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## The longitudinal orthokeratology research in children (LORIC) in Hong Kong: a pilot study on refractive changes and myopic control.

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#### Abstract

**PURPOSE:** Myopia is a common ocular disorder, and progression of myopia in children is of increasing concern. Modern overnight orthokeratology (ortho-k) is effective for myopic reduction and has been claimed to be effective in slowing the progression of myopia (myopic control) in children, although scientific evidence for this has been lacking. This 2 year pilot study was conducted to determine whether ortho-k can effectively reduce and control myopia in children.

**METHODS:** We monitored the growth of axial length (AL) and vitreous chamber depth (VCD) in 35 children (7-12 years of age), undergoing ortho-k treatment and compared the rates of change with 35 children wearing single-vision spectacles from an earlier study (control). For the ortho-k subjects, we also determined the changes in corneal curvature and the relationships with changes of refractive errors, AL and VCD.

**RESULTS:** The baseline spherical equivalent refractive errors (SER), the AL, and VCD of the ortho-k and control subjects were not statistically different. All the ortho-k subjects found post-ortho-k unaided vision acceptable in the daytime. The residual SER at the end of the study was  $-0.18 \pm 0.69$  D (diopetre) and the reduction (less myopic) in SER was  $2.09 \pm 1.34$  D (all values are mean  $\pm$  SD). At the end of 24 months, the increases in AL were  $0.29 \pm 0.27$  mm and  $0.54 \pm 0.27$  mm for the ortho-k and control groups, respectively (unpaired t test;  $p = 0.012$ ); the increases in VCD were  $0.23 \pm 0.25$  mm and  $0.48 \pm 0.26$  mm for the ortho-k and control groups, respectively ( $p = 0.005$ ). There was significant initial corneal flattening in the ortho-k group but no significant relationships were found between changes in corneal power and changes in AL and VCD.

**CONCLUSION:** Ortho-k can have both a corrective and preventive/control effect in childhood myopia. However, there are substantial variations in changes in eye length among children and there is no way to predict the effect for individual subjects.

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