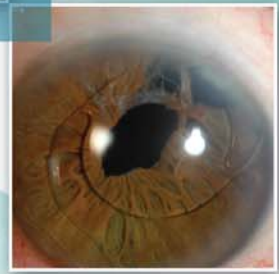
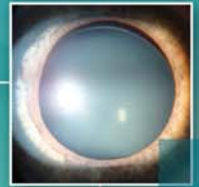
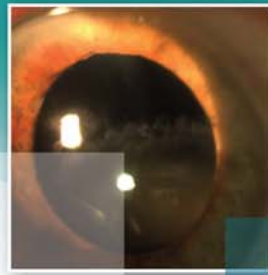
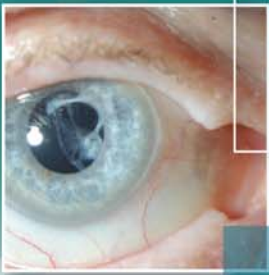


Second Edition

Essentials of **CATARACT SURGERY**



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Bonnie An Henderson

ASSOCIATE EDITORS

Roberto Pineda II
Sherleen H. Chen

SLACK Incorporated

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Essentials of
**CATARACT
SURGERY**

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Essentials of **CATARACT SURGERY**

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DEDICATION

To our mentors for inspiring us;
To our students for challenging us;
To our families for supporting us.

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INTRODUCTION

The idea for the first edition of this book originated with the creation of the first Harvard Medical School Intensive Cataract Surgical Training Course at the Massachusetts Eye and Ear Infirmary in 2005. The authors of this text-book are the faculty members from this course. The authors are distinguished ophthalmologists who were nominated as the best cataract surgery teachers by the Chairperson at their respective academic institutions. As such, this compilation of work represents the viewpoints of the most well-respected cataract surgery educators in the United States.

Mastering phacoemulsification surgery is arduous and arguably the most difficult surgery to learn during residency. We have attempted to dissect each step and dedicate an entire chapter to each individual building block of the surgery. Each chapter outlines the important aspects of the surgical step with personal tips from an experienced mentor. This second edition has been updated with the newest developments in laser technology, intraocular lenses, and surgical techniques. We hope that you will find this book useful while developing competence in cataract surgery and also as a reference once you have mastered it.

The completion of this project required great effort from many people. We do not have enough space in this book to properly express our gratitude. We hope we have properly named all those who have contributed to every aspect of this work.

First and foremost, we are grateful to all the contributing authors. We understand that writing yet another book chapter is not high on the priority list. We share the same passion for teaching and therefore appreciate the authors' acquiescence to participate in this undertaking.

We are grateful to our industry partners from Alcon, Abbott Medical Optics, and Bausch & Lomb for supporting the Harvard Cataract Course and development of this book.

This project would still be just an idea without the help and hard work of Erika Gonzalez, April Billick, Veronica Moul, and John Bond from SLACK Incorporated publishers. Their hours of dedication have made the book a reality.

We are indebted to our family and friends for generously allowing us to burn the midnight oil for the past 2 years.

Bonnie An Henderson, MD

APPROPRIATENESS OF CATARACT SURGERY

Susannah Rowe, MD, MPH

Cataracts are prevalent among older adults, and the incidence of cataract-related vision loss increases with age.¹ When performed appropriately, cataract extraction usually improves quality of life, reduces injury, and attenuates functional declines. Cataract extraction has proven to be generally safe and highly successful; however, it is important to ensure that surgery is performed for the appropriate indications because vision-threatening complications can occur.

I. GUIDELINES

The American Academy of Ophthalmology Preferred Practice Pattern for Cataract in the Adult Eye offers general parameters for ethical decision-making in cataract surgery:

The primary indication for surgery is visual function that no longer meets the patient's needs and for which cataract surgery provides a reasonable likelihood of improvement, or when the lens opacity inhibits optimal management of posterior segment disease or the lens causes (inflammation, angle closure, etc) medically unmanageable open-angle glaucoma.²

II. ACADEMIC STUDIES OF APPROPRIATENESS

In 1996, an expert panel of both ophthalmologists and nonophthalmologists first applied well-established standardized criteria for evaluating the appropriateness of medical interventions to assess 1139 cataract surgeries performed in 10 US academic centers during 1990.³ Based on expert review of available medical records, researchers deemed the overwhelming majority

of surgeries to be “appropriate” (52%) or “appropriate and crucial” (39%). A small minority of surgeries was considered to be either “uncertain” (7%) or “inappropriate” (2%). Subsequent to this study, a White Paper jointly published by the American Academy of Ophthalmology, the American Society of Cataract and Refractive Surgery, and the European Society of Cataract and Refractive Surgeons highlighted evidence that cataract surgery as performed in the United States is generally appropriate and beneficial to the patient.⁴ These findings are in general agreement with subsequent studies showing cataract surgery is generally appropriate.⁵

III. VISUAL DISABILITY FROM CATARACTS REDUCES OVERALL FUNCTION AND QUALITY OF LIFE

Visual disability from any cause can profoundly affect quality of life and can reduce a person’s ability to function safely and independently. Studies show that visual disability reduces global quality of life (based on the SF-36) more than chronic headache, type 2 diabetes, or a history of myocardial infarction.⁶

The visual acuity threshold for functional difficulties varies from patient to patient, but some population-based studies suggest that even mild reductions in vision can be symptomatic. Klein et al demonstrated in a large population-based study that early lens opacities associated with mildly reduced visual acuity are often associated with difficulty reading, driving, and recognizing faces.⁷ Cataract surgeons can advise patients regarding the impact of decreased distance vision as summarized in Table 1-1.⁷⁻¹⁰

IV. APPROPRIATE CATARACT SURGERY IMPROVES SAFETY AND QUALITY OF LIFE

Removing visually significant cataracts usually reduces the risk of injury and improves a patient’s quality of life.¹¹⁻²⁰ Even when surgery is successful in the first eye, second-eye cataract surgery offers additional benefits.¹⁵ In one study, patients aged 65 and older who had significant functional limitations due to cataracts had an 85% likelihood of substantial subjective functional improvement after cataract surgery.¹³

In addition to subjective benefits, research shows that appropriate cataract surgery impacts numerous objective measures of quality of life. Specific improvements include better night vision, enhanced ability to drive, fewer falls and fractures, fewer motor vehicle accidents, better cognitive functioning on standardized tests, greater ability to live independently, and attenuated declines in overall functioning and well-being.¹³⁻²⁰

TABLE 1-1. IMPACT OF DECREASED DISTANCE VISION

<i>Visual Acuity</i>	<i>Impact</i>
Worse than 20/25	More falls and fractures
Worse than 20/40	Decreased overall quality of life Functional declines in global health status (mobility, activities of daily living, and physical performance)
Worse than 20/50	Greater risk of death Impaired visual field, contrast sensitivity, and distance vision Greater risk of motor vehicle accidents

V. ASSESSING THE IMPACT OF CATARACTS ON PATIENTS' QUALITY OF LIFE

Deciding to proceed with cataract surgery represents a collaborative process between the patient and the surgeon as well as other family members and caregivers as indicated. This process should include a careful assessment of the patient's subjective visual function. Preoperative vision-specific quality of life and glare disability remain the most reliable predictors of patient satisfaction with cataract surgery, whereas preoperative visual acuity is only weakly predictive of patient satisfaction.^{14,21} Patients with the poorest preoperative subjective visual function are generally the most satisfied after cataract surgery.

To appropriately advise patients regarding the risks and benefits of cataract surgery, ophthalmologists must clearly understand their patients' needs, desires, and priorities. During this process, surgeons should take into account possibly inaccurate expectations regarding functional decline with age (too high/too low) and some patients' inability to recognize and acknowledge gradual decreases in vision and visual function. Finally, surgeons have a responsibility to educate patients regarding the ways in which decreased vision can limit abilities, safety, and quality of life and to help them balance these risks with the potential risks of surgery.

VI. OTHER PREDICTORS OF GOOD OUTCOME FROM CATARACT SURGERY

In addition to worse vision-associated quality of life, other predictors of good outcome after cataract surgery include age <75 years, posterior

subcapsular cataract and glare disability, and the absence of age-related macular degeneration or diabetes.²¹

VII. DOMAINS OF SUBJECTIVE VISUAL FUNCTION

In order to understand a patient's subjective visual function, surgeons should ask specific questions about vision as it relates to activities of daily living. Quality-of-life studies have identified several important domains of vision-targeted quality of life and include the following^{22,23}:

Difficulty with near vision activities, such as:

- Reading small print such as newspaper, telephone book
- Reading letters from friends and family
- Identifying medicines
- Reading legal forms
- Managing bills
- Sewing, cooking, using tools such as scissors
- Finding things on a shelf
- Performing make-up, hairstyling, shaving

Difficulty with distance vision tasks, such as:

- Going up and down stairs or curbs
- Playing games, exercising, bowling, etc
- Recognizing signs across a hall
- Recognizing people across a room
- Going to see movies, plays
- Watching TV

Vision needs for social functioning, such as:

- Entertaining friends or family in home/room
- Visiting people in their rooms, homes, or restaurants
- Seeing faces and how people react to things

Role limitations from visual impairment, such as:

- Limitations in how long activities can be done
- Accomplishing less than desired
- Needing more help than desired
- Limitations in kinds of activities possible

Dependency from visual impairment, such as:

- Needing lots of help
- Needing to rely on what others say
- Not being able to go out alone
- Staying in a room because of eyesight

Feelings of reduced well-being/distress, such as:

- Worrying about vision
- Feeling frustrated with vision
- Experiencing loss of control
- Fearing embarrassing self or others
- Feeling irritable because of poor vision

Peripheral and color vision tasks, such as:

- Seeing objects off to the side
- Picking out and matching clothes

VIII. SPECIAL CASES

A. *Monocular Patients*

Cataract surgery outcomes for monocular patients have not been formally assessed in large studies. For patients without good visual potential in the fellow eye, careful assessment of subjective visual function is especially critical to help patients and surgeons balance the risks of proceeding with surgery versus the risks of deferring intervention. Recommendations for the surgeon include taking extra time with the decision-making and consent processes and being realistic about the surgical skills and resources necessary for a good outcome. Many surgeons consider referring monocular patients for a subspecialty consult to assess any additional ocular pathology that could influence the outcome of surgery.

B. *Patients With Low Visual Potential*

Many low-vision patients are very satisfied with the results of cataract surgery if they understand in advance the goals of the surgery and have realistic expectations. Therefore, even when the visual potential is limited by factors other than cataracts, it is reasonable to consider surgery if the cataract is advanced and if the patient is well informed and motivated to undergo surgery. In these cases it can be useful to focus on functions related to peripheral vision, improved colors, and brightness, rather than on central visual acuity. It is important to consider the increased threat of surgical complications posed by other pathology, as well as the potential need to remove the cataract in order to diagnose and treat other ocular disorders. Finally, it is critical to evaluate carefully and optimize treatment of disorders such as glaucoma and diabetic retinopathy prior to surgery.

IX. CONCLUSION

Cataract surgery is an appropriate option to consider whenever a patient has decreased ability to perform needed or desired activities due to cataract. In addition, patients who are not aware of subjective visual deficits may benefit from surgery if they have reduced vision from cataract and have elevated risks for falls, motor vehicle accidents, or other injuries. Patients with cataract obscuring the view of the posterior segment may also benefit from cataract surgery. Appropriate decision making for cataract surgery is a collaborative effort between the patient and the surgeon and requires an understanding of the patient's vision-related quality of life and visual function.

KEY POINTS

1. Cataract surgery is indicated when visual function no longer meets the patient's needs or when the lens opacity inhibits optimal management of other ocular disease.
2. Overall, studies report that cataract surgery is performed appropriately in the United States and is beneficial to patients.
3. Visual disability from cataracts reduces overall function and quality of life while appropriate cataract surgery improves safety and quality of life.
4. To appropriately advise patients regarding the risks and benefits of cataract surgery, ophthalmologists must clearly understand their patients' needs, desires, and priorities.
5. Special attention and care must be taken in special circumstances such as monocular patients or those with limited visual potential.

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