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## Original article

# Effect of unilateral congenital cataract surgery on ocular axial length growth and corneal flattening<sup>☆</sup>



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## ABSTRACT

**Objective:** The aim of this article is to study the effect of unilateral congenital cataract surgery on ocular growth and corneal flattening.

**Methods:** This is a cross-sectional study of 59 patients operated on due to a unilateral congenital cataract. The median age of the patients at the time of diagnosis was 17 months (interquartile range, 5–39 months). The median age at cataract the time of surgery was 28 months (interquartile range, 8–52 months), and the mean follow-up between cataract surgery and assessments was  $149.7 \pm 69.9$  months (range, 30–319 months). Axial length and corneal curvature were measured in both operated and non-operated eyes, comparing the results between them.

**Results:** There were no statistically significant differences for axial length growth or corneal flattening between operated and non-operated eyes: axial length ( $P = .327$ , Student t test) and corneal curvature ( $P = .078$ , Student t test). A sub-analysis was performed using the visual acuity and the age of the patient at the time of surgery. The only statistically significant data ( $P = .007$ , Student t test) was a lower axial length in operated eyes compared to non-operated eyes, in the non-deep-amblyopia group.

**Conclusions:** No significant axial length growth modifications were observed between operated and non-operated eyes. Only the non-deep-amblyopia group presented with a lower axial length in the operated eyes compared to non-operated eyes. No significant differences in corneal flattening were found between groups after unilateral congenital cataract surgery.

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## Efecto de la cirugía de las cataratas congénitas unilaterales sobre el crecimiento ocular axial y el aplanamiento corneal

### RESUMEN

#### Palabras clave:

Cataratas congénitas  
Longitud axial  
Biometría  
Curvatura corneal  
Queratometría

**Objetivo:** Estudiar el efecto de la cirugía de las cataratas congénitas unilaterales sobre el crecimiento ocular y el aplanamiento corneal.

**Métodos:** Realizamos un estudio transversal sobre 59 pacientes intervenidos de cataratas congénitas unilaterales. La mediana de edad de los pacientes en el momento del diagnóstico fue de 17 meses (rango intercuartílico: 5-39 meses), la mediana de edad en el momento de la intervención fue de 28 meses (rango intercuartílico: 8-52 meses) y el tiempo medio de seguimiento fue de  $149,7 \pm 69,9$  meses (rango: 30-319 meses). Se midió la longitud axial y la curvatura corneal de ambos ojos en todos los pacientes, tanto los operados de catarata congénita como los no operados. Estos valores fueron comparados entre sí.

**Resultados:** No se evidencian diferencias estadísticamente significativas entre ambos ojos (operados y no operados) respecto a la longitud axial ( $p=0,327$ , prueba t de Student) ni a la curvatura corneal ( $p=0,078$ , prueba t de Student). Al realizar un subanálisis dependiendo de la agudeza visual y la edad de los pacientes en el momento de la intervención, encontramos diferencias estadísticamente significativas solo respecto a la longitud axial en el grupo de pacientes que no presentan ambliopía profunda ( $p=0,007$ , prueba t de Student), con menor longitud axial en los ojos intervenidos respecto a los ojos sanos.

**Conclusiones:** No encontramos cambios significativos en el crecimiento axial de los ojos intervenidos de catarata congénita unilateral respecto a sus ojos adelfos. Solo encontramos menor longitud axial en los ojos intervenidos con respecto a los ojos sanos en el grupo que no presentaba ambliopía profunda. No se hallaron diferencias respecto al aplanamiento corneal en los ojos operados con respecto a los ojos adelfos tras la cirugía de las cataratas congénitas unilaterales.

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## Introduction

Increased axial length (AL) of the eye, together with flattened corner curvature, are the most significant factors for refractive changes that occur in the human eye during growth. The most important axial length increase of the ocular globe takes place in the first 18 months of life<sup>1</sup> while the keratometric change takes place mainly during the first 3–6 months.<sup>1,2</sup> For these reasons, in congenital cataracts pediatric surgery it is recommended to diminish the diopter power of the intraocular lens (IOL) which initially causes hypermetropia which gradually will tend to emmetropia or moderate myopia in adulthood. Accordingly, Dahave et al.<sup>3</sup> recommend correcting the calculated emmetropic power 20% in children under 2 years of age due to the rapid changes in axial length and keratometry readings in this period of life. While in children between 2 and 8 years they recommend 10% hypo-correction as said changes take place at a slower rate.

The objective of this study is to assess the effect on ocular growth and corneal flattening of unilateral congenital cataract surgery by means of studying AL and corneal curvature in children who were intervened for congenital cataract in one eye, and comparing said parameters with the contralateral healthy eye.

## Materials and methods

A transversal study on a group of 59 patients who accepted and signed an informed consent to participate in the study, out of 120 unilateral congenital cataract operations carried out consecutively between January 1982 to September 2004 at the Pediatric Ophthalmology Department in the University Hospital La Fe of Valencia.

All the surgeries were carried out by 3 surgeons in said period of time applying similar surgical procedures. Under general anesthesia, a corneal incision between 3.5 and 6.5 mm was made depending on the IOL to be implanted and, after performing anterior capsulotomy with diathermy, the lens material was removed by aspiration with a Simcoe cannula. In 48 eyes the following IOL were implanted: 41 IOL in capsular sac, 1 OIL in anterior chamber and 6 IOL sutured to sulcus. Eleven eyes were left aphakic, with contact lens adaptation for these patients. Only in 31 cases the implanted IOL type was identified: 15 IOL "Pharmacia 808C", 6 "AMO PC56LB", 5 "Pharmacia 722C", 3 "Pharmacia 722Y", one "Pharmacia 720A", and one "Allergan PC40NB" IOL. In 14 eyes, the posterior capsule was left intact and in 22 eyes continuous circular posterior capsulotomy (CCPC) was performed with diathermy or mechanically, and in 23 eyes CCPC was associated to anterior vitrectomy. Residual viscoelastic was removed with a Simcoe

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