ORIGINAL RESEARCH PAPER

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KEY WORDS: Photo Refractive Keratectomy, Myopia, Hyperopia, Astigmatism, Pachymetry, Topography, Topical Mitomycin C

# FROM BLURRY TO BRILLIANT: THE PRK ODYSSEY

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**ABSTRACT**

**Study Design:** Prospective, observational study **Aim:** To study the outcomes after photo refractive keratectomy in terms of visual outcomes for 3 months follow up post operatively **Methods:** PRK is a surface ablation laser eye surgery for the correction of visual refractive errors such as myopia, hyperopia and astigmatism. 100 eyes of 50 patients undergoing PRK were enrolled. Thorough pre operative workup including best corrected visual acuity, refraction, pachymetry, topography, dry eye test were done. Then patients underwent PRK surgery with application of topical mitomycin C. Post operatively follow up vision on day-1, week-1, month-1 and 3 months was analyzed and any side effects were noted. **Results:** Data entry was done in Microsoft excel and analysis was done. Age group of patients range from 18 to 35 years. Out of 50 patients 25 were males and 25 were females. Pre op vision of all the patients was 6/6. Astigmatism was also present which ranged from 0 DC to 2.5 DC. 46 had low myopia and 54 had moderate myopia. Pachymetry of all patients were in normal range and accordingly residual stromal thickness was calculated. Out of 100 eyes 28% achieved 6/6 vision on day 1, 16% achieved 6/6 vision at week 1, 31% achieve 6/6 vision at month1, 23% achieve 6/6 vision at month 3 and rest 2 % could not achieve 6/6 vision during 3 months follow up period. **Conclusion:** A significant improvement in quality of vision and quality of life is seen after PRK surgery. Hence PRK offers an excellent option for patients who have limitations for other refractive surgeries like LASIK.

## INTRODUCTION

- Photorefractive keratectomy (PRK) is a laser eye surgery for the correction of visual refractive errors such as myopia, hyperopia, and astigmatism. [1]
- Laser refractive surgeries act upon the surface of the cornea, the transparent, dome-shaped, outermost layer that covers the front of the eye.
- The first step of PRK requires complete removal of the superficial corneal epithelium down to Bowman's layer.
- The excimer laser then ablates the stroma, thereby remodeling the corneal surface.
- Following the procedure, re-epithelialization occurs via the migration of fibroblasts and collagen synthesis. [2]

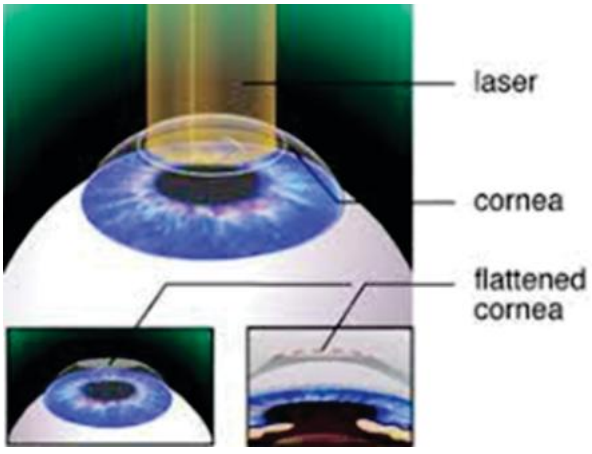



**Fig 1: Mechanism of PRK**

- PRK employs a 193 nm argon fluoride excimer laser to ablate the anterior corneal stroma.
- At 193 nm, a single photon can break the carbon-carbon and carbon-nitrogen bonds that form the peptide backbone of the corneal collagen molecules.
- With each pulse, the collagen polymer is broken into smaller fragments, and a discrete amount of corneal tissue is expelled from the surface. [3]
- The epithelial debridement may be performed through mechanical removal with a spatula, transepithelial removal with the femtosecond laser, application of a diluted alcohol solution, or use of a rotary brush[4]

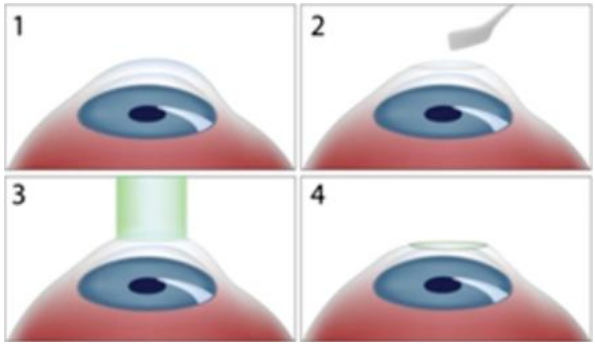



**Fig 2: PRK Procedure**

### Aim and Objective

- To study the outcomes after photo refractive keratectomy in terms of visual outcomes and quality of life for a period of 3 months post operatively.

## MATERIALS AND METHODOLOGY

- Photorefractive keratectomy (PRK) is a laser refractive procedure used to ablate the corneal stroma to correct refractive errors.
- 100 eyes of 50 patients undergoing PRK were enrolled.
- Detailed history of the patient is taken to see for any contraindication of PRK like pregnant women, nursing mother, corneal thinning and ectasia, keratitis, significant cataract, unstable glaucoma, dry eye syndrome, blepharitis, atopy/allergy.
- Thorough pre operative workup done including best corrected visual acuity, refraction (should be stable for at least one year), IOP measurement (to rule out glaucoma), fundus evaluation (to look for lattice, retinal holes, any other degenerative changes)
- Corneal topography and tomography done to look for astigmatism and keratoconus changes
- Corneal pachymeter done to assess corneal thickness.

Slit lamp examination was done to look for any signs of inflammation, corneal scars, vascularization, cataract, keratoconus signs, eyelid examination.

Ocular surface thoroughly examined through various dry eye tests(Schirmer test, TBUT) and ocular adnexa properly examined.

- Pupil size is important as large pupil may lead to glare and halos.



**Fig 3: Schirmer Test**

- Patients are given pre operative antibiotic drops to prevent infection.

  The excimer laser should be calibrated on the day of surgery and checked for an adequate homogenous beam profile, alignment, and power output.
- Relevant data including the patient's name, refraction, intended correction, keratometry values, optical zone, and transition zone, residual stromal thickness are entered.

  Topical anesthetic drops are instilled pre operatively PRK employs a 193 nm argon fluoride excimer laser to ablate the anterior corneal stroma.

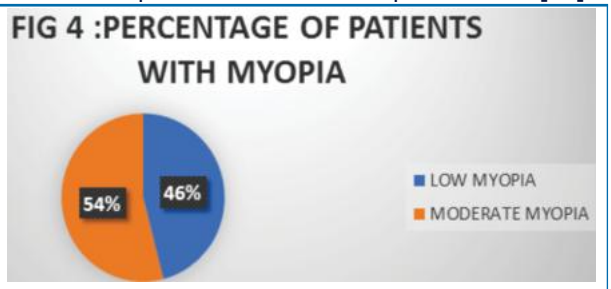
  Epithelial debridement done in PTK mode(Photo Therapeutic keratectomy)
- After exposing the stroma, the laser is centered and focused.

  Correction of myopia involves placing a large number of laser pulses centrally and fewer pulses in the periphery of the optical zone, thereby flattening the natural arc of the cornea.

  In contrast, the correction of hyperopia involves delivering the largest number of laser pulses in the periphery to steepen the corneal arc.
- Then application of topical mitomycin C 0.02% done according to refraction to prevent primary or recurrent corneal haze.
- Ocular surface is then thoroughly washed to prevent mitomycin toxicity to the ocular surface.
- After the procedure soft bandage contact lens is applied and antibiotics eyedrops are instilled and protective goggles applied.
- Post operatively antibiotic eyedrops, steroid eyedrops, lubricating eye drops, cycloplegic eyedrops.
- Post operatively follow up vision on day 1, week 1, month 1 and 3 months was analyzed and any side effects were noted.

## RESULTS AND DISCUSSION

- Data entry was done in Microsoft excel and analysis was done.
- Age group of patients ranged from 18 to 35 years.
- Out of 50 patients 25 were males and 25 were females.
- Pre op vision of all the patients was 6/6 .
- Degree of myopia ranged from low to medium to high myopia lowest being 0.5 DS and highest being 4.75 DS.
- Astigmatism was also present which ranged from 0 DC to 2.5 DC.
- 46 had low myopia and 54 had moderate myopia
- Pachymetry of all patients were in normal range and accordingly residual stromal thickness was calculated.




- Out of 100 eyes,
  28% achieved 6/6 vision on day 1,
  16% achieved 6/6 vision at week 1,
  31% achieve 6/6 vision at month1 ,
  23% achieve 6/6 vision at month 3 and
  rest 2 % could not achieve 6/6 vision
  during 3 months follow up period.
- Pain is the most common side effect seen post operatively
  Other side effects in initial period includes delayed epithelial healing, burning sensation, foreign body sensation, congestion, mild stromal haze.

## CONCLUSION

- A significant improvement in quality of vision and quality of life is seen after PRK surgery.
- PRK can successfully reduce dependency on optical correction.
- Hence PRK offers an excellent option for patients avoiding flap related complications of LASIK.

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