

Effect Of Bifocal Vs. Progressive Spectacles On Near And Distance Visual Tasks In Presbyopic Patients

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ABSTRACT

This cross-sectional, questionnaire-based comparative study evaluated the effectiveness of bifocal and progressive addition lenses (PALs) in enhancing visual performance and comfort among presbyopic patients with myopia. A total of 308 participants aged 40 years and above, with a confirmed diagnosis of both presbyopia and myopia, and who had used either bifocal or PAL spectacles for at least one month, were enrolled. Data were collected using a structured questionnaire assessing visual satisfaction, adaptability, reading ease, distance clarity, and overall visual comfort. Key findings indicated that PAL users experienced superior visual outcomes compared to bifocal users, particularly in intermediate and distance tasks. In one instance, a majority of PAL users reported always having clear vision for intermediate objects, while over 80 bifocal users stated they never experienced such clarity. Similarly, when assessing driving difficulty, 60% of bifocal users reported always having trouble driving with their lenses, whereas over 60% of PAL users reported no such difficulty. These differences underscore the limitations of bifocal lenses in providing smooth visual transitions and maintaining clarity across multiple distances. The continuous gradation of lens power in PALs offers a more natural visual experience, reducing abrupt image jumps and improving adaptability in daily activities. Statistical analysis using chi-square and ANOVA tests further validated the significance of these findings. Overall, this study supports the clinical preference for progressive lenses in presbyopic myopic patients, highlighting their role in enhancing functional vision and quality of life. Future research may explore long-term compliance and adaptation trends in a larger, more diverse population.

Keywords: Bifocal, Progressive Spectacles, Visual Tasks, Presbyopic Patients

1. INTRODUCTION

Presbyopia is an age-related refractive condition that typically manifests around the age of 40, resulting in a progressive inability to focus on near objects due to the loss of accommodative power of the crystalline lens (Patel et al., 2021). To manage this visual impairment, various corrective options are available, among which bifocal and progressive addition lenses (PALs) are the most common. Bifocal lenses have two distinct optical powers, aiding vision for both near and distance tasks, but often lack intermediate correction and may present cosmetic concerns due to their visible segment lines (Smith & Lee, 2020). In contrast, PALs provide a gradient of increasing lens power for distance, intermediate, and near vision, offering a more aesthetic and functionally seamless visual experience, though they require an adaptation period and may introduce peripheral distortions (Johnson et al., 2019).

The choice between bifocal and progressive lenses can significantly impact a patient's performance in everyday visual tasks, such as reading, driving, or using digital devices. These tasks require frequent shifts between near and far focus, making visual adaptability and comfort essential for maintaining quality of life. Several studies have investigated user preference, visual satisfaction, and adaptation time, with varied outcomes depending on individual visual needs and lifestyle factors (Chen et al., 2022). Therefore, this study aims to compare the effectiveness of bifocal and progressive spectacles in supporting near and distance visual tasks in presbyopic patients, with a focus on visual clarity, comfort, and functional efficiency (Yadav, R. K et al. 2024)

2. METHODOLOGY

This study was a cross-sectional, questionnaire-based comparative investigation conducted among 308 presbyopic patients. Participants were selected based on specific inclusion criteria: individuals aged 40 years and above as well as clinically diagnosed with presbyopia and with a history of regular bifocal or progressive addition lens (PAL) use for a minimum

duration of one month. Exclusion criteria included patients with ocular pathologies such as cataracts or glaucoma, those with a history of refractive surgery and individuals with neurological disorders that could impair visual function. Data collection was carried out using a structured questionnaire that assessed various parameters including visual satisfaction, adaptability to lenses, reading ease, distance vision clarity, and overall visual comfort. Responses were graded on a six-point scale: Excellent, Very Good, Good, Satisfactory, Unsatisfactory, and Poor. Statistical analysis was performed using SPSS software, employing chi-square and ANOVA tests to evaluate differences between groups.

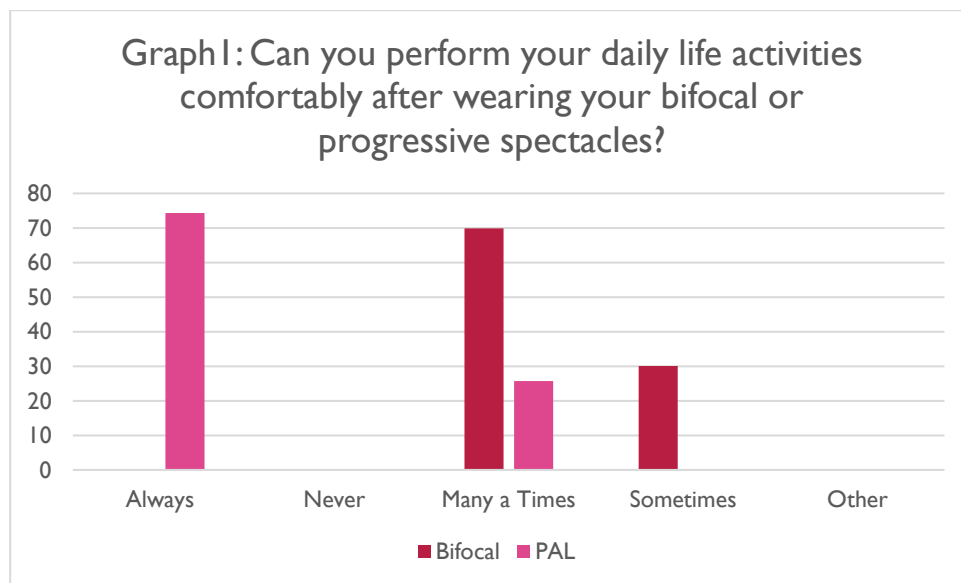
3. RESULTS

According to the data represented in Graph 1, a significantly higher proportion of PAL users reported "Always" being able to perform their daily life activities comfortably, with approximately 75% individuals selecting this option. In contrast, bifocal users showed zero responses in the "Always" category, indicating a notable difference in consistent visual comfort.

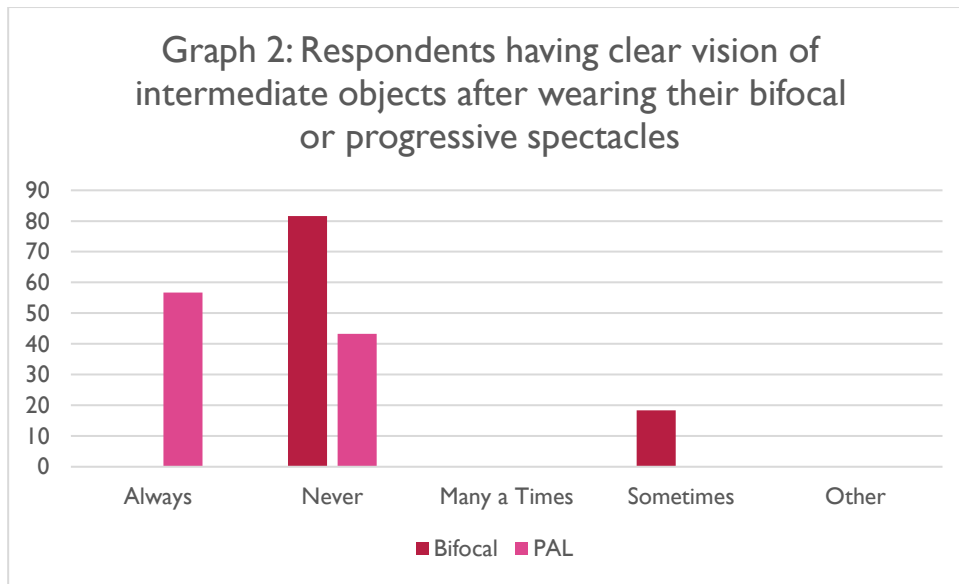
Conversely, the majority of bifocal users (~70% participants) selected "Many a Times" as their response, suggesting that while bifocals offer functional support, they may lack consistency in delivering sustained visual comfort across varying visual tasks. A smaller proportion of PAL users (~25% participants) chose this same response, showing relatively lower reliance on intermittent success with their spectacles.

Furthermore, a considerable number of bifocal users (~30% individuals) selected "Sometimes", indicating variable visual comfort that could potentially interfere with task performance, especially in activities requiring frequent near-far shifts such as reading, driving, or screen use. Neither group reported selecting "Never" or "Other", implying that both spectacle types provided some degree of functional visual support, albeit at varying levels of consistency and satisfaction.

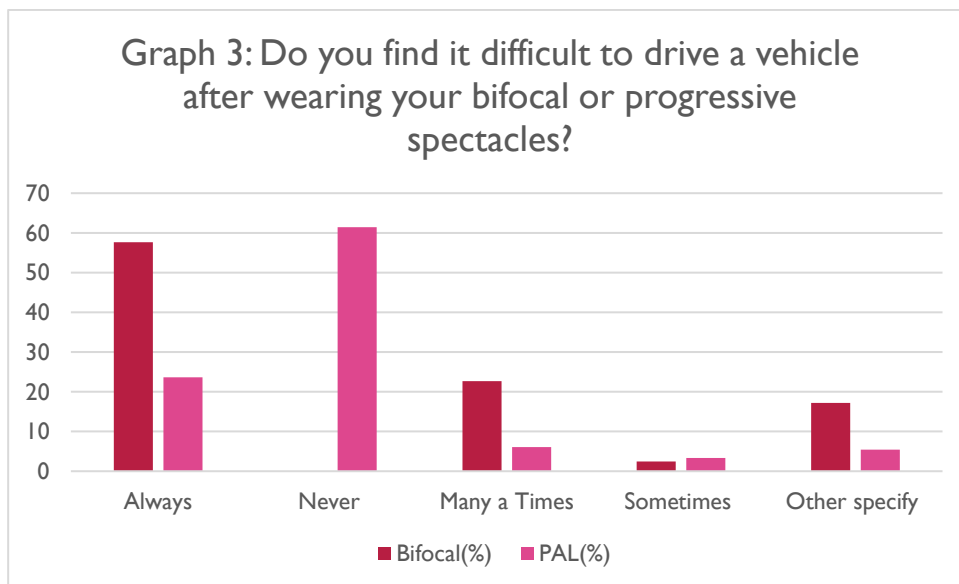
These findings suggest that progressive addition lenses outperform bifocals in ensuring continuous and comfortable vision across the range of daily life tasks. This may be attributed to the design advantage of PALs, which offer a seamless gradation of power, reducing abrupt image jumps and minimizing the need for frequent head tilts or lens switching—common drawbacks in bifocal use. Additionally, patient adaptability and subjective satisfaction appear to be higher among PAL users, aligning with previous literature highlighting the superior ergonomic and visual experience provided by progressive lenses.



Based on **Graph 2**, which illustrates the responses of presbyopic patients regarding the clarity of intermediate vision after using bifocal or progressive addition lenses (PALs), notable differences were observed between the two groups. In this cross-sectional, questionnaire-based comparative study involving 308 participants, the ability to see intermediate objects clearly was significantly higher among PAL users. Approximately **60% PAL users** reported “**Always**” experiencing clear intermediate vision, compared to **none in the bifocal group**. Conversely, a substantial proportion of bifocal users—**over 80% respondents**—selected “**Never**”, indicating a pronounced limitation in intermediate vision clarity with bifocal lenses. Only a minority of PAL users 45% reported “**Never**” experiencing clear intermediate vision. Responses like “**Sometimes**” and “**Many a Times**” were minimal across both groups, with bifocal users showing a slight presence 15% in the “**Sometimes**” category. These findings reinforce the functional superiority of PALs in managing intermediate vision tasks—such as computer work or viewing dashboards—due to their gradual power progression, which bifocal lenses lack. The results align with prior studies highlighting PALs’ advantage in providing seamless vision across all distances, thereby enhancing overall visual satisfaction and comfort in daily life.



Based on **Graph 3**, which explores driving difficulty experienced by presbyopic patients after wearing bifocal or progressive addition lenses (PALs), clear distinctions were observed between the two groups. In this cross-sectional, questionnaire-based comparative study involving 308 participants, a significant proportion of **bifocal users 58%** reported that they **“Always”** found it difficult to drive, highlighting substantial visual limitations while performing distance-based tasks. In contrast, only about **20% of PAL users** selected the same response, indicating comparatively less difficulty with driving. Conversely, **over 60% of PAL users** reported **“Never”** experiencing driving difficulty, suggesting higher visual clarity and stability with PALs while on the road. Meanwhile, only a small fraction of bifocal users selected **“Never,”** further emphasizing their struggle with dynamic vision tasks. A moderate number of bifocal users 22% also selected **“Many a Times”**, suggesting inconsistent visual performance while driving. Minimal responses were recorded under **“Sometimes”** and **“Other specify”** for both groups, though bifocal users still showed higher percentages. These results support the conclusion that **progressive lenses provide superior distance vision adaptability**, especially in motion-intensive scenarios like driving, due to their continuous focal range and reduced image jump, which are often limitations in traditional bifocal design.



4. DISCUSSION

The findings of this cross-sectional, questionnaire-based comparative study highlight significant differences in visual performance between bifocal and progressive addition lenses (PALs) among presbyopic patients with myopia. The results suggest that PALs provide a superior visual experience, particularly in intermediate and distance visual tasks such as computer use and driving. Graph 2 clearly shows that a substantial proportion of PAL users reported consistently clear vision

for intermediate objects, whereas the majority of bifocal users indicated difficulty, with many selecting 'Never' for having clear intermediate vision. This finding aligns with the established advantage of PALs in providing a seamless gradient of lens power, accommodating a wider range of focal distances (Smith & Lee, 2020).

Similarly, the responses related to driving difficulty, depicted in Graph 3, further support the effectiveness of PALs. Over 60% of PAL users reported no difficulty in driving, compared to a notable 58% of bifocal users who reported consistent difficulty. This outcome reinforces prior research indicating that PALs enhance dynamic vision and reduce peripheral distortions often experienced with bifocal lenses (Johnson et al., 2019). The abrupt transition between near and distance segments in bifocals may hinder quick focus shifts required for safe driving, while PALs offer a more natural and continuous visual adaptation (Patel et al., 2021).

These results also reflect on patients' subjective comfort and adaptability, key components of visual quality of life. PALs not only improve clarity across all distances but also enhance visual comfort during daily life activities, which is crucial for aging individuals coping with presbyopia and myopia simultaneously. Overall, the findings of this study are consistent with literature supporting the ergonomic and visual performance benefits of progressive lenses (Chen et al., 2022). Future studies incorporating objective clinical measures alongside subjective feedback would further validate these results.

5. CONCLUSION

In conclusion, this comparative study highlights the distinct advantages of progressive addition lenses (PALs) over bifocal lenses in presbyopic patients with myopia, particularly concerning intermediate and distance visual tasks. The findings reveal that PAL users consistently reported greater clarity in intermediate vision and significantly fewer difficulties while driving compared to bifocal users. These outcomes suggest that the seamless gradation of power in PALs provides enhanced visual adaptability and comfort in daily life, outperforming the abrupt dual-focus structure of bifocal lenses. Given the increasing visual demands of modern lifestyles—especially tasks involving intermediate focus such as computer work and dashboard viewing—PALs emerge as a more effective corrective solution for presbyopic individuals. Thus, progressive lenses not only offer functional optical benefits but also contribute to improved quality of life and visual independence.

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