Research Report

2026

Integrating RLRL:

Designing for Childhood Myopia Management

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QUT - Industrial Design

Authenticity Statement

This is to certify that to the best of my knowledge, the content of this report is my own work. This report has not been submitted for any subject or for other purposes. I certify that the intellectual content of this report is the product of my own work and that all the assistance received in preparing this report and sources have been acknowledged.

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Date: 12/09/2026

A.I Usage Statement

I have utilised two A.I software tools.

Generative A.I (ChatGPT) was used to help research and identify statistics on products found in section 1.3 benchmarking. ChatGPT was used to help identify key themes and codes that would emerge from the interviews. It was also utilised to check grammar and suggest improvements to cohesion. Large Text generated by ChatGPT was not inserted or typed into the report. It remained a tool for the author.

ATLAS.ti was used as a document tool to manually code interviews. No A.I features were used within ATLAS.ti

Executive Summary

Nearsightedness or myopia is an eye condition that is increasing at an alarming rate. This has brought a high demand for effective and practical methods of myopia control. Repeated Low-Level Red Light (RLRL) therapy is a new and emerging treatment capable of slowing axial elongation and myopia progression, with some studies also reporting axial shortening in treated children.

However, the technology remains relatively uncertain, with ongoing discussion surrounding long-term safety, biological mechanisms and treatment protocols.

This research explored how RLRL treatment could be better integrated into the daily lives of children through an Industrial Design perspective. A combination of literature review, benchmarking, three expert interviews and a parent survey was used to investigate the clinical, behavioural and environmental factors influencing treatment use.

The research found that adherence and compliance were the strongest recurring themes across both qualitative and quantitative data. Additional findings identified child engagement, physical ergonomics, treatment environment, safety and parental trust as important design factors that may support consistent treatment use. Parent survey responses particularly highlighted forgetting treatment and inconvenient treatment time or location as major anticipated barriers.

Four key design implications emerged from the data: improving adherence and routine integration, enhancing the child treatment experience, improving physical ergonomics and environmental integration, and maintaining strict safety and trust considerations.

The resulting design opportunity is therefore not to redefine the clinical science of RLRL, but to improve how an already promising treatment is experienced, accessed and incorporated into a child's everyday routine.

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01. Introduction

01.1 Introduction

Nearsightedness, or myopia, is a growing issue among adolescents. Currently, 70% - 90% of children in East Asian countries are myopic by the age of 18. (Morgan et al., 2021) The sudden spike in myopic children has turned the heads of optometrists and scientists towards preventatives and emerging myopic control products. Despite the complexity and limited understanding specialists have of myopia, emerging technology has proven successful in controlling it.

Repeated Low-Level Red Light Therapy, or RLRL, is an emerging technology shown to slow myopia progression in children and adolescents. While this may be true, there remains a high level of uncertainty surrounding the mechanics of RLRL. Many optometrists remain skeptical of the emerging technology, with many safety concerns. Many clinical trials are currently being conducted to study the technology and the means of its mechanical and biological function, along with its possible long-term side effects, and many more reasons.

Research question: Exploring the scope of RLRL as an emerging myopia control tech and how it can be integrated easily into the daily routines of children.

Briefly, an RLRL Device uses a semiconductor laser emitting a red light wave at 650 nm. It's a desktop device that has a viewfinder. The patient would look into the viewfinder as the 650nm waves travel into the eye and towards the retina. The patient is instructed to have three minute sessions, twice a day with a minimum of a four hour gap between the sessions, 5 days a week. (Xu et al., 2024; Chen et al., 2024; Zhu et al., 2023)

RLRL device - Eyerising international



Image 1 : The Eyerising Myopia Management Device, Eyerising international

It's also worth noting that myopia is considered a progressive, irreversible condition. No current myopia preventatives or control has been able to reverse axil elongation. Recent clinical trials observed that among 264 children aged 8-13, roughly a quarter of them had a significant amount of axial shortening. Repeated low-level red light therapy seems to be challenging the view that myopia is incurable. (Wang et al., 2023)

01.2 Background

A large number of trials have been and continue to be conducted, with hundreds of controlled groups of children adapting and using the technology from months to years. (Chen et al., 2024; Zhu et al., 2023; Chen et al., 2026) Many clinical trials have demonstrated that RLRL slows down axial elongation and refractive error in the early-development stage of the eye, concluding that RLRL is a "...promising strategy for myopia control...". (Tran, 2025)



Image 2 : The Eyerising Myopia Management Device in context, Eyerising international

And although RLRL has proven to be one of the most effective myopia treatments compared to existing treatments, many studies emphasise "...that RLRL is still a relatively new form of myopia control, and unknowns such as cellular-level and long-term effects need further investigation." (Tran, 2025) It is worth noting that safety concerns remain a critical factor when clinical trials are being conducted. The safety of RLRL was reviewed in 20 clinical trials comprising 2,380 participants. Of these participants, two cases of "...reversible decline in visual acuity and optical coherence tomography..." emerged. It was noted that both cases were completely resolved, and the patients' visual function returned to pre-onset state. (Chen et al., 2024)

01.2 Background

A separate case report raised concerns about the technology, although the exact cause remains uncertain. A child suffered irreversible retinal structural changes and reduced visual function after 7 months of RLRL treatment. (Tian & Xiao, 2023) An immense amount of research and clinical trials continue to be conducted, with researchers remaining alert to symptoms similar to those reported in the 2022 case. This seems to be the only current case involving irreversible damage and RLRL. This statement was later agreed upon by specialists during interviews.

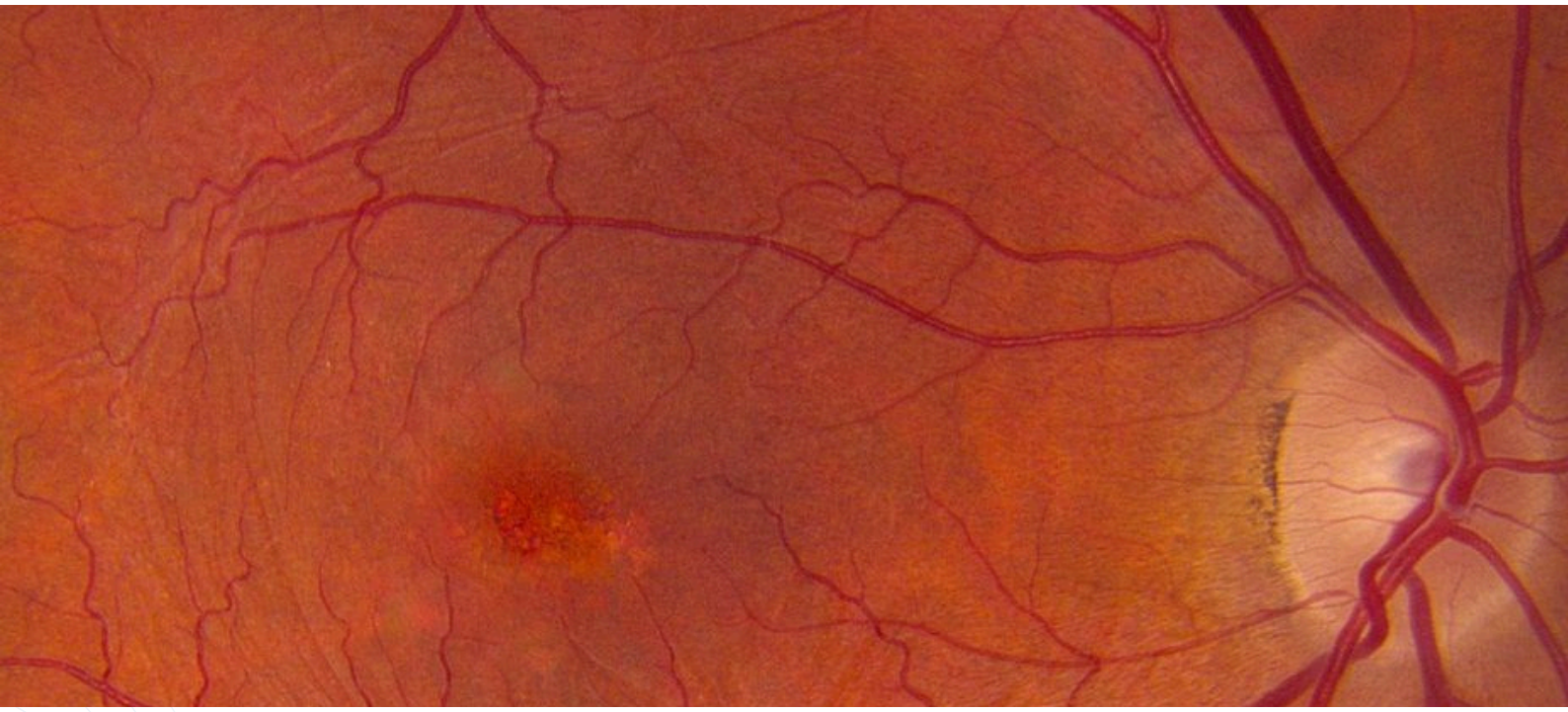


Image 3 : Optic nerves, Pinterest

The biological remedy of RLRL still remains somewhat theoretical. Myopia remains multifaceted and complex, and will continue to be carefully studied (Chen et al., 2025) Currently, ophthalmologists believe that RLRL may impact three things; "...delay[ing] the growth of the eye axis and the progression of myopic refractive diopter by; (1) accelerating retinal cell metabolism (Zha et al., 2017; Hamblin, 2018), (2) modulating physio-anatomical choroidal changes such as thickening and increasing blood flow (Jobling et al., 2004; Wang et al., 2013), and (3) mediating scleral remodeling" (Zha et al., 2017; Zhang & Zhu, 2022; Liu et al., 2022).

Repeated Low-level Red Light therapy is still in its transition from clinical trials to commercialisation. Because of the high rate of myopia prevention and effectiveness, yet also the uncertainties and safety concerns, it remains a highly debated and polarising topic

01.3 Benchmarking

Existing childhood-myopia control products primarily focus on pharmaceutical treatments, clinical approaches, lens correction eye-wear, and light exposure devices. Light technology as myopia treatment is emerging; current solutions include red light, cyan light and white light devices. (Gifford, n.d.)

Atropine Drops	DIMS lenses/contacts	Orthokeratology
		
MyopiaX	RLRL Device	Conventional Glasses
		

Figure 1 : Table of benchmarked myopia treatments

Physical solutions available to the public are centered around clinical, pharmaceutical, and optical intervention. Low dose atropine eye drops have been widely considered the leading pharmaceutical preventative for myopia, with institution 'Singapore National Eye health' having an extensive amount of research backed behind it. (Singapore National Eye Centre, n.d.) At a basic level, atropine seems to play with the molecules that help the back wall (sclera) of the retina stretch, making it more difficult for the eye to elongate. However, it's not fully understood how and what atropine does, and remains a heavily researched area. (Arumugam & McBrien, 2012)(Tran & Ha, 2020)

01.3 Benchmarking

Dual-focus spectacles (glasses) and/or contact lenses, Specifically DIMS lenses are another strong preventative to myopia. After discovery that the natural growth of the eye (elongation or stalling) is due to where light hits the peripheral of the retina (not the centre or focus point where scientists believed would influence correction), Lam designed lens that target both the focus (Centre or Fovea) of the retina, but more importantly, the peripheral of the retina. Studies show that this design (DIMS lenses) caused a significant decrease in developing myopia. (Singapore National Eye Centre, n.d.)(Lam et al., 2020) This discovery supports the theory that the peripheral widely influences elongation.

Correction lenses or Orthokeratology is the non surgical practice where the user wears contact lenses (typically over night) that slowly reshape the cornea temporarily, therefore temporarily solving nearsightedness/myopia. (Myopia Clinic Newcastle, n.d.) The treatment is completely reversible. If the patient were to stop wearing the lenses, the corneas will revert right back to their original shape.

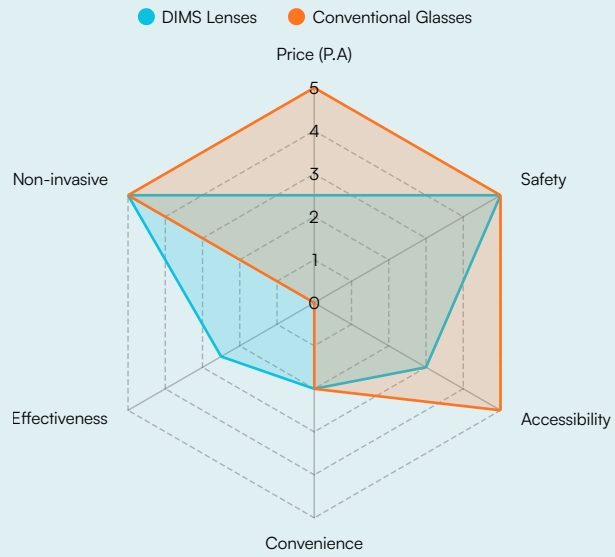
The Eyerising Myopia Management Device is the only TGA approved RLRL myopia treatment desktop device as of 2024. (Harmony Vision, n.d.) (NZ Optics, 2023)(Myopia Profile, n.d.) Studies show that this new technology is proving to be an promising method to myopia prevention. (Jiang et al., 2022)(Xu et al., 2024)

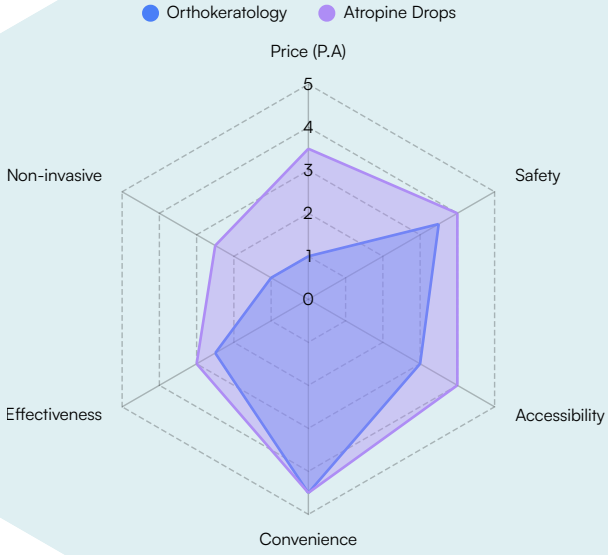
MyopiaX is another emerging light therapy device treating myopia. It utilises a smartphone VR setup that targets blind spots with blue light. The smartphone application is gamified so that children are immersed while being treated. (Gifford, 2026)



Image 4 : Children with Myopia, Wallpapers.com

01.3 Benchmarking





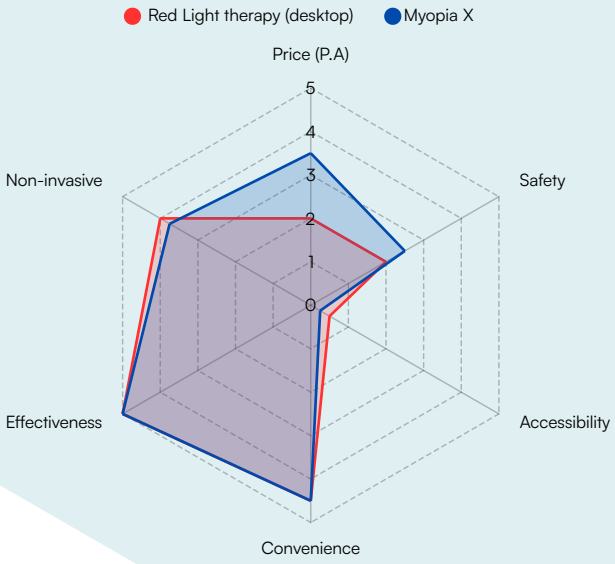


Figure 2 : DIMS Lenses vs Conventional Glasses
Figure 3 : Orthokeratology vs Atropine Drops
Figure 4 : Red Light Therapy (desktop) vs Myopia X

A comprehensive analysis on current myopia treatments concluded that factors such as safety, accessibility, cost, convenience, and individual treatment response are key considerations when developing myopia interventions. Furthermore, non-invasive, efficient, and more convenient treatments are a gap in the market. Atropine and contact lenses were identified as moderate to high invasiveness for children to apply daily. Light therapies have emerged from this gap as an alternative emerging technology yet still needs further studying and trails. (Liu et al., 2026) The gap in the market that has been identified surrounds the ergonomic design and interaction of MyopiaX treatment, and the mechanical application of RLRL treatment. The current market lacks RLRL treatment that seamlessly fits into the child's daily routine.

02. Research

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02.1 Research & Methodology

The research conducted in this report utilised triangulation, which is the practice of using multiple qualitative and quantitative methods of conducting primary research. Conducting research using multiple methods supported a broader understanding of the complexity of the emerging technology, and the systematic way it's integrated into the lives of children. The research conducted included 3 interviews with industry leading experts, Eyerising RLRL device developers, and ophthalmologists, and a survey that targeted parents of children that have myopia. This way I was able to have focused discussions about the theoreticals associated with myopia treatment and RLRL device insight with scientists and doctors, as well as a wide, diverse range of perspectives and experiences from the end users.



Image 7 : Eyerising IInternational



Image 8 : Myopia Profile

Survey

The survey aimed at understanding the lived experiences of having myopia. It uncovered what parents may think their child struggles with daily. The quantitative survey identified the primary environmental and behavioral barriers concerning the majority of parents. The survey totaled 6 questions. It contained general questions such as daily health routine, myopia management preventative, and knowledge about RLRL. It then identifies the barriers and issues that may be faced if/when/associated with completing or maintaining the myopia prevention treatment. A majority of the questions check-boxes, with a plethora of possible issues that may arise, along with the option for 'other'.

The survey was strategically structured in a way that got progressively more complex with a simple short answer yes or no in the middle. They were also categorically-based questions, with the first section stating general questions, and the second section being aimed at RLRL theoretical implementation.

02.1 Research & Methodology

When deploying the survey, consideration was given to the demographic most likely to represent the intended end-user group. It is estimated that by 2050, approximately 50% of the global population will have myopia, with prevalence among children in East and Southeast Asia estimated at 80–90% (Pan et al., 2025). Given the high prevalence of childhood myopia within these regions, and the intended target audience of children with myopia and their parents or caregivers, the survey was developed in both English and Traditional Chinese to improve accessibility for potential participants. Identical English and Traditional Chinese versions were created using Google Forms and distributed through social media and word of mouth. It was anticipated that a significant proportion of responses would be obtained through the Traditional Chinese survey.

Interviews

Interviews were conducted with leading industry experts, RLRL device and treatment developers, and optometrists, in order to get a deeper understanding of the emerging technology, and the industry itself. Interviews were semi-structured, allowing the industry expert to talk freely about relevant information or insight.

Interviewees were contacted via email, and found through respective industry online profiles, e.g., Eyerising International and Myopia Profile Interviewees received a brief overview of the project outline and the research into RLRL. Once having replied, they were emailed an interview information document and a consent form. Further explanatory information was provided to those required.

An interview with the Eyerising international team involved two participants at the same time. It was established that a two-on-one interview would be efficient while gaining invaluable information about their RLRL device.

<table>
<tr><td>Interview: 1</td><td>P1</td><td>Myopia Profile</td></tr>
<tr><td>Interview: 2</td><td>P2</td><td>Optometrist</td></tr>
<tr><td rowspan="2">Interview: 3</td><td>P3</td><td rowspan="2">Eyerising international</td></tr>
<tr><td>P4</td></tr>
</table>

Figure 5 : Participants - interviews, context

02.2 Analysis

Interviews

Interviews were audio-recorded using Apple Voice-Memos app, which also had a transcribe feature. The transcribed text was then dropped into a Google Docs document and thoroughly corrected in the matter where A.I couldn't detect certain words.

ChatGPT was used to help identify key themes and codes that would emerge from the text. Transcripts were then plugged into ATLAS.ti, where codes were manually added. Additional stand-alone codes were also added.

See *Table of key themes and codes in the Appendix*

Adherence/Compliance

Adherence emerged as the strongest theme across all three interviews. Interview participants emphasised the importance of compliance from the child, as it was discussed that compliance directly determines the effectiveness of any myopic treatment. Participants highlighted that introducing a treatment that requires 2 sessions a day for 3 minutes could make consistency difficult. Therefore, it was important to associate the treatment with a daily activity or consistent time in the child's lifestyle. Overall indications emphasise the importance of compliance and being able to measure the compliance rate.

"...because compliance adherence to treatment is a huge factor in the success of myopia control treatment" - P1

"compliance adherence to treatment is a huge factor in the success of my OP control treatment." - P1

"So being able to monitor compliance and understand how much the patient has actually done the treatment is a key part that's important in a feature of the machine..." - P3

"... what we know about myopic control is that compliance is key." - P2

"... all [myopia treatments] work reasonably well if the compliance is good. So anything that can improve compliance will be a good idea." - P2

Figure 6 : Participant Quotes about Adherence & Compliance

02.2 Analysis

Child experience and engagement:

A child's experience when using myopic treatments emerged as another key theme, specifically when discussing the concern of maintaining the child's attention, and incentive. Experts questioned how engaging the current RLRL Eyerising device is, highlighting that it may be especially challenging for younger children to maintain that willingness to complete treatment for 3 minutes, twice a day, 5 days a week. It was also briefly mentioned that the ergonomic considerations of the upright sitting position over time could prove to be uncomfortable to some, making it a potential engagement barrier.

Physical ergonomics and environment:

Physical positioning and environment in which the treatment occurs was another emerging theme. The current device requires adjustment for height and interpupillary distance, while maintaining alignment during the treatment. One expert questions if the static treatment could be uncomfortable over time. Portability and storage were also highly talked about. Eyerising reported that the current device weighs approximately three kilograms and is commonly left on a table or in a regular household space rather than packed away after each treatment. This indicates that the physical form of the device influences both the child's posture during treatment and how easily treatment integrates into the home environment.

Safety and trust

Interviews revealed polarising opinions about the safety behind RLRL. Some participants raised the fact that the long term effects of RLRL remain unknown, along with concerns of the involvement of the centre of the retina, and the appearance of after imaging. On the other hand, the Eyerising team expressed confidence in their safety treatment , backed up by vigorous clinical evidence and expert reviews from industry leading specialists. The device has a login system with a password intended to prevent overexposure, this includes session timeouts, limiting the amount of sessions during the day and week, and automatic lockouts. Eyerising also raised concerns around the perception of laser-based treatment. It was suggested that the term 'laser' itself can create negative safety associations, and that some market competitors have reinforced these concerns. They stated that "the fact that lasers are used, people have this negative connotation about laser and safety and eyes and children," and claimed that competitors were "sponsoring some misinformation" around the technology.

02.2 Analysis

Surveys

The survey totaled 24 participants, all of which were completed from the traditional Chinese version of the survey. The raw data was manually added into graphs to best represent the findings. The survey targeted parents with lived experience of raising children who are myopic, however, it is noted in ‘figure 8' that none of the participants had real experience with an RLRL device. Therefore the data had to be measured by the parents' perception and anticipated experience or barriers that may arise if their child were to use the device.

Prior to the survey, 91% of participants were unfamiliar with RLRL. The survey provided a brief overview to ensure participants shared a baseline understanding of the technology.



Figure 7 : Participant RLRL familiarity

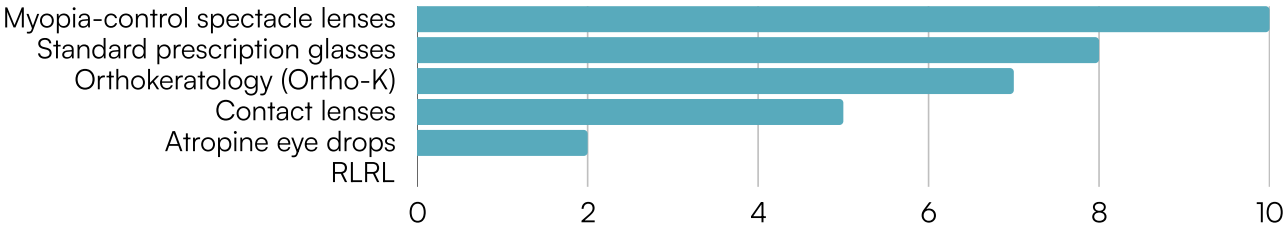


Figure 8 : Participant Current use of Myopia treatment

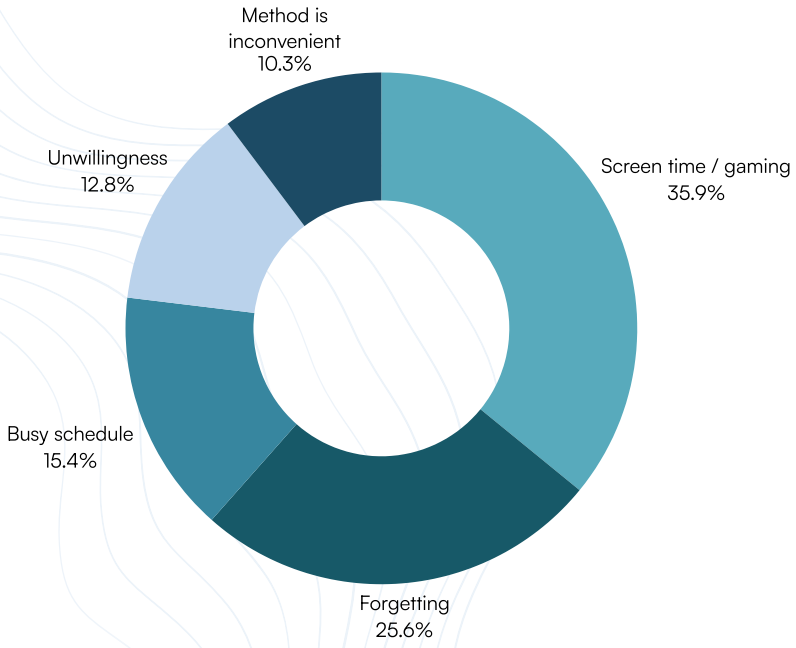


Figure 9 : Difficulties completing current Myopia treatment methods

Survey findings pinpointed behavioural concerns that parents had with any myopia treatment. The most common concerns were distraction from gaming and screen time, along with forgetting to complete treatment, both of which may interfere with the consistent integration of treatment into a child’s daily routine.

02.2 Analysis

Survey findings confirm the concerns and themes identified in the interviews, especially treatment adherence and integration into daily routines. Forgetting treatment and inconvenient treatment time/location were the most prevalent concern for RLRL use, each selected by 57.1% of respondents. Difficulty remaining still or being distracted was selected by 33.3%, while loss of interest, treatment discomfort and difficulty finding treatment time were each identified by 28.6%. These results indicate that parents anticipate the greatest challenges to RLRL treatment to occur from difficulty integrating it into the child's everyday routine.

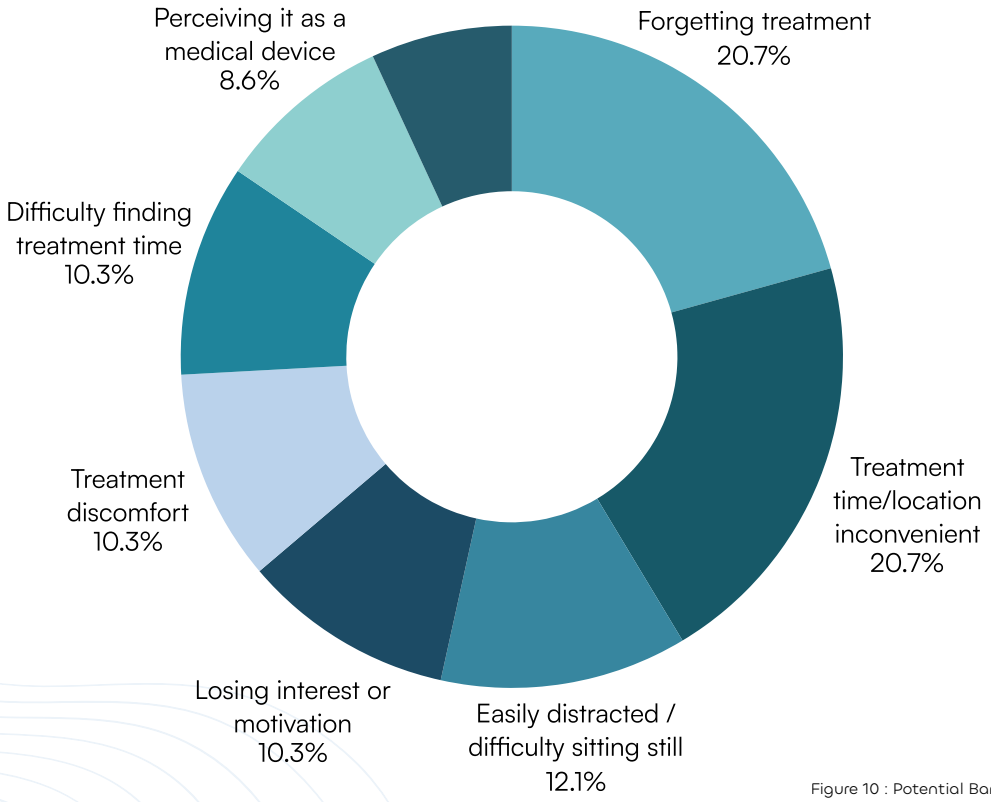


Figure 10 : Potential Barriers for RLRL

Findings from both the qualitative expert interviews and quantitative parent survey consistently highlighted adherence and compliance as major concerns. The quantitative data helped identify where adherence may break down, while the qualitative findings emphasised that adherence is fundamental to treatment effectiveness. Across both data sets, routine integration, child engagement and ease of use emerged as important factors influencing whether treatment is completed consistently.

03. Discussion

03.1 Discussion

The findings suggest that the effectiveness of RLRL therapy is determined by how successful the compliance of the treatment is. Secondary research identifies RLRL as a promising emerging treatment capable of slowing (and even reversing) axial elongation and myopia progression. However, concerns remain regarding long-term safety, biological mechanism uncertainty, and the relative newness of the technology. As the science and clinical trials remain new and uncertain, interviews were heavily biassed. Given the emerging and polarising nature of RLRL, expert perspectives differed. Where opinions conflicted, the analysis distinguished device-specific or evidence-based information from professional interpretation.

The primary research supports the gap identified through benchmarking by showing considerations towards the burdens of current treatments in a child's everyday experience. Eyerising compared RLRL with existing interventions, explaining that it can be "a lot more comfortable than putting hard contact lenses on at night," while also noting that atropine can produce side effects such as photophobia. These findings strengthen the identified opportunity for a treatment that minimises physical intervention and avoids requiring children to wear, insert or apply something throughout the day or overnight.

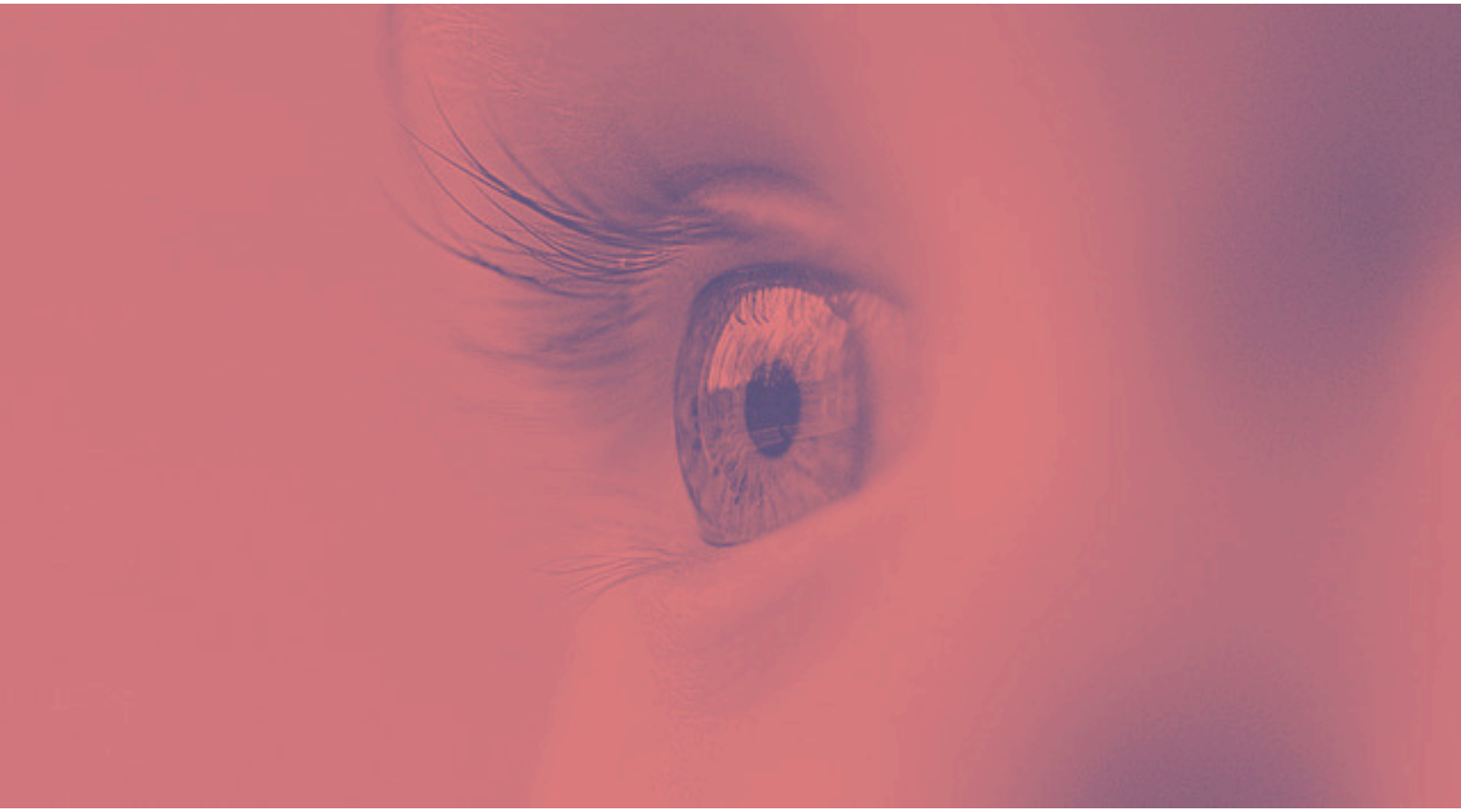
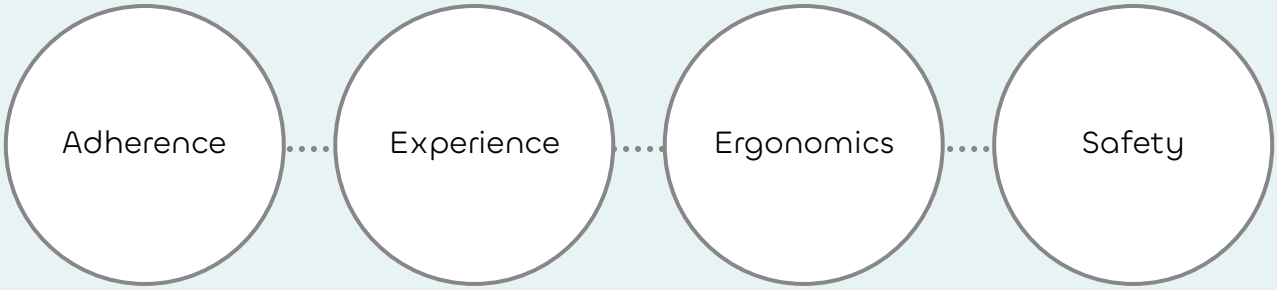


Image 5 : Close up of childrens eye, NewsPress

03.1 Discussion



Adherence was the strongest topic of agreement between qualitative and quantitative research. Experts repeatedly described compliance as fundamental to successful myopia management, with one participant explaining that treatments should ideally be linked to existing daily activities to improve consistency. This was reinforced by the parent survey, where forgetting treatment and inconvenient treatment time/ location were the most commonly anticipated barriers to RLRL treatment.

The interview experts also agreed that engagement and physical ergonomics contribute to positive adherence. Experts questioned the experience of children remaining relatively still while looking into a fixed red field for three minutes, particularly for younger users. This supports the broader benchmarking research, which identified convenience, accessibility and treatment experience as important considerations when evaluating myopia interventions.
Secondary research about the Safety and trust of RLRL become significant due to different experts expressing different levels of confidence in RLRL. Independent experts remained cautious about long-term retinal effects and the incomplete understanding of the treatment mechanism, while Eyerising representatives expressed confidence in existing safety data and described technological controls intended to prevent misuse or overexposure.

Overall, the research identifies a gap between RLRL technology and integrating it seamlessly into children's lives. RLRL provides strong therapeutic outcomes, but its long-term use also depends on adherence, routine integration, child comfort, engagement and parental confidence. These findings focus the design opportunities toward improving the experience and system through which treatment is delivered.

03.2 Design Implications

After analysing the findings from both expert interviews and parent survey data relating to RLRL, four key design implications emerged, laying down the fundamental design considerations.

Adherence & Compliance

What this data in the analysis indicates is that implementing positive compliance and adherence should be the fundamental design approach. More specifically, designing a device that caters for the potential barriers that parents and experts have identified, and integrates seamlessly into the child's routine rather than being perceived as a burden.

Child experience and engagement

The experience of the treatment should be explored. Exactly how the child spends those three minutes twice a day is something to consider. Factors like boredom, irritation, discomfort, or any negative experience should be explored and improved upon. Specifically, feedback on treatment progress for the user or other sensory engagement was identified as relevant design opportunities by experts.



Image 6 : Photo by Fenghua on Unsplash

03.2 Design Implications

Physical ergonomics and environment

The current desktop device requires the child to be relatively still with correct posture, staring into the viewfinder. It was here that experts raised concerns over repeated three minute treatments would lead to uncomfortability and possibly the child not finding the device desirable. Therefore opportunities around its ergonomic design emerged. Its environment meaning where the treatment happens, and what's done with the device after treatment also emerged as design gaps and opportunities. Furthermore, Eyerising stated that they are "... trying to make new designs that's a little bit more portable... as we are extending this usage to adults... they probably need more... economy in terms of space...". So experts suggested that portability, storage, and ergonomic factors would further contribute to a better design.

Safety and trust

The eye-healthcare industry and medical device standards are both highly regulated, requiring strict adherence to frameworks such as TGA compliance pathways. Because of the sensitivity around safety of children's eyes, any design solution should directly reflect or improve on all safety considerations in the current TGA approved RLRL desktop device from eyerising international. The safety of paediatric eye treatment is multifaceted and extends beyond light therapy concerns alone, such as stability and impact resistance, hygiene, material safety, sharp objects, electrical cable safety, and so on.

It's notable that cost was identified as a consideration, but not a primary design constraint. Eyerising highlighted the higher production cost of RLRL compared with treatments such as atropine, spectacles and contact lenses, creating a trade-off between added features and affordability. However, given RLRL's potential to achieve axial shortening in some children and therefore offer more than current competitor treatments, this project prioritises adherence, ergonomics and child experience over designing primarily to compete on cost.

03.3 Conclusion

This research report explored the scope of Repeated Low-Level Red Light therapy as an emerging myopia-control technology and how it could be integrated easily into the daily routines of children. Secondary research identified RLRL as a highly promising treatment, with evidence of slowing axial elongation and, in some cases, shortening axial length. However, the technology remains relatively new, with continued uncertainty surrounding long-term safety, biological mechanisms and optimal treatment parameters.

Benchmarking and primary research identified a gap between the clinical effectiveness of RLRL and the everyday experience of using it. Expert interviews and parent survey data consistently highlighted adherence, routine integration, child engagement, ergonomics and parental confidence as factors that may influence whether treatment is completed consistently. These findings translated into four key design implications: improving compliance and routine integration, enhancing the child experience, addressing physical ergonomics and treatment environment, and maintaining strict safety and trust considerations.

This project approaches RLRL through an Industrial Design lens rather than attempting to redefine its clinical science. Kate Gifford stated that it was “fascinating to… see my field through your eyes,” highlighting the value of examining established clinical technology from outside the medical industry.
Overall, the opportunity is to retain the therapeutic mechanisms of RLRL while redesigning the way children interact with and experience the treatment, and how it integrates into everyday life.

04. References

04.1 References

Arumugam, B., & McBrien, N. A. (2012). Muscarinic antagonist control of myopia: Evidence for M4 and M1 receptor-based pathways in the inhibition of experimentally-induced axial myopia in the tree shrew. Investigative Ophthalmology & Visual Science, 53(9), 5827–5837. https://doi.org/10.1167/iovs.12-9943

Chen, Y., Wang, W., Xiong, R., Yu, F., Pan, S., Dong, J., Zhang, J., Zhu, Z., Ding, X., Wang, B., Chen, Y., Chan, H. H., Choi, K. Y., Chan, S. S. H., Zheng, Y., Shi, D., Aung, Y., Kishi, S., Ohno-Matsui, K., & He, M. (2026). Three-year efficacy and safety of repeated low-level red-light therapy for myopia control: A multicentre real-world study. British Journal of Ophthalmology. https://doi.org/10.1136/bjo-2025-328687

Chen, Y., Xiong, R., Yang, S., Zhu, Z., Li, H., Xiang, K., Congdon, N., Wang, W., & He, M. (2024). Safety of repeated low-level red-light therapy for myopia: A systematic review. Asia-Pacific Journal of Ophthalmology, 13(6), 100124. https://doi.org/10.1016/j.apjo.2024.100124

Chen, Y.-J., Jeon, I.-C., Cho, S.-S., & Park, D.-H. (2025). RLRL therapeutic feasibility and potential mechanism on myopia. International Journal of Molecular Sciences, 27(1), 428. https://doi.org/10.3390/ijms27010428

Dirani, M., Tong, L., Gazzard, G., Zhang, X., Chia, A., Young, T. L., Rose, K. A., Mitchell, P., & Saw, S.-M. (2009). Outdoor activity and myopia in Singapore teenage children. British Journal of Ophthalmology, 93(8), 997–1000. https://doi.org/10.1136/bjo.2008.150979

Gifford, K. (n.d.). Light therapies for myopia control. Myopia Profile. https://www.myopiaprofile.com/products/light-therapies

Gifford, K. (2026, January 15). MyopiaX: A new blue-light therapy for myopia. Myopia Profile. https://www.myopiaprofile.com/articles/myopiax-new-light-therapy-for-myopia-control

Hamblin, M. R. (2018). Mechanisms and mitochondrial redox signaling in photobiomodulation. Photochemistry and Photobiology, 94, 199–212. https://doi.org/10.1111/php.12864

Harmony Vision. (n.d.). Myopia control clinic: Slow down your child's shortsightedness. https://www.harmonyvisioncare.com.au/myopia-control-slowing-the-progression-of-shortsight

Jiang, Y., Zhu, Z., Tan, X., Kong, X., Zhong, H., Zhang, J., Xiong, R., Yuan, Y., Zeng, J., Morgan, I. G., & He, M. (2022). Effect of repeated low-level red-light therapy for myopia control in children: A multicenter randomized controlled trial. Ophthalmology, 129(5), 509–519. https://doi.org/10.1016/j.ophtha.2021.11.023

Jobling, A. I., Nguyen, M., Gentle, A., & McBrien, N. A. (2004). Isoform-specific changes in scleral transforming growth factor-β expression and the regulation of collagen synthesis during myopia progression. Journal of Biological Chemistry, 279(18), 18121–18126. https://doi.org/10.1074/jbc.m400381200

Lam, C. S. Y., Tang, W. C., Tse, D. Y. Y., Lee, R. P. K., Chun, R. K. M., Hasegawa, K., Qi, H., Hatanaka, T., & To, C. H. (2020). Defocus incorporated multiple segments (DIMS) spectacle lenses slow myopia progression: A 2-year randomised clinical trial. British Journal of Ophthalmology, 104(3), 363–368. https://doi.org/10.1136/bjophthalmol-2018-313739

Liu, D., Yu, T., Ma, G., & Wang, J. (2026). Efficacy of repeated low-level red-light therapy for myopia management in children and adolescents: A systematic review and meta-analysis. BMC Ophthalmology, 26, 139. https://doi.org/10.1186/s12886-026-04645-8

04.1 References

Liu, G., Li, B., Rong, H., Du, B., Wang, B., Hu, J., Zhang, B., & Wei, R. (2022). Axial length shortening and choroid thickening in myopic adults treated with repeated low-level red light. Journal of Clinical Medicine, 11, 7498. https://doi.org/10.3390/jcm11247498

Martinez-Perez, C., & Oliveira, A. P. (2026). Nutritional supplementation for myopia prevention and control: A systematic review of randomized controlled trials. Nutrients, 18(1), 4. https://doi.org/10.3390/nu18010004

Morgan, I. G., Wu, P.-C., Ostrin, L. A., Tideman, J. W. L., Yam, J. C., Lan, W., Baraas, R. C., He, X., Sankaridurg, P., Saw, S.-M., French, A. N., Rose, K. A., & Guggenheim, J. A. (2021). IMI risk factors for myopia. Investigative Ophthalmology & Visual Science, 62(5), 3. https://doi.org/10.1167/iovs.62.5.3

Myopia Clinic Newcastle. (n.d.). Orthokeratology. https://myopiaclinicnewcastle.com.au/orthokeratology/

Myopia Profile. (n.d.). Eyerising Myopia Management Device. https://www.myopiaprofile.com/product/eyerising-repeated-low-level-red-light-therapy

NZ Optics. (2023, August 15). Eyerising myopia management device approved in Australia. https://nzoptics.co.nz/live-articles/eyerising-myopia-management-device-approved-in-australia/

Pan, Z., Xian, H., Li, F., Wang, Z., Li, Z., Huang, Y., Liu, W., Li, Y., Li, F., Wang, J., Chen, H., Wu, Y., Xu, Y., Wu, G., Zhang, Y., He, L., Zhang, J., Zhang, F., Qian, X., ... Wong, T. Y. (2025). Myopia and high myopia trends in Chinese children and adolescents over 25 years: A nationwide study with projections to 2050. The Lancet Regional Health – Western Pacific, 59, 101577. https://doi.org/10.1016/j.lanwpc.2025.101577

Rose, K. A., Morgan, I. G., Ip, J., Kifley, A., Huynh, S., Smith, W., & Mitchell, P. (2008). Outdoor activity reduces the prevalence of myopia in children. Ophthalmology, 115(8), 1279–1285. https://doi.org/10.1016/j.ophtha.2007.12.019

Saw, S.-M., Zhang, M.-Z., Hong, R.-Z., Fu, Z.-F., Pang, M.-H., & Tan, D. T. H. (2002). Near-work activity, night-lights, and myopia in the Singapore-China study. Archives of Ophthalmology, 120(5), 620–627. https://doi.org/10.1001/archopht.120.5.620

Singapore National Eye Centre. (n.d.). Myopia treatments available. https://www.snec.com.sg/our-specialties/clinic-locations/myopia-centre/understanding-myopia/myopia-treatments-available

Tariq, F., Mobeen, R., Wang, X., Lin, X., Bao, Q., Liu, J., & Gao, H. (2023). Advances in myopia prevention strategies for school-aged children: A comprehensive review. Frontiers in Public Health, 11, 1226438. https://doi.org/10.3389/fpubh.2023.1226438

Tian, Y., & Xiao, Z. (2023). Recovery of retinal structural damage after repeated low-intensity red light therapy for high myopia: A case report. Chinese Journal of Experimental Ophthalmology, 41(9), 853–855. https://doi.org/10.3760/cma.j.cn115989-20221119-00539

Tran, D. (2025, May 30). The latest in red light therapy. Review of Myopia Management. https://reviewofmm.com/the-latest-in-red-light-therapy/

Tran, H., & Ha, T. (2020, October 1). Mechanism of action of atropine in controlling myopia progression. Review of Myopia Management. https://reviewofmm.com/mechanism-of-action-of-atropine-in-controlling-myopia-progression/

04.1 References

Walline, J. J., Lindsley, K. B., Vedula, S. S., Cotter, S. A., Mutti, D. O., Ng, S. M., & Twelker, J. D. (2020). Interventions to slow progression of myopia in children. Cochrane Database of Systematic Reviews, 2020(1), CD004916. https://doi.org/10.1002/14651858.CD004916.pub4

Wang, H., Zhuang, K., Gao, L., Zhang, L., & Yang, H. (2013). Increased expression of CCN2 in the red flashing light-induced myopia in guinea pigs. BioMed Research International, 2013, 761823. https://doi.org/10.1155/2013/761823

Wang, W., Jiang, Y., Zhu, Z., Zhang, S., Xuan, M., Tan, X., Kong, X., Zhong, H., Bulloch, G., Xiong, R., Yuan, Y., Chen, Y., Zhang, J., Zeng, J., Morgan, I. G., & He, M. (2023). Axial shortening in myopic children after repeated low-level red-light therapy: Post hoc analysis of a randomized trial. Ophthalmology and Therapy, 12, 1223–1237. https://doi.org/10.1007/s40123-023-00671-7

Xu, Y., Cui, L., Kong, M., Li, Q., Feng, X., Feng, K., Zhu, H., Cui, H., Shi, C., Zhang, J., & Zou, H. (2024). Repeated low-level red light therapy for myopia control in high myopia children and adolescents: A randomized clinical trial. Ophthalmology, 131(11), 1314–1323. https://doi.org/10.1016/j.ophtha.2024.05.023

Zha, Y., Zhu, G., Zhuang, J., Zheng, H., Cai, J., & Feng, W. (2017). Axial length and ocular development of premature infants without ROP. Journal of Ophthalmology, 2017, 6823965. https://doi.org/10.1155/2017/6823965

Zhang, P., & Zhu, H. (2022). Light signaling and myopia development: A review. Ophthalmology and Therapy, 11, 939–957. https://doi.org/10.1007/s40123-022-00490-2

Zhu, Q., Cao, X., Zhang, Y., Zhou, Y., Zhang, J., Zhang, X., Zhu, Y., & Xue, L. (2023). Repeated low-level red-light therapy for controlling onset and progression of myopia—A review. International Journal of Medical Sciences, 20(10), 1363–1376. https://doi.org/10.7150/ijms.85746