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INTRODUCTION

Use of multifocal-like soft contact lenses have shown promise in slowing myopia¹⁻⁵ with some studies indicating that compliance to lens wear influences the myopia control efficacy.^{1,2,6} It is of interest to determine if non-compliant wearers are not satisfied with any particular aspect of lens wear as this may help design strategies to improve compliance and therefore myopia control.

PURPOSE

To determine if subjective responses to lens wear differed between compliant and non compliant users and if these were different between wearing either single vision (SVCL) or novel myopia control CL (MCL).

METHODS

- Prospective, randomised, clinical trial conducted at Brien Holden Vision Institute research center, Zhongshan Ophthalmic Center, Guangzhou, China from Feb 2014 to Jan 2017 (ChiCTR-TRC-14004227).
- 523 Chinese children (8 to 13 years) with myopia, sphere: -0.75D to -3.50D, Cyl ≤ -0.75D, anisometropia ≤ 0.75D and normal ocular findings were randomised to one of 5 groups.
 - Control group assigned to wear SVCL (Control Lens; Somofilcon A).
 - Two test groups wearing MCL designed to reduce on and off axis hyperopic defocus (Test Lens I or II; Somofilcon A).
 - Two test groups wearing extended depth of focus MCL (Test Lens III and IV; Etafilcon A).
 - CL wear was on a daily wear, daily disposable basis.
- A questionnaire was administered at 1 month, 3 months and 3 monthly intervals thereafter for 2 years and gathered subjective responses related to ocular comfort, vision at various distances, ghosting, night haloes and vision stability. Children completed the questionnaire on an electronic tablet without any intervention from examiners, staff or carers (Picture 1). Queries were designed using an analog scale of 1 to 10 (1 = poor and 10 = excellent) and had anchoring emoticon symbols/associated visual images corresponding to specific points on the numerical scale to aid the children with the interpretation of the scale (Table 1).



Picture 1: Children completing self-administered questionnaire used in this study

- Lens wear categorised as “Compliant” when CL wear was reported as ≥ 6 days/week or “Non-compliant” when lens wear ≤ 5 days/week. Compliance to CL wear was collected at each visit based on Px recall on the number of days of CL worn/ week.
- Categorised compliance data was summarized as a % across visits for each CL type.

METHODS (Continued)

- Differences between the Compliant and Non-compliant groups were analysed for effect of lens types and visits and its association with subjective ratings using linear mixed models.

QUESTION	Visual Image
1. When looking into the distance (for example, reading from the board in the classroom), my vision with these lenses is ...	Blurred all the time, Mostly blurry, Blurry at times, Mostly clear, Clear all the time
2. When looking at TV or a computer screen, my vision with these lenses is ...	Blurred all the time, Mostly blurry, Blurry at times, Mostly clear, Clear all the time
3. When reading, my vision with these lenses is ...	Blurred all the time, Mostly blurry, Blurry at times, Mostly clear, Clear all the time
4. When I walk or play sport with these lenses, I feel ...	Unsteady all the time, Unsteady most times, Unsteady at times, Mostly steady, Steady all the time
5. At night, when I look at lights with these lenses, I see ...	Haloed all the time, Mostly haloed, Haloed at times, Mostly normal, Normal all the time
6. When I walk up and down the stairs with these lenses, I feel ...	Unsteady all the time, Unsteady most times, Unsteady at times, Mostly steady, Steady all the time
7. When I wear these lenses, my vision with these lenses is closest to ...	RRRRRRRRRR
8. When I wear these lenses, my eyes feel ...	Uncomfortable all the time, Uncomfortable most times, Uncomfortable at times, Mostly comfortable, Comfortable all the time

Table 1: Anchoring emoticon symbols and associated visual images of the self-administered questionnaire used in this study

RESULTS

- Compliance to CL wear for the 2 year period was 80%, 70%, 75%, 68% and 64% respectively for the SVCL, Test CL III, Test CL IV, Test CL II and Test CL I (p=0.0262; Test CL I < SVCL, p=0.02)(Fig 1). Significant difference existed in the subjective ratings to CL wear between compliant and non-compliant wearers with higher ratings observed with compliant wearers (Figures 2-6). This was true even in those wearing SVCL.
- With compliant wearers, ratings (Figures 7-14)
 - improved from baseline ratings (average of 0.2 grade) and plateaued at subsequent visits.
 - ratings were lower for haloes, near vision clarity and vision stability (walk/sports) for all lens types.
 - differences between test and control groups were observed in vision stability (walk/sports) and vision stability (stairs) ratings (p<0.05; Test Lens I was different to other CL).
- In contrast to compliant wearers, non-compliant wearers were more variable with their subjective rating to CL wear between visits (Figures 2-6).

RESULTS (Continued)

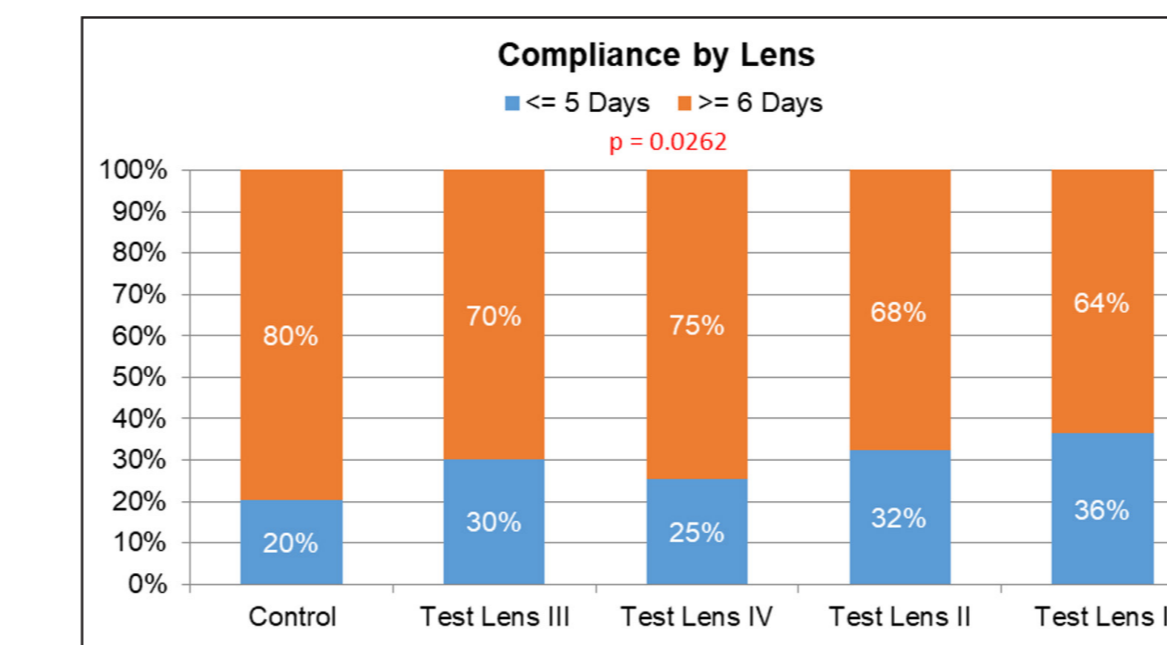


Figure 1: Lens wearing compliance of subject visits among the five groups

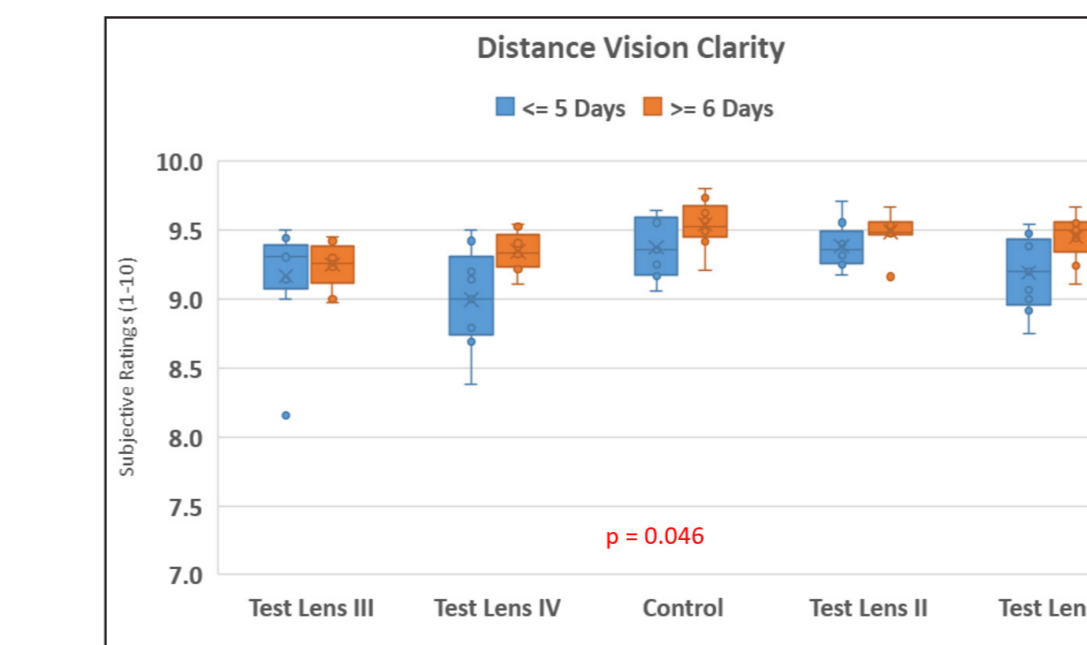


Figure 2: Subjective rating on distance vision clarity between compliant and non-compliant groups

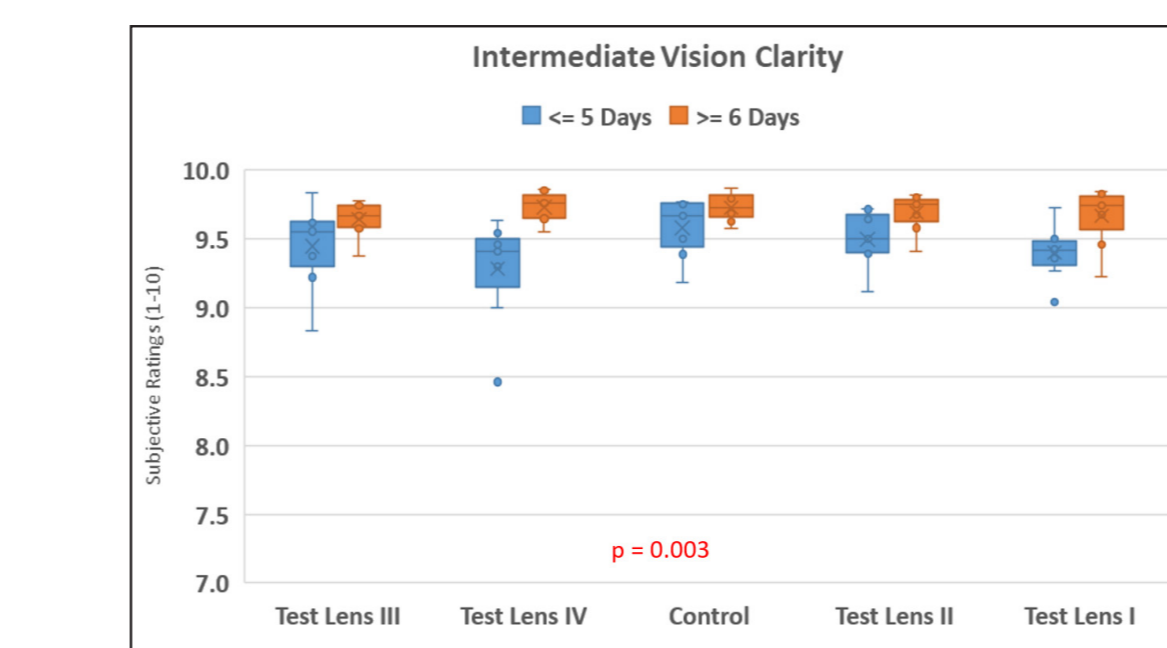


Figure 3: Subjective rating on intermediate vision clarity between compliant and non-compliant groups

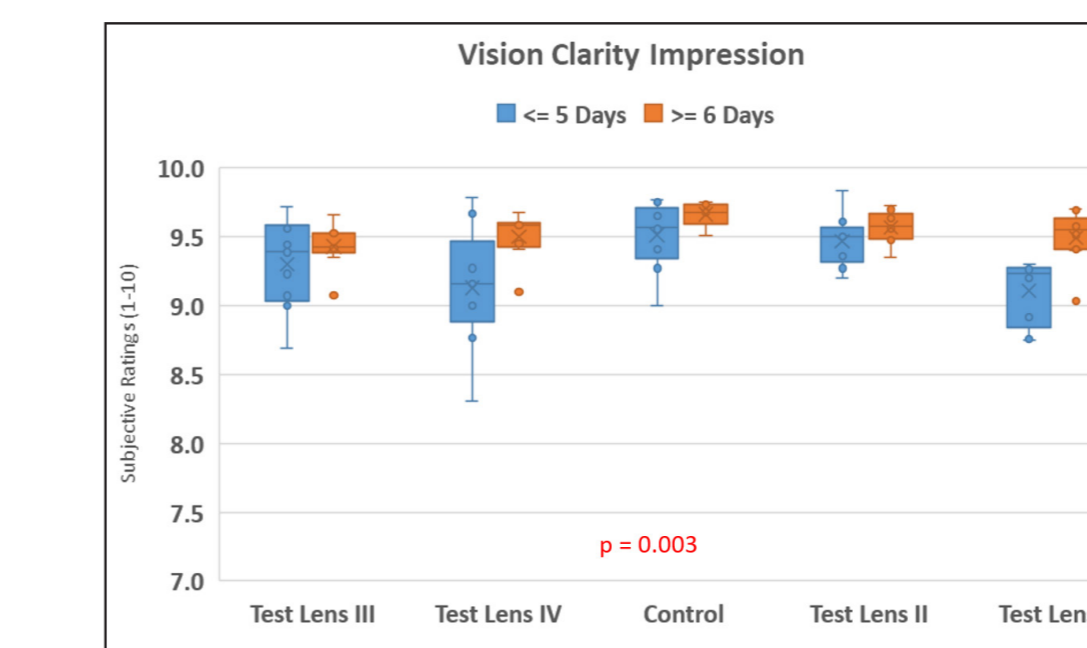


Figure 4: Subjective rating on vision clarity impression between compliant and non-compliant groups

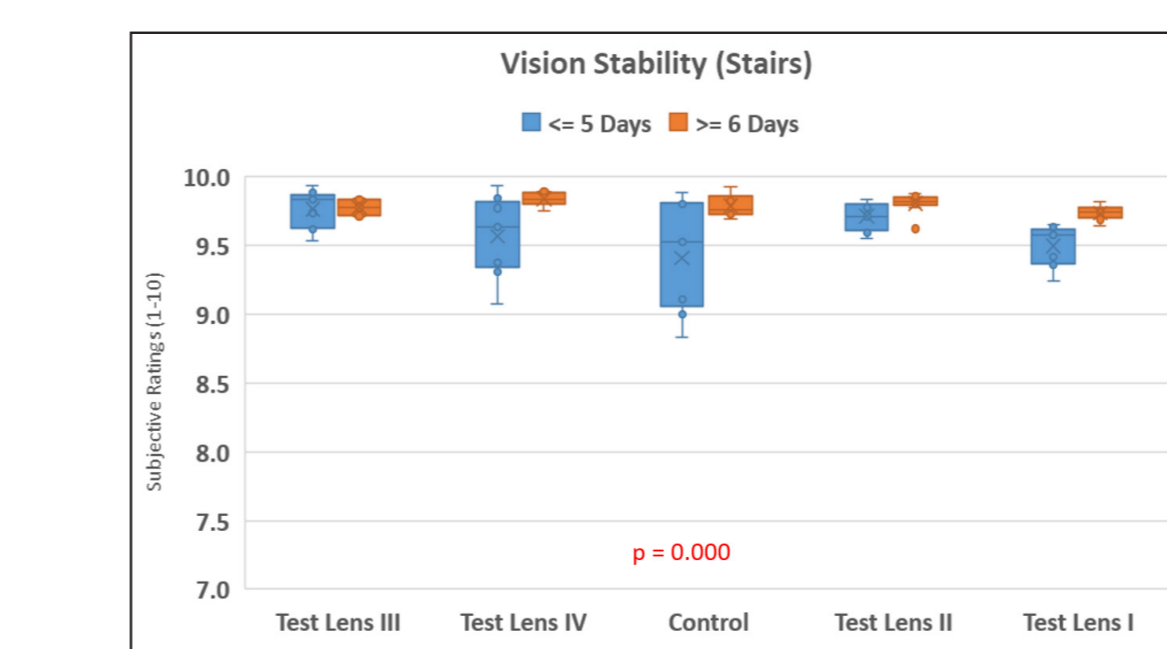


Figure 5: Subjective rating on vision stability (stairs) between compliant and non-compliant groups

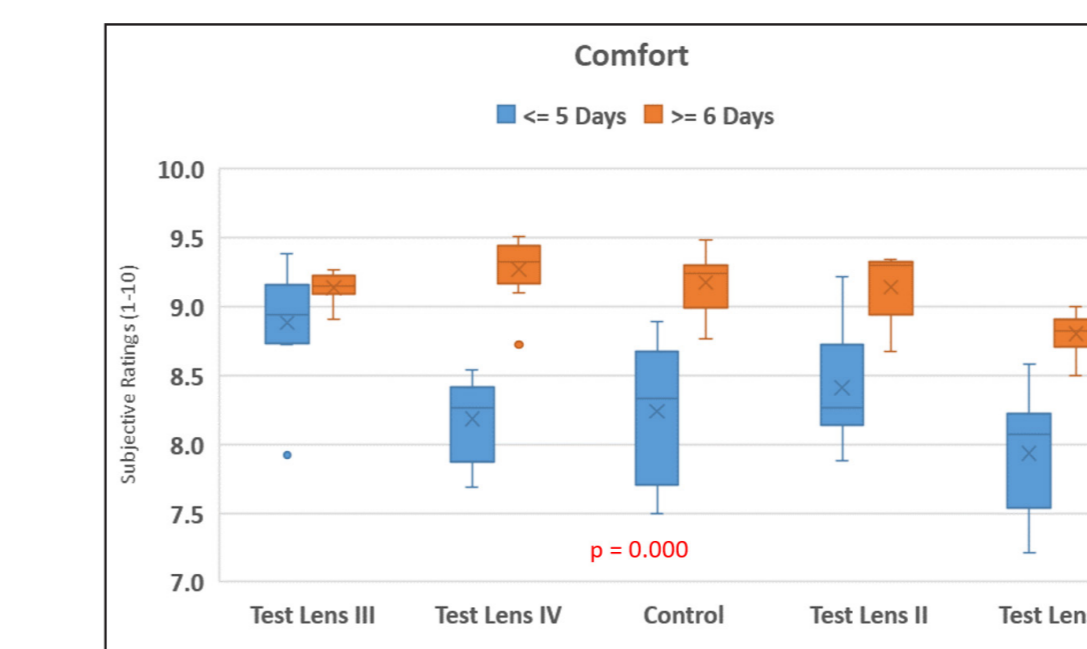


Figure 6: Subjective rating on overall comfort between compliant and non-compliant groups

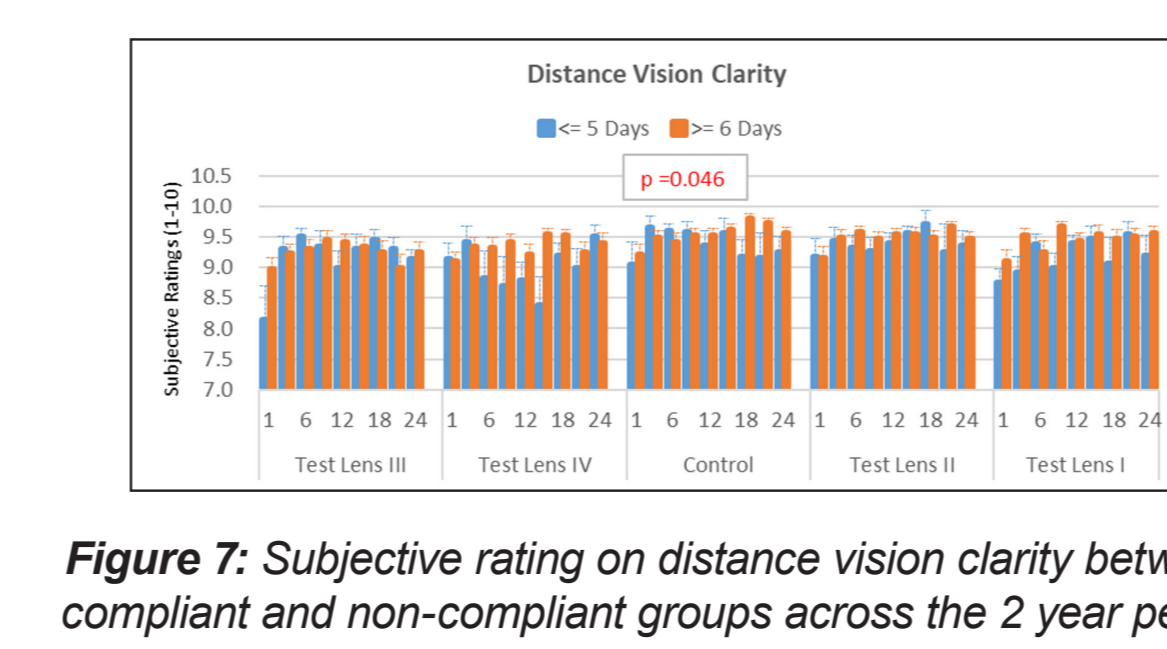


Figure 7: Subjective rating on distance vision clarity between compliant and non-compliant groups across the 2 year period

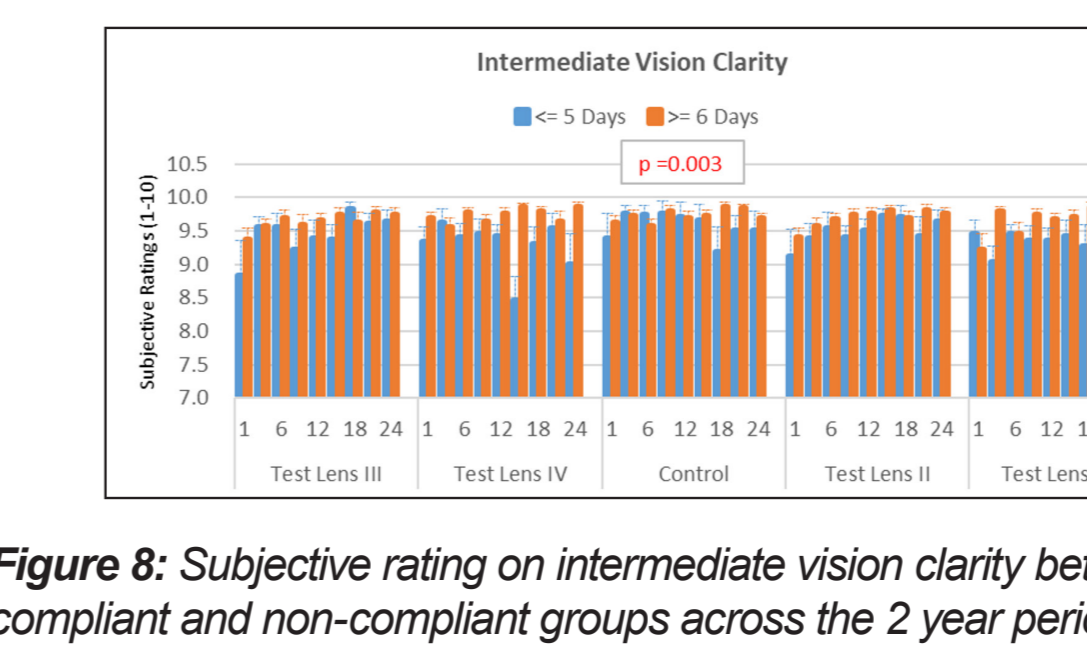


Figure 8: Subjective rating on intermediate vision clarity between compliant and non-compliant groups across the 2 year period

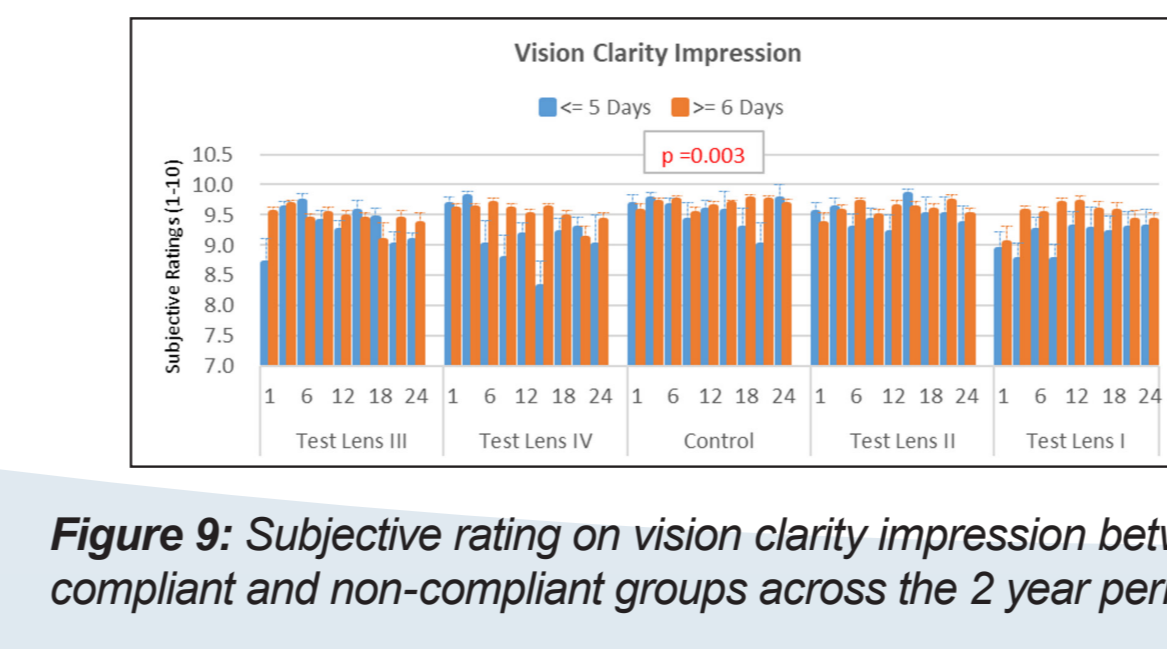


Figure 9: Subjective rating on vision clarity impression between compliant and non-compliant groups across the 2 year period

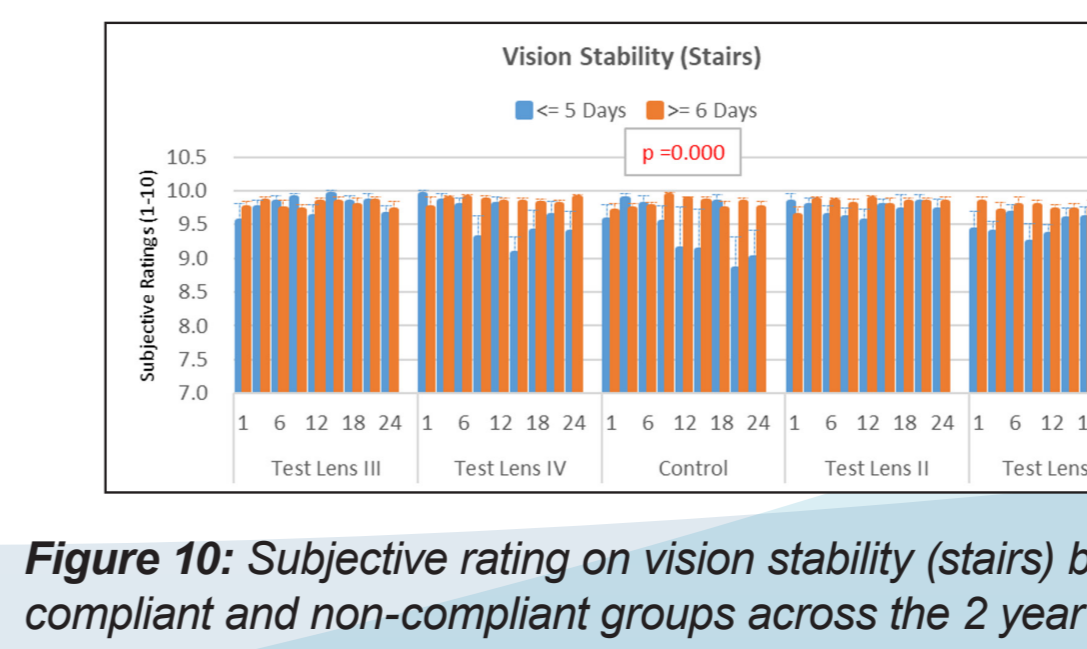


Figure 10: Subjective rating on vision stability (stairs) between compliant and non-compliant groups across the 2 year period

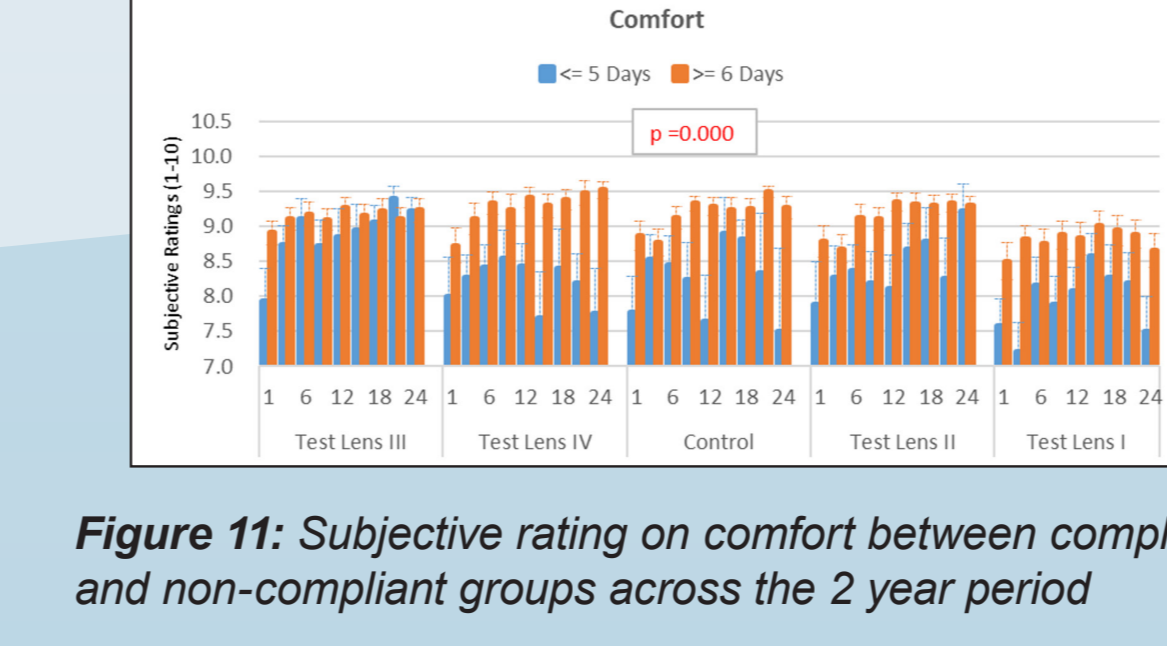


Figure 11: Subjective rating on comfort between compliant and non-compliant groups across the 2 year period

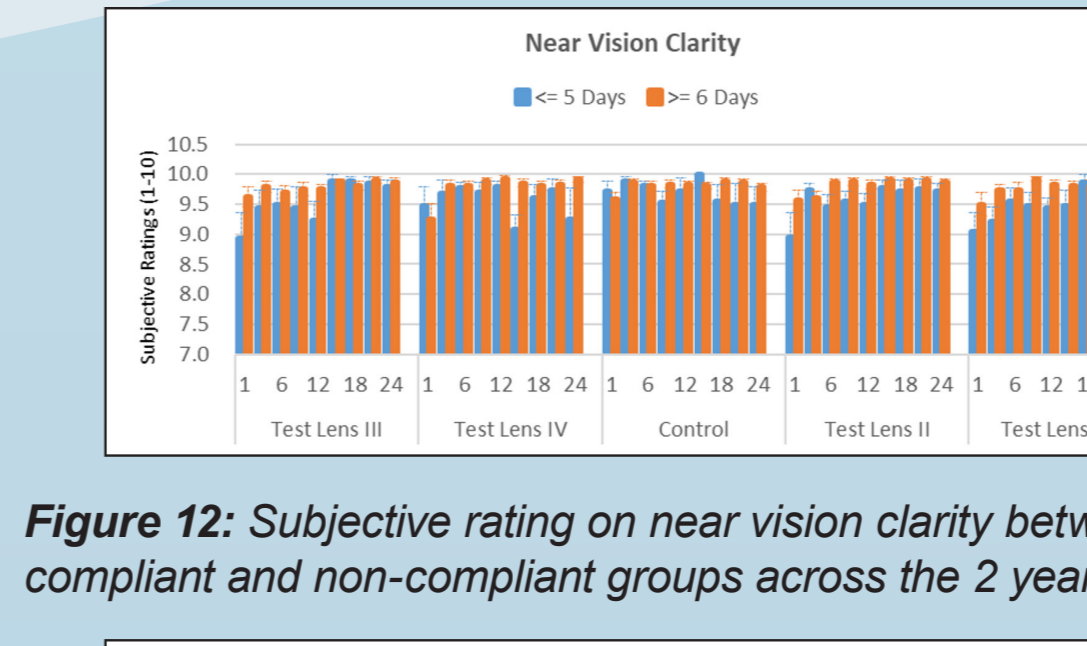


Figure 12: Subjective rating on near vision clarity between compliant and non-compliant groups across the 2 year period

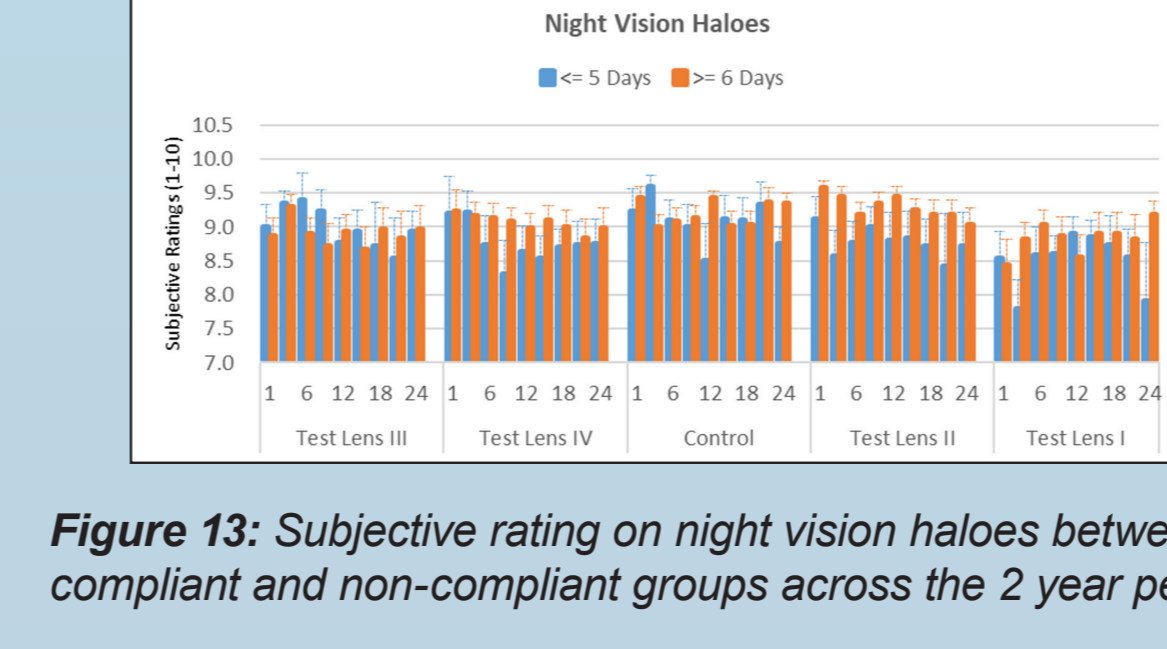


Figure 13: Subjective rating on night vision haloes between compliant and non-compliant groups across the 2 year period

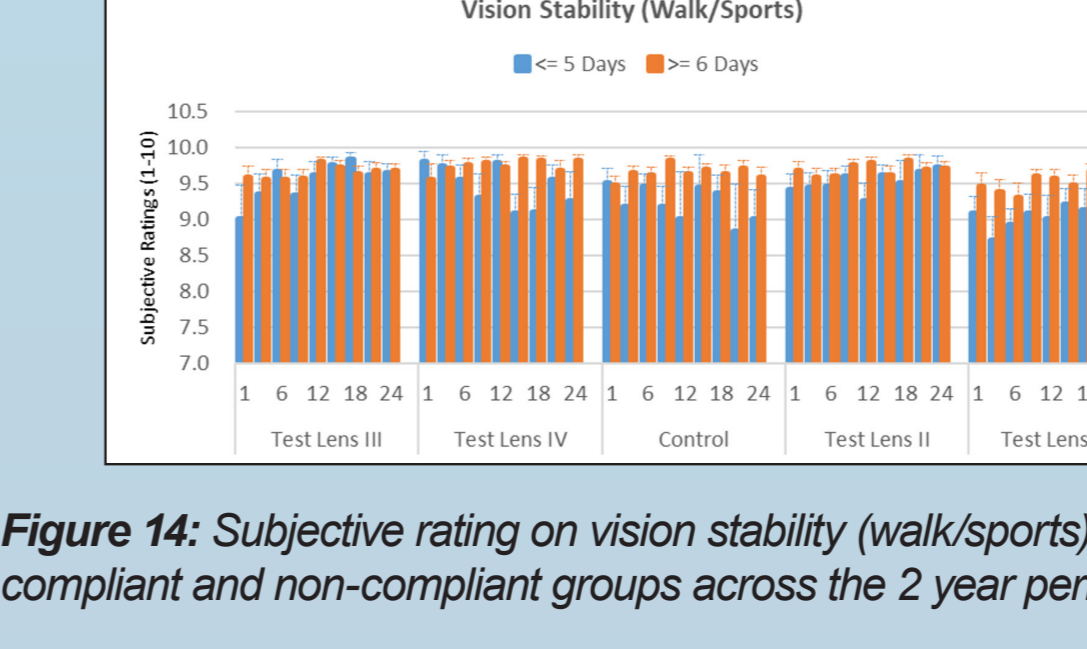


Figure 14: Subjective rating on vision stability (walk/sports) between compliant and non-compliant groups across the 2 year period

DISCUSSION / CONCLUSION

- Twenty % or more of the children, including those wearing SVCL were non-compliant to CL wear. Although non-compliant wearers reported their satisfaction to be less across all domains i.e. vision and comfort, compared to compliant wearers the difference was most for overall comfort indicating that comfort may be an important factor driving non-compliance.
- The number of children presenting with non-compliance varied between CL types and was least with SVCL and most with the CL with most peripheral plus (+2.50D, Test CL I). Interestingly, subjective ratings for stability of vision during walking, playing sport and climbing stairs were less with Test Lens I compared to other CL types. Since the lens material was the same between SVCL and Test Lens I, the higher peripheral plus may also been responsible for some of the non-compliance observed in this group. Importantly, comfort was also least in those wearing Test Lens I indicating that comfort and vision may be interrelated. It could be that comfort is perceived to be more than the physical comfort of the lens on the eye and including visual aspects of lens wear.
- Non-compliant wearers are clearly less satisfied with aspects of lens wear as indicated by the lower and variable subjective ratings. In this regard, it is not clear if comfort is the primary driver leading to non-compliance or if non-compliant wearers are more sensitive/less tolerant to aspects of lens wear. Interestingly, those wearing extended depth of focus type lenses reported comfort and vision ratings that were generally similar to those wearing SVCL and this could be due to the lens material providing improved comfort (etafilcon A versus somofilcon A) or due to having less discrete zones of power change across the lens.
- In summary, when choosing myopia control CL for a wearer, an appropriate lens material that provides good comfort may be an important consideration to ensuring compliance to lens wear. Furthermore, educating the wearer on visual performance of myopia control CL and choosing an appropriate lens design may further help promote compliance.

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