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RESEARCH ARTICLE

A PROSPECTIVE STUDY OF REFRACTIVE SURGERY OUTCOMES IN PATIENTS WITH MESOPIC PUPIL SIZE - PHAKIC COLLAMER LENSES VS SURFACE ABLATION

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Key words:-
Surface Ablation (Photorefractive Keratectomy), Rabin Super Vision Test, Implantablecollamer Lens

Abstract

Purpose- The aim of this study was to evaluate and compare the visual outcomes of night vision and contrast sensitivity in patients undergoing phakiccollamer lenses (ICL) or surface ablation (PRK)

Method of Study- A prospective nonrandomised study in which 50 eyes of patients with myopic astigmatism and pupil size of 6.51 ± 0.8 mm were studied. The contrast sensitivity and visual outcome(2 months postoperative) was measured with Rabin super vision test, under normal low light conditions.

Introduction:-

Photorefractive keratectomy or surface ablation entails the removal of the corneal epithelium followed by excimer laser stromal ablation to offer refractive correction ,it's a safe and popularly gained correction surgery for myopia,but since these procedures include surface ablation with higher degrees of refractive errors it needs more tissue ablation and more oblate corneas causing higher order aberrations (HOA).The implantable collamer lens can correct anywhere from -3 to – 20 D ,and since this procedure doesn't need any tissue removal or surface ablation,it is beneficial in patients with high myopia or thinner corneas or significantly largers pupil patients with more discomfort due to HOAs. The purpose of this study is to evaluate and compare the super visual aquity(LogMar and contrast sensitivity) among patients who has undergone ICL or ablative procedures.

Patientsandmethods–
Prospective comparison study of 50 patients (28 males 22 females)
>ICL- 25and ablative –25
>refractive power range -6D to -13D
>mean age group selected- 20-40 years
>mean scotopic pupil size chosen- 6.51+/- 0.8 mm

Each patient preoperatively underwent comprehensive ocular examination (slit lamp, anterior segment,dilated posterior segment,corneal topography, central corneal thickness and anterior chamber depth with Anterior segment OCT. Each patient who were good candidate for refractive surgery with corneal thickness not less than 500 micron were elected to undergo ablative photorefractive keratectomy (PRK). If patients weren't meeting the laser vision correction criteria they were added for additional testings like confocal microscopy of corneal endothelial layer, anterior chamber depth measurement and following which were made suitable for ICL implantation.

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Inclusioncriteriaandexclusioncriteria

Prkgroup–

No change in spherical equivalent of more than 0.5D in last one year
Myopia ,with astigmatism less than 3D
Minimal corneal thickness of 475-490 microns with post ablation not to be reduced below 400 microns.
No abnormal posterior float on corneal topography
Inferior and superior difference of keratometry less than 1.5D(4 mm pupillary area)
No other ocular surface disorders
Pregnant and nursing females
Lost to follow up patients weren't added in the study result

Iclgroup

No change in spherical equivalent of more than 0.5D in last one year
Myopia ,with astigmatism less than 3D
Anterior chamber depth of minimum 3 mm
Endothelial cell count minimum 700 cells /mm square
No history of glaucoma,iritis, uveitis, pseudoexfolaition, pigment dispersion.
Pregnant and nursing females
Lost to follow up patients weren't added in the study result

Parameters–

All preoperative patients refractive status was measured with Rabin super vision test ,for the ease of post operative comparison mapping.The measurement of contrast sensitivity was done under low intensity light conditions.
Patients underwent Supervision testing post operative 3 months.
Technicians were blinded while performing these procedures on the patient
Test results interpretation by Ophthamologist was also done by blinding.

Parameteranalysis–

To analyse the visual outcome preoperative and post operative visual changes were studied in each group individually.To compare the outcomes of this normally distributed population, independent t test was done and tables are charted as follows.

Table 1:- Summary of visual acuity and contrast sensitivity outcome in the ICL group and PRK groups.

variables	**Groupswithnumber of eyes**	**Preoperative (mean+- SD)**	**Postoperative (mean +- SD)**	**pvalue**
LogMar(bright light)	PRK(n-23) ICL(n-25)	-0.054+-0.057 -0.041+-0.059	-0.113+-0.963 -0.144+-0.511	<0.001
LogMar(night vision)	PRK(n-25) ICL(n-24)	0.073+-0.093 0.057+-0.143	0.113+-0.153 -0.144+-0.117	<0.001
LogCS(bright light)	PRK(n-22) ICL(n-22)	0.453+-0.780 0.301+-0.605	0.988+-0.411 1.005+-0.147	<0.001
LogCS(night vision)	PRK(n-22) ICL(n-22)	0.886+-0.305 0.968+-0.774	1.076+-0.162 2.001+-0.075	<0.001

Table 1:- Showing comparison of LogMar brightpre and post op ICL and PRK.

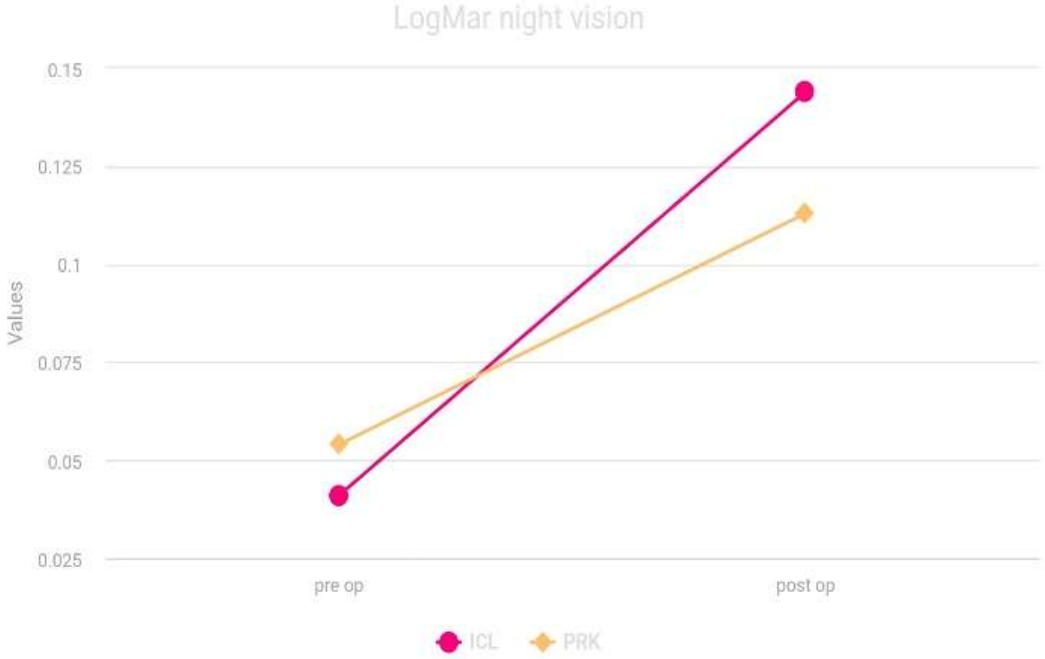


Table 2:- Showing comparison of LogMarnight pre and post op ICL and PRK.

Table 3:- showing comparison of LogCS Bright pre and post op ICL and PRK.

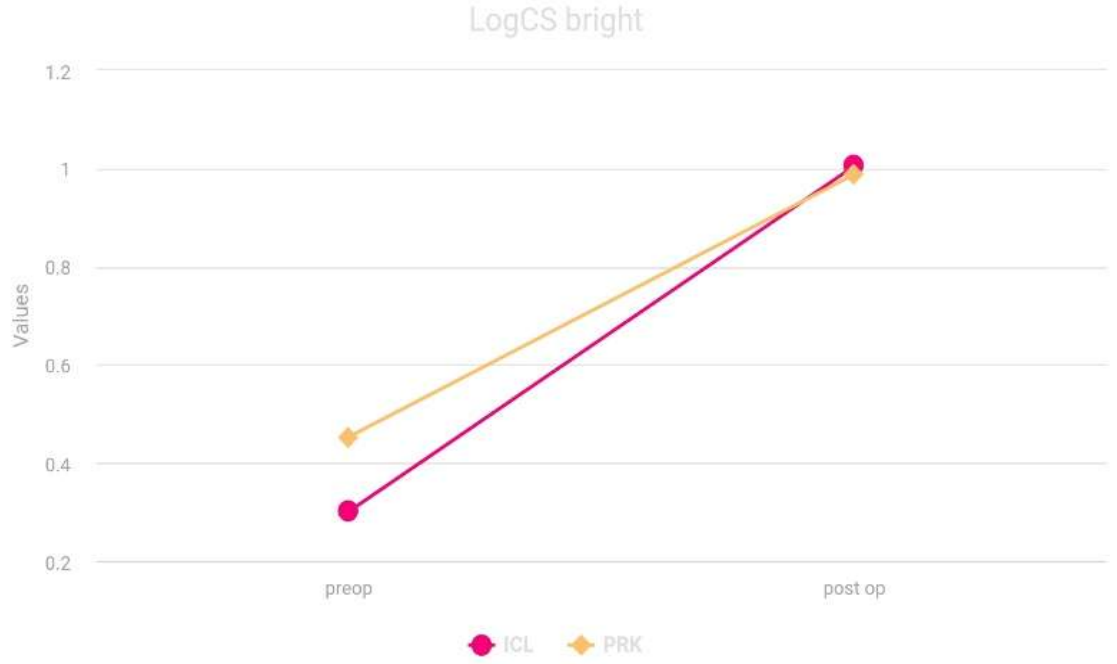
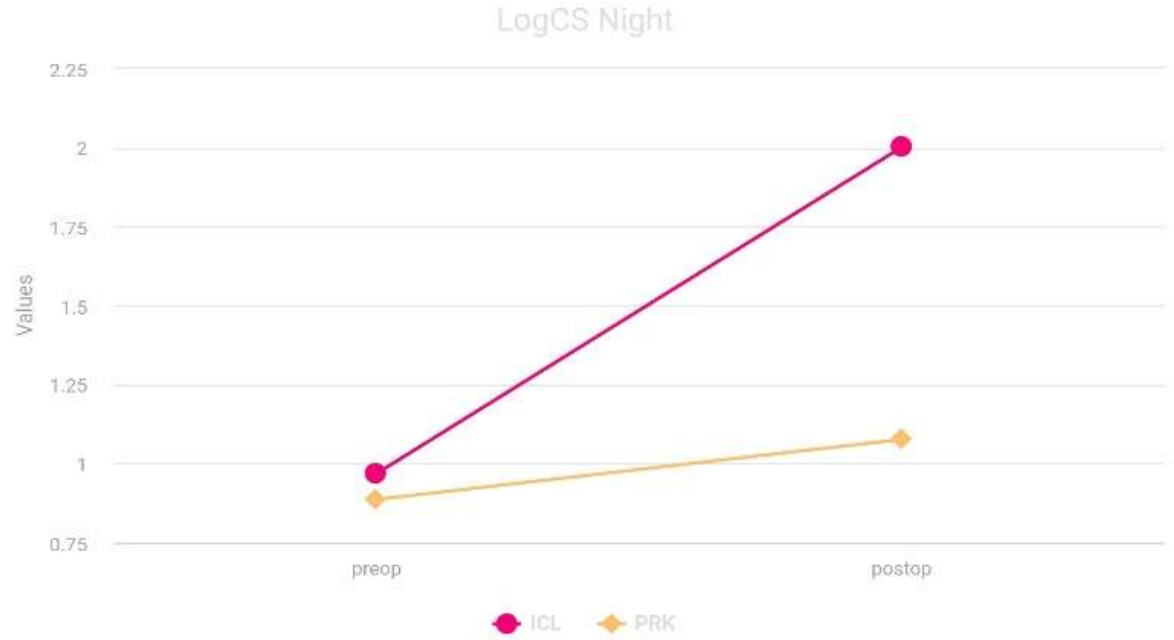


Table 4:- Showing comparison of LogCS night pre and post op ICL and PRK.



Result:-

Post operative 3 months follow up in the 50 patients who underwent either of the procedure were drawn into a comparative map and super vision was assessed respectively. The patient chosen for either of the procedure were preoperative mean spherical diopteric power range of -6 D to -13D range with minimal astigmatism.The visual outcomes of all 50 patients were emmetropic,but with statistically significant Supervisionacquity($p<0.001$).TheSuper vision(LogMar + contrast sensitivity)ofboth groups were compared with age adjusted emmetropic contrast sensitivity, ICL group (LogMar CS – 0.140 ,PRK group(LogMar CS-0.063),$p<0.005$.Mean improvement of visual outcome was comparably equal in both groups with statistically significant better contrast sensitivity in ICLGROUPthan the ablative group .

A statistically high improvement p <0.001 from preoperative to postoperative level was observed accoryto the above table.Hencestatistically significant greater improvement of contrast sensitivity and night vision in the ICL group noted.

All surgeries were uneventful and no other complications were seen throughout the study.

Conclusion:-

ICL correction of refractive errors offers more precise results vis-à-vis surface ablation procedure in patient with mesopicpupil.These differences can be significantly greater in occupational groups needing night vision and preservation of corneal asphericityhas a greater visual outcome.

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