

Introduction

- Amblyopia is a developmental disorder with a binocular consequence; it has a prevalence of 2-5%¹
- Patching is not very effective and is usually left with residual amblyopia in older children and adults.²
- Deficits in Binocularity (fusion and stereopsis), hand eye coordination saccades and pursuits³⁻⁴
- Dichoptic Treatments – Principles: A (contrast adjusted) stimulus is presented exclusively to each eye & the brain is forced to integrate the images into a single perception.⁵(Figure 1)

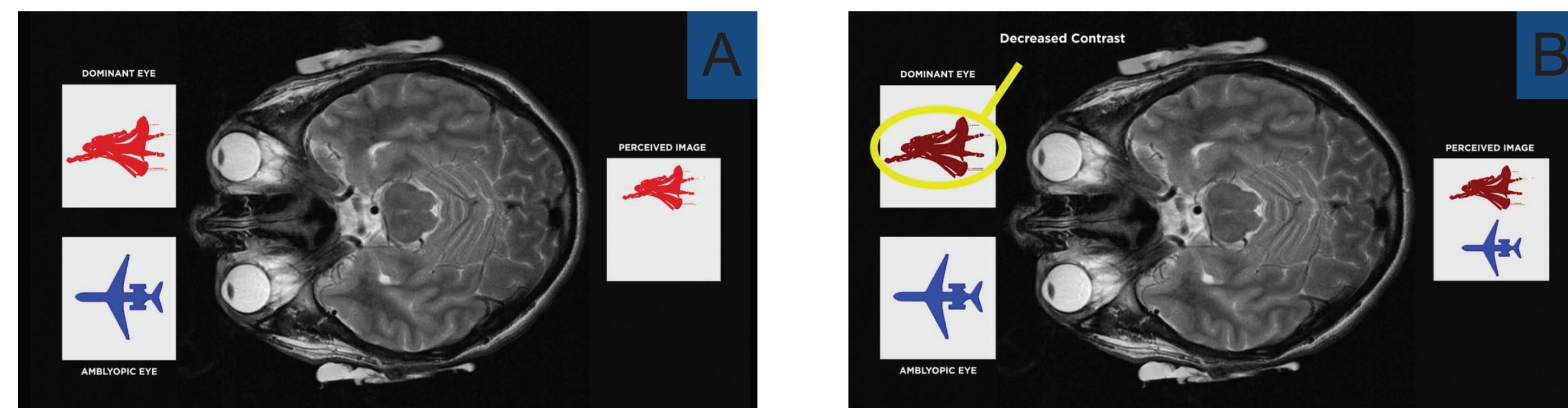


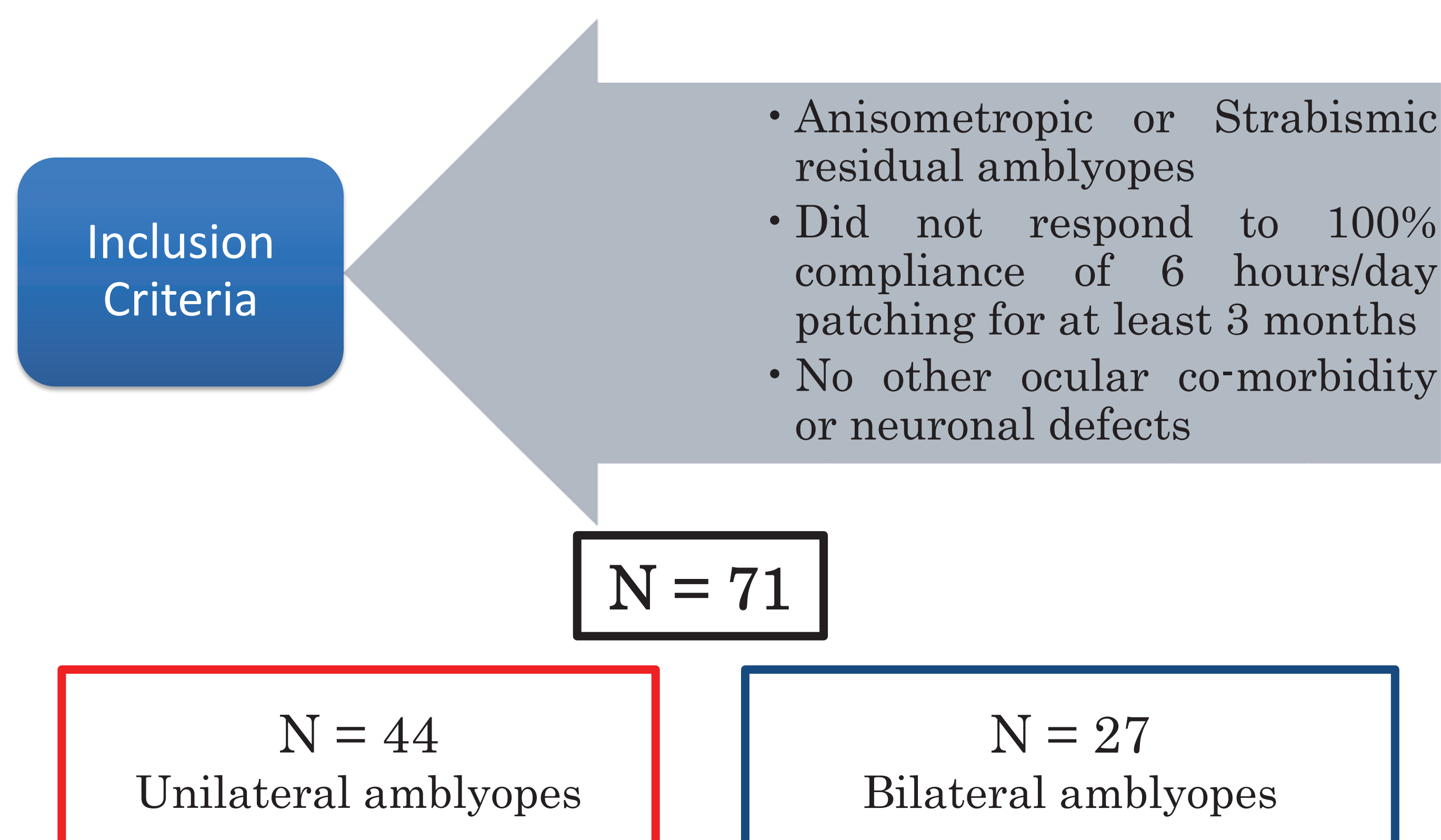
Figure 1: Image perceived in suppression (A), Image perceived after contrast reduction (B)

Aim

- To assess the improvement in visual acuity with dichoptic therapy in residual amblyopia.

Methods

- Prospective cohort data were analyzed



Treatment Protocol

- 20 sessions of office based Bynocs™ Dichoptic Amblyopia (DAT) Therapy, 1 hr / day (Figure 2)
- 30minutes of anti suppression using dichoptic therapy with Bynocs™
- 30minutes fusional exercise with Bynocs™

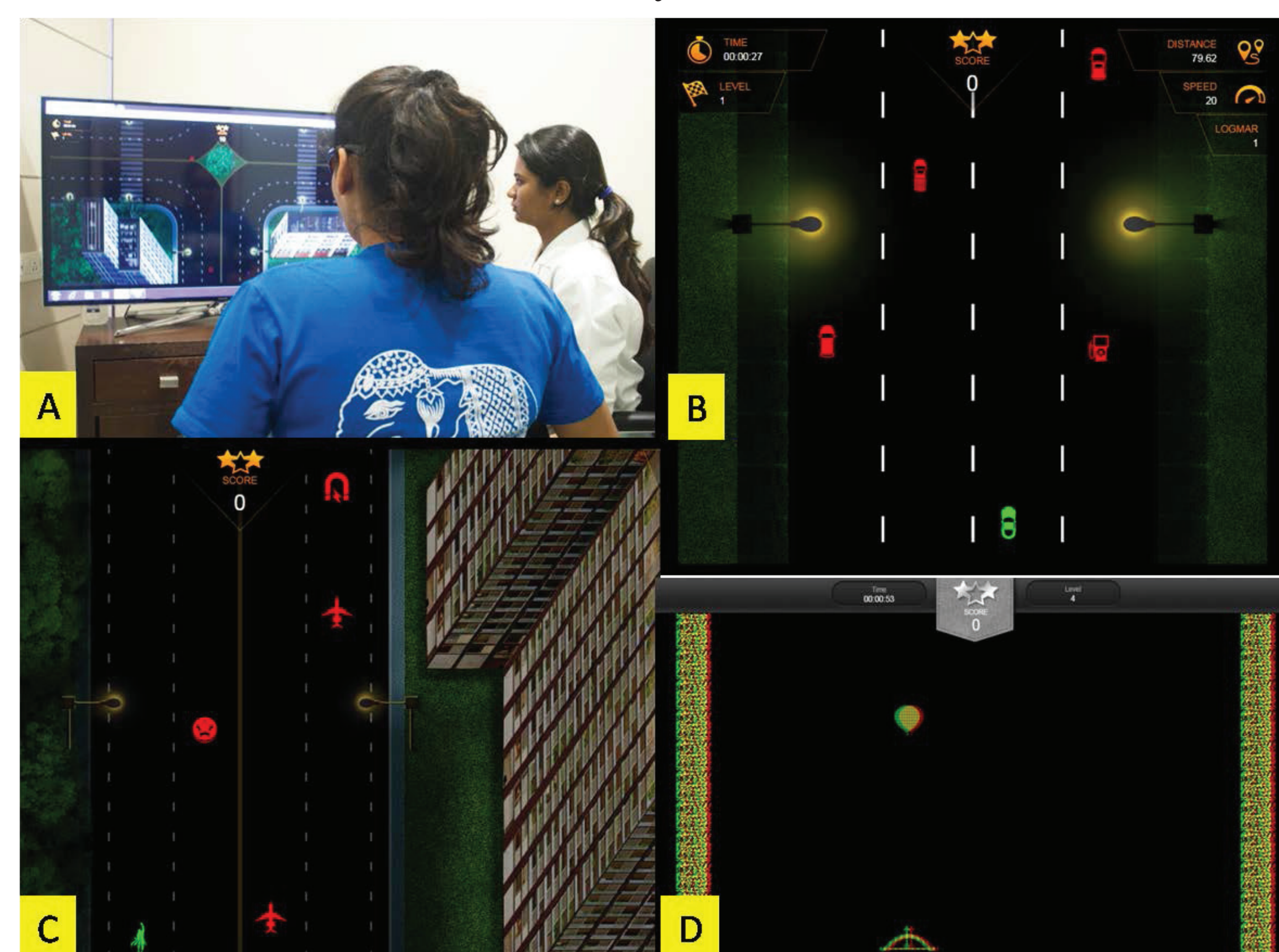


Figure 2: Image showing patient undergoing Bynocs™ DAT training (A), screenshots of Bynocs™ showing anti-suppression activity targets (B and C) and fusion development activity (D).

Results

- Overall**
 - Mean Age 16.29 ± 11.55 years
 - 37 males (52%) and 34 females (48%)
- Group 1: Unilateral amblyopes**
 - Mean age 18.64 ± 12.59 years
 - Mean improvement of 0.24 ± 0.19 logMAR visual acuity (Figure 3), p < 0.0001 (Paired- t test)
- Group 2: Bilateral amblyopes**
 - Mean age 12.48 ± 8.56 years
 - Right Eye: Mean improvement of 0.22 ± 0.08 logMAR visual acuity (Figure 4)
 - Left Eye: Mean improvement of 0.22 ± 0.01 logMAR visual acuity (Figure 4)

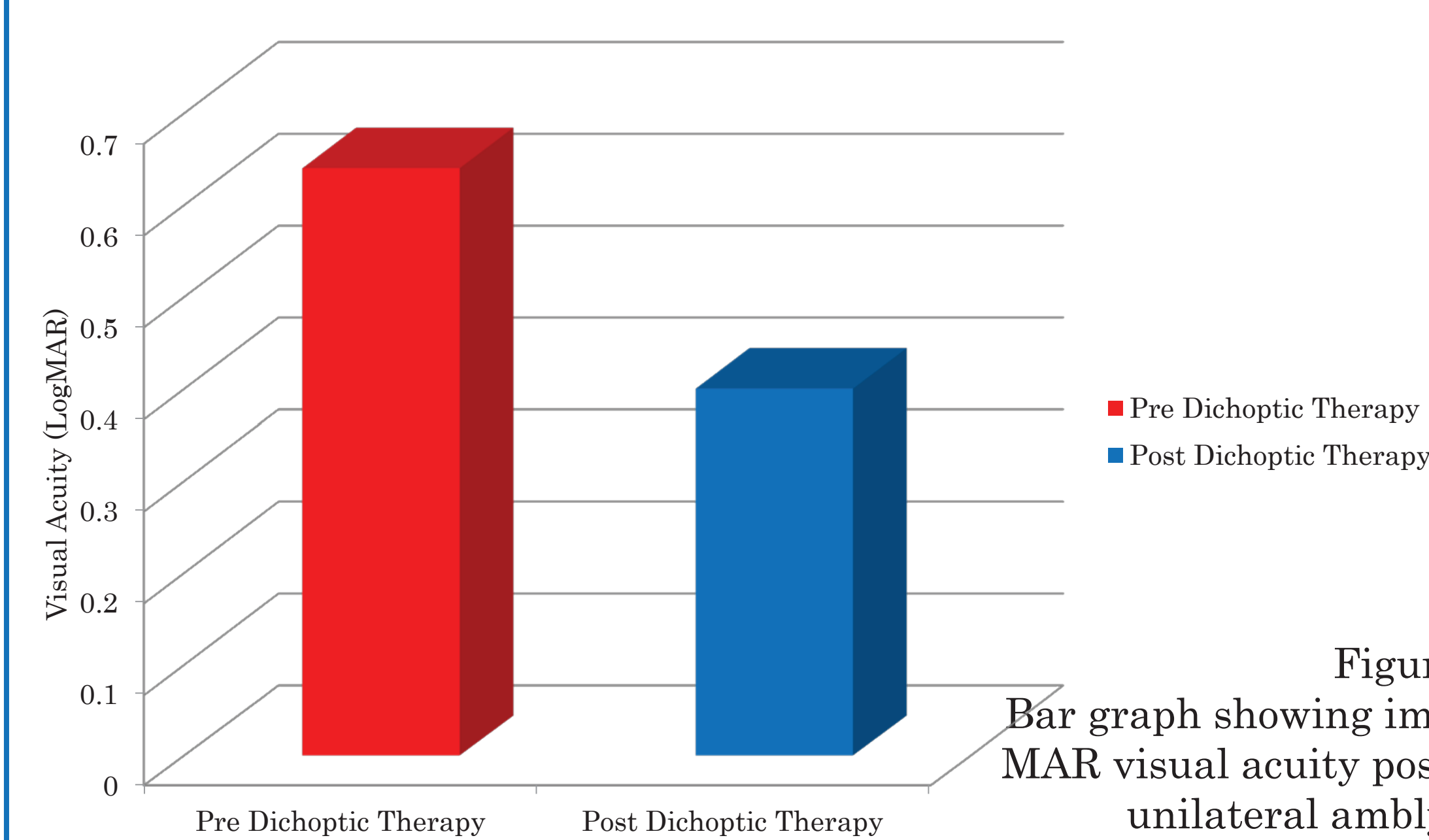


Figure 3: Bar graph showing improvement of 0.24 logMAR visual acuity post dichoptic therapy in unilateral amblyopia (Group 1)

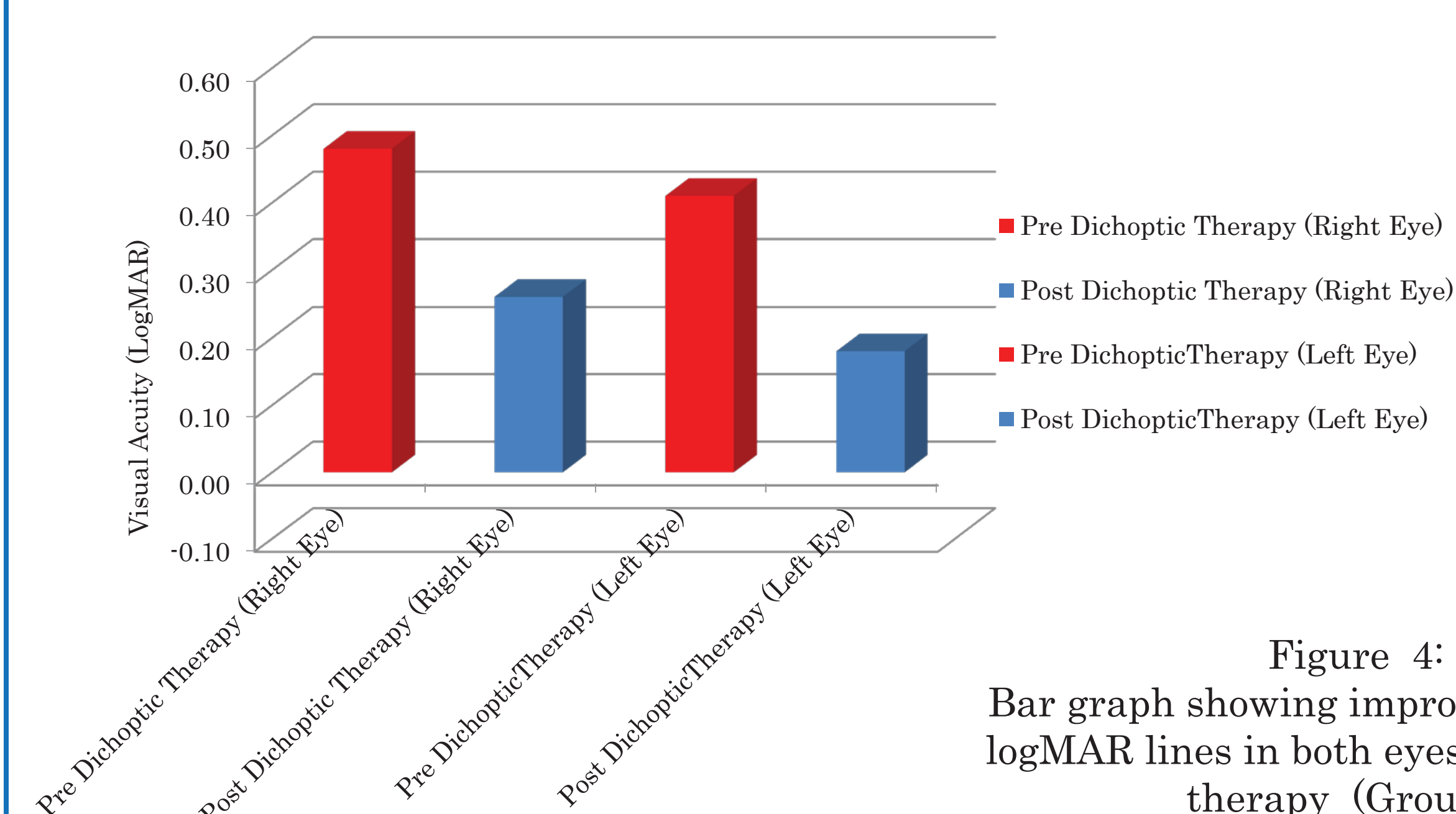


Figure 4: Bar graph showing improvement of 0.22 logMAR lines in both eyes post dichoptic therapy (Group 2)

Conclusion

- Significant improvement in visual acuity post dichoptic therapy
- Both unilateral and bilateral amblyopes showed improvement of visual acuity by at least 0.22 LogMAR
- Most of the subjects improved their fusion and stereopsis post dichoptic therapy

Limitation

- Average duration of pre dichoptic therapy patching was not known
- Quantification of stereopsis was not done before and after dichoptic therapy for all subjects

References

1. Attebo K, Mitchell P, Cumming R, Smith W, Jolly N, Sparkes R. Prevalence and causes of amblyopia in an adult population. *Ophthalmology*. 1998;105(1):154-9.
2. Holmes JM, Lazar EL, Melia BM, Astle WF, Dagi LR, Donahue SP, et al. Effect of age on response to amblyopia treatment in children. *Archives of ophthalmology*. 2011;129(11):1451-7.
3. McKee SP, Levi DM, Movshon JA. The pattern of visual deficits in amblyopia. *Journal of vision*. 2003;3(5):380-405.
4. Levi DM, Klein SA. Vernier acuity, crowding and amblyopia. *Vision research*. 1985;25(7):979-91.
5. Hess RF, Thompson B, Baker DH. Binocular vision in amblyopia: structure, suppression and plasticity. *Ophthalmic & physiological optics: the journal of the British College of Ophthalmic Opticians (Optometrists)*. 2014;34(2):146-62.