



Management of Post-PRK Haze

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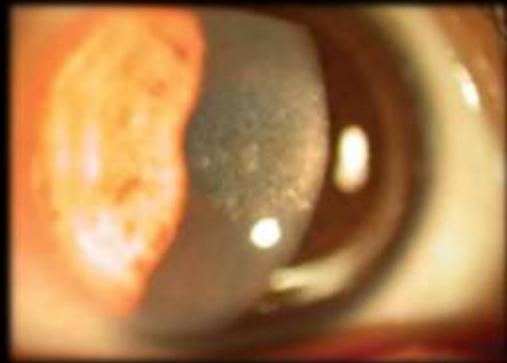
Post-PRK Haze

- *Laser vision correction (LVC) surgery: 3% of the general population per year.*
- *PRK was the first use of excimer laser for the correction of refractive errors.*
- *LASEK, epi-LASIK, and tPRK are other surface ablation techniques of LVC.*
- *Post-PRK haze is a common side effect after corneal surface ablation.*
- *Significant haze is seen in less than 5% of the cases.*

Post-PRK Haze

- **Definitions:**

- *A decrease in tissue transparency*
- *Loss of corneal clarity*
- *A subepithelial stromal opacity*



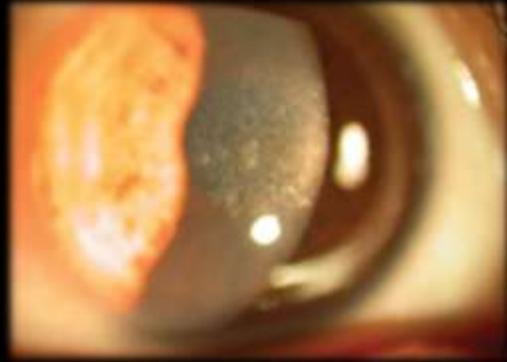
Post-PRK Haze

- Clinically:

- Completely *asymptomatic* (most cases)

- Symptoms:

- Night vision problems (Starbursts)
- Ghost images, polyopia (irregular astigmatism)
- Refractive regression (progressive visual deterioration)



Post-PRK Haze

Clinically insignificant

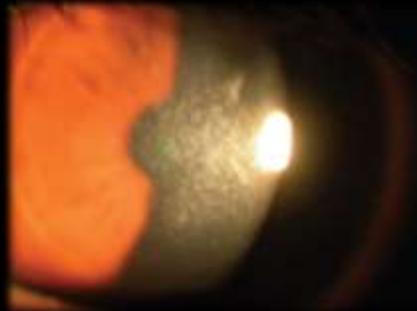
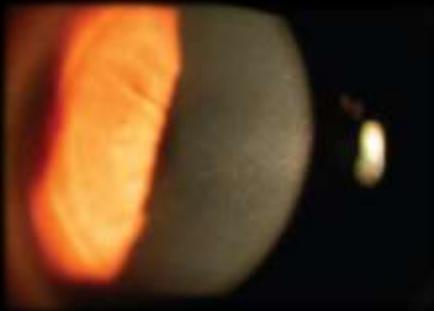
Most eyes

Lasts for up to 1–2 years after surgery.

Clinically significant

Small % of eyes

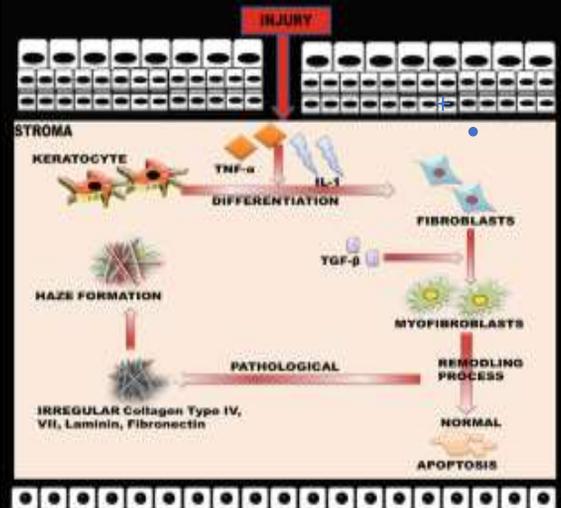
(less than 0.5–4%)



<u>Transitory haze</u>	<u>Late haze</u>
<ul style="list-style-type: none"> • <i>More common</i> 	<ul style="list-style-type: none"> • <i>Less common</i>
<ul style="list-style-type: none"> • <i>Rarely associated with clinical symptoms</i> 	<ul style="list-style-type: none"> • <i>May compromise vision:</i> <ul style="list-style-type: none"> • <i>Decreased corneal transparency</i> • <i>Myopic regression</i>
<ul style="list-style-type: none"> • <i>Noted between 1 and 3 months postoperatively</i> 	<ul style="list-style-type: none"> • <i>Initially a clear cornea postop.</i> • <i>Haze appears between 2 and 5 months postop.</i>
<ul style="list-style-type: none"> • <i>Disappears within the first year after surgery</i> 	<ul style="list-style-type: none"> • <i>Resolves over time</i> • <i>It may stay longer and may persist for up to 3 years</i>
<ul style="list-style-type: none"> • <i>Related to:</i> <ul style="list-style-type: none"> • <i>Depth of ablation</i> • <i>Quality of laser ablation</i> 	<ul style="list-style-type: none"> • <i>No known risk factors</i>

Pathogenesis

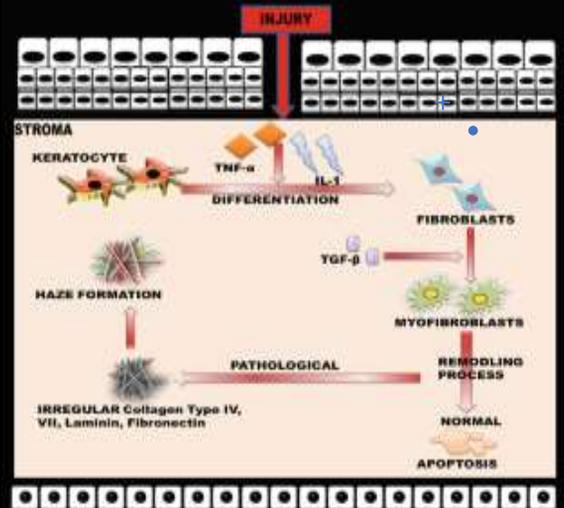
- *End stage of a series of events secondary to corneal epithelial and stromal injury*
- *Surgical trauma with disruption of the BM & apoptosis/necrosis of the surrounding corneal cells will result in keratocyte activation and further transformation into fibroblasts.*



Pathogenesis

- Fibroblasts migrate centripetally to the site of injury and:

1. Lay down ECM
2. Transform into myofibroblasts
3. Lay collagen
4. Irregularity of the stromal surface.



Risk Factors

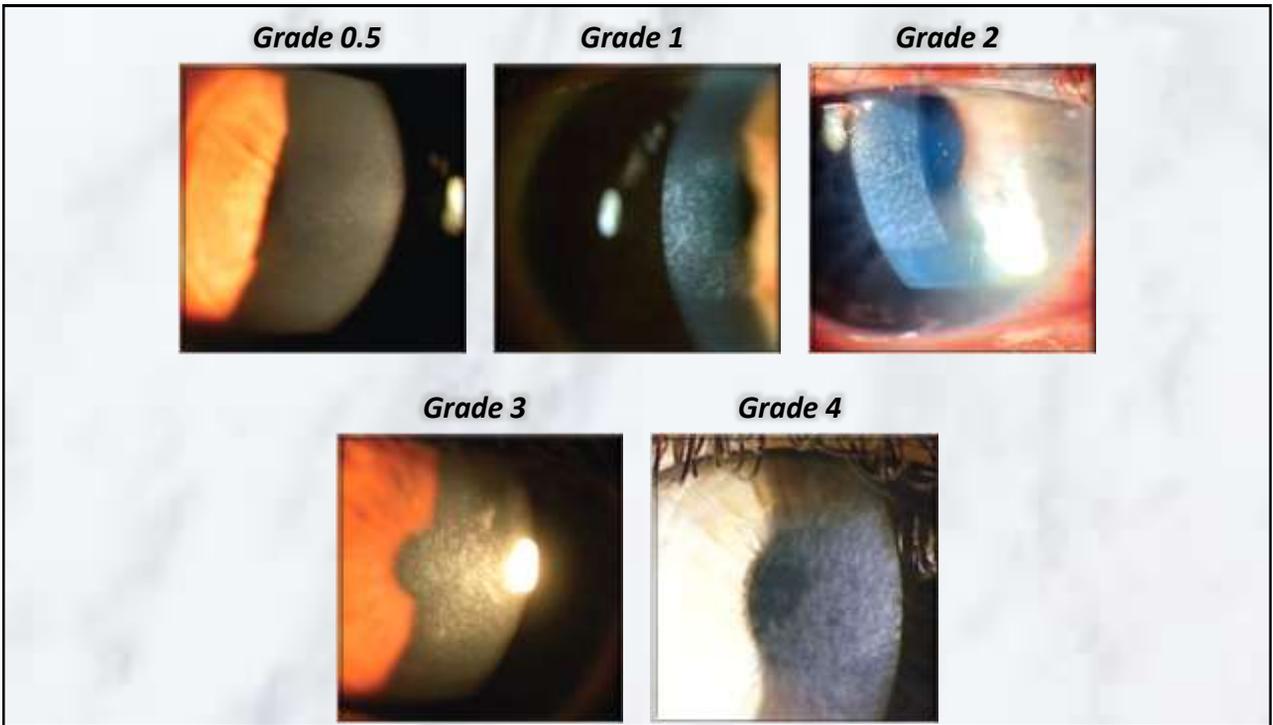
1. Depth of ablation (>80 μm)
2. Diameter of ablation (<6 mm)
3. High levels of correction (>6 D)
4. Proximity of ablation to the corneal periphery
5. Slope of wound surface over the entire area of ablation

Risk Factors

6. *Irregularity of post-op stromal surface*
7. *Tear fluid TGF- β levels*
8. *Residence close to the equator*
9. *Other factors:*
 - *Ablation of Bowman's layer*
 - *Length of time required for epithelial defect healing*
 - *Laser type (more with broad beam)*

Clinical Assessment (Slit lamp Grading)

<u>Grade</u>	<u>Slit Lamp Appearance</u>
0	No haze, completely clear cornea
0.5	Trace haze seen with careful oblique illumination
1	Haze not interfering with the visibility of iris details
2	Mild obscuration of iris details
3	Moderate obscuration of the iris and lens
4	Complete opacification of the stroma in the area of the scar



Clinical Assessment

- **Objective assessment:**

1. **Scheimpflug anterior segment analysis system**
2. **Confocal Microscopy**
3. **Forward scattered light meter (Van den Berg stray light meter)**

Prevention

1. MMC (0.2 mg/ml or 0.02%):

- An antibiotic derived from *streptomyces caespitosus*.
- It cross-links DNA (Inhibiting DNA & RNA replication and protein synthesis)
- **Rapidly dividing cells are more sensitive to its action, and therefore:**
 - Inhibits proliferation of corneal epithelial & stromal cells.
 - Induces keratocyte apoptosis and can lead to myofibroblast death
- Used to prevent haze formation after PRK for high myopia since 1991



Prevention

1. MMC (0.2 mg/ml or 0.02%):

- Applied to the corneal surface for a maximum of 2 min, followed by copious irrigation with BSS.
- **Complications:**
 1. Failure to eliminate haze.
 2. Late corneal melting and keratectasia.
 3. Recurrence of Haze.



Prevention

2. Vitamin C:

- *Vitamin C (ascorbic acid) minimizes the damage produced by UV excimer laser and reduces keratocyte activation.*
- *Oral supplementation might have a prophylactic effect in decreasing haze development after PRK.*



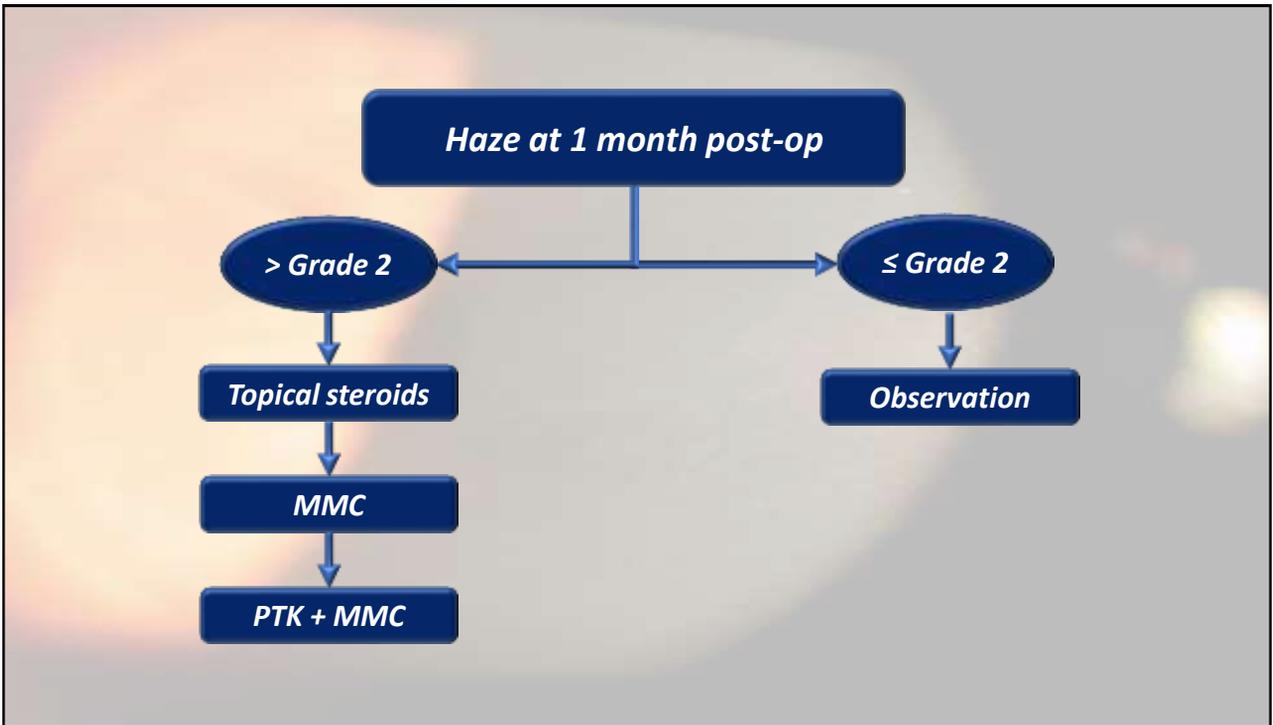
Control and Treatment

1. *Topical Corticosteroids*

2. *MMC*

3. *PTK + MMC*





Take Home Messages

1. *Postoperative haze should be graded. Grades ≤ 2 require only observation.*
2. *More advanced stages, more aggressive treatment is necessary.*
3. *Topical steroids can be used effectively.*
4. *MMC can adequately prevent and treat haze*
5. *Redo surgery with MMC is the last resort.*

