Laser Eye Surgery Explained: Understanding the Basics of Vision Correction.

David Huerta*

Department of Eye, University of Toronto, Canada

Introduction

For many individuals, the dream of clear vision without the need for glasses or contact lenses is now a reality thanks to advancements in laser eye surgery. This groundbreaking procedure has transformed the lives of millions worldwide, offering a permanent solution to common refractive errors such as myopia (nearsightedness), hyperopia (farsightedness), and astigmatism. In this article, we will delve into the basics of laser eye surgery, exploring the different types of procedures, their mechanisms, candidacy criteria, potential risks, and benefits [1].

Laser eye surgery, also known as refractive surgery, is a procedure that aims to correct refractive errors in the eye, allowing for improved vision without the need for corrective lenses. The surgery reshapes the cornea – the transparent front part of the eye – to alter its focusing power, thus correcting the way light rays enter the eye and improving vision clarity [2].

LASIK is the most common type of laser eye surgery performed worldwide. During the procedure, a thin flap is created on the surface of the cornea using a microkeratome or femtosecond laser. The underlying corneal tissue is then reshaped using an excimer laser to correct the refractive error. Finally, the flap is repositioned, allowing for rapid healing. PRK is an alternative to LASIK, particularly for individuals with thin or irregular corneas [3].

In PRK, the outer layer of the cornea (epithelium) is removed entirely, exposing the underlying stroma. The excimer laser is then used to reshape the corneal stroma to correct the refractive error. As there is no flap creation, the recovery process in PRK is longer compared to LASIK. SMILE is a newer and minimally invasive form of laser eye surgery. In SMILE, a small incision is made in the cornea, and a lenticule (a small disc-shaped piece of tissue) is extracted using a femtosecond laser. This reshapes the cornea and corrects the refractive error without the need for flap creation. SMILE offers advantages such as quicker recovery and reduced risk of dry eye compared to LASIK [4].

Laser eye surgery works by reshaping the cornea to change its curvature, thereby altering its focusing power. This allows light rays to focus properly on the retina, improving vision clarity. The excimer laser used in the procedure removes microscopic amounts of corneal tissue in a precise and controlled manner, guided by computer-generated maps of the patient's eye. Not everyone is a suitable candidate for laser eye surgery [5].

Refractive Stability: Candidates should have stable refractive errors for at least one year before surgery. Age: Candidates should be at least 18 years old, as vision tends to stabilize by this age. Eye Health: Candidates should have healthy eyes, free from conditions such as cataracts, glaucoma, and corneal diseases. Corneal Thickness: Sufficient corneal thickness is necessary for flap creation in LASIK or for tissue removal in PRK and SMILE. Realistic Expectations: Candidates should have realistic expectations regarding the outcome of the surgery and understand that complete elimination of glasses or contacts is not always guaranteed [6].

While laser eye surgery is generally safe and effective, like any surgical procedure, it carries certain risks and potential complications: Dry Eye: Temporary or persistent dryness of the eyes is common after surgery, particularly in LASIK. Under correction or Overcorrection: In some cases, the desired refractive error correction may not be achieved, leading to residual refractive errors. Flap Complications: In LASIK, flap-related issues such as flap dislocation, flap wrinkles, or epithelial ingrowth may occur. Infection: Though rare, infection of the cornea (keratitis) can occur, requiring prompt treatment with antibiotics [7].

Reduced Dependence on Corrective Lenses: Many patients experience a significant reduction in dependence on glasses or contact lenses after surgery. Improved Quality of Life: Enhanced vision clarity and freedom from glasses or contacts can lead to improved quality of life and greater convenience in daily activities. Quick Recovery: Most patients experience rapid visual recovery, with improved vision within a few days to weeks after surgery. Long-Term Results: Laser eye surgery provides long-term vision correction, with the majority of patients maintaining improved vision for years following the procedure. Enhanced Career Opportunities: For individuals in professions that require excellent vision, such as pilots, athletes, or military personnel, laser eye surgery can enhance career opportunities and performance [8,9].

Use of Eye Drops: Patients may be prescribed antibiotic and anti-inflammatory eye drops to prevent infection and reduce inflammation. Avoidance of Rubbing Eyes: Patients should avoid rubbing their eyes to prevent displacement of the

***Correspondence to:** David Huerta, Department of Eye, University of Toronto, Canada, E-mail: huerta@edu.ca

***Received:** 20-April-2024, Manuscript No. OER-24-132938; **Editor assigned:** 22-Apr-2024, Pre QC No. OER-24-132938 (PQ); **Reviewed:** 26-Apr-2024, QC No. OER-24-132938; **Revised:** 29-Apr-2024, Manuscript No. OER-24-132938 (R); **Published:** 30-Apr-2024, DOI: 10.35841/oer-8.2.201*

***Citation:** Huerta D. Laser Eye Surgery Explained: Understanding the Basics of Vision Correction. Ophthalmol Case Rep. 2024; 8(2):201*

corneal flap (in LASIK) or disruption of the corneal surface (in PRK and SMILE). Protective Eyewear: Sunglasses should be worn outdoors to protect the eyes from UV radiation and minimize discomfort from bright light. Scheduled Follow-Up Visits: Patients are scheduled for follow-up visits to monitor healing progress and assess visual acuity [10].

Conclusion

Laser eye surgery has revolutionized the field of vision correction, offering a safe and effective solution for individuals with refractive errors. From LASIK and PRK to newer techniques like SMILE, patients have a range of options to choose from based on their individual needs and preferences. While the decision to undergo laser eye surgery requires careful consideration and consultation with an eye care professional, the potential benefits of improved vision and reduced dependence on corrective lenses are undeniable. With advancements in technology and ongoing research, the future of laser eye surgery holds promise for further refinement and innovation in the field of refractive surgery.

References

1. Kates MM, Tuli S. What is LASIK eye surgery?. JAMA. 2020;324(8):815-.
2. Shuker MS. New Treatment for Regular Astigmatism Using Physical Exercises. Medico-legal Update. 2021;21(1).
3. Schiefer U, Kraus C, Baumbach P, Ungewiß J, Michels R. Refractive errors: Epidemiology, effects and treatment options. Deutsches Ärzteblatt International. 2016;113(41):693.
4. Rattan SA, Alrubaie A, Salih SF, Abdalla SO, Hussein SD, Tariq FA. A correlation between body mass index and refractive errors. Acta facultatis medicae Naissensis. 2023;40(2):199-207.
5. Toda I. Dry eye after LASIK. Investigative ophthalmology & visual science. 2018;59(14):DES109-15.
6. Kaschke M, Donnerhacke KH, Rill MS. Optical devices in ophthalmology and optometry: technology, design principles and clinical applications.
7. Atchison D. Optics of the human eye. CRC Press; 2023.
8. Sinjab MM, Cummings AB. Introduction to Wavefront Science. Customized Laser Vision Correction. 2018:65-93.
9. Sinjab MM. Introduction to astigmatism and corneal irregularities. Customized laser vision correction. 2018:1-64.
10. Queener H, Lin J, Thorn K, Awwal A. Adaptive optics for vision science.

Citation: *Huerta D. Laser Eye Surgery Explained: Understanding the Basics of Vision Correction. Ophthalmol Case Rep. 2024; 8(2):201*