

# **Comparative Study for Corrective Eye Surgery**

## **Data Report**

**Prepared for Gavin Orion**

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## Introduction

You stated in our conversation that you would like to correct your vision. Your eyesight has worsened since you started wearing glasses at the age of ten. You also mentioned that you have astigmatism and nearsightedness. Now that you are an adult, you want to be able to see clearly without the aid of glasses or contact lenses. Due to your lack of time, I will continue to research and evaluate the options and criteria for the comparative study of corrective eye surgeries.

You mentioned that both glasses and contact lenses are uncomfortable. Glasses leave marks on the bridge of your nose and pressure on the temples of your head. Contact lenses become dry and make it hard for you to see clearly. Your discomfort makes it dangerous while driving and distracting while concentrating at work.

You desire restoration of 20/20 vision so that you can perform daily activities without the aid of glasses or contact lenses. LASIK is not the only type of operation that does away with the need for glasses or contact lenses, there are many other kinds of eye surgeries for improving vision. Even though laser eye surgery has turned out to be widely popular since the late 90's, it is still important to be informed about whether you are a candidate for LASIK, PRK, or Intacs.

Corneal refractive surgical procedures change the shape of the cornea to correct myopia (nearsightedness) and some types of astigmatism (irregular curvature of the cornea). The various types of procedures offer the potential to reduce or eliminate the need for glasses and contact lenses. It should be noted that in most cases these procedures do not correct presbyopia, which is the need to wear glasses for reading after middle age.\*

Astigmatism is a common problem that is caused by an irregular shaped cornea, called corneal astigmatism. It can also be caused by irregular shaped lens, which is known as lenticular astigmatism. You said that you experience blurred vision, which is a symptom of astigmatism. Even though surgery will correct astigmatism, it is a problem your children will also have, since astigmatism is hereditary.

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\* "LASIK Eye Surgery: A Consumer Guide," LASIK & Other Vision Surgery, Feb. 2005, 4 Feb. 2005  
<<http://www.allaboutvision.com/visionsurgery/>>

Since you have astigmatism and nearsightedness, I will compare the following procedures that treat these conditions.

- Laser Assisted In-Situ Keratomileusis (LASIK)
- Photorefractive Keratectomy (PRK)
- Intra Corneal Ring Segments (Intacs)

The following criteria will be used to evaluate the various options for correcting your vision.

- Cost
- Procedure
- Duration of Treatment
- Risk Factors (Potential Complications)
- Recovery Circumstances
- Results
- Benefits

The purpose of this data report is to present my complete research and evaluation of all the criteria of each option. This data report includes information regarding the cost, procedure, duration of treatment, risk factors, recovery time, results, and benefits of LASIK, PRK, and Intacs. An updated bibliography is also included for reference.

## Research Data

### LASIK (Laser Assisted In-Situ Keratomileusis)

#### Cost

The cost of LASIK depends on the surgeon and the condition of your eyes. The average cost of LASIK is approximately \$1,575 per eye.<sup>1</sup>

#### Procedure

The following are steps of the LASIK process.<sup>2</sup>

- Corneal topographer is used to measure the eyes shape, size and amount of correction
- Local Anesthetic drops are applied for numbing
- Eyelid holder is placed around eyes to prevent blinking
- A thin layer of the cornea is cut into a flap shape with a microkeratome
- A target light is used for you to focus on while the laser is reshaping the cornea
- Beams of light from an excimer laser are aimed at certain parts of the cornea to change its shape.
- The flap is folded back down and bonds back in place.
- Eye drops are applied for protection

#### Duration of Treatment

LASIK requires 15 minutes per eye. The duration of the laser treatment lasts for about one to two minutes per eye.<sup>3</sup>

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<sup>1</sup> Charles Slonim, "LASIK and PRK: Frequently Asked Questions," LASIK & Other Vision Surgery, Feb. 2005, 27 Feb. 2005 <[http://www.allaboutvision.com/faq/lasik\\_prk.htm#17](http://www.allaboutvision.com/faq/lasik_prk.htm#17)>

<sup>2</sup> LASIK Eye Surgery – Laser-assisted in Situ Keratomileusis, 27 Feb. 2005 <<http://www.eyecaresource.com/eye-surgeries/lasik-eye-surgery.php>>

<sup>3</sup> LASIK Eye Surgery – Laser-assisted in Situ Keratomileusis

## **Risk Factors (Potential Complications)**

The following table consists of the possible postoperative complications and associated symptoms and treatments of LASIK.<sup>4</sup>

<b>Complications</b>	<b>Symptoms</b>	<b>Treatments</b>
De-centeration (misalignment of laser beam)	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure
Diffuse Lamellar keratitis (DLK), (noninfectious inflammation under the corneal flap)	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure
Dry eye	Dry, itchy, scratchy, redness, discomfort	Artificial tears, punctual occlusion (blockage of tear ducts in order to retain tear film on eye)
Epithelial in-growth (the growth of corneal surface epithelial cells under flap)	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure
Haze	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure
Incomplete corrections, under-correction, overcorrection, residual astigmatism	Blurriness	Glasses, contact lenses, eye drops, second procedure
Infection	Pain, redness, oozing puss	Eye drops, oral medications
Irregular flap folds, wrinkles (caused by rubbing eyes during early stages of post-op period)	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Surgical corrections, second procedure
Oversized pupils	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure

<sup>4</sup> Keith Croes, "LASIK Risks and Complications," LASIK & Other Vision Surgery, 2005, 27 Feb. 2005 <[http://www.allaboutvision.com/visionsurgery/lasik\\_complication\\_1.htm](http://www.allaboutvision.com/visionsurgery/lasik_complication_1.htm)>

## **Recovery Circumstances**

Return to daily activities 2 to 5 days later. Complete healing occurs several weeks to 3 months later.<sup>5</sup>

## **Results**

The following table includes the results of LASIK after three months with either 20/20 or 20/40 or better vision.<sup>6</sup>

<b>Procedure</b>	<b>20/20 or Better</b>	<b>20/40 or Better</b>
LASIK	42% to 84.8%	76.8% to 99.4%

## **Benefits**

The following advantages of LASIK include:<sup>7</sup>

- Immediate improvement of vision
- Lack of pain
- No structural weakening of cornea
- Quick recovery
- Easier retreatment
- Minimal discomfort
- Rare haze formation

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<sup>5</sup> "LASIK," Procedures, 2005, 27 Feb. 2005  
<<http://www.ienhance.com/procedure/description.asp?ProclD=81&bodyid=1&specialtyid=4>>

<sup>6</sup> "LASIK Results: What to Expect," LASIK & Other Vision Surgery, 2005, 27 Feb. 2005  
<[http://www.allaboutvision.com/visionsurgery/outcomes\\_2.htm](http://www.allaboutvision.com/visionsurgery/outcomes_2.htm)>

<sup>7</sup> "The Advantages of LASIK," Pros/Cons of LASIK & PRK, 2005, 27 Feb. 2005  
<<http://www.halevision.com/learningCenter/theBook/advantagesDisadvantages.html>>

# **PRK (Photorefractive Keratectomy)**

## **Cost**

The cost of PRK depends on the surgeon and the condition of your eyes. The average cost of PRK ranges from \$1,000 to \$1,800 per eye.<sup>8</sup>

## **Procedure**

The following are steps of the PRK process.<sup>9</sup>

- Corneal topographer is used to measure the eyes shape, size and amount of correction
- Local Anesthetic drops are applied for numbing
- Eyelid holder is placed around eyes to prevent blinking
- The epithelium, which is the protective layer that covers the cornea is removed
- A target light is used for you to focus on while the laser is reshaping the surface of the cornea
- An ultraviolet laser beam is used to reshape the surface of the cornea according to the amount of correction
- A soft bandaged contact lens is placed over eyes

## **Duration of Treatment**

PRK requires 20 minutes in the operating room. The actual duration may vary according to the type and amount of correction.<sup>10</sup>

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<sup>8</sup> Liz Segre, "Cost of LASIK and Other Corrective Eye Surgery," LASIK & Other Vision Surgery, Nov. 2004, 27 Feb. 2005 <<http://www.allaboutvision.com/visionsurgery/cost.htm>>

<sup>9</sup> Photorefractive Keratectomy PRK, 27 Feb. 2005 <<http://www.eyecaresource.com/eye-surgeries/photorefractive-keratectomy.php>>

<sup>10</sup> "PRK," Procedures, 2005, 27 Feb. 2005 <<http://www.ienhance.com/procedure/description.asp?ProclD=83&bodyid=1&specialtyid=4>>

## **Risk Factors (Potential Complications)**

The following table consists of the possible complications and associated symptoms and treatments of PRK.<sup>11</sup>

<b>Complications</b>	<b>Symptoms</b>	<b>Treatments</b>
Diffuse Lamellar Keratitis (DLK), (noninfectious inflammation under the corneal flap)	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure
Dry eye	Dry, itchy, scratchy, redness, discomfort	Artificial tears, punctual occlusion (blockage of tear ducts in order to retain tear film on eye)
Epithelial in-growth (the growth of corneal surface epithelial cells under flap)	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure
Haze	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure
Incomplete corrections, under-correction, overcorrection, residual astigmatism	Blurriness	Glasses, contact lenses, eye drops, second procedure
Infection	Pain, redness, oozing puss	Eye drops, oral medications
Irregular flap folds, wrinkles (caused by rubbing eyes during early stages of post-op period)	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Surgical corrections, second procedure
Oversized pupils	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure

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<sup>11</sup> Keith Croes

## **Recovery Circumstances**

The protective contact lens is removed about 3 to 5 days following the procedure. 2 to 5 days of rest are required after the procedure. Your eyes will completely heal after about 3 months.<sup>12</sup>

## **Results**

The following table includes the results of PRK after three months with either 20/20 or 20/40 or better vision<sup>13</sup>

<b>Procedure</b>	<b>20/20 or Better</b>	<b>20/40 or Better</b>
PRK	67%	95%

## **Benefits**

The following advantages of PRK include:<sup>14</sup>

- Accurate in treating astigmatism
- Low chance of infection
- No structural weakening of cornea
- Preservation of corneal thickness
- No flap complications
- No eye trauma concerns
- Lower retreatment rates

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<sup>12</sup> "PRK," Procedures

<sup>13</sup> "LASIK Results: What to Expect"

<sup>14</sup> "The Advantages of LASIK"

## **Intacs (Intra Corneal Ring Segments)**

### **Cost**

The cost of Intacs depends on the surgeon and the condition of your eyes. The average cost of Intacs ranges from \$1,700 to \$2,600 per eye.<sup>15</sup>

### **Procedure**

The following are steps of transplanting Intacs:<sup>16</sup>

- Eye exam
- Local Anesthetic drops are applied for numbing
- Eyelid holder is placed around eyes to prevent blinking
- A small incision is made in the cornea
- A centering guide is placed on the surface
- Two microscopic tunnels are made in the periphery of the cornea
- Intacs are inserted (Intacs are the brand of corneal ring segments which are small curved shaped prescription material made of plastic polymer)
- Opening is closed up
- Antibiotic drops are applied

### **Duration of Treatment**

The duration of implanting Intacs takes approximately 15 to 30 minutes per eye.<sup>17</sup>

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<sup>15</sup> Liz Segre

<sup>16</sup> Intacs, 27 Feb. 2005 <<http://www.eyecaresource.com/eye-surgeries/intacs.php>>

<sup>17</sup> "Intacs," Procedure, 2005, 27 Feb. 2005  
<<http://www.ienhance.com/procedure/description.asp?ProclD=82&bodyid=1&specialtyid=4>>

## **Risk Factors (Potential Complications)**

The following table consists of the possible complications and associated symptoms and treatments of Intacs.<sup>18</sup>

<b>Complications</b>	<b>Symptoms</b>	<b>Treatments</b>
Dry eye	Dry, itchy, scratchy, redness, discomfort	Artificial tears, punctual occlusion (blockage of tear ducts in order to retain tear film on eye)
Haze	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure
Incomplete corrections, under-correction, overcorrection, residual astigmatism	Blurriness	Glasses, contact lenses, eye drops, second procedure
Infection	Pain, redness, oozing puss	Eye drops, antibiotics, removal of rings
Oversized pupils	Double vision, ghosting, glare, halos, starbursts, loss of contrast sensitivity, and troubles with low-light or night vision	Eye drops, second procedure

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<sup>18</sup> "Intacs Prescription Inserts: An Alternative to LASIK Eye Surgery," LASIK & Other Vision Surgery, 2005, 27 Feb. 2005  
<[http://www.allaboutvision.com/visionsurgery/outcomes\\_2.htm](http://www.allaboutvision.com/visionsurgery/outcomes_2.htm)>

## **Results**

The following table includes the results of Intacs after three months with either 20/20 or 20/40 or better vision<sup>19</sup>

<b>Procedure</b>	<b>20/20 or Better</b>	<b>20/40 or Better</b>
Intacs	74%	97%

## **Benefits**

The following advantages of Intacs include:<sup>20</sup>

- Can be removed
- Can be replaced
- Flexible to prescription changes
- No maintenance
- No removal of tissue

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<sup>19</sup> "LASIK Results: What to Expect"

<sup>20</sup> Intacs

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