### Title:
Clinical Performance of Defocus Incorporated Soft Contact (DISC) Lenses for Myopia Control

### First Name(s), Last Names(s)
Carly SY Lam, Wing Chun Tang, Ying Yung Tang, Dennis Y Tse, Chi Ho To

### Affiliation(s)
Centre for Myopia Research, School of Optometry, The Hong Kong Polytechnic University

### Purpose
To evaluate the clinical performance of a special designed Defocus Incorporated Soft Contact (DISC) Lenses for myopia control trial.

### Methods
Thirty-two myopic (-1 to -5D with astigmatism less than 1D) Hong Kong Chinese schoolchildren aged between 9 to 15 years were recruited. They were randomly selected from the subject pool of our on-going ‘myopia control study’ using the DISC lenses. The DISC lens is a custom-made bifocal (with 2.5D addition power) soft contact lens which provides simultaneous vision for both distance and near. The near zone incorporates constant myopic defocus for all viewing distances. Half of them wore the DISC lenses and the other half wore single vision (SV) lenses with same materials. Lens evaluation was performed for each subject after 30 minutes of lens wear. Clinical performance was assessed for their right eyes in terms of lens fitting performance (centration, primary gaze movement, movement with blink, lens tightness), physiology parameters (limbal and bulbar redness, corneal and conjunctival staining), subjective perception (ratings of comfort and vision, grade 1-4) and visual performance among individuals. Assessment on visual performance include: distance visual acuities (VA) and contrast sensitivities (CS) with different contrasts (100%, 25%, 10% and 5%) under photopic and scotopic conditions, high contrast and low contrast near VA. Each subject were given a break and then switched to wear the other lens type on the same eye. Measurements were repeated after 30 minutes of lens adaptation. Paired t-test was used for statistical analysis.

### Results
Lens fitting performance, physiology parameters and subjective perception of lens comfort were very similar for both lens types (p>0.05). Overall satisfaction of vision with lenses was graded by the subjects on a scale from 1-5 (1-very poor, 2-poor 3- fair; 4-good, 5-excellent). The mean grades for both lens types was good DISC lens = 4.13, SV lens = 4.81) although the subjects found slightly better vision with SV lenses than the DISC lenses. There was no significant difference between two lens types in high contrast near VA, but a significant difference showed in low contrast near VA (p<0.0001). The distance VA of various contrast levels was significantly better for SV lens than the DISC lenses under both photopic and scotopic conditions. The mean differences of 10 % and 5% (p <0.0001) low contrast distance VA were 0.09 and 0.16 logMAR units (about 1 to 1.5 lines). The mean differences of 100% (p = 0.001) contrast and 25% (p<0.0001) contrast levels were only 0.03 and 0.04 logMAR units (1.5 to 2 letters) respectively, and this was not likely to be clinically significant.

### Discussion and Conclusions
The DISC lens shows similar clinical performance with single vision lens in most aspects except low contrast VA. Overall performance indicates the DISC lens can be prescribed for schoolchildren.
| **Statement on proprietary interests:** | A patent ‘Method of Optical Treatment’ (US patent no. 7506983) was issued on 24 Mar 2009. |
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