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Anterior Segment Optical Coherence Tomography Detects Cells in Children without Eye Disease

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Abstract

Purpose : OCT based quantification of anterior chamber inflammation has been shown to be repeatable, responsive and sensitive. Given assumptions around ocular immune privilege, specificity is apparently poor as it detects cells in clinically inactive eyes. We wished to determine OCT findings in the anterior chambers of an ethnically diverse population of children without eye disease.

Methods : Scans were acquired (swept source AS-OCT, Heidelberg Anterion™ 13-line raster) from children aged 5-17 years old purposively sampled from two schools characterised by sociodemographic diversity. Data collected included sex and iris colour (5-level grading, blue to dark brown). Images underwent manual analysis by at least two independent readers to detect hyperreflective dots representative of anterior chamber inflammatory cells. Statistical analysis comprised description of the maximum cell count per line, median and total cell count(cc) (MAXCC, MEDCC, TCC) per eye, and regression analysis of cell counts and demographics.

Results : Interim findings are reported here based on the current complete dataset of 3562 analysed images from 137 children (of 220) of whom 49% were female and 26%, 9%, 21%, 34% and 11% had blue, blue-green, hazel, brown and dark brown eyes respectively. Mean age 11.3years (range 5-14). At least one cell was detected in 82% of eyes (91% children). MEDCC ranged from 0-2 per eye (median 0), and MAXCC 0-7 (median 2). TCC per eye ranged from 0 – 28 (median 4).

Older age was associated with higher counts (regression coefficient for TCC 0.72,

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p<0.001, 95% CI 0.51- 0.93, fig 1) with a median TCC for children aged 5yrs of 1.5 cells, versus 8 cells for children aged 13+yrs. Iris colour and gender were not associated with cell count.

Conclusions : Healthy children have findings on SS-ASOCT that could be considered representative of inflammatory cells. Our normative thresholds will have consequences for setting therapeutic targets for disease control in childhood uveitis, and the wider use of AS-OCT based screening for children at risk of uveitis. Ongoing analysis of acquired images will improve precision of the 95th centiles for cell counts for use in clinical practice. The association of age with cell count suggest an early life ageing related change in blood-iris barrier stability which is worthy of further exploration.

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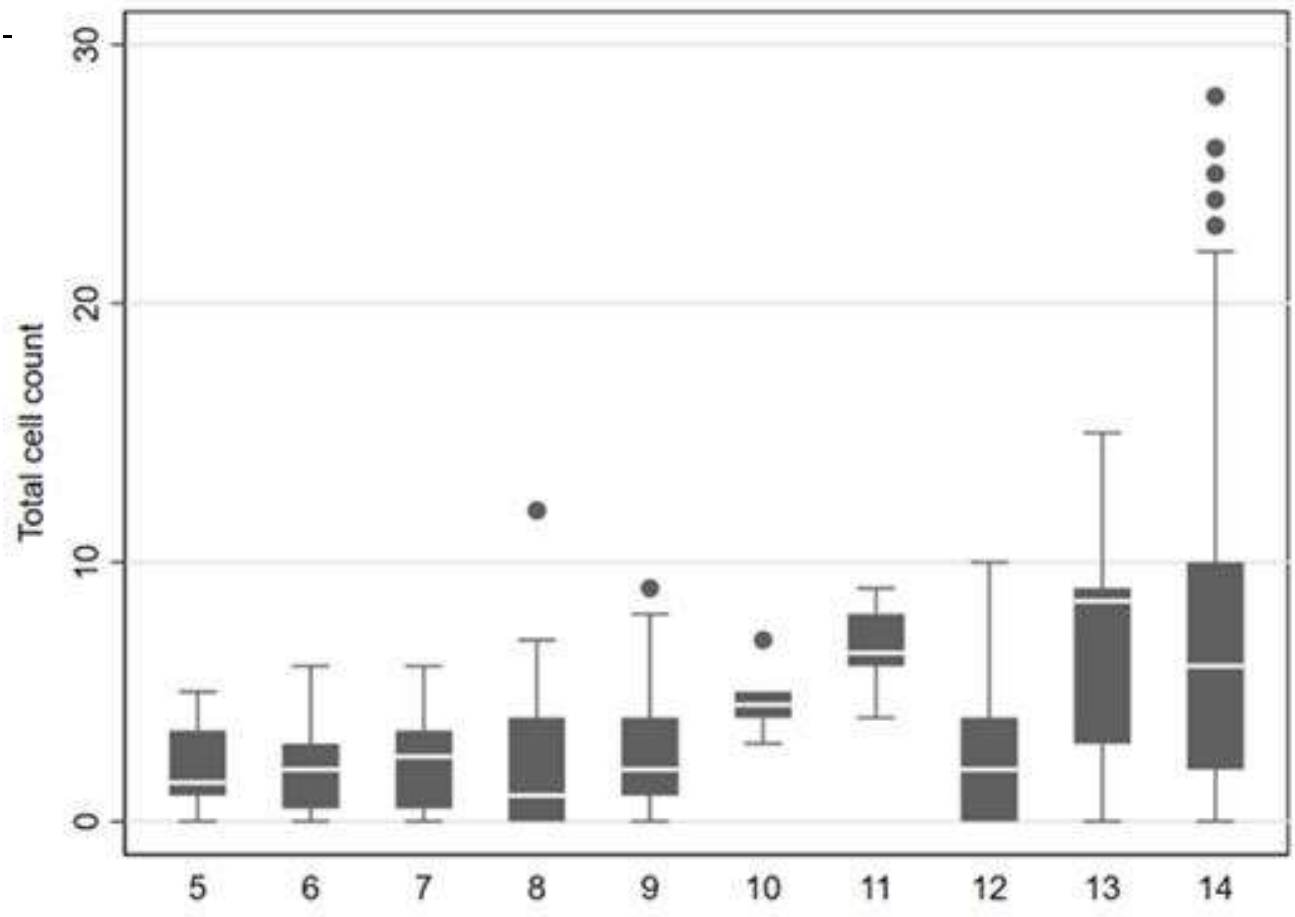

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Box plot: total cell count (TCC) versus age in years

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