

Cochrane Database of Systematic Reviews

Excimer laser refractive surgery versus phakic intraocular lenses for the correction of moderate to high myopia (Review)

Barsam A, Allan BDS

Barsam A, Allan BDS. Excimer laser refractive surgery versus phakic intraocular lenses for the correction of moderate to high myopia. Cochrane Database of Systematic Reviews 2014, Issue 6. Art. No.: CD007679. DOI: 10.1002/14651858.CD007679.pub4.

www.cochranelibrary.com

Excimer laser refractive surgery versus phakic intraocular lenses for the correction of moderate to high myopia (Review)

WILEY

Copyright © 2014 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.



Trusted evidence. Informed decisions. Better health.

[Intervention Review]

Excimer laser refractive surgery versus phakic intraocular lenses for the correction of moderate to high myopia

Allon Barsam¹, Bruce DS Allan²

¹Moorfields Eye Hospital NHS Foundation Trust, London, UK. ²External Disease Service, Moorfields Eye Hospital NHS Foundation Trust, London, UK

Contact: Allon Barsam, Moorfields Eye Hospital NHS Foundation Trust, City Road, London, EC1V 2PD, UK. abarsam@hotmail.com.

Editorial group: Cochrane Eyes and Vision Group. **Publication status and date:** New search for studies and content updated (no change to conclusions), published in Issue 6, 2014.

Citation: Barsam A, Allan BDS. Excimer laser refractive surgery versus phakic intraocular lenses for the correction of moderate to high myopia. *Cochrane Database of Systematic Reviews* 2014, Issue 6. Art. No.: CD007679. DOI: 10.1002/14651858.CD007679.pub4.

Copyright © 2014 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

ABSTRACT

Background

Myopia is a condition in which the focusing power (refraction) of the eye is greater than that required for clear distance vision. There are two main types of surgical correction for moderate to high myopia; excimer laser and phakic intraocular lenses (IOLs). Excimer laser refractive surgery for myopia works by removing corneal stroma to lessen the refractive power of the cornea and to bring the image of a viewed object into focus onto the retina rather than in front of it. Phakic IOLs for the treatment of myopia work by diverging light rays so that the image of a viewed object is brought into focus onto the retina rather than in front of the retina. They can be placed either in the anterior chamber of the eye in front of the iris or in the posterior chamber of the eye between the iris and the natural lens.

Objectives

To compare excimer laser refractive surgery and phakic IOLs for the correction of moderate to high myopia by evaluating postoperative uncorrected visual acuity, refractive outcome, potential loss of best spectacle corrected visual acuity (BSCVA) and the incidence of adverse outcomes.

Search methods

We searched CENTRAL (which contains the Cochrane Eyes and Vision Group Trials Register) (2014, Issue 1), Ovid MEDLINE, Ovid MEDLINE In-Process and Other Non-Indexed Citations, Ovid MEDLINE Daily, Ovid OLDMEDLINE (January 1946 to February 2014), EMBASE (January 1980 to February 2014), the *meta*Register of Controlled Trials (*m*RCT) (www.controlled-trials.com), ClinicalTrials.gov (www.clinicaltrials.gov) and the World Health Organization (WHO) International Clinical Trials Registry Platform (ICTRP) (www.who.int/ictrp/search/en). We did not use any date or language restrictions in the electronic searches for trials. We last searched the electronic databases on 11 February 2014.

Selection criteria

We included randomised controlled trials (RCTs) comparing excimer laser refractive surgery and phakic IOLs for the correction of myopia greater than 6.0 diopters (D) spherical equivalent.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. We performed data analysis. We summarised data for outcomes using odds ratios. We used a fixed-effect model as only three trials were included in the review.

Main results

This review included three RCTs with a total of 228 eyes. The range of myopia of included patients was -6.0 D to -20.0 D of myopia with up to 4.0 D of myopic astigmatism. The percentage of eyes with uncorrected visual acuity (UCVA) of 20/20 or better at 12 months postoperative

Excimer laser refractive surgery versus phakic intraocular lenses for the correction of moderate to high myopia (Review) Copyright © 2014 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.



Trusted evidence. Informed decisions. Better health.

was not significantly different between the two groups. Phakic IOL surgery was safer than excimer laser surgical correction for moderate to high myopia as it results in significantly less loss of best spectacle corrected visual acuity (BSCVA) at 12 months postoperatively. However there is a low risk of developing early cataract with phakic IOLs. Phakic IOL surgery appears to result in better contrast sensitivity than excimer laser correction for moderate to high myopia. Phakic IOL surgery also scored more highly on patient satisfaction/preference questionnaires.

Authors' conclusions

The results of this review suggest that, at one year post surgery, phakic IOLs are safer than excimer laser surgical correction for moderate to high myopia in the range of -6.0 to -20.0 D and phakic IOLs are preferred by patients. While phakic IOLs might be accepted clinical practice for higher levels of myopia (greater than or equal to 7.0 D of myopic spherical equivalent with or without astigmatism), it may be worth considering phakic IOL treatment over excimer laser correction for more moderate levels of myopia (less than or equal to 7.0 D of myopic spherical equivalent with or equal to 7.0 D of myopic spherical equivalent with or equal to 7.0 D of myopic spherical equivalent with or equal to 7.0 D of myopic spherical equivalent with or equal to 7.0 D of myopic spherical equivalent with or equal to 7.0 D of myopic spherical equivalent with or phakic IOLs. Further RCTs adequately powered for subgroup analysis are necessary to further elucidate the ideal range of myopia for phakic IOLs. This data should be considered alongside comparative data addressing long-term safety as it emerges.

PLAIN LANGUAGE SUMMARY

Excimer laser versus phakic intraocular lenses for the correction of moderate to high short-sightedness

Background

Myopia is a condition in which the focusing power (refraction) of the eye is greater than that required for clear vision of distant objects. Myopia is a common cause of visual disability throughout the world. The World Health Organization (WHO) has grouped myopia and uncorrected refractive error among the leading causes of blindness and vision impairment in the world. The overall power of the lens that would be needed to correct the myopia is expressed in diopters (D) of a sphere. Most people have some degree of astigmatism where the eye is better at focusing light in one meridian than it is at another. It is possible to combine the effect of any astigmatism with the overall focusing power of the eye as a spherical equivalent in diopters. There are two main types of surgical correction for moderate to high myopia; excimer laser and phakic intraocular lenses (IOLs). Excimer laser refractive surgery for myopia works by removing corneal stroma to lessen the refractive power of the cornea and to bring the image of a viewed object into focus onto the retina rather than in front of it. Phakic IOLs for the treatment of myopia work by diverging light rays so that the image of a viewed object is brought into focus onto the retina rather than in front of it. They can be placed either in the anterior chamber of the eye in front of the iris or in the posterior chamber of the eye between the iris and the natural lens.

Study characteristics

This review included three randomised controlled trials with a total of 228 eyes. The range of myopia of included patients was -6.0 D to -20.0 D with up to 4.0 D of myopic astigmatism.

Key results

The results of this review showed that the chance of the uncorrected visual acuity being 20/20 or better was not different between the two groups. Phakic IOL surgery was safer than excimer laser surgical correction for moderate to high myopia as it results in significantly less loss of best spectacle corrected visual acuity (BSCVA) at 12 months postoperatively. Phakic IOL surgery appears to result in better contrast sensitivity than excimer laser correction for moderate to high myopia. Phakic IOL surgery also scored more highly on patient satisfaction/ preference questionnaires. Neither technique resulted in any complication that caused a loss of final BSCVA.

Quality of the evidence

Only studies that fulfilled the proper requirements were selected for inclusion in the analysis. The limitations of the studies that we included were the relatively short follow up period of one year as well as the fact that many of the interventions studied have now been superseded by more technologically advanced alternatives. In the present day the technology available for both excimer laser and phakic IOL surgical correction of high myopia is better than during the period of the included studies.

Conclusion

This review showed that phakic IOLs for the treatment of high myopia were safer and preferred by patients when compared with excimer laser. Studies looking at more up to date technology with longer follow to determine long term safety issues are needed.