From Barry Linder

A. VEP(visual evoked potential) may be useful in the following

1. Multiple Sclerosis (including progressive spastic paraparesis)

2. Optic neuritis (pure; MS; ischemic; Leber's)

3. Doubtful function of the visual path
   Is any information reaching occipital cortex?;
   hysterical, malingered, or cortical blindness

4. Tumor of sella region compressing optic nerve or chiasm
   (sphenoid wing meningioma; suprasellar meningioma;
   craniopharyngioma; pituitary adenoma)

5. Tumor of orbit compressing optic nerve

B. Auditory Brainstem Evoked Response (ABER) may be useful in the following:

1. White matter disease

   a. Multiple Sclerosis
   b. Central pontine myelinolysis
   c. Leukodystrophies (D/D gray matter disease by combination
      of ABER & EEG)

      1. Pelizaeus-Merzbacher
      2. Metachromatic Leukodystrophy
      3. Adrenal Leukodystrophy

   d. Progressive Multifocal Leukoencephalopathy

2. Cerebellopontine angle tumors (neoplasm, aneurysm, etc)

3. Brain stem lesions (tumor, vascular, etc.)

4. Olivopontocerebellar atrophy (in combination with CT scan)

5. Coma (D/D structural vs toxic, metabolic)

6. Suspected non-organic symptom such as hearing loss.

7. Integrity of the peripheral auditory system (is information reaching
   the cochlear hair cells; the acoustic nerve?

   a. CM generated by hair cells
   b. P1 generated by acoustic nerve (cochlear neurons)

8. Symptoms that might be due to either brainstem or peripheral
   disorder (vertigo)

9. Assessing response to Rx in brainstem lesions

   a. anti-infectious
   b. anti-neoplastic

10. Brain death.

Abbreviations:

AEP	Auditory Evoked Potential
CNV	Contingent Negative Variation
EP	Evoked Potential
ERP	Event-Related Potential
LPC	Late Positive Complex
N400	N400
P300	P300
RP	Readiness Potential
SEP	Somatosensory Evoked Potential
SW	Slow Wave
VEP	Visual Evoked Potential

a. Picton et al EEGCNP 1974, 36: 179-190 (Part I)

b. but finer tests (occlusion by cross modal stimulus 0.5 sec before test tone; interhem asym. with certain types of aud. stimuli) show that N1,P2 have some modal specificity pp.187-88 in Picton.[a]

c. but in addition, N1P2 are increased in amp. and altered in scalp topography by rare-tone detection task.[a]

d. Davis 1976, Annals ORL p.27.

e. Simson et al 1976 EEGCNP 40: 33-42.

f. Both 250 msec and 300 msec are given by Picton et al.[a]

I. Kinds of PRVEP abnormality (monocular stimulation; midline occipital recording)

A. Latency

1. Latency increased
2. Latency difference left eye vs. right eye despite normal values of absolute latency

B. Amplitude

3. ↓ amplitude ratio

4. Absence of P2 or of all peaks

C. Form

5. Abnormal form of P2

II. Kinds of abnormality in ABER	Site of lesion* (ipsilateral to stimulated ear)
A. Latency	
1. Increased latency between peaks (Inter-Peak Interval)	B; CPA
2. Increased latency of all peaks, but interpeak intervals normal	P
B. Amplitude	
1. Absence of all peaks	B (< 70dB loss); P; CPA (70-80 dB loss)
2. Absence of all peaks after one or more preserved peaks	B; CPA
3. Absence of all peaks except for a delayed P5	P; CPA
4. Absence of P5 despite preserved peaks before and after P5	B
5. Decreased amplitude ratio P1/P5	B
C. Form: There are no abnormalities of form in ABER	

*B = brainstem; P = peripheral auditory system; CPA = cerebellopontine angle.

Event-Related Potentials:

Exogenous vs. Endogenous

	Exogenous (Evoked)	Endogenous (Cognitive)
Latency	Short: 1-8 msec Middle: 8-50 msec Long: 50-200 msec[g]	Late: 200-500 msec
Duration	Shorter	Longer
Amplitude, latency influenced by	Physical Properties of Stimulus[c]	Significance of stimulus for assigned task
Amplitude, influenced by sleep	Short: No[a] Middle: No[a] Long: Yes[a] (N2 markedly increased by sleep = the auditory evoked K complex in raw EEG. Davis et al 1939)[a]	?
Stimulus Modality-Specific	Short: Yes Middle: Yes Long: No[b]	No
Scalp Maximum	Long N1: Over primary sensory & nearby assoc. cortex (changes with stimulus modality)[e] Long P2: Midline for all sensory modalities[e] Middle: Midline for AEP?[a] Short: Only for field peaks seen on scalp.	At midline (Same for all stimulus modalities)
Generator site	Short: Nerve, brainstem (AEP) Middle: Dorsal root lets; dorsal column in cord (SEP); thalamus & cortex (primary & assoc)[a,d] (AEP) thalamus N20 & radiation P23 (& primary cortex?) (SEP) Long: Primary & Assoc. cortex (?) (VEP) Assoc. cortex (?) (SEP) frontal assoc. cortex[a] (AEP)	Inferior Parietal Lobule?
Nomenclature	Long Latency: Vertex potential (P1N1P2N2) (Davis; Bancaud) (paradigm is auditory EP, but similar with any stimulus modality) Occipital VEP (P1N1P2N2) Parietal SEP	LPC (includes P300 SW CNV N400 RP

Event-Related Potentials:

Exogenous vs. Endogenous

	Exogenous (Evoked)	Endogenous (Cognitive)
Amplitude, latency influenced by	Physical Properties of Stimulus	Significance of stimulus for assigned task
Latency	Short 1-8 msec Middle 8-50 msec Long 50-200 msec	Late 200- 500 msec
Duration	Shorter	Longer
Stimulus Modality-Specific	Yes	No
Scalp Maximum	Over primary sensory & assoc. Cortex (changes with stimulus modality)	At midline (Same for all stimulus modalities)
Generator site	Short: Nerve, brainstem (AEP) Middle: Cord (SEP); brainstem (AEP); primary cortex (SEP) (AEP?) Long: Primary & Assoc. cortex (?) (VEP) Assoc. cortex (?) (SEP) (AEP?)	Inferior Parietal Lobule
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* Introductory papers (Handout)

Ev. Pot. Demo -

Visual -

Flasher - Reversed Checker Board
Alternating Fields
Flasher
} 1 Hz.

Recorded

Results V