、左眼和双眼）与临床资料完全一致。相关图刺激的反应波也易于识别，但其只能提供双眼性活动的信息。双重视刺激的反应波显示了明显的个体间差异。

结论：双重视刺激性双眼 VEP 可以提供有用的临床信息，为同时评价来自（左、右）两眼及双眼视觉的反应提供了一个快速可信的方法。