

# A Prospective, Randomized Comparison of SMILE Surgery to Wavefront-guided LASIK Surgery

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## 1. PURPOSE OF THE STUDY

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### a. Brief Summary

The purpose of the study is to compare the results of wavefront- guided LASIK surgery to SMILE (small incision lenticule extraction) surgery in patients with nearsightedness with or without astigmatism.

Objectives I hope to determine if there are any advantages/disadvantages of wavefront-guided LASIK over SMILE surgery in nearsighted patients. We will be performing tests of visual performance to see if there are any advantages of one technology over the other.

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### b. Rationale for Research in Humans

We want to evaluate which of these surgical procedures produces superior results in humans.

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## 2. STUDY PROCEDURES

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### a. Procedures

The patients will have a comprehensive eye examination once they express an interest in the study. This is considered standard of care. This includes a slit lamp examination of the front of the eye and a dilated fundoscopic examination of the back of the eye. If there is any pathology noted that would exclude the patient from the study, then we will inform the patient and make an appropriate referral. If the patient is deemed appropriate for the study after a comprehensive examination included computerized videokeratography, then they can be enrolled. The patient will undergo bilateral simultaneous eye surgery. Which eye is treated with the WFG- LASIK and which eye is treated with SMILE will be randomized so there is a 50% chance for either eye to receive one treatment. The patients will be seen on the day of surgery, post op day one, one week, one month, three months, six months and one year. The patient will receive topical antibiotics in each eye for one

week following the procedure. The patient will receive topical steroid ophthalmic drops for one week after treatment. The patient will also receive topical antibiotic ophthalmic drops for four days after treatment. All of this is within the usual and customary standard of care for the treatment of patients undergoing LASIK and SMILE surgery.

The research aspect of the study is a comparison of outcomes between the two eyes. All of the procedures in the study are standard of care.

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**b. Procedure Risks**

We are studying outcomes of WFG-LASIK and SMILE surgery. Both techniques are FDA approved and used in clinical practice. The research procedures are the least risky that can be performed consistent with sound research design.

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**c. Use of Deception in the Study**

No deception will be used.

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**d. Use of Audio and Video Recordings**

No audio or video recordings are planned for the study.

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**e. Alternative Procedures or Courses of Treatment**

Alternative procedures include no surgery and continuing to wear glasses and contact lenses. Alternatives also include performing LASIK, SMILE or PRK surgery on both eyes outside of the study.

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**f. Will it be possible to continue the more (most) appropriate therapy for the participant(s) after the conclusion of the study?**

The surgery is performed in both eyes at the same time. Once a patient has had a LASIK or SMILE surgery, there is no need to create an additional LASIK flap or SMILE surgery. Patients in both groups will receive the same postoperative care.

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**g. Study Endpoint(s)**

We plan to follow the patients for one year. Patients may experience improvement in their vision 6-12 months following surgery so we will need to gather the full data to determine final outcomes. We will terminate the study prior to enrolling the projected participant population if we determine that one procedure is superior to the other. The study will end after 70 subjects have been enrolled.

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**3. BACKGROUND**

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**a. Past Experimental and/or Clinical Findings**

Most reports in the literature report comparable outcomes between SMILE surgery and WFG-LASIK surgery for similar levels of nearsightedness with and without astigmatism.

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**b. Findings from Past Animal Experiments**

None.

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#### 4. DEVICES USED IN THE STUDY

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##### a. IDE-Exempt Devices

<b>Investigational Device 1</b>	
Name:	Intralase IFS
Manufacturer:	Abbott Medical Optics, Inc.
<b>Investigational Device 2</b>	
Name:	AMO Visx CustomVue
Description:	Abbott Medical Optics, Inc.
<b>Investigational Device 3</b>	
Name:	VisuMax
Description:	Zeiss

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#### 5. DRUGS, BIOLOGICS, REAGENTS, OR CHEMICALS USED IN THE STUDY

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##### a. Commercial Drugs, Biologics, Reagents, or Chemicals

<b>Commercial Product 1</b>	
Name:	Vigamox
Dosage:	Alcon Labs
Manufacturer:	QID x 1 week
<b>Commercial Product 2</b>	
Name:	Econopred
Dosage:	Alcon Labs
Administration Route	QID x 1 week
<b>Commercial Product 3</b>	
Name:	Proparacaine
Dosage:	Alcon
Administration Route	1 drop at time of surgery
<b>Commercial Product 3</b>	
Name:	Voltaren
Dosage:	Alcon
Administration Route	1 drop at time of surgery
<b>Commercial Product 3</b>	
Name:	Diazepam
Dosage:	Roche
Administration Route	5 mg at time of surgery
<b>Commercial Product 3</b>	
Name:	Vicodin
Dosage:	Generic
Administration Route	325 mg prn pain
<b>Commercial Product 3</b>	
Name:	Systane
Dosage:	Alcon
Administration Route	1 drop Q 4 hrs prn dryness

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#### 6. DISINFECTION PROCEDURES FOR MEDICAL EQUIPMENT USED ON BOTH HUMANS AND ANIMALS

None.

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## 7. PARTICIPANT POPULATION

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### a. Planned Enrollment

70 healthy subjects with myopia with and without astigmatism. These are the patients who typically seek out LASIK and/or PRK surgery to lessen or reduce their dependence on glasses and contact lenses.

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### b. Age, Gender, and Ethnic Background

Subjects age 22 and older with myopia with and without astigmatism will be eligible to participate. All genders and ethnic backgrounds are eligible to participate in the study.

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### c. Vulnerable Populations

N/A

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### d. Rationale for Exclusion of Certain Populations

Minors are not included because the lasers are not indicated for use in minors. Additionally, vision is not stable in minors.

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### e. Stanford Populations

Employees and students are eligible to participate in the study if they qualify. They will get the same written informed consent.

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### f. Healthy Volunteers

All subjects are healthy with myopia with and without astigmatism. We are studying outcomes of LASIK and SMILE surgery in healthy nearsighted eyes with and without astigmatism.

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### g. Recruitment Details

We plan to run advertisements in the local paper regarding the study. The patients will be informed of the details of the study on the telephone.

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### h. Eligibility Criteria

#### i. Inclusion Criteria

Subjects age 22 and older with healthy eyes. Nearsightedness between -1.00 diopters and -10.00 diopters.

Subjects with less than or equal to 3.00 diopters of astigmatism.

#### ii. Exclusion Criteria

Subjects under the age of 22.

Subjects with excessively thin corneas.

Subjects with topographic evidence of keratoconus.

Subjects with ectatic eye disorders.

Subjects with autoimmune diseases.

Subjects who are pregnant or nursing.

Subjects must have similar levels of nearsightedness in each eye. They can not be more than 1.5 diopter of difference between eyes.

Subjects with more than 3.00 diopters of astigmatism

Subjects must have similar levels of astigmatism in each eye. They can not have more than 0.75 diopters of difference between eyes

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**i. Screening Procedures**

- j.** We will attempt to screen patients on the telephone to determine if they are eligible. If they appear to be eligible on the telephone, then we will have them come in for a screening examination. **Participation in Multiple Protocols**

We will ask subjects if they are participating in more than one study and this will be stated on the consent form.

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**k. Payments to Participants**

There is no payment for participating in the study. The patients will receive a reduced fee of [REDACTED] per eye to participate in the study.

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**l. Costs to Participants**

The patient is responsible for a fee of [REDACTED] per eye w/out discount and [REDACTED] per eye with the discount.

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**m. Planned Duration of the Study**

The study is for one year. We estimate that the study will take approximately three years to complete. Total time per participant during the screening process is approximately 45 minutes. Total time per participant for active participation in the study will be approximately 10 to 12 hours. Total time per participant for analysis of the participant data is approximately 30 minutes.

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**8. RISKS**

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**a. Potential Risks**

- i.** Investigational devices

No investigational devices are to be used. The excimer laser(AMO Visx Star S4 CustomVue) is FDA approved for use in LASIK surgery. The Intralase iFS 150 is FDA-approved for used in LASIK surgery. The VisuMax is FDA approved for use in SMILE surgery. LASIK and SMILE surgery are performed in the excimer department.

- ii.** Investigational drugs

No investigational drugs are being used.

- iii.** Commercially available drugs, biologics, reagents or chemicals

Vigamox - ocular irritation, stinging, allergy.

Pred Forte - ocular irritation, increased intraocular pressure, cataract formation

Systane - ocular irritation, burning, transient blurring of vision

Voltaren - ocular irritation, burning, allergy  
Proparacaine - ocular stinging, transient anesthesia of cornea  
Diazepam - nausea, drowsiness  
Vicodan - nausea, drowsiness

iv. Procedures

Corneal topography, slit lamp biomicroscopy, snellen visual acuity testing, low contrast visual acuity testing, and anterior segment ocular coherence tomography testing are all routine non-contact examinations performed in the ophthalmology clinic with essentially little or no risk.

Applanation tonometry and pachymetry involve touching a probe to the eye to measure intraocular pressure and corneal thickness respectfully. There is a low risk of a corneal abrasion while performing these tests (less than 1%). These tests are routinely performed in all the patients seen in the excimer clinic.

Corneal sensation measurement using Cochet-Bonnet aesthesiometry utilizes a nylon filament to stimulate the corneal nerves to measure corneal sensation. This device is commonly used in the clinic with essentially little or no risk.

Fundus examination involves a dilated examination of the posterior pole of the eye. Bright light is projected into the eye. Patients can experience some discomfort secondary to the bright light. This test is also performed as a routine part of every comprehensive eye exam in the excimer clinic.

The following are non-investigational procedures:

LASIK  
Corneal topography  
Slit lamp biomicroscopy  
Fundus examination  
Pachymetry  
Applanation Tonometry  
Snellen visual acuity testing  
Low contrast visual acuity testing  
Anterior segment ocular coherence tomography  
Ultrasonic pachymetry  
Corneal sensation measurement using Cochet-Bonnet Aesthesiometry

v. Radioisotopes/radiation-producing machines

N/A

vi. Physical well-being

Low risk

vii. Psychological well-being

Low risk

viii. Economic well-being

Low risk

- ix. Social well-being  
Low risk
- x. Overall evaluation of risk  
Low risk

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**b. International Research Risk Procedures**

N/A

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**c. Procedures to Minimize Risk**

We will perform regular examinations of subjects at frequent intervals. If any adverse effects are noted, the subject will receive the appropriate care as needed. Both eyes are being treated at the same time so we will be following patients after the treatment.

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**d. Study Conclusion**

We expect the study to terminate after all subjects have been enrolled. We will terminate the study sooner if a clear advantage is seen with one procedure compared to the other. We may terminate the study earlier depending on our rate of enrollement. Individual subjects may be terminated for a variety of reasons including but not limited to:

- failure to come to follow up visits
- failure to follow the appropriate medication regimen
- pregnancy
- the subject needs to receive treatment not allowed in the study
- the study is cancelled
- unanticipated circumstances
- other administrative reasons

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**e. Data Safety Monitoring Plan (DSMC)**

- i. Data and/or events subject to review  
All measures of visual performance including uncorrected visual acuity, best spectacle corrected visual acuity, low contrast visual acuity, higher order aberration analysis, anterior segment OCT imaging.
- ii. Person(s) responsible for Data and Safety Monitoring  
The principle investigator will be monitoring the data.
- iii. Frequency of DSMB meetings  
N/A
- iv. Reporting of Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reactions (SUSARs), or Unanticipated Problems (UPs)  
All adverse events will be reported to the IRB within one week of discovery.

- v. Will the Protocol Director be the only monitoring entity? (Y/N)  
Yes
- vi. Will a board, committee, or safety monitor be responsible for study monitoring?  
(Y/N)  
No

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**f. Risks to Special Populations**

N/A

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**9. BENEFITS**

Subjects should experience a reduction or elimination of their nearsightedness with or without astigmatism with a resultant improvement in their uncorrected visual acuity. We may discover that either SMILE surgery or WFG-LASIK surgery yields better results so future subjects can choose the better technology.

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**10. PRIVACY AND CONFIDENTIALITY**

All participant information and specimens are handled in compliance with the Health Insurance Portability and Accountability Act (HIPAA) and privacy policies of Stanford University, Stanford Health Care, and Stanford Children's Health.