Refractive Surgery Overview

- The myopic eye has too much power for its length

Myopic Eye
Refractive Surgery Overview

- The myopic eye has too much **converging** power for its length

![Myopic Eye Diagram]
Refractive Surgery Overview

- The myopic eye has too much **converging** power for its length

Think of it this way: The myopic eye refracts light as if an extra ‘plus’ lens was built into it. This so-called **error lens** contributes the excess convergence that produces a myopic refractive error.
The myopic eye has too much converging power for its length. This explains why myopes wear minus lenses to correct their refractive error—minus lenses are needed to offset the excess convergence induced by the plus error lenses in their eyes.

Think of it this way: The myopic eye refracts light as if an extra ‘plus’ lens was built into it. This so-called error lens contributes the excess convergence that produces a myopic refractive error.
Refractive Surgery Overview

- The myopic eye has too much \textit{converging} power for its length.
- In contrast, the hyperopic eye has too much power for its length.

Hyperopic Eye
Refractive Surgery Overview

- The myopic eye has too much *converging* power for its length
- In contrast, the hyperopic eye has too much *diverging* power for its length
Refractive Surgery Overview

- The myopic eye has too much *converging* power for its length.
- In contrast, the hyperopic eye has too much *diverging* power for its length.

Thus, the hyperopic eye acts as if it has a *minus* error lens within it, contributing the excess divergence resulting in a hyperopic refractive error.
The myopic eye has too much **converging** power for its length.

In contrast, the hyperopic eye has too much **diverging** power for its length.

This explains why hyperopes wear plus lenses to correct their refractive error—plus lenses are needed to offset the excess divergence induced by the minus error lenses in their eyes.

Thus, the hyperopic eye acts as if it has a *minus* error lens within it, contributing the excess divergence resulting in a hyperopic refractive error.
Refractive Surgery Overview

Refractive Surgery

?    ?
Refractive Surgery Overview

Refractive Surgery

Intraocular

Corneal
Refractive Surgery Overview

Refractive Surgery

- Intraocular
- Corneal
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
- Phakic IOL

Corneal
Intraocular refractive surgery offsets the refractive error produced by the error lens by either 1) removing the native lens and substituting an IOL powered to offset the error lens; or
Refractive Surgery Overview

Refractive Surgery

Intraocular

Corneal

Pseudophakic

Phakic IOL

Myopic Eye

Hyperopic Eye

**Intraocular** refractive surgery offsets the refractive error produced by the error lens by either 1) removing the native lens and substituting an IOL powered to offset the error lens; or 2) leaving the native lens in place, but implanting an IOL in the AC powered to offset the error lens.
Refractive Surgery Overview

Corneal-based refractive surgery offsets the refractive error produced by the error lens by creating compensatory changes to the shape of the cornea.
Refractive Surgery Overview

Refractive Surgery

Intraocular

Corneal

Pseudophakic

Phakic IOL

Myopic Eye

Hyperopic Eye

**Cornea-based** refractive surgery offsets the refractive error produced by the error lens by creating compensatory changes to the shape of the cornea.:

*Myopic keratorefractive surgery* **flattens** the central cornea
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic

Phakic IOL

Corneal

Myopic Eye

Hyperopic Eye

Cornea-based refractive surgery offsets the refractive error produced by the error lens by creating compensatory changes to the shape of the cornea:

Myopic keratorefractive surgery flattens the central cornea

Hyperopic keratorefractive surgery steepens the central cornea
Refractive Surgery Overview

Refractive Surgery

- Intraocular
  - Pseudophakic
  - Phakic IOL

- Corneal
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic

Phakic IOL

Refractive lens exchange (RLE)

Corneal
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic

Refractive lens exchange (RLE)

Phakic IOL

Corneal

?
Refractive Surgery Overview

Refractive Surgery

Intraocular

- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic

Phakic IOL

- Refractive lens exchange (RLE)
- Iris-fixated
- Sulcus-fixated

Corneal

- ?
- ?

Other
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal
- Incisional
- Laser
- Other
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal
- Incisional
  - ?
  - ?
  - ?
- Laser
- Other
Refraction Surgery Overview

- Refractive Surgery
  - Intraocular
    - Pseudophakic
      - Refractive lens exchange (RLE)
    - Phakic IOL
      - Iris-fixated
      - Sulcus-fixated
  - Corneal
    - Incisional
      - RK
      - AK
      - LRI
    - Laser
    - Other
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal
- Incisional
  - RK?
  - AK
  - LRI
- Laser
- Other

What does RK stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic
- Refractive lens exchange (RLE)

Phakic IOL
- Iris-fixated
- Sulcus-fixated

Corneal

Incisional
- RK
- AK?
- LRI

Laser

Other

What does RK stand for? Radial Keratotomy

What does AK stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal
- Incisional
  - RK
  - AK
  - LRI?
- Laser
- Other

What does RK stand for? Radial Keratotomy
What does AK stand for? Arcuate Keratotomy
What does LRI stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic

Refractive lens exchange (RLE)

Iris-fixated

Phakic IOL

Sulcus-fixated

Corneal

Incisional

Laser

Other

RK

AK

LRI

What does RK stand for?
Radial Keratotomy

What does AK stand for?
Arcuate Keratotomy

What does LRI stand for?
Limbal Relaxing Incisions
Refractive Surgery Overview

Refractive Surgery

Intraocular

- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal

- Incisional
  - RK
  - AK
  - LRI
- Laser
- Other

What does RK stand for? Radial Keratotomy

What does AK stand for? Arcuate Keratotomy

What does LRI stand for? Limbal Relaxing Incisions

There are several fundamental differences between RK vs AK and LRI. What are they?

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Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal
- Incisional
  - RK
  - AK
  - LRI
- Laser
- Other

What does RK stand for?
Radial Keratotomy

What does AK stand for?
Arcuate Keratotomy

What does LRI stand for?
Limbal Relaxing Incisions

There are several fundamental differences between RK vs AK and LRI. What are they?
--RK corrects
AK/LRI correct
--RK incisions are oriented
; AK/LRI incisions are oriented
--RK is considered (at least in the US); AK/LRI are

There are several fundamental differences between RK vs AK and LRI. What are they?
--RK corrects myopia; AK/LRI correct astigmatism
--RK incisions are oriented radially; AK/LRI incisions are oriented parallel to the limbus
--RK is considered obsolete (at least in the US); AK/LRI are still performed
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic
- Refractive lens exchange (RLE)

Phakic IOL
- Iris-fixated
- Sulcus-fixated

Corneal

Incisional
- RK
- AK
- LRI

Laser

Other

What does RK stand for? Radial Keratotomy

What does AK stand for? Arcuate Keratotomy

What does LRI stand for? Limbal Relaxing Incisions

What about hyperopia—can’t it be corrected with RK?

There are several fundamental differences between RK vs AK and LRI. What are they?

--RK corrects myopia

--RK incisions are oriented radially

--RK is considered obsolete (at least in the US); AK/LRI are still performed

No, it can’t. RK can only flatten the cornea (thereby causing a hyperopic shift in the power of the eye); it cannot be used to produce global steepening of the cornea, and thus can’t cause the myopic shift needed to correct hyperopia.
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic
  - Refractive lens exchange (RLE)

Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal

Incisional
  - RK
  - AK
  - LRI

Laser

Other

What does RK stand for? Radial Keratotomy

What does AK stand for? Arcuate Keratotomy

What does LRI stand for? Limbal Relaxing Incisions

What about hyperopia—can’t it be corrected with RK?
No, it can’t. RK can only flatten the cornea (thereby causing a hyperopic shift in the power of the eye); it cannot be used to produce global steepening of the cornea, and thus can’t cause the myopic shift needed to correct hyperopia.
Refractive Surgery Overview

Refractive Surgery

Intraocular

- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal

Incisional

- RK
- AK
- LRI

Laser

Other


There are several fundamental differences between RK vs AK and LRI. What are they?

-- RK corrects myopia; AK/LRI correct astigmatism
-- RK incisions are oriented radially; AK/LRI incisions are oriented parallel to the limbus
-- RK is considered obsolete (at least in the US); AK/LRI are still performed

What is the fundamental difference between AK and LRI?

It's where the incisions are located. LRIs are placed near the limbus, whereas AKs are placed in the corneal midperiphery.
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal
- Incisional
  - RK
  - AK
  - LRI
- Laser
- Other

What does RK stand for? **Radial Keratotomy**
What does AK stand for? **Arcuate Keratotomy**
What does LRI stand for? **Limbal Relaxing Incisions**

There are several fundamental differences between RK vs AK and LRI. What are they?
-- RK corrects myopia; AK/LRI correct astigmatism
-- RK incisions are oriented radially; AK/LRI incisions are oriented **parallel to the limbus**
-- RK is considered **obsolete** (at least in the US); AK/LRI are **still performed**
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal
- Incisional
  - RK
  - AK
  - LRI
- Laser
  - ?

Other
- ?
- ?
- ?
- ?
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal
- Incisional
  - RK
  - AK
  - LRI
- Laser
  - PRK
  - LASEK
  - Epi-LASIK
  - LASIK
  - SMILE
- Other
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic
- Refractive lens exchange (RLE)

Phakic IOL
- Iris-fixated
- Sulcus-fixated

Corneal

Incisional
- RK
- AK
- LRI

Laser
- PRK?
- LASEK
- Epi-LASIK
- LASIK
- SMILE

Other

What does PRK stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal
- Incisional
  - RK
  - AK
  - LRI
- Laser
  - PRK
  - LASEK?
  - Epi-LASIK
  - LASIK
  - SMILE
- Other

What does PRK stand for? PhotoRefractive Keratectomy

What does LASEK stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Iris-fixated
- Sulcus-fixated
- Phakic IOL

Corneal
- Incisional
  - RK
  - AK
  - LRI
- Laser
  - PRK
  - LASEK
  - Epi-LASIK?
  - LASIK
  - SMILE
- Other

What does **PRK** stand for?
PhotoRefractive Keratectomy

What does **LASEK** stand for?
LASer SubEpithelial Keratomileusis

What does **Epi-LASIK** stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular

- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal

Incisional

- RK
- AK
- LRI

Laser

- PRK
- LASEK
- Epi-LASIK
- LASIK
- SMILE

What does PRK stand for?
PhotoRefractive Keratectomy

What does LASEK stand for?
LASer SubEpithelial Keratomileusis

What does Epi-LASIK mean?
EpiPolis

What does Epipolis mean?
It is a Greek word meaning 'superficial'
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic
  - Refractive lens exchange (RLE)
Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal

Incisional
  - RK
  - AK
  - LRI

Laser
  - PRK
  - LASEK
  - Epi-LASIK
  - LASIK
  - SMILE

Other

What does PRK stand for?
PhotoRefractive Keratectomy

What does LASEK stand for?
LASer SubEpithelial Keratomileusis

What does Epipolis mean?
It is a Greek word meaning ‘superficial’
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic
- Refractive lens exchange (RLE)
- Iris-fixated

Phakic IOL
- Phakic IOL
- Sulcus-fixated

Corneal

Incisional
- RK
- AK
- LRI

Laser
- PRK
- LASEK
- Epi-LASIK
- LASIK?
- SMILE

Other

What does PRK stand for?
PhotoRefractive Keratectomy

What does LASEK stand for?
LASer SubEpithelial Keratomileusis

What does Epi-LASIK stand for?
EpiEpipolis LASer In-situ Keratomileusis

What does LASIK stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular

- Pseudophakic
  - Iris-fixated
  - Sulcus-fixated
  - Refractive lens exchange (RLE)

- Phakic IOL

Corneal

- Incisional
  - RK
  - AK
  - LRI

- Laser
  - PRK
  - LASEK
  - Epi-LASIK
  - LASIK
  - SMILE

- Other

What does PRK stand for? PhotoRefractive Keratectomy

What does LASEK stand for? LASer SubEpithelial Keratomileusis

What does Epi-LASIK stand for? EpiPolis LASer In-situ Keratomileusis

What does LASIK stand for? LASer In-situ Keratomileusis

What does SMILE stand for?
Refractive Surgery Overview

Refractive Surgery

- Intraocular
  - Pseudophakic
    - Refractive lens exchange (RLE)
  - Phakic IOL
    - Iris-fixated
    - Sulcus-fixated

- Corneal
  - Incisional
    - RK
    - AK
    - LRI
  - Laser
    - PRK
    - LASEK
    - Epi-LASIK
    - LASIK
    - SMILE
  - Other

**What does PRK stand for?**
PhotoRefractive Keratectomy

**What does LASEK stand for?**
LASer SubEpithelial Keratomileusis

**What does Epi-LASIK stand for?**
EpiPolis LASer In-situ Keratomileusis

**What does LASIK stand for?**
LASer In-situ Keratomileusis

**What does SMILE stand for?**
SMall-Incision Lenticule Extraction
In what fundamental way do PRK/LASEK/epi-LASIK differ from LASIK and SMILE?
**Refractive Surgery Overview**

Refractive Surgery

- Intraocular
  - Pseudophakic
  - Phakic IOL
    - Iris-fixated
    - Sulcus-fixated

- Corneal
  - Incisional
    - RK
    - AK
    - LRI
  - Laser
    - PRK
    - LASEK
    - Epi-LASIK
    - LASIK
    - SMILE

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*In what fundamental way do PRK/LASEK/epi-LASIK differ from LASIK and SMILE? PRK, LASEK and epi-LASIK involve manipulating the corneal epithelium; for this reason, these techniques are called *surface procedures*. In contrast, LASIK and SMILE do not involve manipulating the corneal epithelium.*
How do the surface-ablation procedures differ from one another?

- PRK
- LASEK
- Epi-LASIK
- LASIK
- SMILE
How do the surface-ablation procedures differ from one another? It's all about how the corneal epithelium is managed.
How do the surface-ablation procedures differ from one another?  
It’s all about how the corneal epithelium is managed

In what fundamental way do LASEK and epi-LASIK differ from PRK?
How do the surface-ablation procedures differ from one another?  
It's all about how the corneal epithelium is managed

In what fundamental way do LASEK and epi-LASIK differ from PRK?  
In LASEK and epi-LASIK, an epithelial cap is created and displaced, then re-placed after the subepithelial surface has been ablated. In PRK, no attempt is made to preserve the epithelium for re-placement after ablation—the post-ablation surface is left epithelium-free.
Photoablative Refractive Surgery

How is the epithelium handled in LASEK and epi-LASIK?

**LASEK:**

**epi-LASIK:**

How do the surface-ablation procedures differ from one another? It’s all about how the corneal epithelium is managed.

In what fundamental way do LASEK and epi-LASIK differ from PRK? In LASEK and epi-LASIK, an epithelial cap is created and displaced, then re-placed after the subepithelial surface has been ablated. In PRK, no attempt is made to preserve the epithelium for re-placement after ablation—the post-ablation surface is left epithelium-free.
**Photoablative Refractive Surgery**

How is the epithelium handled in LASEK and epi-LASIK?

**LASEK:** The epithelium is loosened chemically (usually with alcohol), creating a free ‘epithelial cap’ that can easily be displaced.

**epi-LASIK:** A blunt keratome slides under and displaces the epithelium en bloque, essentially creating an epithelial ‘free cap’.

How do the surface-ablation procedures differ from one another?
It’s all about how the corneal epithelium is managed.

In what fundamental way do LASEK and epi-LASIK differ from PRK?

In **LASEK and epi-LASIK, an epithelial cap is created and displaced**, then re-placed after the subepithelial surface has been ablated. In PRK, no attempt is made to preserve the epithelium for re-placement after ablation—the post-ablation surface is left epithelium-free.
Photoablative Refractive Surgery

Refractive Surgery

Intraocular

Corneal

Laser

Other

How is the epithelium handled in PRK?

How is the epithelium handled in LASEK and epi-LASIK?

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How is the epithelium handled in PRK?
Harshly. It is removed via scraping, chemical destruction, brushing, etc, or just lased away.

How is the epithelium handled in LASEK and epi-LASIK?
**LASEK**: The epithelium is loosened chemically (usually with alcohol), creating a free ‘epithelial cap’ that can easily be displaced.

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It’s all about how the corneal epithelium is managed.

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Photoablative Refractive Surgery

Refractive Surgery

PRK seems much simpler—why bother with the other procedures?
Intraoperatively, PRK is the simplest of the laser keratorefractive procedures.

How is the epithelium handled in PRK?
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How is the epithelium handled in LASEK and epi-LASIK?

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Photoablative Refractive Surgery

Refractive Surgery

PRK seems much simpler—why bother with the other procedures?
Intraoperatively, PRK is the simplest of the laser keratorefractive procedures. However, it has two major post-operative complications that render it less than ideal:
1) 
2) 

How is the epithelium handled in PRK?
Harshly. It is removed via scraping, chemical destruction, brushing, etc, or just lased away.

How is the epithelium handled in LASEK and epi-LASIK?
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**Photoablative Refractive Surgery**

**Refractive Surgery**

*PRK seems much simpler—why bother with the other procedures?*
Intraoperatively, PRK is the simplest of the laser keratorefractive procedures. However, it has two major post-operative complications that render it less than ideal:
1. It is associated with significant post-op [**pain**](#).
2. It is associated with an increased risk of post-op [**haze formation**](#).

*How is the epithelium handled in PRK?*
Harshly. It is removed via scraping, chemical destruction, brushing, etc, or just lased away.

*How is the epithelium handled in LASEK and epi-LASIK?*

**LASEK:** The epithelium is loosened chemically (usually with alcohol), creating a free ‘epithelial cap’ that can easily be displaced.

**epi-LASIK:** A blunt keratome slides under and displaces the epithelium en bloque, essentially creating an epithelial ‘free cap’

*How do the surface-ablation procedures differ from one another?*
It’s all about how the corneal epithelium is managed.

*In what fundamental way do LASEK and epi-LASIK differ from PRK?*
In LASEK and epi-LASIK, an epithelial cap is created and displaced, then re-placed after the subepithelial surface has been ablated. **In PRK, no attempt is made to preserve the epithelium for re-placement after ablation**—the post-ablation surface is left epithelium-free.
PRK seems much simpler—why bother with the other procedures? Intraoperatively, PRK is the simplest of the laser keratorefractive procedures. However, it has two major post-operative complications that render it less than ideal:
1) It is associated with significant post-op pain
2) It is associated with an increased risk of post-op haze formation.

How do the surface-ablation procedures differ from one another? It’s all about how the corneal epithelium is managed

In what fundamental way do LASEK and epi-LASIK differ from PRK? In LASEK and epi-LASIK, an epithelial cap is created and displaced, then re-placed after the subepithelial surface has been ablated. In PRK, no attempt is made to preserve the epithelium for re-placement after ablation—the post-ablation surface is left epithelium-free.
Photoablative Refractive Surgery

Refractive Surgery

Intraocular

Corneal

Incisional Laser

Other

How does LASIK deal with the epithelium?

By doing an end-run around it. A hinged flap is cut in the stroma and reflected, thereby moving the epithelium out of the treatment area. The underlying stromal bed is then lased, and the flap (with its intact epithelium) is laid back in place.

What benefits does this render to LASIK over surface procedures?

LASIK is much less painful, and has a much lower rate of haze formation.

Does LASIK have a downside?

1) Not all eyes are good candidates for it (much more on this later)
2) The flap itself is a source of a number of complications (ditto)
How does LASIK deal with the epithelium?

By doing an end-run around it. A hinged flap is cut in the stroma and reflected, thereby moving the epithelium out of the treatment area. The underlying stromal bed is then lased, and the flap (with its intact epithelium) is laid back in place.
How does LASIK deal with the epithelium? By doing an end-run around it. A hinged flap is cut in the stroma and reflected, thereby moving the epithelium out of the treatment area. The underlying stromal bed is then lased, and the flap (with its intact epithelium) is laid back in place.

What benefits does this render to LASIK over surface procedures?
How does LASIK deal with the epithelium?
By doing an end-run around it. A hinged flap is cut in the stroma and reflected, thereby moving the epithelium out of the treatment area. The underlying stromal bed is then lased, and the flap (with its intact epithelium) is laid back in place.

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2)
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What benefits does this render to LASIK over surface procedures?
LASIK is much less painful, and has a much lower rate of haze formation.

What drawbacks go along with LASIK?
1) Not all eyes are good candidates for it
2) The flap itself is a source of a number of complications
Briefly, how is the SMILE (lenticule extraction) performed?

The femtosecond laser is used to carve and isolate a disc-shaped portion of the corneal stroma (the lenticule). The lenticule is then removed 'whole' via a small incision connecting the created intrastromal space and the corneal surface. This loss of tissue flattens the central cornea.

'Flattens the central cornea'—does that mean the SMILE technique can only be used to treat myopia? No, it can correct hyperopia. (Obviously, the shape of the lenticule will be different.) That said, as of this writing it is only FDA-approved for myopia.

In terms of visual outcomes, how does it compare to LASIK? Final visual acuity is essentially identical to that obtained via LASIK.

What advantage does SMILE offer over surface ablation and flap-based ablation procedures? Not surprisingly, it is vastly less painful than surface procedures, and visual recovery is significantly faster. Equally unsurprising, SMILE does not engender the flap-related risks associated with LASIK.
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Photoablative Refractive Surgery

Refractive Surgery

Intraocular
- Pseudophakic
  - Refractive lens exchange (RLE)
- Phakic IOL
  - Iris-fixated
  - Sulcus-fixated

Corneal

Incisional
- RK
- AK
- LRI

Laser
- PRK
- LASEK
- Epi-LASIK
- LASIK
- SMILE

Think of it this way:
SMILE is to LASIK as Arthroscopic surgery is to ‘Open’ surgery
Refractive Surgery Overview

Refractive Surgery

Intraocular

- Pseudophakic
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  - Iris-fixated
  - Sulcus-fixated

Corneal

- Incisional
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- Laser
  - PRK
  - LASEK
  - Epi-LASIK
  - LASIK
  - SMILE
- Other
  - ?
  - ?
  - ?
  - ?
Refractive Surgery Overview

Refractive Surgery

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- LASIK
- SMILE

Other

- CK
- SAI
- CRI
- CXL
- ICRS
What does CK stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic

Phakic IOL

Iris-fixated

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Corneal

Incisional

Laser

RK

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Other

PRK

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LASIK

SMILE

CK

SAI?

CRI

CXL

ICRS

What does CK stand for?
Conductive Keratoplasty

What does SAI stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular

Pseudophakic
- Refractive lens exchange (RLE)

Phakic IOL
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Other
- CK
- SAI
- CRI?
- CXL
- ICRS

What does CK stand for?
Conductive Keratoplasty

What does SAI stand for?
Small Aperture Inlay

What does CRI stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular
- Pseudophakic
- Phakic IOL
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Corneal
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  - RK
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  - SMILE

Other
- CK
- SAI
- CRI
- CXL?
- ICRS

What does CK stand for? Conductive Keratoplasty
What does CXL stand for? Corneal Reshaping Inlay
What does CRI stand for? Corneal Reshaping Inlay
What does SAI stand for? Small Aperture Inlay
Refraction Surgery Overview

Refraction Surgery

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What does CK stand for? Conductive Keratoplasty
What does CXL stand for? Corneal CROSS Linking
What does CRI stand for? Corneal Reshaping Inlay

What does SAI stand for? Small Aperture Inlay
What does ICRS stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular

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What does CRI stand for?
Corneal Reshaping Inlay

What does SAI stand for?
Small Aperture Inlay

What does ICRS stand for?
Intrastromal Corneal Ring Segments
Corneal Inlay, Collagen Shrinkage, and Cross-linking Surgery

Refractive Surgery

Intraocular
- Pseudophakic
- Phakic IOL

Corneal
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- Other
- CK
- SAI
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CK, SAI and CRI have something in common. Likewise, CXL and ICRS do too. What are these respective commonalities?
Corneal Inlay, Collagen Shrinkage, and Cross-linking Surgery

CK, SAI and CRI have something in common. Likewise, CXL and ICRS do too. **What are these respective commonalities?**

CK, SAI and CRI are used to treat **presbyopia**, whereas CXL and ICRS are primarily used to treat **keratoconus**.
Corneal Inlay, Collagen Shrinkage, and Cross-linking Surgery

**Refractive Surgery**

- **Intraocular**
  - Pseudophakic
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- **Corneal**
  - Incisional
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Phakic IOL

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It is inflammatory, or noninflammatory?

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What does corneal topography reveal about the typical dz course in KCN?

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At what age does the dz tend to progress most rapidly?
Adolescence

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Refractive Surgery Overview

Refractive Surgery

Intraocular

Corneal

Other

CK
SAI
CRI
CXL
ICRS

In one line, describe each procedure.

CK: Conductive Keratoplasty
SAI: Small Aperture Inlay
CRI: Corneal Reshaping Inlay
CXL: Corneal CROSS Linking
ICRS: Intrastromal Corneal Ring Segments

What does CK stand for?
What does SAI stand for?
What does CRI stand for?
What does CXL stand for?
What does ICRS stand for?
Refractive Surgery Overview

Refractive Surgery

Intraocular

Corneal

Other

In one line, describe each procedure.

**CK**: Heat is used to produce a set of focal corneal scars, which together act to steepen it.

**SAI**: A tiny, donut-shaped device is placed in the central corneal stroma, where it produces a pinhole effect.

**CRI**: A tiny, lens-shaped device is placed in the central corneal stroma, where it increases corneal power.

**CXL**: A chemical reaction strengthens the bonds between corneal stroma fibrils.

**ICRS**: One or more pieces of semicircular PMMA are placed in the peripheral corneal stroma, where they produce local flattening.

What does **CK** stand for? **Conductive Keratoplasty**

What does **CXL** stand for? **Corneal CROSS Linking**

What does **CRI** stand for? **Corneal Reshaping Inlay**

What does **SAI** stand for? **Small Aperture Inlay**

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Refractive Surgery Overview

Refractive Surgery

Intraocular

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