

# A Cohort of High Hypermetropes with Esotropia How well do they do?

Lionel Kowal  
Jo-Anne Pon  
Chris Chen

Royal Victorian Eye and Ear Hospital

Squint Club Meeting April 2008

# Method

- 86 consecutive cases from private practice of strabismologist
- Retrospective audit
- High hypermetropia  $\geq 6\text{DS}$
- With esotropia
- Progressive hypermetropia (change in refraction  $\geq 1.5\text{DS}$ )

# Data

- Age of presentation
- Follow-up
- Visual acuities
- Best Stereopsis
- Refractive error (cycloplegic)
- Ocular deviation – esotropia & cyclovertical
- Surgery and response

# Data

- N=86
- Follow-up  
Mean 20.2 months (0-216)

# High Hypermetropia in Literature

- Parks 1958
  - $143/897 = 16\%$  ( $>5.25D$  & ET)
- Abrahamsson 1992 ( $>5D$  & strabismus)
  - $2/49 = 4\%$
  - Progressive Hypermetropia
    - $5/41$  ( $\Delta$  by 2-3D),  $3/41$  ( $\Delta$  by 1- $<2D$ )
    - 41 with ET

1. Abnormal Accommodative Convergence in Squint, Parks, Archives in Ophthalmology, 1958;59 March

2. Refraction changes in childhood developing convergent or divergent strabismus, Abrahamsson, BJO 1992;76:723-727

# Progressive Hypermetropia in Literature

- Abrahamsson 1992
  - Progressive Hypermetropia
    - 5/41 ( $\Delta$  by 2-3D), 3/41 ( $\Delta$  by 1-<2D)
    - 41 with ET (Range of Refractive Error?)
- Progressive hypermetropia in this study
  - 25/70 (36%)

# Average Age of Presentation

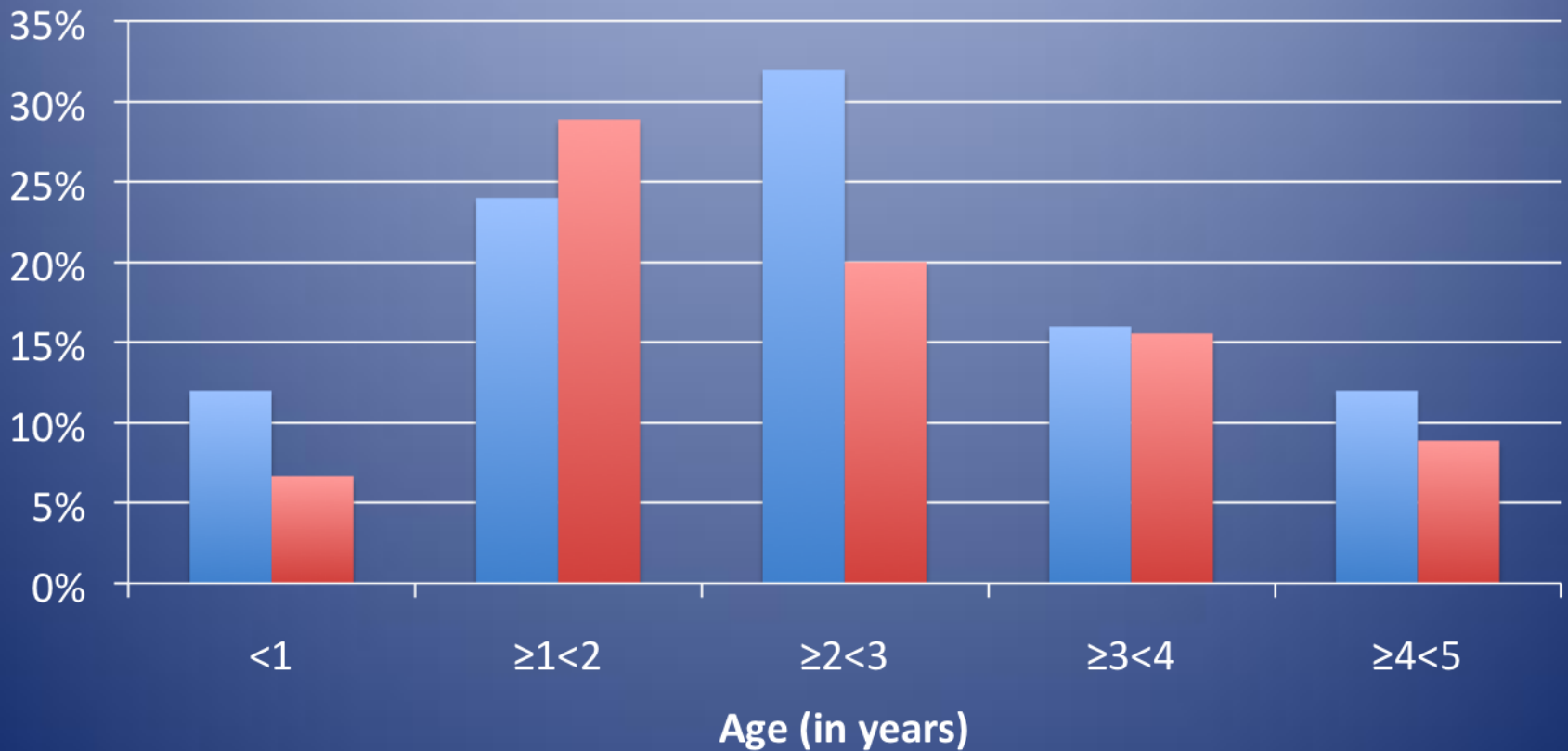
- 2.6yrs – this study
- Parks 1958 2.5yrs
- Abrahamsson 1992 2-3yrs

1. Abnormal Accommodative Convergence in Squint, Parks, Archives in Ophthalmology, 1958;59 March

2. Refraction changes in childhood developing convergent or divergent strabismus, Abrahamsson, BJO 1992;76:723-727

# Age of Presentation (%)

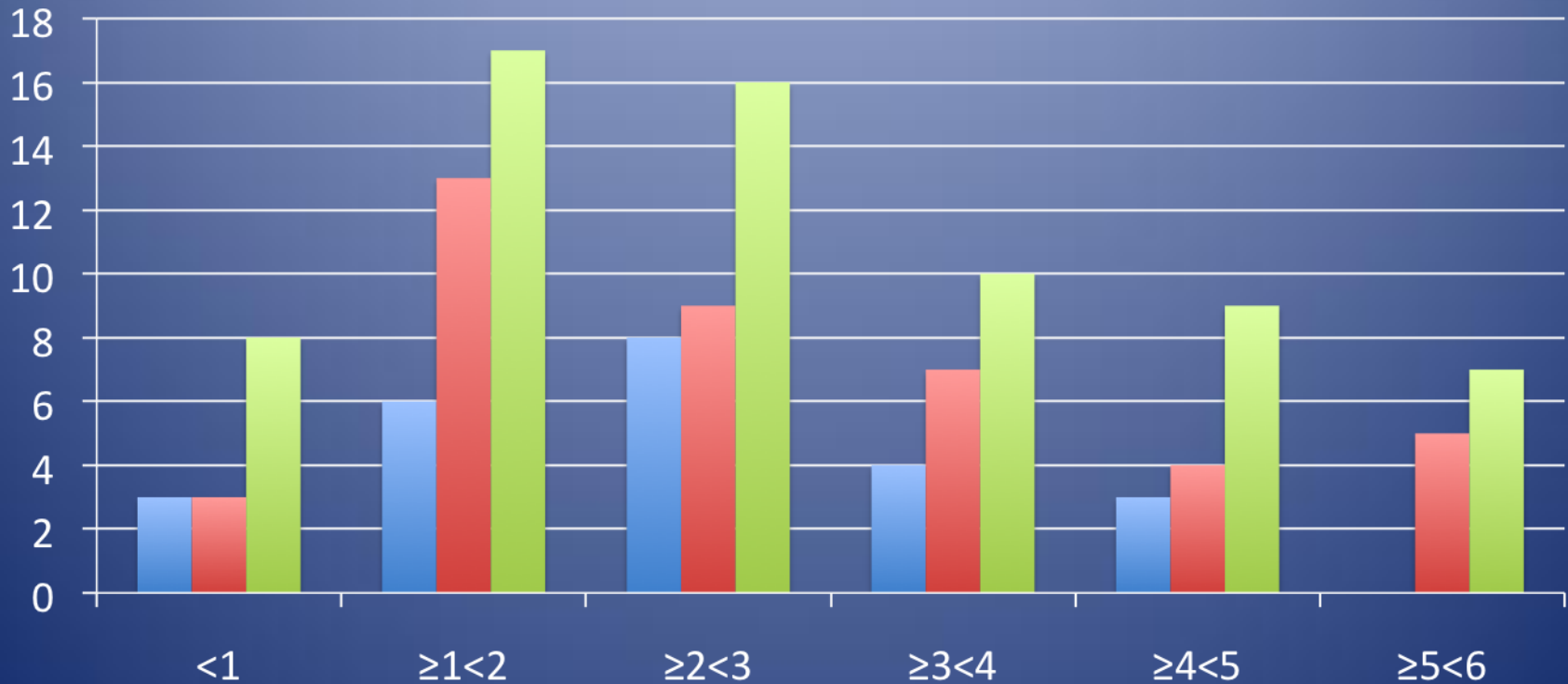
■ Progressive Hyperopia    ■ Non-progressive Hyperopia





# Isoametropic Hyperopes Age of Presentation

Progressive Hyperopia      Non-progressive Hyperopia  
Isoametropic Hyperopes



# Isoametropic Hyperopes

## Age of Presentation

- Isoametropic Hyperopes present later
- Klimek – 5yrs 1mo vs 3yrs 5 mo (all hyperopes)
- Ziylan – 5.5 yrs vs 4.1 yrs (all hyperopes)
- Not in this study
  - Majority before age 3

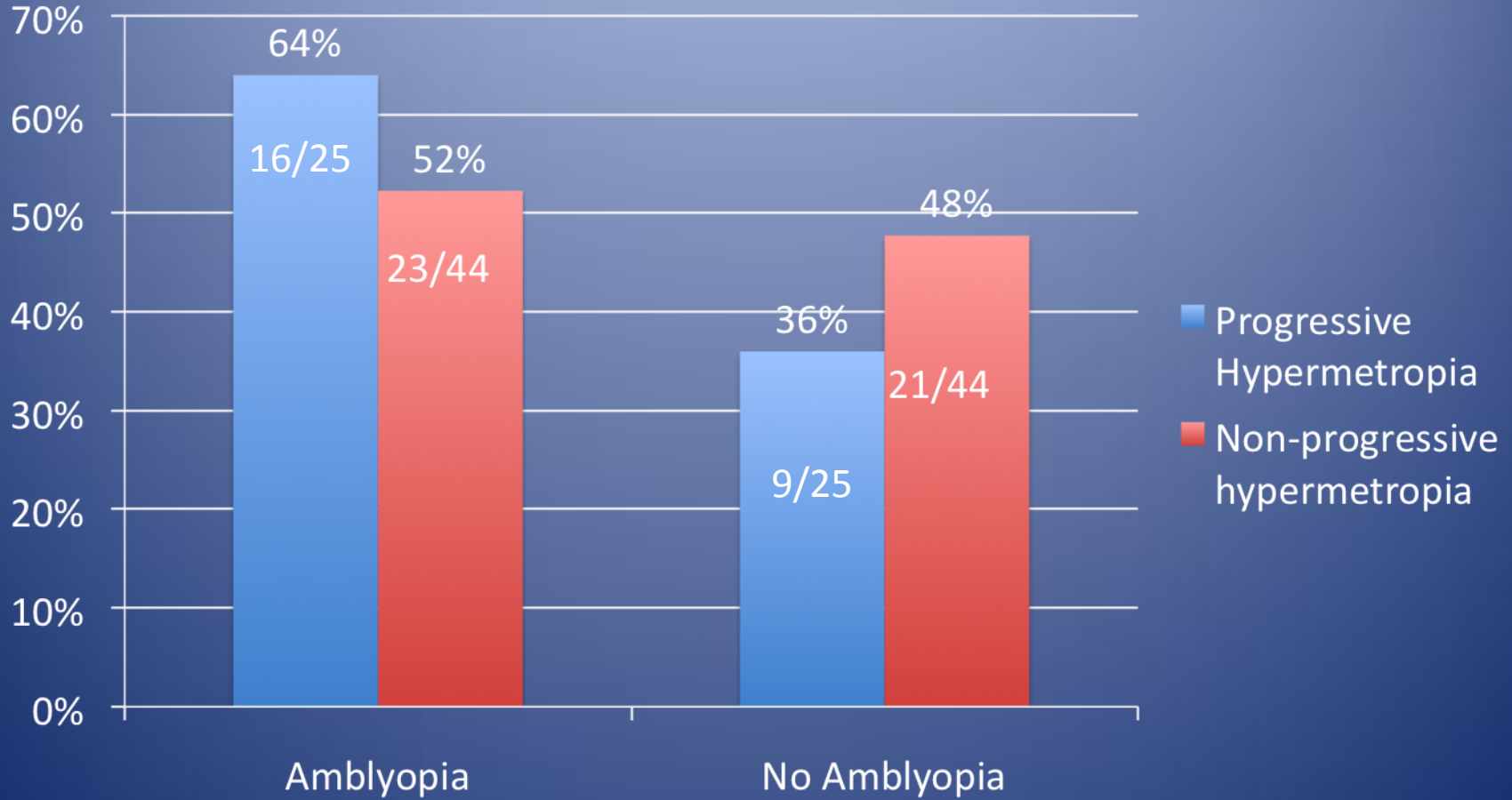
# High Hyperopes & Amblyopia

- Bilateral amblyopia ( $\leq 6/12$ )
  - 18% this study
  - 9% - Klimek ( $\geq 4.5D$ , no anisometropia  $\geq 1.5D$ )
- Responded well to Rx – glasses & patching
- After Amblyopia Rx – achieved  $> 6/12$ 
  - 86% - Klimek ( $\geq 6/12$ )
  - 83.9% - Ziylan
  - 83% - this study

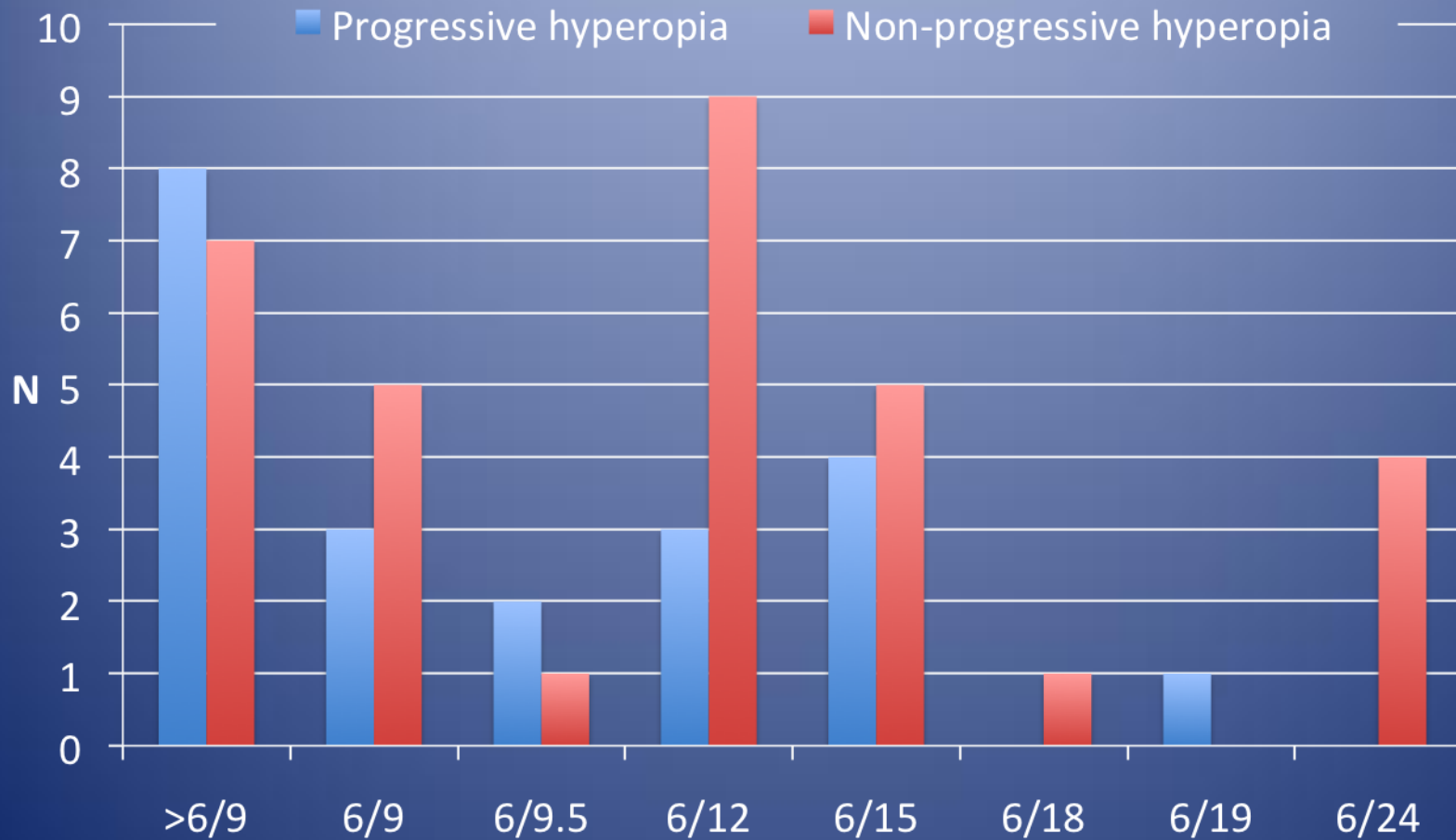
# BCVA in better eye

- $VA \geq 6/7.5$ 
  - 23/60 (38%) – this study (higher hypermetropia,  $\leq 1.5D$  anisometropia)
  - 58% Klimek ( $\geq 5D$ ,  $\leq 1.5D$  anisometropia)
- Overall do high hypermetropes do worse?

# Progressive Hypermetropes & Amblyopia

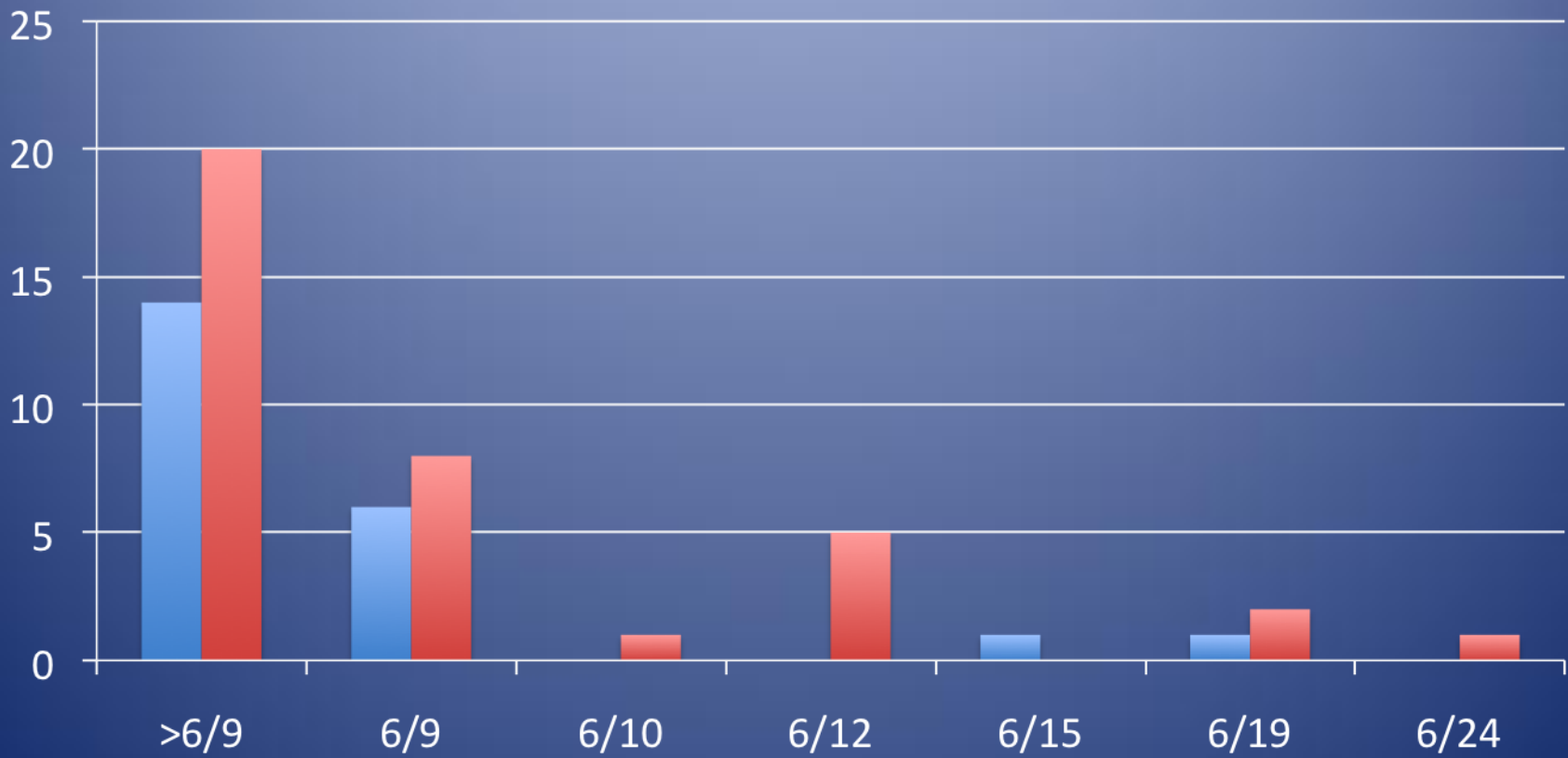


# Progressive Hypermetropia & BCVA in worse eye



# BCVA better eye

■ Progressive hyperopia    ■ Non-progressive hyperopia



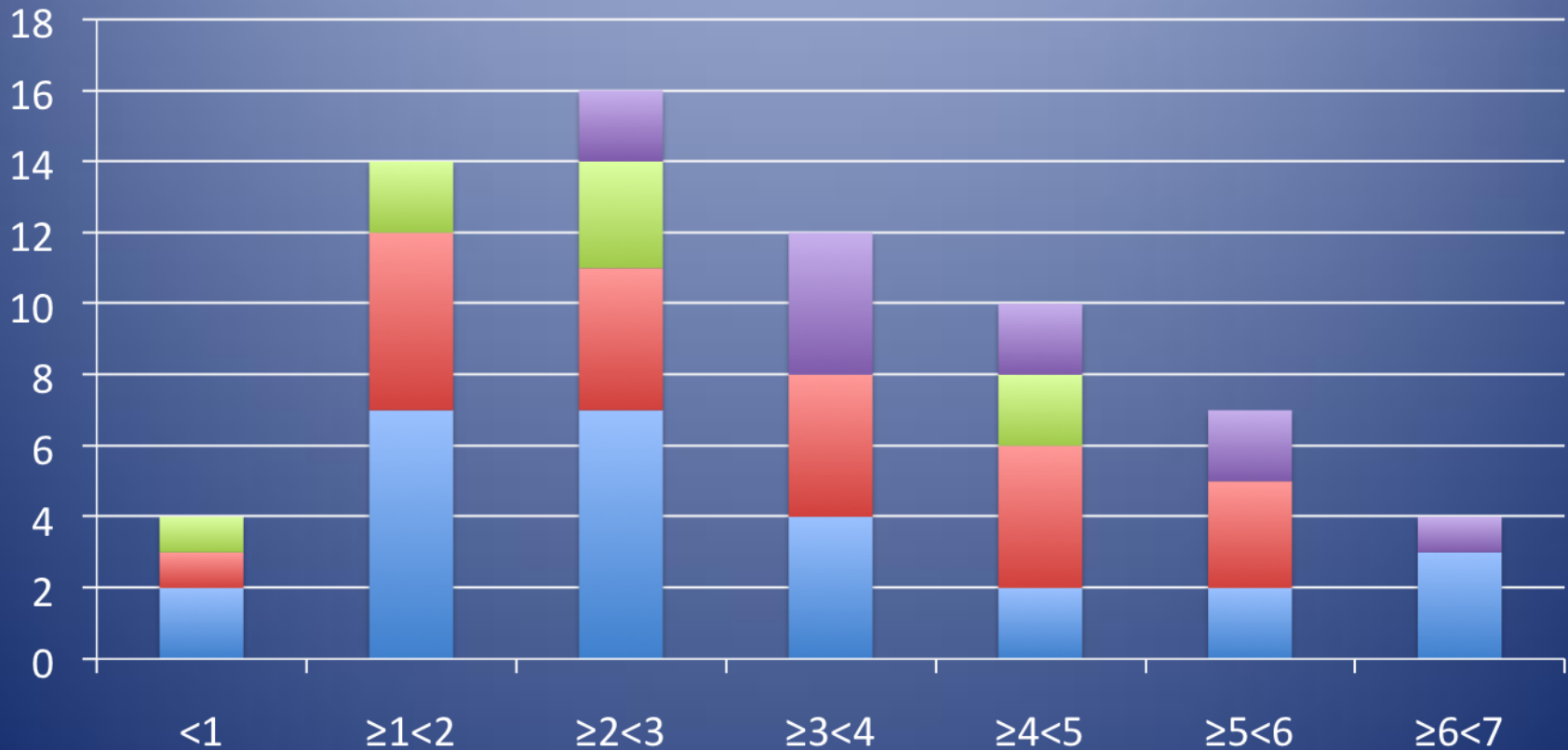
# Stereopsis

- No difference between progressive hyperopes and non-progressive hyperopes



# Age of Presentation & Best Sensory Fusion

■ No Stereopsis ■ 4dot ■ FLY ■ 200"-25"



# Stereopsis

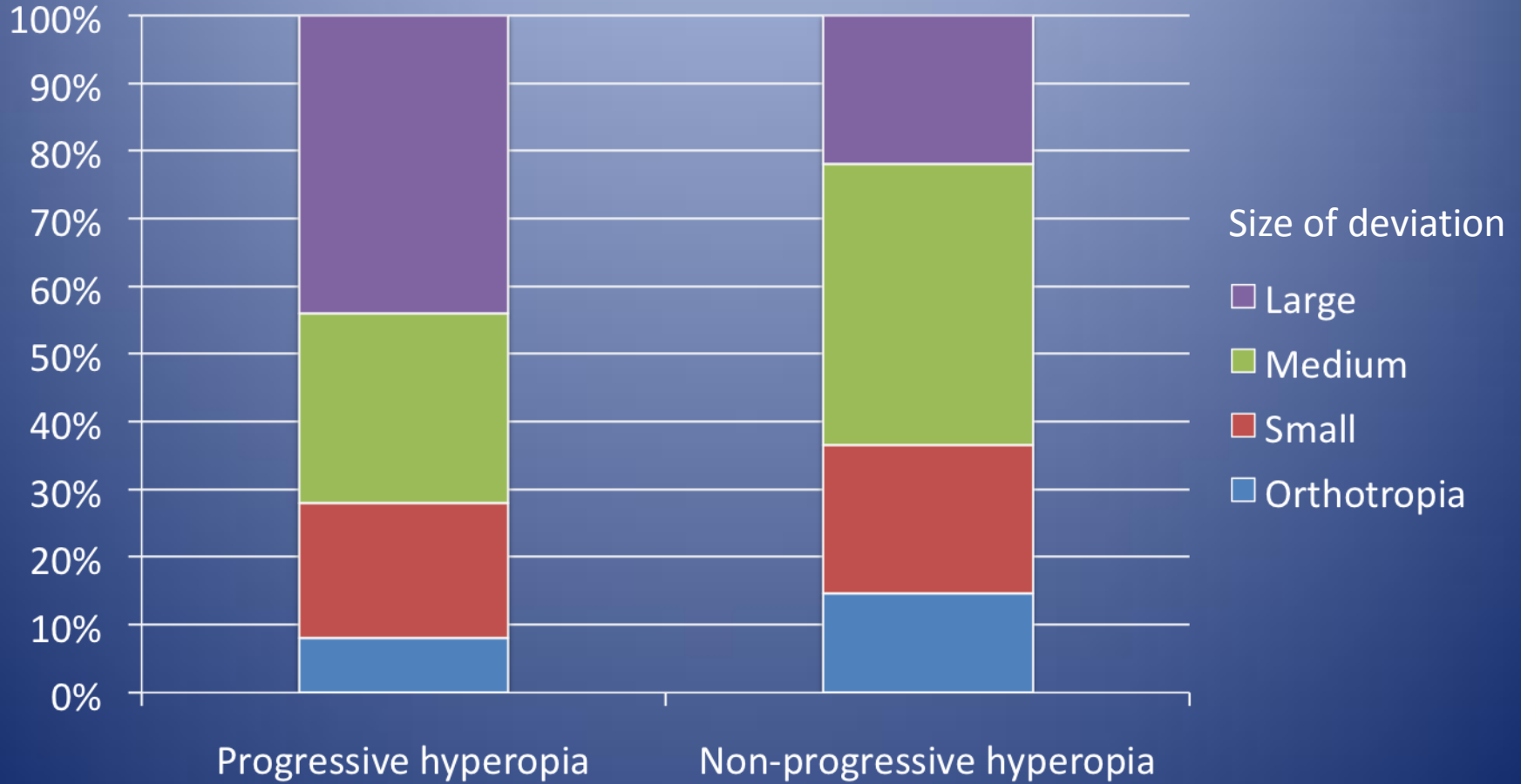
- Higher levels of stereopsis found in those who presented later
- (rather than early detection and Rx)

## % with stereopsis

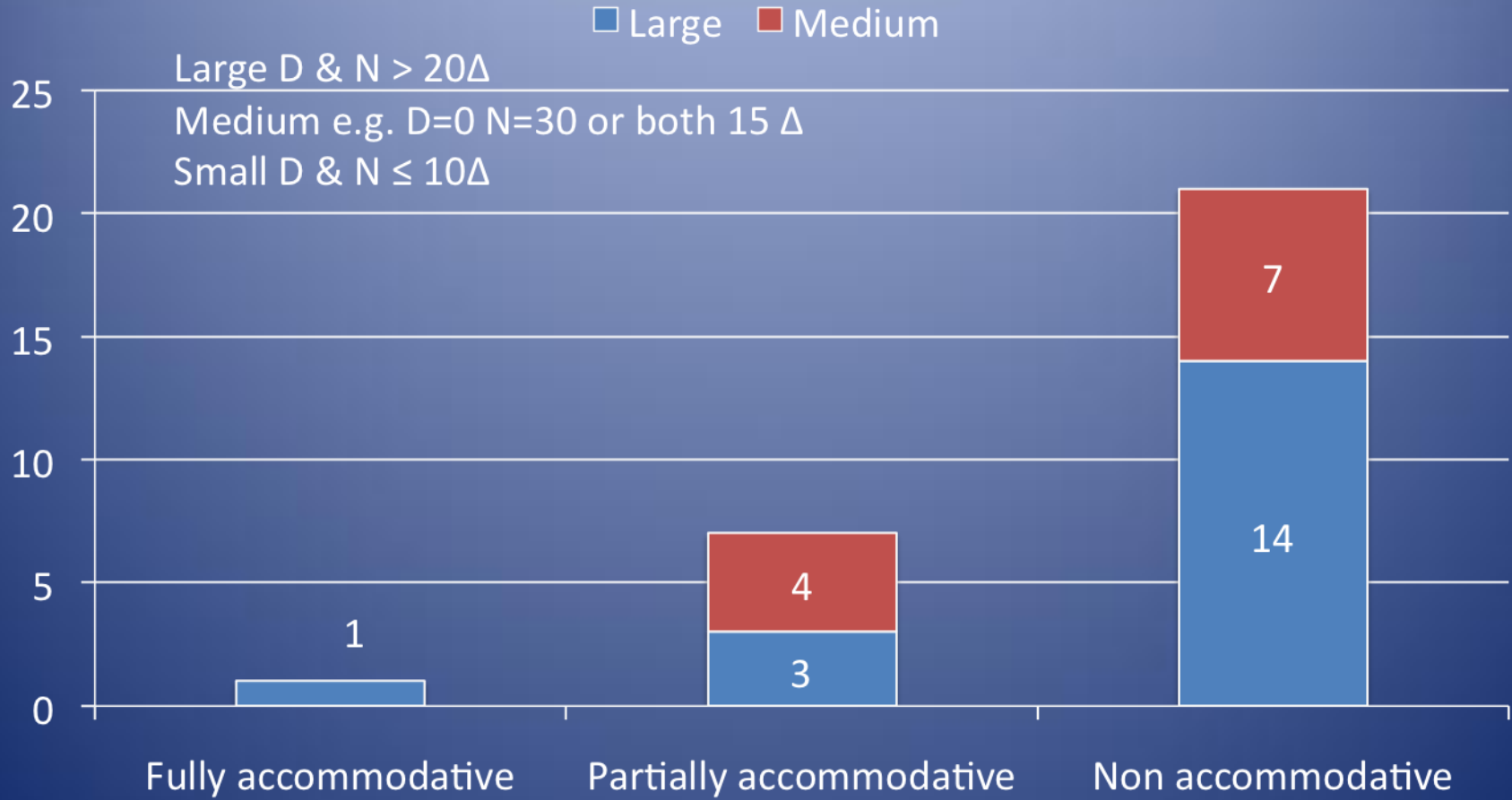
- 89.3% - Mulvihill (range of hyperopia uncertain)
- 33% - this study

Outcome in refractive accommodative esotropia, Mulvihill et al, BJO 2000; 84:746-749

# Progressive Hyperopes & Esotropia



# Surgery & Size of Deviation

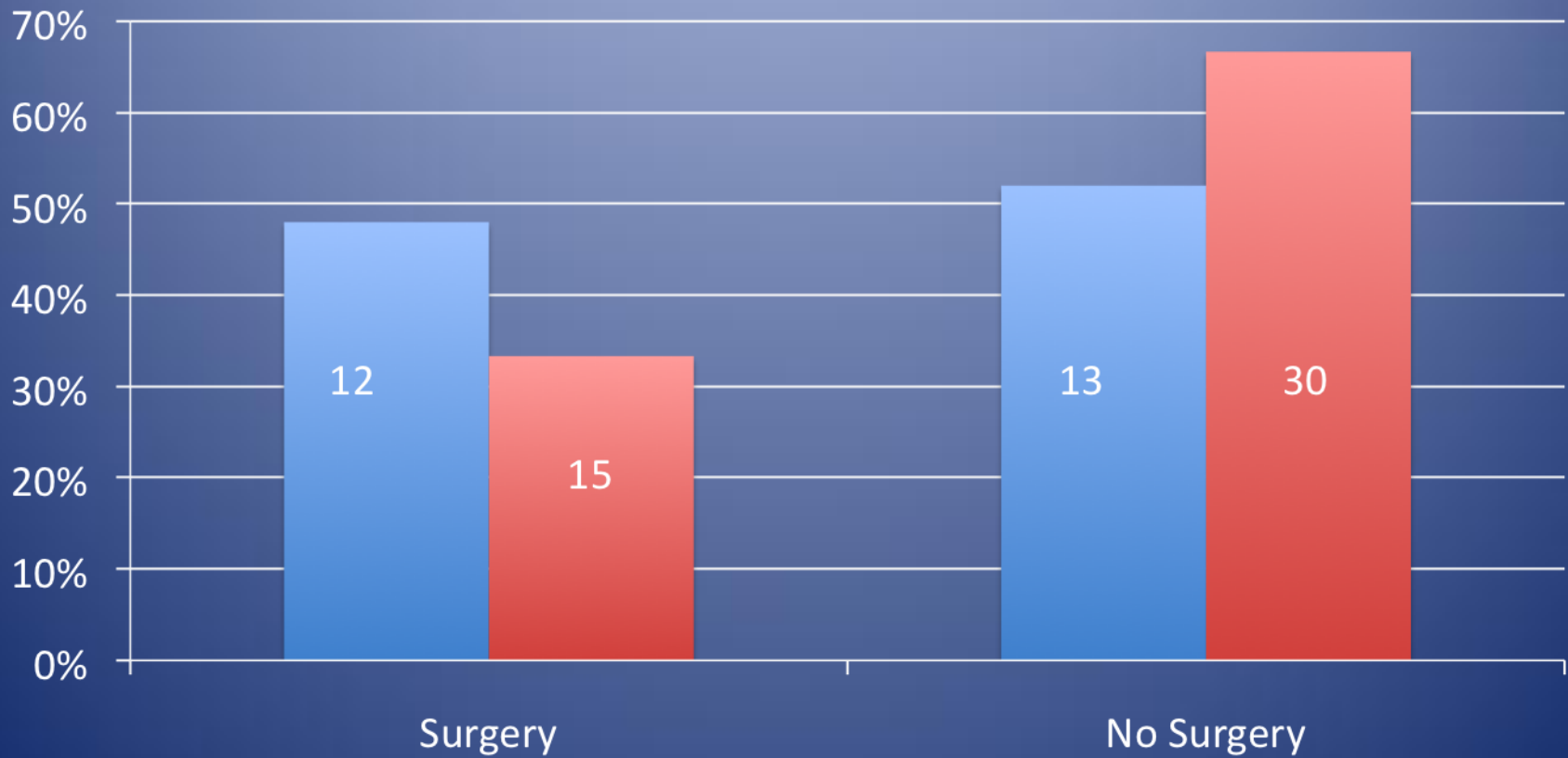


# Surgery in fully accommodative ET

- Decompensation of fully accommodative ET
  - 2.4% requires surgery (Mulvihill)
  - $1/40 = 2.5\%$  (this study)

# Progressive Hyperopes & Surgery

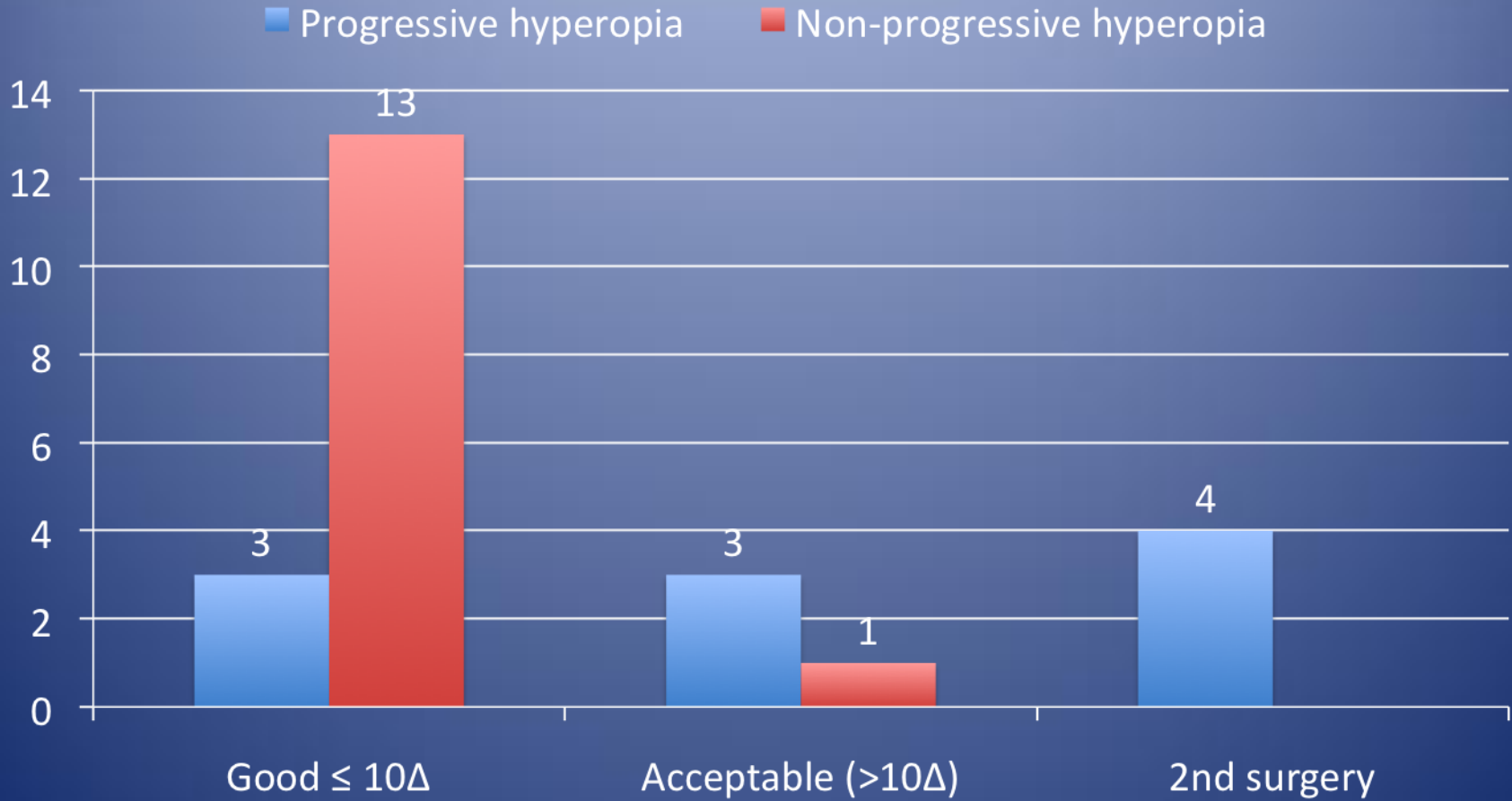
■ Progressive hyperopia    ■ Non-progressive hyperopia



# Surgery

- Rate 30/85 (35%)
  - 1 Operation: 24
  - 2 Operations: 5
  - 3 Operations: 1
  - Reoperation rate 6/24 (25%)
- Reoperation rate of surgeon
  - BMR 10%
  - <2yrs old 15%,
  - Difficult group (consecutive XT) 16%

# Surgery results



Results for 6 patients unknown

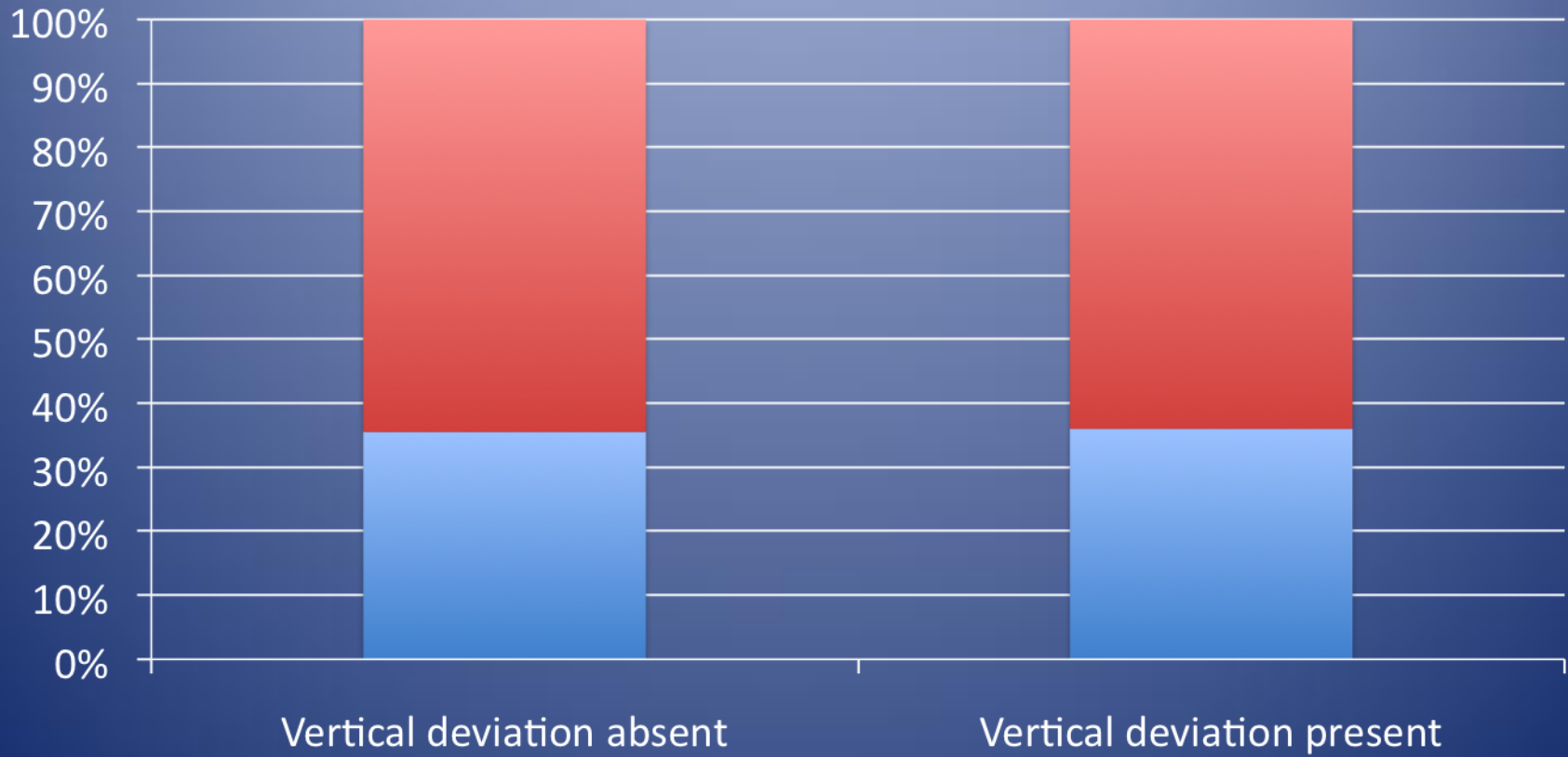


# Cyclovertical Anomaly

- N=86
- Present 32 (37%)
- None 54 (63%)

# Cyclovertical anomaly

■ Progressive hyperopia    ■ Non-progressive hyperopia



# Differences between $\geq 6\text{DS}$ & ET vs $< 6\text{DS} \pm \text{ET}$

- 36% Progressive hypermetropia
  - More common with high plus
- Bilateral amblyopia – higher risk
- Sensory fusion seen if presenting age  $\geq 2\text{yrs}$
- Reoperation rate 25%

# Progressive vs Non-progressive hypermetropia

## **Progressive hypermetropes more likely to**

- Have amblyopia - But responds well to Rx
- More likely to have larger angle ET
- More likely to require surgery
- Less likely to have good results
  - Progressive hyperopes – not well reported in literature