

# A comparison of cardiorespiratory responses during ROP screening using ultra-widefield scanning laser ophthalmoscopy (UWF-SLO) versus binocular indirect ophthalmoscopy (BIO)

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## Abstract

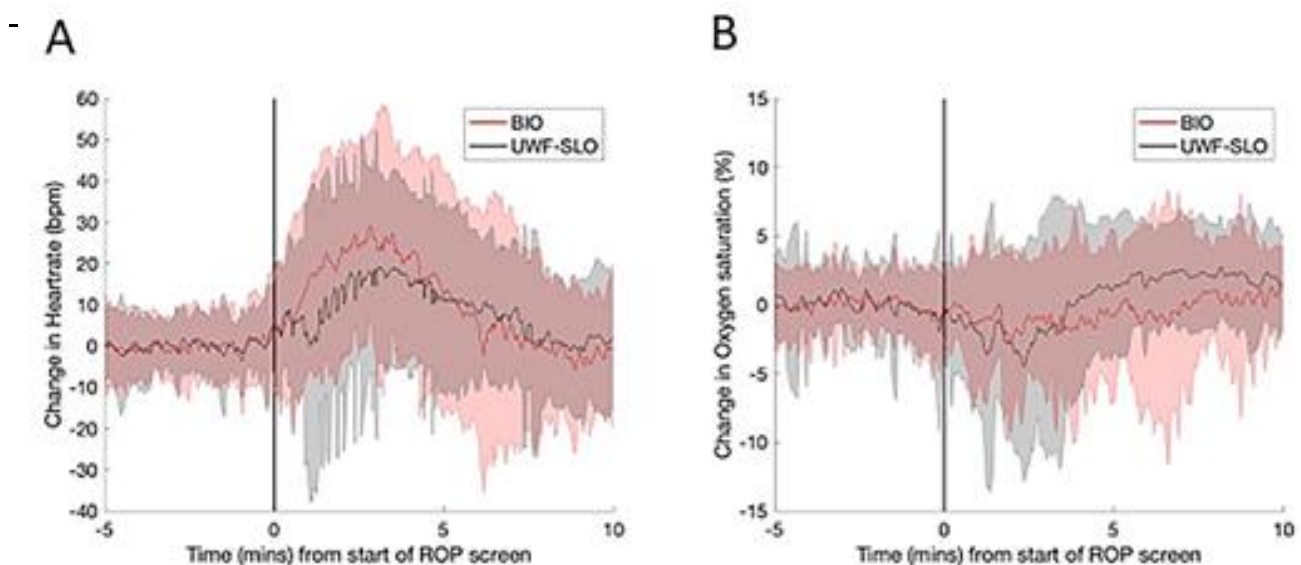
**Purpose :** Imaging-based retinopathy of prematurity (ROP) screening using UWF-SLO provides a potential alternative to traditional indented BIO examination, and may be better tolerated by infants. We aim to assess the safety of UWF-SLO based ROP screening by comparing physiological responses of infants examined using both methods.

**Methods :** Pooled data from three prospective cohorts totaling 86 infants (46 males and 40 females) undergoing ROP screening were included in the study. 44 infants were examined by optomap imaging (California rg, Optos plc, Dunfermline, UK) with 'flying baby' technique and 42 by BIO with scleral indentation. The same neonatal wire speculum was used for both groups. Infants were aged between 30+3 and 44+3 weeks postmenstrual age. Vital signs were continuously recorded via a laptop connected to hospital monitors. Heart rate (HR) and oxygen saturation (SpO<sub>2</sub>) were examined for 10 min before and after the start of ROP screening. Increase in HR and decrease in SpO<sub>2</sub> were calculated above or below the infant's baseline range (mean  $\pm$  two standard deviations). The maximum change in HR and minimum change in SpO<sub>2</sub> were calculated from the infant's baseline mean. Bradycardia, tachycardia and oxygen desaturation were identified using standard clinical definitions. Data was analysed using linear regression, correcting for birthweight, gestational age at birth/examination, and baseline HR and SpO<sub>2</sub> for their respective parameters.

**Results :** Figure 1 shows the average change in HR and SpO<sub>2</sub> in the two groups. No significant difference in terms of increase in HR (p=0.18) or decrease in SpO<sub>2</sub> (p=0.88) was detected between the two screening methods. The maximum change from baseline in HR was lower in the UWF-SLO group by a mean of 9.1 beat/min (p=0.024). There was no statistical difference in the occurrence of bradycardia (p=0.73), tachycardia (p=0.32) or oxygen desaturation (p=0.93).

**Conclusions :** Our results indicate that ROP screening using UWF-SLO is safe when evaluated using cardiorespiratory markers. Less fluctuation (changes from baseline) in HR was seen in the UWF-SLO group, indicative of good tolerability. Although there was no statistically significance difference in the rate of tachycardia between the two groups, the mean HR trended lower during ROP examination with UWF-SLO.

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**Figure 1.** Comparison of fluctuations in (A) heart rate and (B) oxygen saturation around the time of retinopathy of prematurity (ROP) screening using indented binocular indirect ophthalmoscopy (BIO, in red) versus ultra-widefield scanning laser ophthalmoscopy (UWF-SLO, in grey). The start of ROP examination was defined as time 0. Means are shown as solid traces while shaded areas represent standard deviation.

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