

Refractive Surgery of Myopia by LASIK, Z-LASIK, PRK, PHACO, and I.C.L.

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Abstract

Refractive Surgery of Myopia performed by LASIK, Z-LASIK, PRK, Phaco and I.C.L. on 52 patients including 20 patients for LASIK surgery, also 20 patients for Z-LASIK, 8 patients for PRK, 3 patients for PHACO surgery and 1 patients for I.C.L., this type of surgery is used for vision correction because it is quick and painless. The patient's vision was examined before and after the surgery by using Snellen chart to determined visual acuity; the corneal thickness, shape of cornea were determined by Topography; the refractive error was measured before and after surgery by using Auto refractor meter, also determine gender, age and degree of glasses for each patient. The refractive surgery of myopia was performed in order to discard the use of glasses. Patients after the 18 years were eligible for surgery using LASIK, Z-LASIK, PRK except PHACO and I.C.L techniques. The processes of PRK, Z-LASIK works with little thickness of cornea of 480 microns. High degrees of short sightedness were corrected by PHACO surgery due to the thickness of the cornea which could not tolerate scrape to perform the surgery for all grades. I.C.L. can be used better on young patients because after surgery, there is no need to glasses compared with LASIK, PHACO and Z-LASIK surgery may require glasses after surgery, this surgery undesirable for young. Surgery using PRK technique until 4 degrees of short sight safely while works LASIK surgery with more than 4- degrees occurs with LASIK surgery. Z-LASIK works only with high degree of myopia with a little cornea thickness of 480 microns, either with very low degrees of myopia with a cornea thickness of 500 microns or more works Z-LASIK and LASIK both.

Keywords: Myopia, LASIK, Z-LASIK, PRK, Phaco, I.C.L. and Refractive surgery.

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Introduction

Myopia or shortsightedness is a type of refractive fault in which parallel rays of light arriving from infinity are concentrate in front of the retina when conditioning is at rest [1]. Its incidence has increased over the past decades, leading to a growing concern in the general populace and scientific community [2]. Myopia is on the increase around the globe [3, 4, 5]. Patients with higher grade of myopia are in danger of developing sight-threatening complication such as continuation visual defect (or "blindness") from myopic macular degeneration, cataract, glaucoma, retinal pores and lachrymation and retinal detachments [6, 7]. Myopia has been included as the sixth main cause of vision loss [8]. In particular,

myopia important is due critical retinal detachments in patients having between 4-8 grades of myopia. This risk is increased after having an uneventful cataract extraction or a YAG capsulotomy . The event of retinal detachments is rising significantly as a result of increase in myopia. Delay in dealing with myopia in children could essentially affect the lives of 42 million adults in the United States [1]. Myopia has been in general categorized by age based on the onset of the pathology as school age, or adult onset. Pathologic myopia, commonly observed before six years of age caused by unnatural and maximum stretching of the axial longitude of the eye mostly does not advance and is often linked with precocious retinal modification [1]. School age nearsightedness happen among 6 and 18 years of age and is thought to proceed steadily via delayed adolescent or early twenties [9]. This kind of myopia is correlated with higher IQ scores, most time spent reading and less hours of exposition to sunlight as contrast to non-myopic patients [10]. There are clinical differences types of myopia including congenital nearsightedness, simple or evolution myopia, pathological or deterioration myopia and gained myopia. Simple or developmental myopia, also known as physiological or school myopia, is the widespread variety, it serves as a physiological error not related with any disease of the eye whereas congenital myopia is existent since birth, determined by the age of 2-3 years, it is more considerably in children who were born before the due time or with diverse birth defects such as Marfan's syndrome [11].

LASIK or Lasik or (Laser in situ Keratomileusis) usually known as laser eye surgery or laser vision rectification, is a kind of refractive surgery for the rectification of myopia, hyperopia, and astigmatism. The LASIK surgery is carry out by an ophthalmologist who utilizes a laser to reshape corneal bend for perfection of visual acuity [12]. LASIK facilitates a long-lasting alternate to eyeglasses or suit lenses [13]. LASIK is generality identical to other surgical reformist process, Photo Refractive Keratectomy (PRK), and LASEK. All seems to an improvement over radiate keratotomy in the surgical therapy of refractive errors of seeing. For patients with temperate to high myopia or thin cornea which cannot be remedy with LASIK and PRK, the phaco intraocular lens is an alternate [14]. The FEMTO LDV is a femto second laser which employs an oscillator laser origin with high frequency output. As outcome, it is not susceptible to environmental agent such as temperature and humidity, physical motion. The small size of the laser, armed with wheels, makes it suitable to move between operating rooms and it adjust with every excimer laser. Patient's relief is increased as they do not have to be moved. It is the only femto second laser which utilize very low energy, action in the nanojoule and megahertz range [15].

Ziemer's FEMTO LDV with low pulse-energy, the cutting method is confined by the central volume of the laser. Low pulse energies can only be accomplished with a small focus. The FEMTO LDV uses very low energy in nanojoules range. This is more thin on the corneal tissue that besetment the ruptured volume [15, 16].

Material and Methods

Practical method of PRK surgery:

- 1- Use anesthetic droplet more than once before enter the patient to surgery in order to help removal the epithelium much easier.
- 2- Sterilization the patient's eye by biotin and covers the eye.
- 3 - Wash the eye with sterile water with whipping to remove foreign substances found in the eye.
- 4 - The coating layer is scaled by the hockey knife.
- 5 - Hit the laser in the place of the surface of the cornea.
- 6 - Wash the place of hitting the laser and put a contact lens.

Practical method of LASIK surgery:

- 1- The eye surgeon utilize that either a mechanical surgical named a microkeratome or a femto second laser to created a fine, circuitous flap in the cornea.
- 2-The surgeon folds back the hinged flap by to arrival the underlying cornea which is stroma and eliminate some corneal tissue by using an excimer laser.
- 3- Used extremely specialized laser which a cool ultraviolet light ray to removed microscopic material of tissue from the cornea to reshape it, it must be carefully concentricity light on the retina for afflicted vision.
- 4-Excimer lasers used to proper astigmatism by smoothing an irregular cornea into most normal shape.
- 6- The flap is then laid back in place, covering the area where the corneal tissue was removed. In order to allowed the cornea to heal naturally.

Practical method of Femto or Z-LASIK surgery:

The same as previous steps of Z-LASIK except step, the laser femto are placed to cut the epithelium by laser, femto is the safest and most accurate in determining the thickness of the separated layer and the speed of area healing and re-docking.

Practical method of PHACO surgery:

1-An anesthesia droplet by the instillation is fundamental for visual surgery, impartial anesthesia employed of tetracaine or lidocaine.

2- Lidocaine or prolonged acting bupivacaine anesthetic that injected into the region besetment (peribulbar block) or back (retrobulbar block) the eye muscle etcher further completely immobilize the extraocular muscles and decrease ache sensibility.

A facial nerve impede by utilizing lidocaine and bupivacaine might sometimes be thorough to decrease lid squeeze.

3-General anesthesia was utilized for children, traumatic optic harm with cataract, for so worried or unwilling to help patients.

4- Sterile precautions must be proper of the area for surgery use antiseptics including povidone-iodine.

5-A plastic plate with container assistance assemble the fluids through phaco emulsification. An eye telescope is incorporated to keep the eyelids open.

Practical method of I.C.L surgery :

1- The ICL eye surgery was carry out in less than 30 minutes.

2-Before the surgery, the eye was anaesthetized with a topical or local anesthetic and a mild calmative might be given if necessary.

3-ICL eye surgery was similar to intraocular lens embed surgery except there was no need for cataract removal to allows the implantable contact lens to be inserted without removing the eye's normal lens.

4-Make a small wound in the eye and placed into its placement in front of the natural lens.

5-Two types of lenses were used for ICL eye surgery. ICL was inserted through a tiny incision and unfolds into its site between the iris and the eye's normal lens.

Results and Discussions

Patients

Fifty-two patients attending the Dar –Al Salam Hospital during the period 2018- 2019 were studied. 20(38.5%) patients had surgery by LASIK, 20 (83.5%) patients by Z.LASIK, 8(15.4%) patients by PRK, 3(5.8%) patients Phaco and 1(1.8%) patients I.C.L.

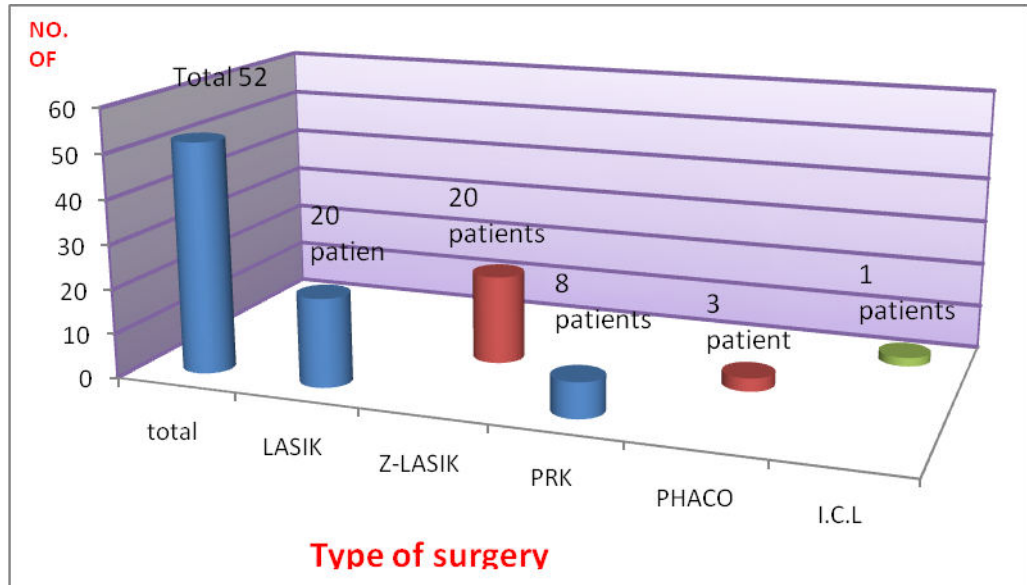


Figure 1: Total number of Patients for each surgery.

In figure 1 demonstrates total number of patients for each surgery, 52 patients as a total including 20 patients for LASIK surgery, 20 patients for Z-LASIK surgery, 8 patients for PRK surgery, 3 patients for PHACO surgery and 1 patients for I.C.L. surgery.



Figure 2: Checking the patient's vision before and after surgery Visual acuity by using Snellen chart.



Figure 3: Checking the thickness and shape of cornea by using Topography.

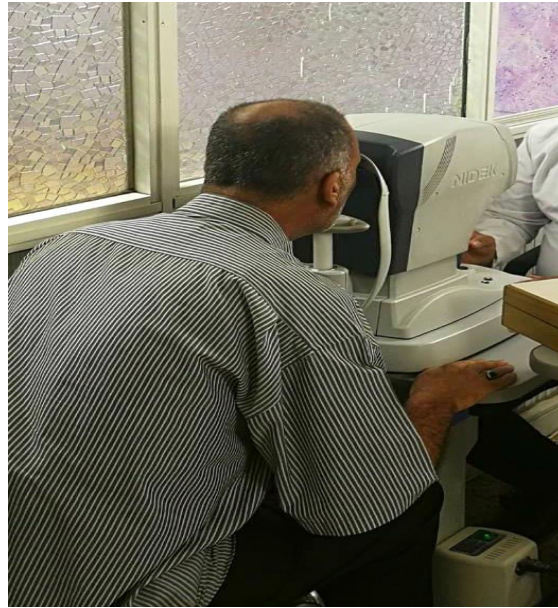


Figure 4: Measurement of refractive errors of the eye before and after the surgery by using Auto refractor meter.

The figure 2, 3, 4 demonstrates the procedure for checking the patients vision before and after surgery by using visual acuity; checking the thickness and shape of cornea by using Topography; also measurement of refractive errors of the eye before and after surgery by using Auto refractor meter.

Table 1: The Gender, Age and Types of surgery.

Cases	Age	Gender	Types of surgery	V.A Without glass (before surgery)		Degree of glass		V.A after surgery	
				R.E	L.E	R.E	L.E	R.E	L.E
1	22	MALE	Z.LASIK	6/60	6/18	-5.5D.S	-2.25/- 0.5x72	6/9	6/6
2	50	MALE	Z.LASIK	C.F2M	C.F5M	-12.0/- 3.5x15	-6.0/- 3.5x160	6/12	6/6
3	29	FEMALE	Z.LASIK	6/60	C.F3M	-2.0/- 1.0x160	-5.0/- 1.0x25	6/6	6/9
4	27	FEMALE	Z.LASIK	C.F4M	C.F2M	-11.0/- 2.0x10	-18.0D.S	6/18	6/24
5	30	FEMALE	Z.LASIK	6/24	6/36	-4.5D.S	-5.5D.S	6/6	6/9
6	32	MALE	Z.LASIK	C.F4M	6/24	-8.0D.S	-3.5/- 0.5x10	6/9	6/6
7	29	MALE	Z.LASIK	6/36	6/24	-4.5/-0.5x20	-3.75/-	6/6	6/6

							0.5x90		
8	22	FEMALE	Z.LASIK	6/36	6/60	-4.0/-1.0x80	-4.0/-1.5x170	6/6	6/6
9	26	MALE	Z.LASIK	6/24	6/24	-3.5/-1.0x4	-4.0/-0.5x106	6/6	6/6
10	33	MALE	Z.LASIK	6/60	6/60	-6.0 D.S	-6.5D.S	6/6	6/6
11	25	FEMALE	Z.LASIK	C.F2M	C.F3M	-12.0D.S	-11.0D.S	6/12	6/12
12	22	FEMALE	Z.LASIK	6/12	6/24P	-1.5/-0.5x74	-1.0/-3.0x119	6/6	6/9
13	39	MALE	Z.LASIK	6/60	6/18P	-3.75/-2.25x1	-0.5/-2.075x2	6/6	6/6
14	44	FEMALE	Z.LASIK	C.F2M	6/24P	-16.0D.S	-9.0/-1.0x144	6/18	6/12
15	23	FEMALE	Z.LASIK	6/60	6/60	-2.5/-1.0x40	-2.5/-1.0x147	6/6	6/6
16	38	MALE	Z.LASIK	6/60p	6/60p	-4.25/-0.5x5	-4.0/-0.5x95	6/6	6/6
17	45	FEMALE	Z.LASIK	6/60	6/60	-3.0/-0.75x12	-3.75/-0.05x60	6/6	6/6
18	42	FEMALE	Z.LASIK	C.F5M	C.F3M	-6.0/-1.5x57	-6.0/-2.0x5	6/6	6/9
19	36	MALE	Z.LASIK	6/24P	6/36	-1.5/-1.5x30	-1.5/-1.75x165	6/6	6/6
20	22	MALE	Z.LASIK	C.F3M	C.F3M	-5.0/-1.0x40	-6.0/-1.0x140	6/6	6/6
21	44	MALE	LASIK	C.F5M	C.F3M	-6.0/-1.0x50	-6.5D.S	6/6	6/6
22	36	FEMALE	LASIK	6/24p	6/36p	-1.25/-1.25x3	-1.25/-1.75x160	6/6	6/6
23	24	FEMALE	LASIK	C.F4M	C.F4M	-4.5/-1.25x45	-5.0/-1.0x130	6/6	6/6
24	48	FEMALE	LASIK	6/60	6/60	-2.5/-0.5x5	-2.5/-0.5x66	6/6	6/6
25	33	MALE	LASIK	6/36	6/36	-3.75D.S	-3.75D.S	6/6	6/6
26	20	MALE	LASIK	6/24p	6/24p	-2.5D.S	-2.5D.S	6/6	6/6
27	44	MALE	LASIK	C.F2M	6/60	-14.5D.S	-11.0/-2.0x140	6/36	6/12
28	27	FEMALE	LASIK	6/60	6/18p	-3.75/-2.75x1	-0.5/-2.75x4	6/6	6/6
29	30	FEMALE	LASIK	C.F1M	C.F1.5M	-11.5/-2.5x10	-11.5/-2.5x175	6/18	6/18
30	48	MALE	LASIK	C.F2M	C.F5M	-12.0/-3.0x15	-7.0/-2.5x160	6/12	6/9
31	28	FEMALE	LASIK	C.F5M	C.F1M	-11.5/-	-18.0D.S	6/18	6/24

						1.5x10			
32	25	FEMALE	LASIK	6/60	C.F4M	-2.5/- 1.0x160	-4.0/- 2.0x25	6/9	6/9
33	22	MALE	LASIK	6/60	6/18P	-4.75D.S	-2.25/- 0.5x80	6/6	6/6
34	24	FEMALE	LASIK	6/12	6/24	-1.0/0.5x74	-1.25/- 2.25x55	6/6	6/6
35	32	FEMALE	LASIK	6/60	6/18	-6.0/- 2.0x180	-0.5/- 3.0x175	6/6	6/6
36	19	FEMALE	LASIK	6/36	6/36	-3.75D.S	-3.75D.S	6/6	6/6
37	21	MALE	LASIK	6/60	6/36P	-4.0 D.S	-3.5D.S	6/6	6/6
38	35	FEMALE	LASIK	6/60	6/36	-1.75/- 1.5x17	-2.0/- 1.25x180	6/6	6/6
39	33	FEMALE	LASIK	6/60	6/60	-3.75D.S	-3.75D.S	6/6	6/6
40	39	MALE	LASIK	6/60p	6/60	-4.5/- 0.5x10	-4.25/- 0.5x100	6/6	6/6
41	22	MALE	PRK	6/24	6/24	-1.0/- 0.75x30	-1.0/- 0.75x163	6/6	6/6
42	31	MALE	PRK	6/24	6/24	-2.75D.S	-2.75D.S	6/6	6/6
43	22	FEMALE	PRK	6/24	6/24	-2.25D.S	-2.25D.S	6/6	6/6
44	29	FEMALE	PRK	6/18	6/18	-1.75D.S	-1.75D.S	6/6	6/6
45	21	FEMALE	PRK	6/12	6/12	-1.5D.S	-1.5D.S	6/6	6/6
46	22	FEMALE	PRK	6/12P	6/12P	-1.25/-0.5x5	-1.5/- 0.25x1	6/6	6/6
47	25	MALE M	PRK	6/9p	6/9p	-1.0 D.S	-1.0 D.S	6/6	6/6
48	20	FEMALE	PRK	6/9p	6/9p	-1.0/-0.25x2	-1.25/- 0.25x51	6/6	6/6
49	23	FEMALE	PHACO	C.F2M	C.F2M	-14.0 D.S	-14.0D.S	6/9	6/9
50	29	FEMALE	PHACO	C.F1M	C.F1M	-22.0/- 2.0x10	-22.0D.S	6/18	6/18
51	60	MALE M	PHACO	C.F4M	C.F5M	-10.0D.S	-10.0D.S	6/6	6/6
52	24	FEMALE	I.C.L	C.F2M	C.F3M	-13.0/- 2.0x10	-10.0/- 2.0x154	6/9	6/9

Table 1 show the gender, age and types of surgery (LASIK, Z-LASIK, PRK, PHACO, and I.C.L.) surgery. In this table R.E. mean right eye, L.E. mean left eye, VA mean vision acuity after surgery, this table show total information of patients before and after surgery for 52 patients.

Table 2: Z-LAZIK Surgery with K1 and K2.

CASES	Degree of glass	K reading		Degree of glass	K reading	
		R .E			L.E	
	R.E	K1	K2	L.E	K1	K2
1	-5.5D.S	41.98D	42.19D	-2.25/-0.5x72	42.54	42.70D
2	-12.0/-3.5x15	42.3D	45.9D	-6.0/-3.5x160	42.5	45.5D
3	-2.0/-1.0x160	42.57D	44.07D	-5.0/-1.0x25	42.92D	44.32D
4	-11.0/-2.0x10	42.1D	44.9D	-18.0D.S	42.3D	43.8D
5	-4.5D.S	42.3D	44.5D	-5.5D.S	42.4	44.9D
6	-8.0D.S	42.55D	44.11D	-3.5/-0.5x10	42.9D	44.3D
7	-4.5/-0.5x20	42.4D	43.99D	-3.75/-0.5x90	42.42D	45.31D
8	-4.0/-1.0x80	42.51D	44.08	-4.0/-1.5x170	42.6D	44.22D
9	-3.5/-1.0x4	42.6D	43.65D	-4.0/-0.5x106	42.7D	44.56D
10	-6.0 D.S	42.3D	45.8D	-6.5D.S	42.29D	45.7D
11	-12.0D.S	44.7D	47.5D	-11.0D.S	43.99D	46.55D
12	-1.5/-0.5x74	44.19D	45.11D	-1.0/-3.0x119	44.42D	49.05D
13	-3.75/-2.25x1	44.96D	47.76D	-0.5/-2.075x2	44.74D	47.84D
14	-16.0D.S	43.01D	44.70D	-9.0/-1.0x144	44.06D	44.95D
15	-2.5/-1.0x40	42.08D	44.04D	-2.5/-1.0x147	42.99D	44.09D
16	-4.25/-0.5x5	43.31D	43.90D	-4.0/-0.5x95	43.60D	43.98D
17	-3.0/-0.75x12	45.4D	46.1D	-3.75/-0.5x60	45.4D	45.5D
18	-6.0/-1.5x57	44.77D	45.92D	-6.0/-2.0x5	44.36D	44.85D
19	-1.5/-1.5x30	43.75D	45.45D	-1.5/-1.75x165	43.31D	44.25D
20	-5.0/-1.0x40	43.13D	44.62D	-6.0/-1.0x140	43.22D	44.71D

In table 2 shows the results of Z-LASIK surgery included for 20 patients, the R.E. mean right eye, L.E. mean left eye, k1 mean flat keratometry and k2 mean steep keratometry, D mean Diopter (a unit of refractive power of a given lens).

Table 3: LAZIK Surgery with K1 and K2.

CASES	Degree of glass	K reading		Degree of glass	K reading	
	R.E	K1	K2	L.E	L.E	
				K1	K2	
1	-6.0/-1.0x50	44.36D	44.85D	-6.5D.S	44.77D	45.92D
2	-1.25/-1.25x3	43.95D	45.35D	-1.25/-1.75x160	43.5	45.15D
3	-4.5/-1.25x45	43.20D	44.65D	-5.0/-1.0x130	43.35D	44.75D
4	-2.5/-0.5x5	45.9D	46.5D	-2.5/-0.5x66	45.8D	45.6D
5	-3.75D.S	43.30D	43.61D	-3.75D.S	43.66D	43.77D
6	-2.5D.S	42.80D	44.20D	-2.5D.S	42.80D	44.10D
7	-14.5D.S	44.95D	47.77D	-11.0/-2.0x140	44.72D	47.85D
8	-3.75/-2.75x1	43.02D	44.72D	-0.5/-2.75x4	42.6D	44.22D
9	-11.5/-2.5x10	44.74D	46.78D	-11.5/-2.5x175	44.57D	46.67D
10	-12.0/-3.0x15	42.3D	45.7D	-7.0/-2.5x160	42.5D	45.5D
11	-11.5/-1.5x10	42.11D	44.9D	-18.0D.S	42.3D	43.8D
12	-2.5/-1.0x160	42.57D	44.07D	-4.0/-2.0x25	42.92D	44.43D
13	-4.75D.S	41.92D	42.19D	-2.25/-0.5x80	42.54D	47.84D
14	-1.0/0.5x74	44.19D	45.11D	-1.25/-2.25x55	44.42D	49.05D
15	-6.0/-2.0x180	44.08D	45.04D	-0.5/-3.0x175	42.9D	43.19D
16	-3.75D.S	43.72D	44.22D	-3.75D.S	43.41D	43.96D
17	-4.0 D.S	44.63D	45.91D	-3.5D.S	43.61D	44.55D
18	-1.75/-1.5x17	43.88D	45.75D	-2.0/-1.25x180	43.71D	44.80D
19	-3.75D.S	43.95D	45.35D	-3.75D.S	43.3D	45.15D
20	-4.5/-0.5x10	43.23D	44.61D	-4.25/-0.5x100	43.31D	44.81D

Table3 shows the results LASIK surgery included for 20 patients also, the R.E. mean right eye, L.E. mean left eye, K reading mean Keratometry, k1 mean flat keratometry and k2 mean steep keratometry, D mean Diopter (a unit of refractive power of a given lens).

Table 4: PRK Surgery with K1 and K2.

CASES	Degree of glass		K reading		Degree of glass		K reading	
	R.E		R.E		L.E		L.E	
	R.E		K1	K2	L.E		K1	K2
1	-1.0/-0.75x30		43.28D	45.39D	-1.0/-0.75x163		43.25D	45.88D
2	-2.75D.S		43.7D	45.91D	-2.75D.S		42.57D	45.51D
3	-2.25D.S		42.17D	44.18D	-2.25D.S		43.9D	44.94D
4	-1.75D.S		43.10D	44.93D	-1.75D.S		42.87D	44.50D
5	-1.5D.S		44.56D	45.11D	-1.5D.S		43.33D	44.92D
6	-1.25/-0.5x5		43.15D	44.21D	-1.5/-0.25x1		43.29D	44.35D
7	-1.0 D.S		42.41D	43.19D	-1.0 D.S		43.40D	45.3D
8	-1.0/-0.25x2		43.41D	44.28	-1.25/-0.25x51		43.16D	44.2D

Table 4 shows the results for PRK surgery included for 8 patients, the R.E. mean right eye, L.E. mean left eye, K reading mean Keratometry, k1 mean flat keratometry and k2 mean steep keratometry, D mean Diopter(a unit of refractive power of a given lens).

Table 5: PHACO Surgery with Power of lens (IOL) , Axial length .

CASES	Axial length		Degree of glass		Power Of lens	
	R.E	L.E	R.E	L.E	R.E	L.E
1	29.25mm	29.14mm	-14.0 D.S	-14.0D.S	6.5 D	6.5 D
2	33.44mm	32.97mm	-22.0/-2.0x10	-22.0D.S	-3.5 D	-4.5 D
3	27.06mm	27.12mm	-10.0D.S	-10.0D.S	9.0 D	9.0 D

In table5 show the results for PHACO surgery for 3 patients also, the R.E. mean right eye, L.E. mean left eye, with Axial length of eye degree of glass for right and left eye power of lens (IOL) that implanted for right and left eye.

Table 6 : I.C.L Surgery , with power of lens (IOL) , Axial length.

CASES	Axial length		Degree of glass		Power Of lens	
	R.E	L.E	R.E	L.E	R.E	L.E
1	28.54mm	26.86mm	-13.0/-2.0x10	-10.0/-2.0x154	6.0 D	10.0 D

In table 6 shows result of I.C.L. surgery for 1 patients also, the R.E. mean right eye, L.E. mean left eye , with Axial length of eye; degree of glass for right and left eye; power of lens (IOL) that implanted for right and left eye. The surgery of I.C.L. requires an extremely small incision that is self-healing. The Verisyse lens, on the other hand, is inserted in front of the iris through a somewhat larger incision that must be closed with sutures which dissolve over time.



Figure 6: LASIK Device used to Refractive surgery of Myopia /Germany Company.

LASIK and PRK are two different methods. Both process react to the epithelium OF the context, the PRK method eliminate completely, while LASIK shave the substance away for the method, prior put again for cure next laser surgery [17].These method are utilized to treat astigmatism, myopia and hypermetropia [18].

PRK is also used to avoid added complexity related with the flap formed through surgery. The method may furthermore decrease the alteration of dry eye signs after surgery [20]. Because the LASIK method requires a surgical flap, sportsman or persons with harm to the flap may benefit from PRK. Patients that put on contact lenses will usually be required to stop wearing them for a particular time prior to estimate of corneal curvature [21].Comparing PRK and LASIK, LASIK has shorter healing

period and less trouble. The two techniques have identical outcome [22]. A 2016 study was indefinite whether any divergence in competence, fineness and opposite impact when liken PRK and LASIK surgery among people with minimal to temperate myopia [23,24].

Phaco emulsification is a modernistic cataract surgery in which the eye's inner lens is made into with an ultrasonic hold and aspirated from the eye. Aspirated fluids are substitution with wash of equiponderant salt solution to preserve the anterior cell [25].

Intraocular lens is grain in the eye as portion of a therapy for cataracts or myopia. The most widespread kind of IOL is the pseudophakic IOL. These are cultivated through cataract surgery; next the unclear eye's natural lens (colloquially known a cataract) has been taken away. The pseudophakic IOL supply the identical light centering role as the naturalist crystalline lens [26]. The second kind of IOL, widely a phakic intraocular lens (PIOL), is a lens that is lay over the present naturalist lens and is utilized in refractive surgery to alter the eye's visual power as a therapy for myopia, or shortsightedness [27]. IOLs consist of a tiny soft lens with soft side struts, known as haptics, to carry the lens in site through the capsular bag within the eye[28]. Surgeons plant more than 6 million lenses annually. The process can be done beneath topical anaesthesia with the patient seeing the entire surgical procedure. The utilize of a bend IOL can the lens to be rolled for injection into the capsule during extremely small wound, therefore escape the requirement for stick and this process commonly completed less than 30 minutes by an experienced ophthalmologist[29]. The cure duration is about 2–3 weeks next surgery, patients should evade tiring work out or anything that rise blood pressure. They should as well visit their ophthalmologists orderly for several months so as to observe the implant [30].

A toric IOL is a kind of toric lens utilized to proper before existent corneal astigmatism at the period of cataract surgery. This astigmatism ability also be handle with limbal relaxing wound or an excimer laser process. About 40% of Americans have considerable astigmatism and therefore can be elect for a toric IOL [31]. Cataract surgery to planting of a toric IOL is particularly the like as cataract surgery with a traditional IOL [30]. Similar toric osculate lenses, toric IOLs have various powers in diverse meridians of the lens and they must be placed on the correct meridian to reverse the preexisting astigmatism. If the toric IOL is not on the true midday, it possible to be replaced in a second process [31].

Both PRK and femto-LASIK (Z-LASIK) surgeries appear be secure for ocular surface state. Both PRK and femto-LASIK surgeries appear to have minimal effect on ocular surface state [32].

Laser in situ keratomileusis (LASIK) and photorefractive keratectomy (PRK) are the widely current utilized corneal refractive technicality to rectify low and mid myopia [22]. Both are safe and efficient and the chosen of either surgical technique is fundamentally specified by the grade of ametropia and the corneal form of the elect [33]. As their significance partially superposition, award-action is also affected by occupational request of the patients (patients binding in contact sports or violence prone career), divergence in postoperative retrieval time and ocular surface state. Patient's farthest non-refractive after surgery illness is dry eye and regarding symptoms such as visional inconstancy and exotic body emotion [34].

Straighten if arid eye sign are especially tentative, this number remnant the main reason of patient discontent after corneal refractive surgery. Dry eye sickness (DED) dominance data are qualified that 50% of patients have signs of dry eye at 1-week post LASIK, 40% at 1 month and 20 to 40% at 6 months [35]. The happening of DED post PRK is qualified to be about 3%, through few works out [36]. PRK technique is the treatment of preference in patients with ocular surface disturbance based at most on the higher happening of dry eye and regarding signs after LASIK surgery. However, proportional study between both techniques has been export so far [37].

Otherwise, both surgical and diagnostic improvement have been noteworthy in this field. First, the display of a clinical device as Tear Lab osmolarity system (TearLab Corp, San Diego, CA) permit, with easy and non-invasive procedure, to measured in clinical tear osmolarity in a little seconds (lab-on-a-chip technology). Variation in tear osmolarity and inflammation are quoted in the introduction of DED from 2007 Dry Eye Workshop (DEWS) and is now serve as a key element in the development and identification of DED [38]. In addition, further costly than the conventional microkeratome, the femto second (FS) laser supply most precise, credible and safer LASIK flap mood (femto-LASIK) [39]. However, DED pathogenesis is not fully decided yet, corneal refractive surgery has illuminate with spotlight the main role of corneal innervation in the organization of tear flux [40]. Femto second laser make thinner and further constant flaps thus a several impact on tear flux could be predictable since iatrogenic corneal nerves hurt take in a more apparent scale [32]. These new evolution request new studies to estimate the impact of femto-LASIK and PRK techniques on the ocular surface and to test alike the classical presumption is therefore proper. This work to compare the effect on ocular surface state of current femto-LASIK and PRK techniques with one-year follow-up time [24].

Conclusions:

- 1-Refractive surgery of myopia by LASIK , Z-LASIK , PRK , Phaco , I.C.L. done in order to get away from the glasses.
- 2-Patients ages after 18 years can be performed for them all LASIK , Z-LASIK, PRK ,except PHACO and I.C.L surgery.
- 3- The processes PRK , Z-LASIK with little thickness of cornea of 480 microns.
- 4-High degrees of short sightedness occurs the PHACO surgery due to the thickness of the cornea does not tolerate scrape to perform the surgery for all grades.
- 5-I.C.L. used better with young patients (age is small) because after surgery not need to glasses compared with LASIK,PHACO and Z-LASIK surgery may be need glasses after surgery , this surgery undesirable for young.
- 6-surgery of PRK works until 4 degrees of short sight safely while works LASIK surgery with more than 4- degrees occurs with LASIK surgery.

7-Z-LASIK works only with high degree of myopia with a little cornea thickness of 480 microns, either with very low degrees of myopia with a cornea thickness of 500 microns or more works Z-LASIK and LASIK both.

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