

*Refractive Status in Intermittent
Exotropia (IXT) and its Impact on
Surgical outcome*

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No Financial Interest
Consent for photos taken



INTERMITTENT EXOTROPIA (IXT)



Patching



Present management options

Overminus lenses

Orthoptic exercises

Botox injection



Prisms



Pencil Push-ups



The Brock String

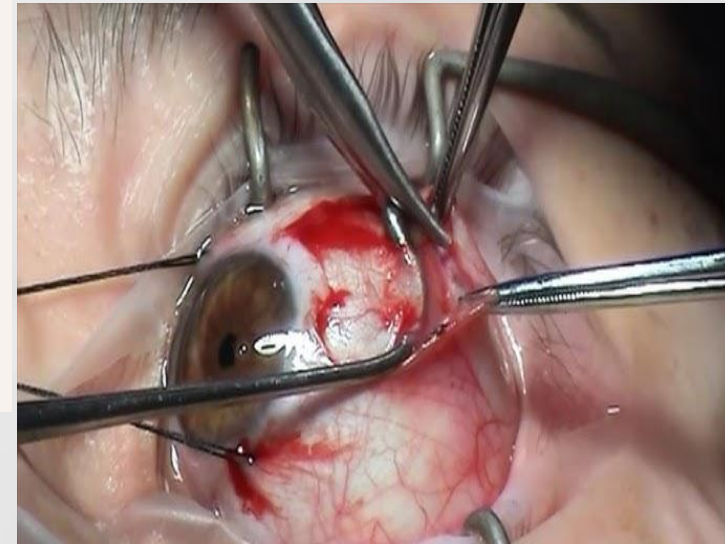


Barrel Cards



Near Far Focus Switching

Surgery



Revised Newcastle Control Score

	Score
Home control	
IXT or monocular eye closure seen	
Never	0
<50% of time fixing in distance	1
>50% of time fixing in distance	2
>50% of time fixing in distance + seen at near	3
Clinic control	
Near	
Immediate realignment after dissociation	0
Realignment with aid of blink or re-fixation	1
Remains manifest after dissociation/prolonged fixation	2
Manifest spontaneously	3
Distance	
Immediate realignment after dissociation	0
Realignment with aid of blink or re-fixation	1
Remains manifest after dissociation/prolonged fixation	2
Manifest spontaneously	3
Total NCS: (Home + near + distance)	

Grading the severity of IXT

Score of 3 or more needs surgical intervention

Factors influencing prognosis of surgery

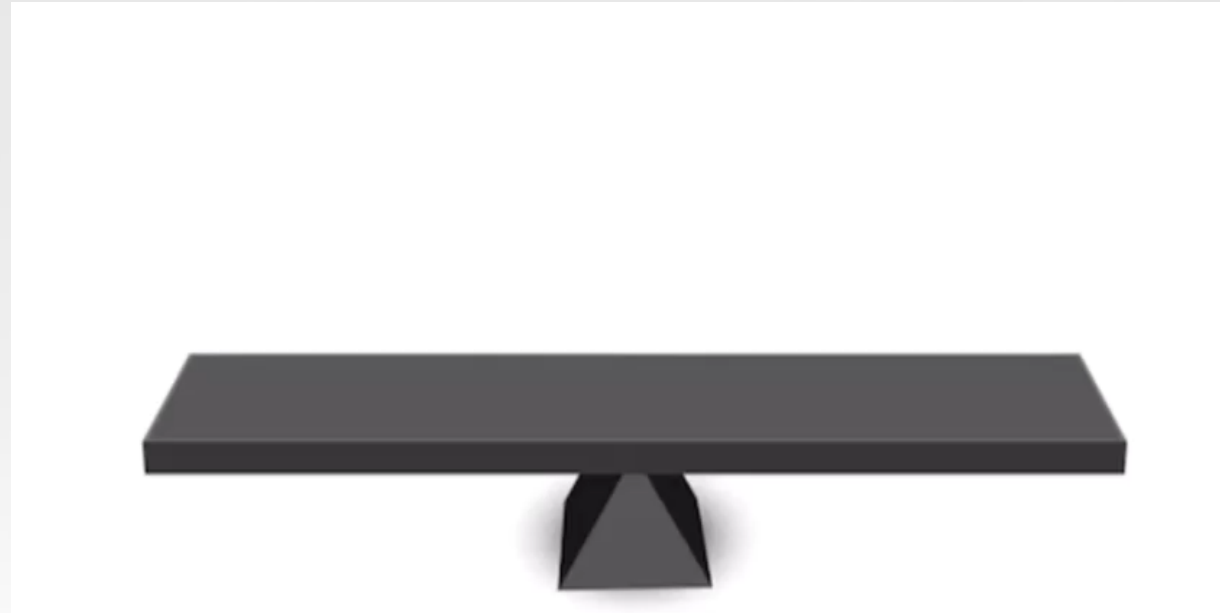
1. Pre operative and post operative degree of exodeviation
2. Type of surgery performed
3. Age at diagnosis and surgery
4. Pre operative refractive status
5. Visual acuity
6. Stereopsis
7. Amblyopia
8. Nystagmus
9. Associated AV pattern, Oblique muscle dysfunction, Dissociated Vertical Deviation

Refractive errors and recurrences

Not related

Huda S, Asim T, Abdulbari B. Factors Affecting the Surgical Outcome of Primary Exotropia in Children. British Journal of Ophthalmology. 2016;2016(16(10)):1-7.

Lim SH, Hwang BS, Kim MM. Prognostic factors for recurrence after bilateral rectus recession procedure in patients with intermittent exotropia. Eye. 2012 Jun;26(6):846.



Significantly related

Gezer A, Sezen F, Nasri N, Gözüm N. Factors influencing the outcome of strabismus surgery in patients with exotropia. Journal of American Association for Pediatric Ophthalmology and Strabismus. 2004 Feb 29;8(1):56-60.

Surgical success rate : 38-91% (1)

- ❖ Follow up periods
- ❖ Criteria used to determine success



(1) Ekdawi NS, Nusz KJ, Diehl NN, Mohny BG. Postoperative outcomes in children with intermittent exotropia from a population-based cohort. Journal of American Association for Pediatric Ophthalmology and Strabismus. 2009 Feb 28;13(1):4-7.

Need for the study

Progression to exotropic drift after surgery

In Recurrent IXT, refractive status has a role



Surgically induced refractive changes (SIRC) : astigmatism and myopic shift

OUR OBJECTIVE



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OUR OBJECTIVE

To analyze the refractive status in IXT

To analyze and compare the *surgical outcomes* (success / failure) with respect to refractive status in IXT

To assess if IXT surgery induces any *new refractive changes* among these groups



Methods

A retrospective,
cross sectional,
observational study

Underwent first time
corrective surgery for IXT



237 patients (474 eyes)
aged between 2 to 20 yrs

At least one year follow
up.

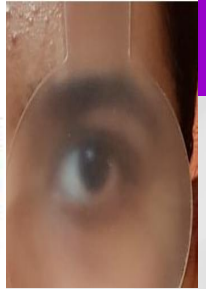
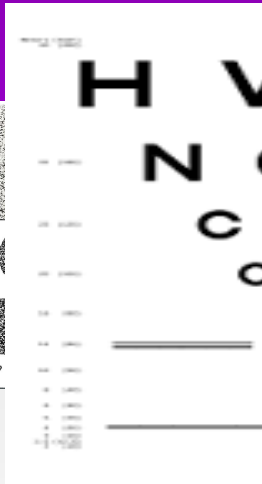
Informed written consent and a detailed ophthalmic history was obtained from parents or legal representatives.

Exclusion criteria

- ❖ All ocular deviations other than IXT
- ❖ Previous extraocular muscle surgery
- ❖ Severe unilateral amblyopia.
- ❖ Nystagmus.
- ❖ Neurological or other medical problems.
- ❖ Associated ocular pathology



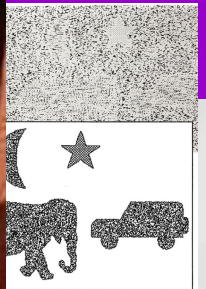
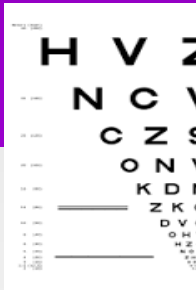
Cycloplegic refraction



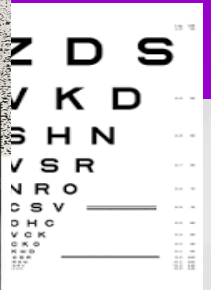
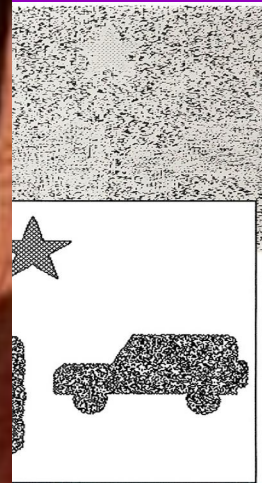
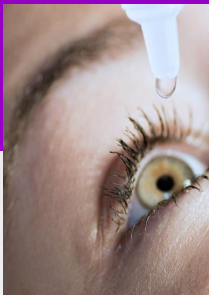
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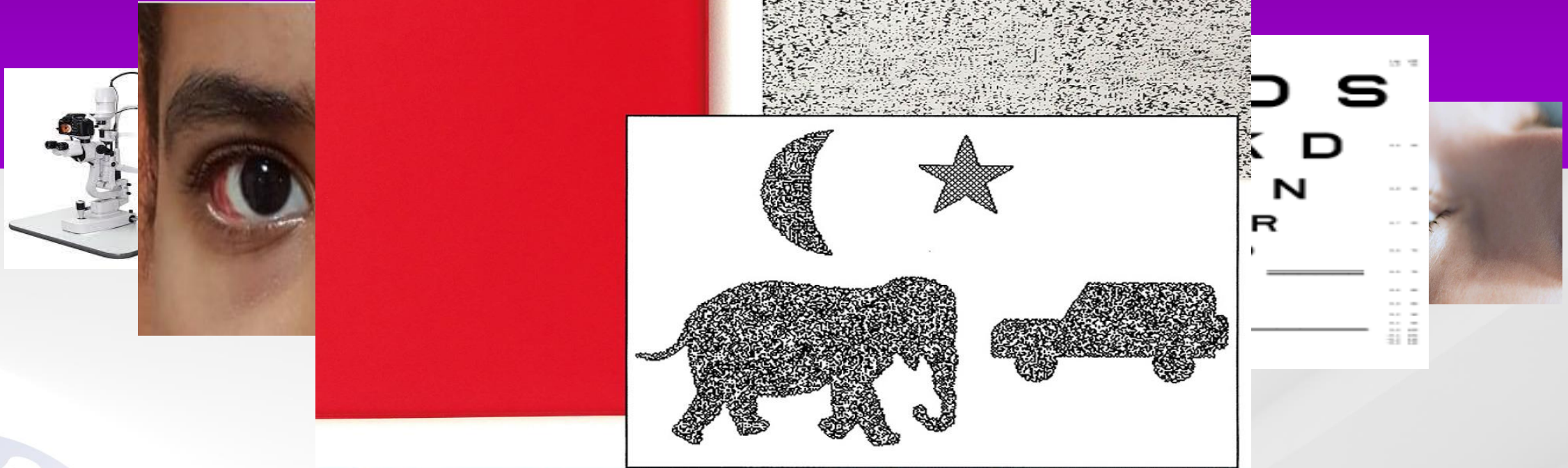
Ocular examination



Squint assessment



Sensory Orthoptic evaluation



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Follow up schedule



1
month

6
months

2 years
(if available)



3
months

1 year



Emmetropia
(SE -1 to +2D)

Myopia
(SE > -1D)

Hypermetropia
(SE > +2D)

Astigmatism
(simple, compound &
mixed astigmatism)

4
groups

Surgical outcome



Success

- Esotropia \leq 5 PD
- Exotropia \leq 15 PD



Recurrence

- Exotropia $>$ 15 PD

Overcorrection

- Esotropia $>$ 5 PD

Data analysis

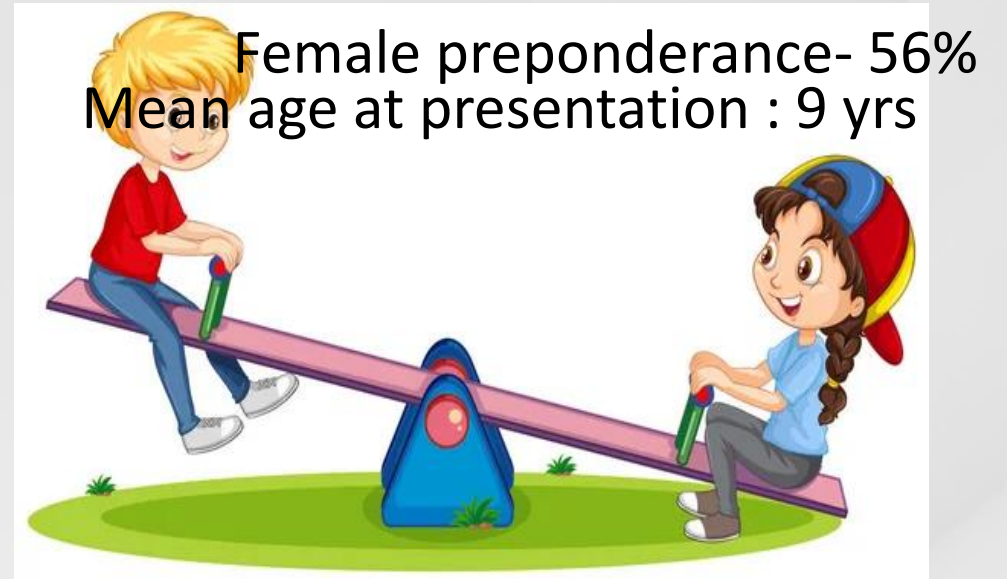
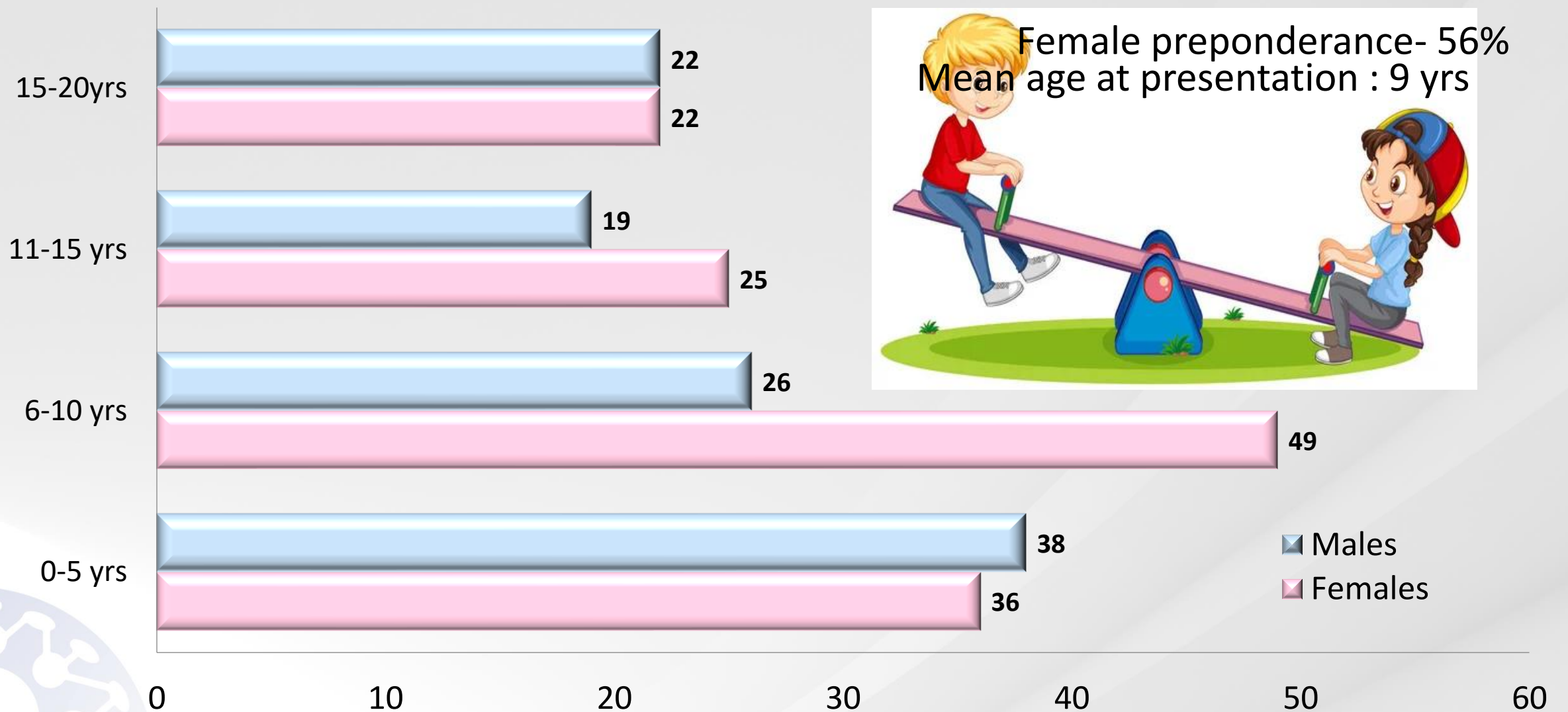
- **Software**: statistical Package for Social Sciences(SPSS) v 20 (IBM, Armonk, New York , USA)
- The following statistical methods will be used to test the hypothetical results:
 - ❖ Descriptive statistics-Mean, Median, Mode , IQR and Graphical representation
 - ❖ Univariate analysis
 - ❖ Receiver Operating Characteristics analysis
 - ❖ Binary Logistic regression and Chi-square test
- A **$p < 0.05$** was considered ***significant***

RESULTS

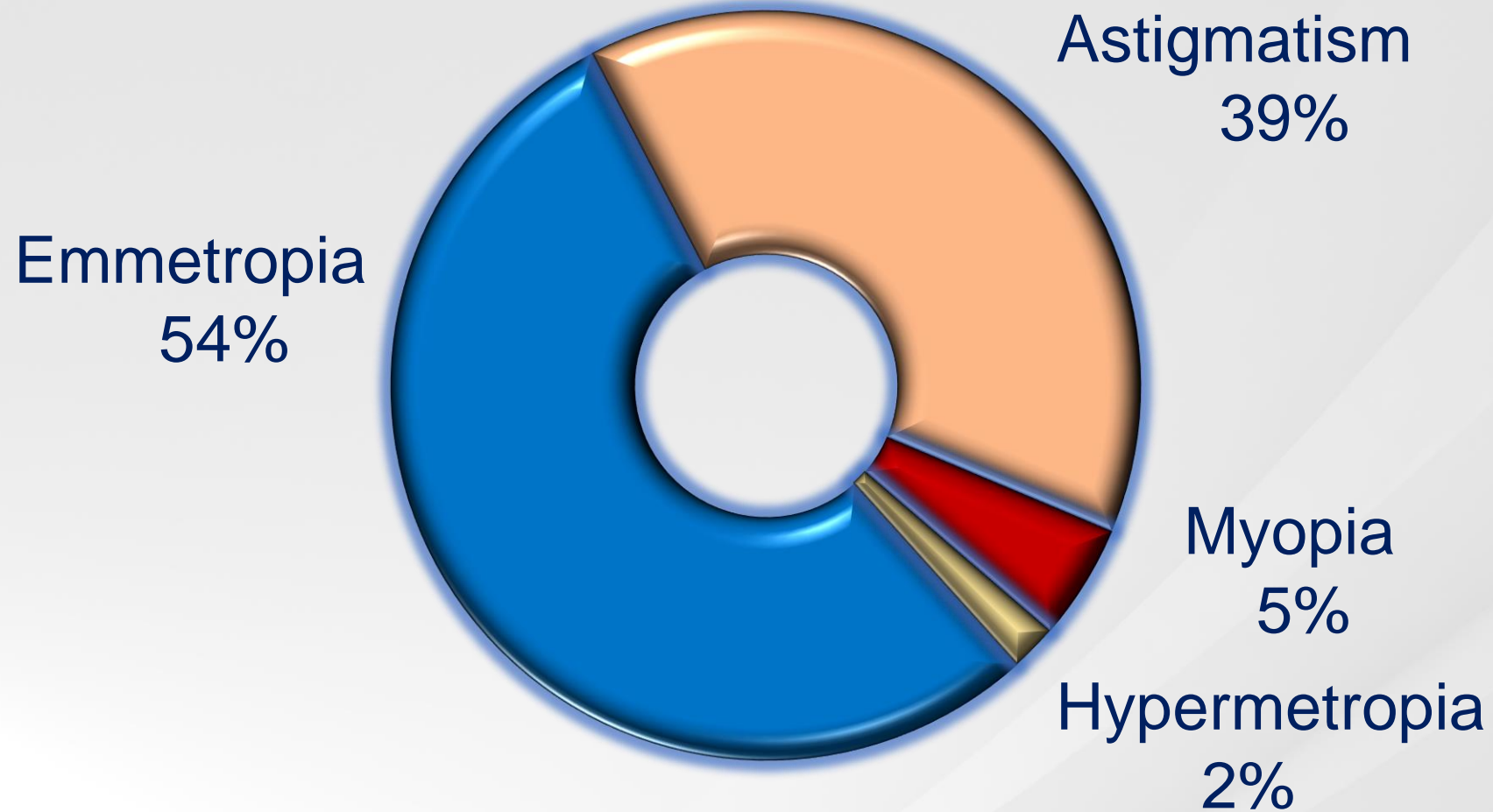
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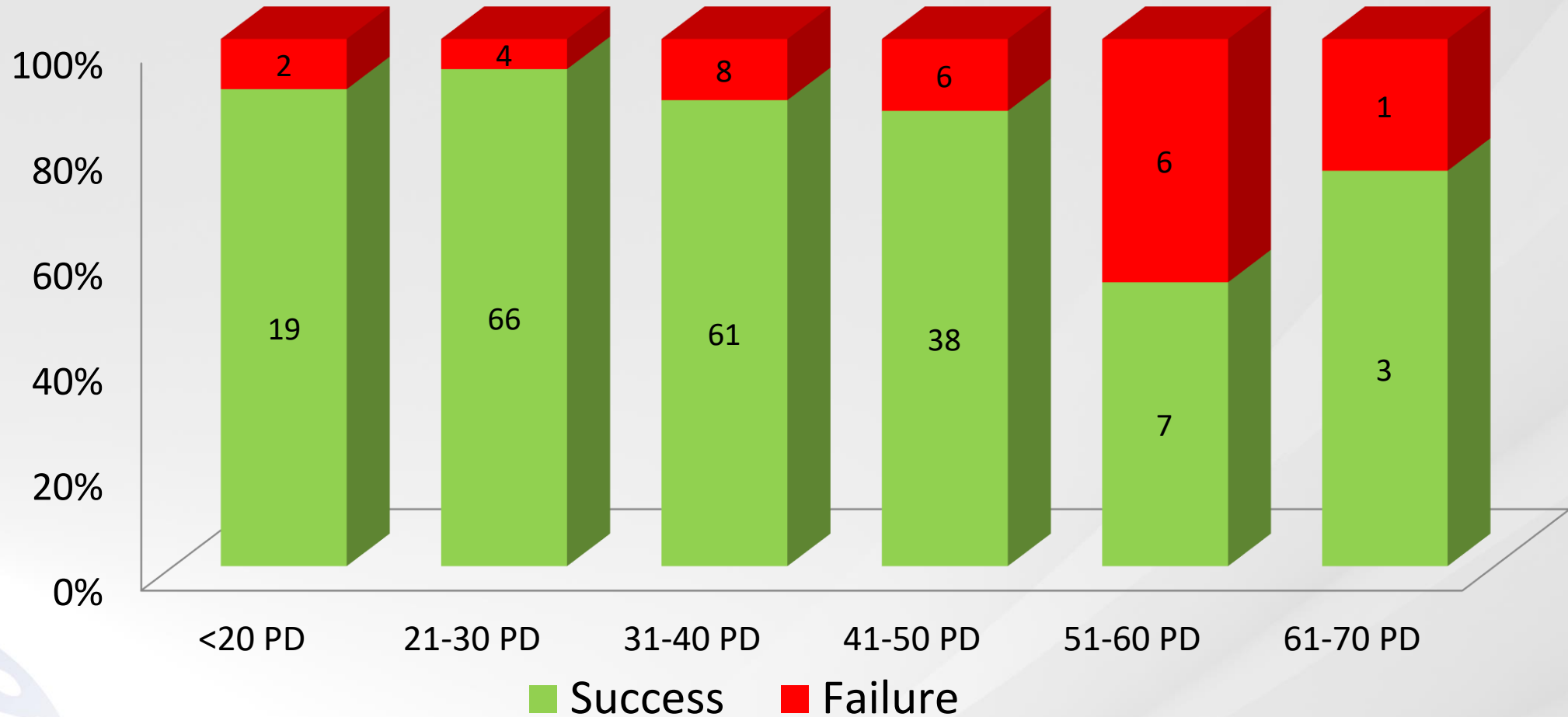
Age and gender wise distribution of patients



Preoperative refractive status

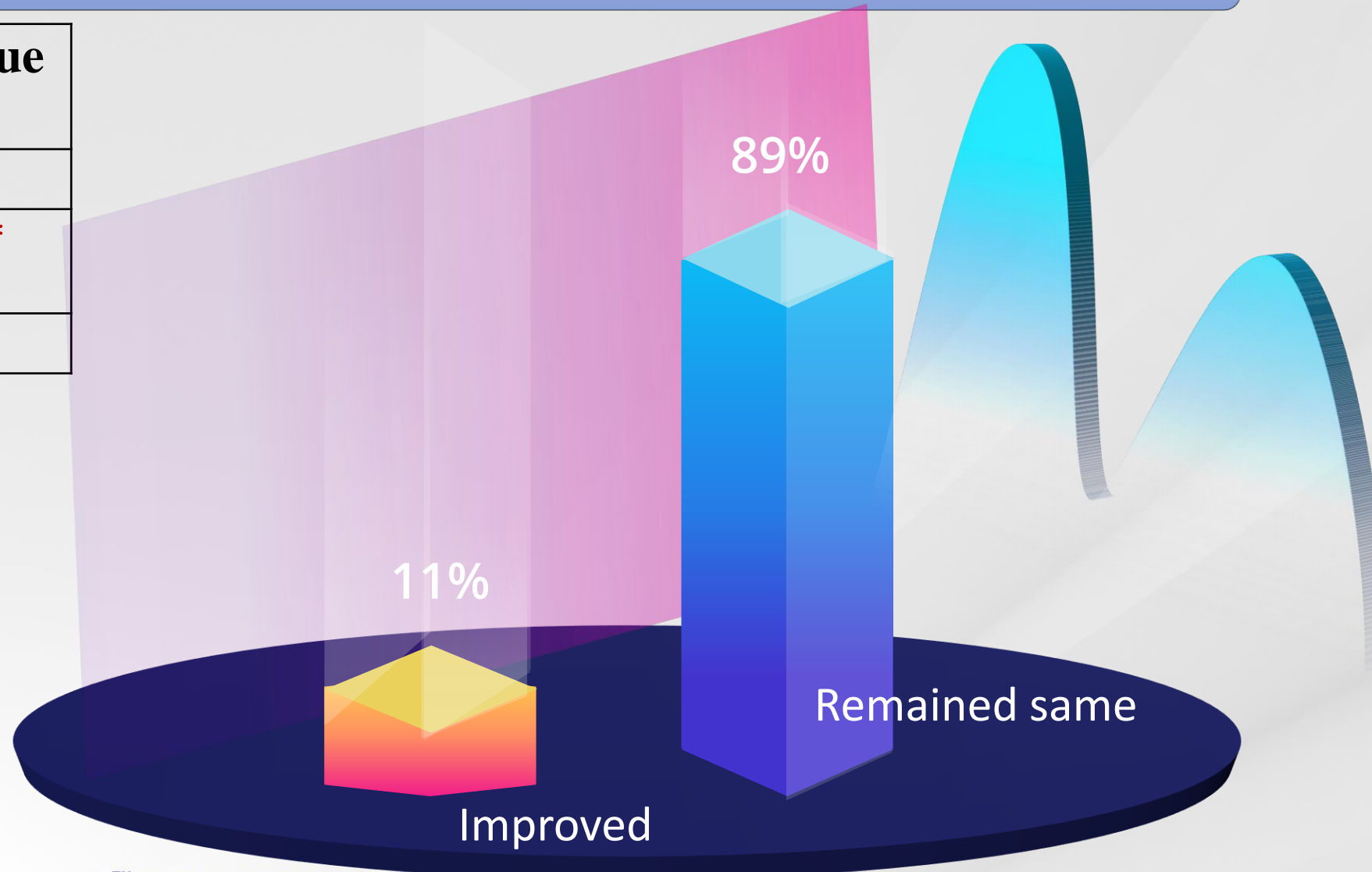


Pre operative angle of deviation & Surgical Outcome



Postoperative visual outcome

Outcome	No. of eyes	P value
Improved	53 (11%)	0.013
Remained same	421 (89%)	0.008*
Deteriorated	0	



Mean spherical equivalent

Mean spherical equivalent	Preoperative	Postoperative	P value
Right Eye	-0.46±0.97	-0.48±1.06	0.00368*
Left Eye	-0.45±1.03	-0.50±1.06	0.00122*

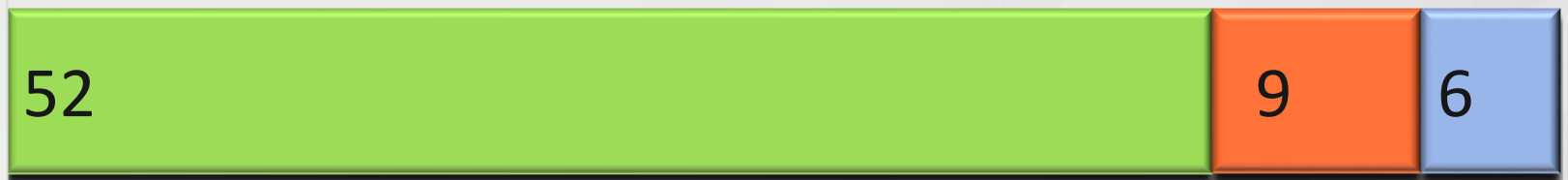
* There was a **slight myopic shift** postoperatively

Laterality of surgical procedure

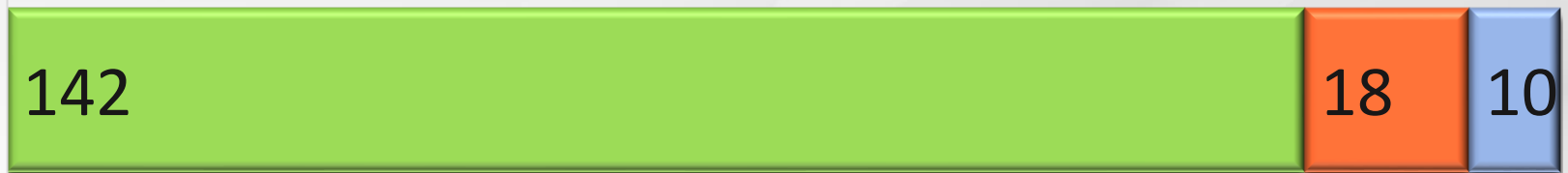
- Bilateral surgery had better surgical outcomes as compared to unilateral surgery (p=0.006)

■ success ■ failure ■ repeat surgery

UNILATERAL SURGERY



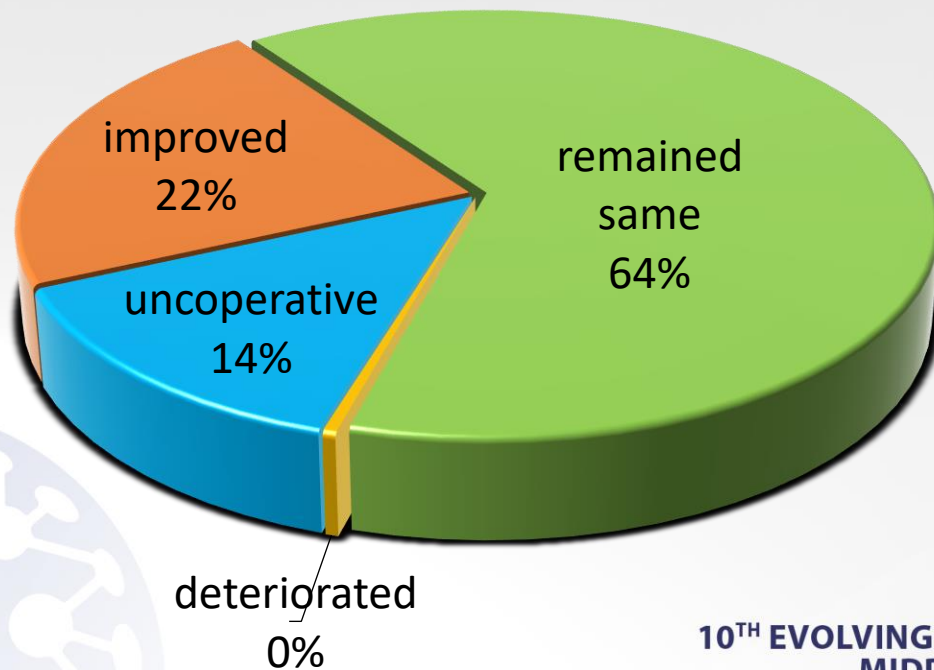
BILATERAL SURGERY



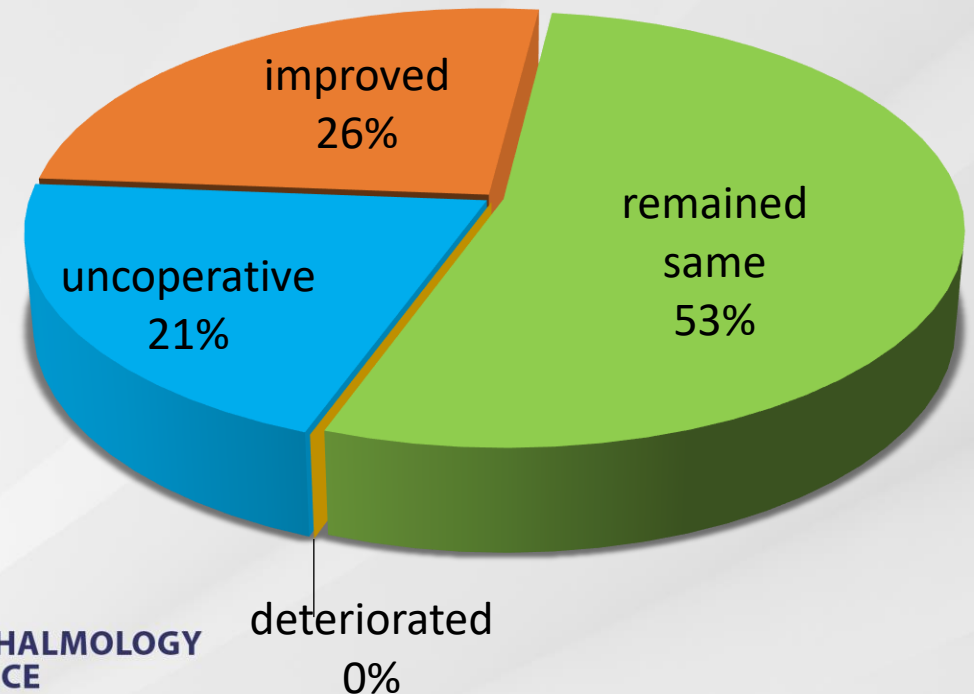
Binocularity and near stereoacuity(NSA)

- Binocularity ($p= 0.022$)and NSA ($p= 0.000$) either improved or remained the same in most of the cases.

Binocularity

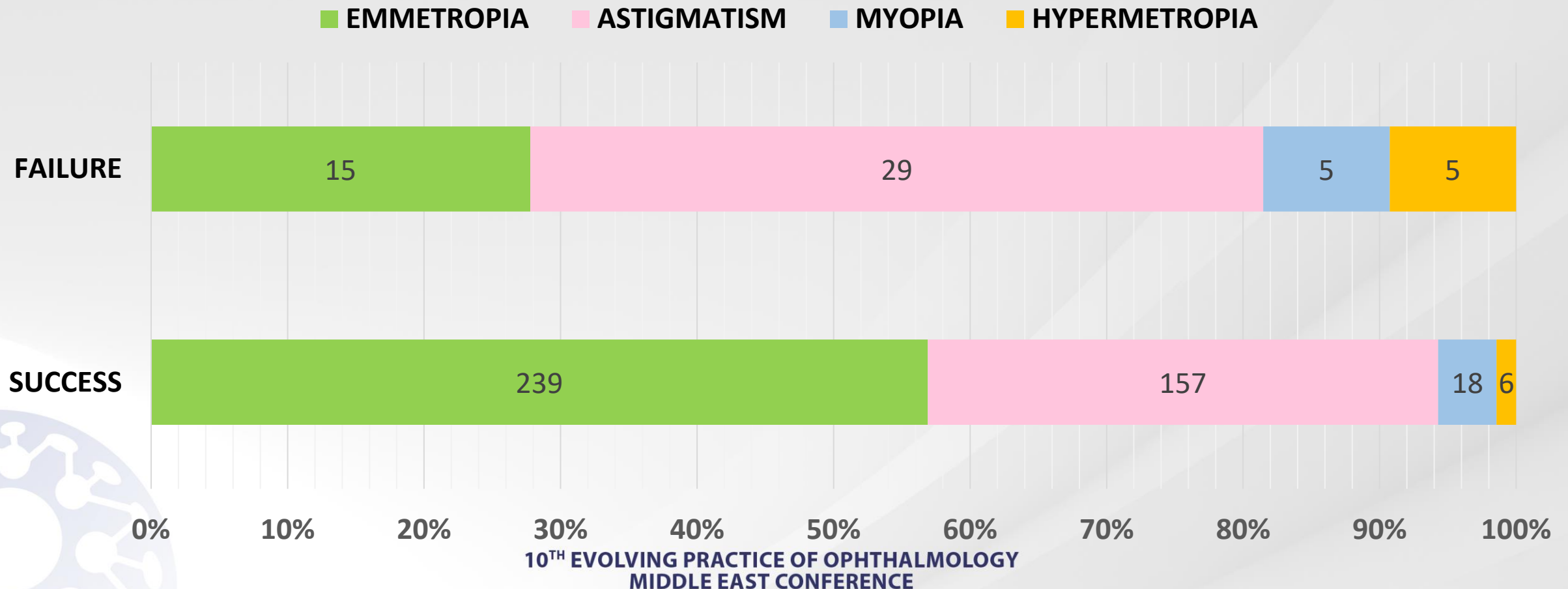


Stereopsis



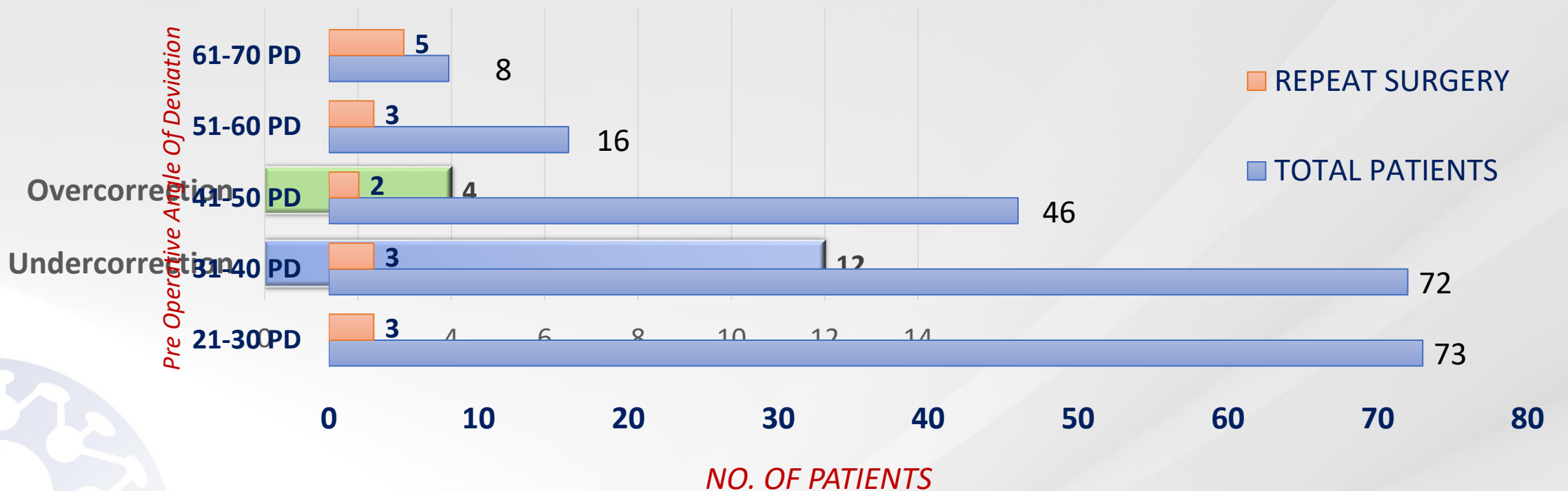
Surgical outcome in terms of refractive status

- Our **success rate was 89%** (420 eyes) and **failure rate was 11%** (54 eyes)



Repeat surgery

- ❖ Total 16 patients (6.75%)
- ❖ All had successful outcome following surgery.
- ❖ A **larger preoperative angle of deviation** often required a repeat surgery



CONCLUSION

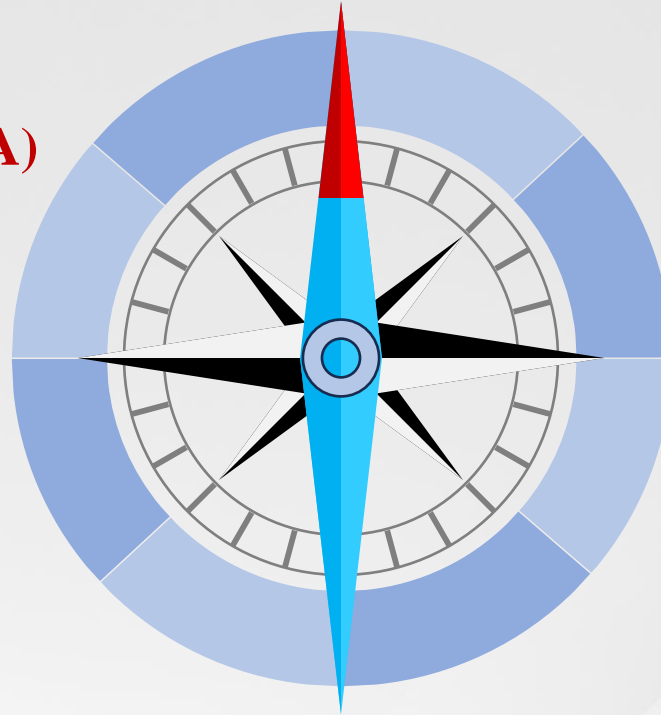
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Conclusion

Gender, Age at the time of surgery, pre-op BCVA were **not significant** predictors of surgical outcome

Binocularity and near stereoacuity (NSA) **remained same** or improved following surgery



Emmetropia and myopic astigmatism was **more prevalent** in IXT & had **better surgical outcome**

Bilateral LR recession instead of unilateral R-R surgery has a **good surgical outcome.**

There was a **slight myopic shift** post surgery.

Larger preoperative deviation has poor outcome & mostly required a **repeat surgery**

CONS

- Retrospective nature
- Selection bias



PROS

- Long term study
- Large sample size
- Very few studies have been reported so far that exclusively studies impact of refractive status in surgical outcome of IXT.



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