

### Introduction

- VEP testing is regularly used in the diagnostic workup of patients with infantile nystagmus (IN).
- Fixation instability reduces VEP signal amplitude.
- Therefore, VEP reliability is reduced in one of the patient groups that needs it most.
- VEP amplitude is known to be higher in nystagmus with well-defined foveation periods<sup>1</sup> (see also <sup>2</sup>).
- We investigated whether VEP amplitude can be increased by only triggering during foveation periods.

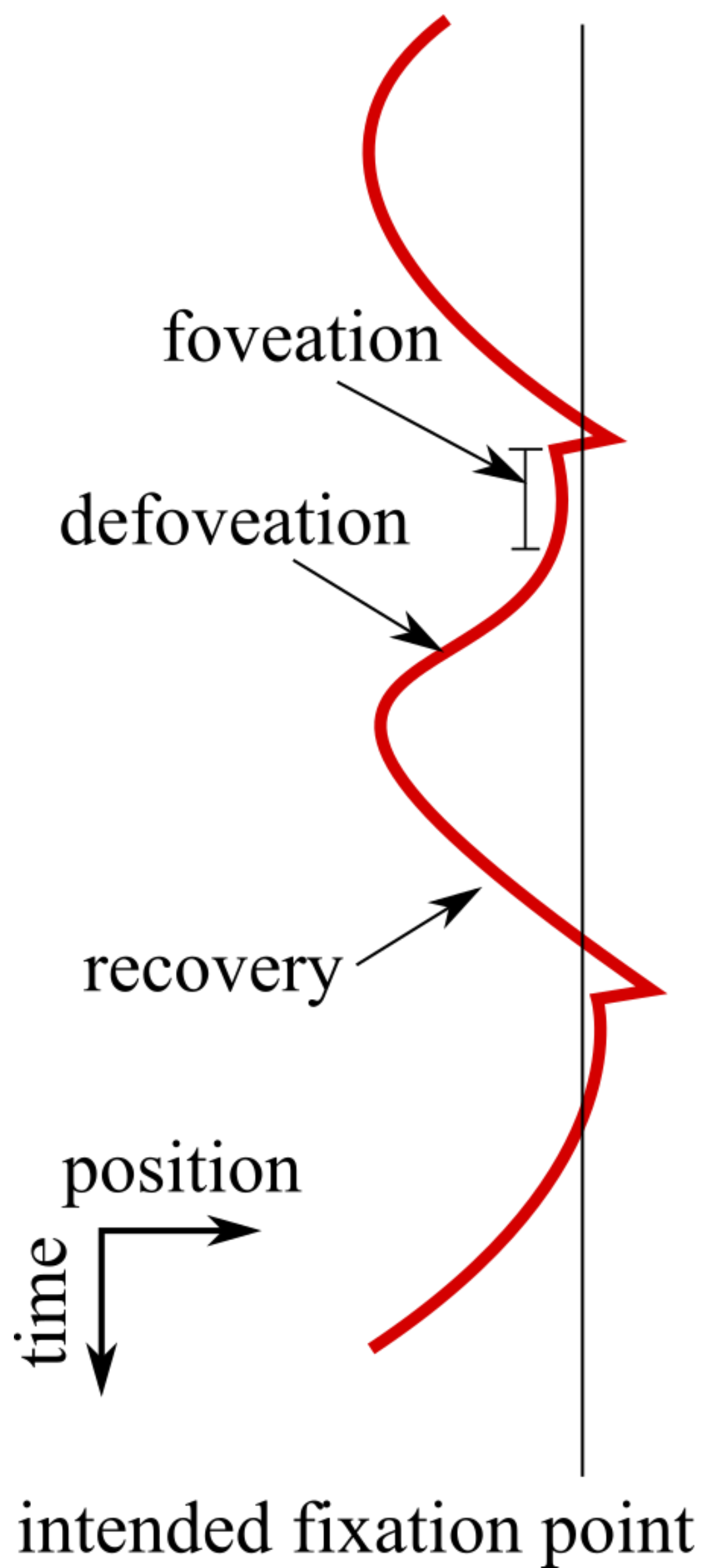


Fig. 1 Nystagmus waveform

### Methods

- Eye movements recorded live (EyeLink 1000+) and VEP (Espion) triggered only during low velocity (foveation) periods of the nystagmus waveform.
- VEP amplitude using this method compared to VEPs triggered continuously (regular, non-gaze-contingent).
- Data collected from seven patients with IN (pattern onset/offset in all participants; pattern reversal in three).
- Full datasets also collected for comparison in three patients with acquired nystagmus.

### Participants

Table 1 Clinical characteristics of study participants

Age / Sex	Diagnosis	Clinical VA (logMAR)
35 / F	IN (unknown macular disorder)	R: 1.30 L: 1.20
41 / M	IN (albinism [grade 2/3 foveal hypoplasia])	R: 0.30 L: 0.18
30 / M	IN (congenital stationary night blindness)	R: 1.00 L: 0.80
30 / F	IN (albinism)	R: 0.30 L: 0.40
6 / M	IN (albinism)	R: 0.30 L: 0.20
39 / F	IN (albinism)	Not measured
40 / M	IN (idiopathic)	R: 0.50 L: 0.42
36 / F	undiagnosed neurological issue with non-epileptic seizures	R: 0.30 L: 0.60
38 / F	post-meningitis nystagmus	R: 0.12 L: 0.12
35 / F	Arnold-Chiari malformation type I (severe)	R: 0.10 L: 0.00

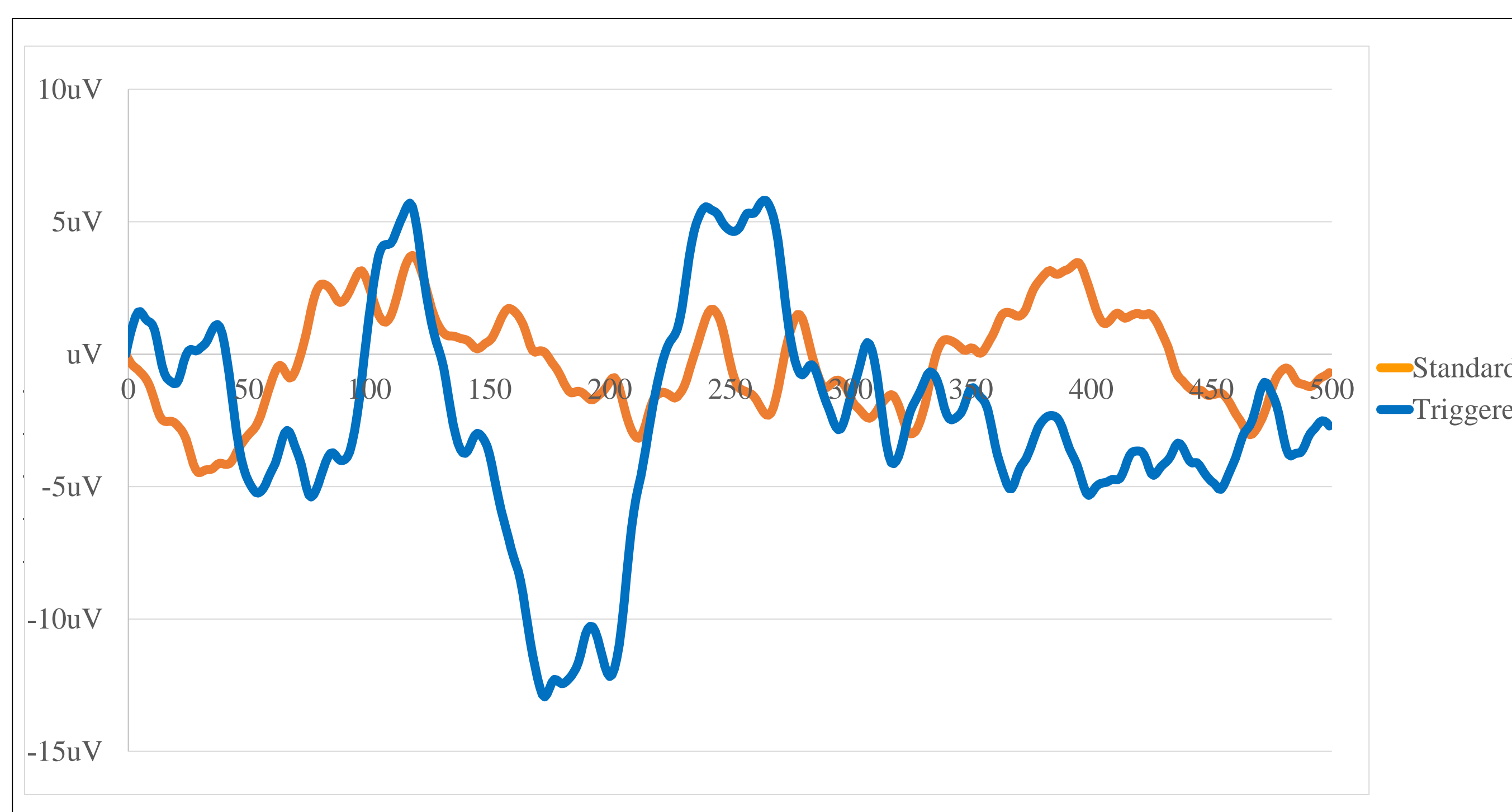


Fig. 2 VEP waveform example

### Results

In patients with IN, VEP signal amplitude is significantly increased by gaze-contingent VEP triggering (mean = 18  $\mu$ V, as compared to 12  $\mu$ V under continuous acquisition;  $p = 0.001$ ). In the three patients with acquired nystagmus, triggering VEPs using eye velocity had no significant effect on VEP amplitude ( $p = 0.121$ ).

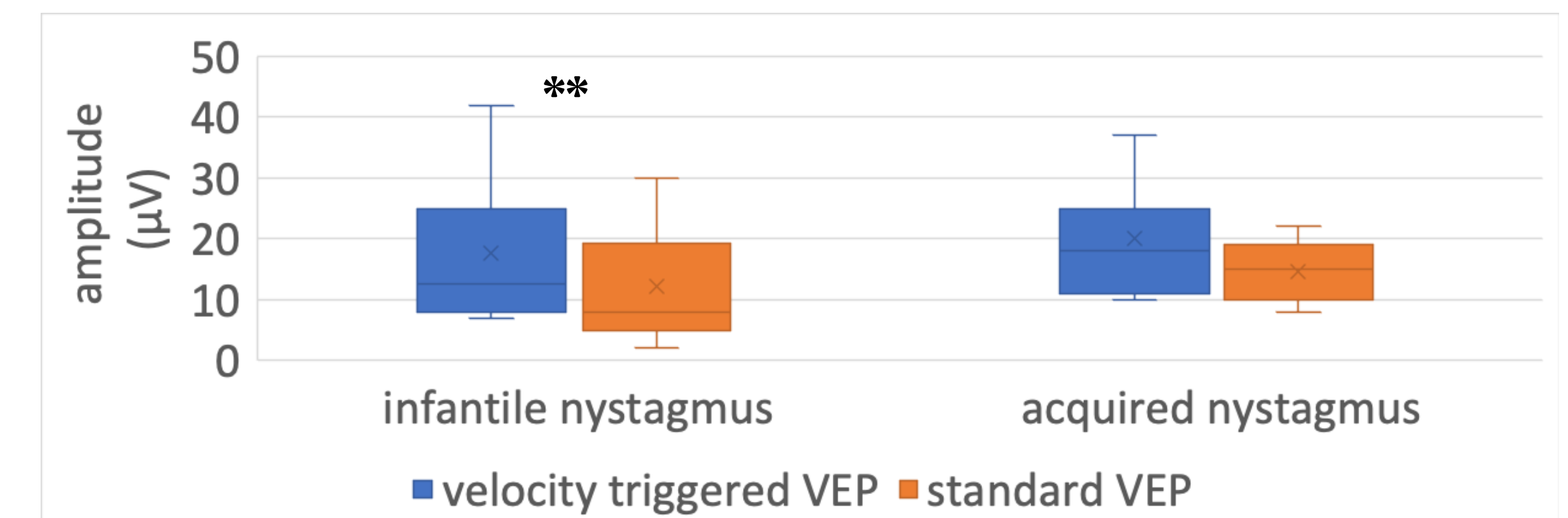


Fig. 3 VEP amplitudes obtained with each method in nystagmus patients

### Conclusions

Triggering VEP acquisition during foveation periods (based on eye velocity) significantly increases VEP amplitude and therefore **has the potential to improve prognostic reliability in people with IN.**

### References

1. Kelly, Phillips, Weiss (2017) The relationship of nystagmus waveform on the VEP response in infantile nystagmus syndrome: a small case series. *Documenta Ophthalmologica* **134**: 37-44
2. Kelly, Tarczy-Hornoch, Phillips, Weiss (2021) A reduced visual pathway response in infantile nystagmus syndrome. *J AAPOS* **25**: 9.e1-9.e6