

# Refractive lens exchange as a refractive surgery modality

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## Purpose of review

Refractive lens exchange is becoming a more popular method of refractive surgery in the presbyopic patient. The limitations of keratorefractive surgery have led to a resurgence of lens exchange surgery for patients with prescriptions outside the limits of corneal refractive procedures, in addition to patients with routine refractive errors requesting a surgical procedure to achieve emmetropia and also address presbyopia. A review of the recent literature was performed to determine recent advances in this surgical procedure.

## Recent findings

New multifocal and accommodative lens technology should enhance patient satisfaction. In addition, newer lens extraction techniques using microincisions and new phacoemulsification technology will enhance the safety of this procedure, ultimately allowing refractive lens exchanges to be performed through two microincisions as future lens technologies become available.

## Summary

Attention to detail in regard to proper patient selection, preoperative measurements, intraoperative technique, and postoperative management has resulted in excellent outcomes and improved patient acceptance of this effective technique.

## Keywords

refractive lens exchange, multifocal intraocular lens, accommodative intraocular lens, light adjustable lens, bimanual microincision phacoemulsification

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## Abbreviations

IOL intraocular lens  
LAL light adjustable lens  
RLE refractive lens exchange

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## Introduction

Advances in small incision surgery have enabled cataract surgery to evolve from a procedure concerned primarily with the safe removal of the cataractous lens to a procedure refined to yield the best possible postoperative refractive result. As the outcomes of cataract surgery have improved, the use of lens surgery as a refractive modality in patients without cataracts has increased in popularity.

Removal of the crystalline lens for refractive purposes or refractive lens exchange (RLE) offers many advantages over corneal refractive surgery. Patients with high degrees of myopia, hyperopia, and astigmatism are poor candidates for excimer laser surgery. In addition, presbyopia can currently only be addressed with monovision or reading glasses. RLE with multifocal or accommodating intraocular lenses (IOLs) in combination with corneal astigmatic procedures could theoretically address all refractive errors, including presbyopia, while simultaneously eliminating the need for cataract surgery in the future.

Current attempts to enhance refractive results and improve functional vision with customized corneal ablations with the excimer laser expose another advantage of RLE. The overall spherical aberration of the human eye tends to increase with increasing age [1-4]. This is not the result of significant changes in corneal spherical aberration but rather increasing lenticular spherical aberration [5-7]. This implies that attempts to enhance visual function by addressing higher order optical aberrations with corneal refractive surgery will be sabotaged at a later date by lenticular changes. Addressing both lower order and higher order aberrations with lenticular surgery would theoretically create a more stable, ideal optical system that could not be altered by lenticular changes, since the crystalline lens would be removed and exchanged with a stable pseudophakic lens.

## Intraocular lens technology

The availability of new IOL and lens extraction technology should allow RLEs to be performed with added safety and increased patient satisfaction.

## Multifocal intraocular lenses

Perhaps the greatest catalyst for the resurgence of RLE has been the development of multifocal lens technology. High hyperopes, presbyopes, and patients with border-

