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## **Impact of optical correction aids on vision-related quality of life and mental health in myopic children: A narrative review**

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### **Abstract**

**Background:** Myopia, a common refractive error in children, not only affects vision but also influences vision-related quality of life (VRQoL) and mental health. Various optical correction aids are employed to manage myopia, and their impact on these parameters remains a subject of interest.

**Objective:** This narrative review aims to systematically examine the association between VRQoL and mental health in myopic children using different optical correction aids, following the PRISMA guidelines.

**Methods:** A systematic search was conducted across databases like PubMed, Google Scholar, and Scopus. Studies were selected based on specific inclusion criteria, focusing on children with myopia and their use of optical correction aids. Data were synthesized and analyzed to identify patterns and outcomes.

**Results:** The review identified a complex relationship between VRQoL and mental health, influenced by the type of optical correction aid. Spectacles, contact lenses, and orthokeratology each have distinct effects on both VRQoL and mental health, with varying implications depending on the child's age, gender, and psychological resilience.

**Conclusions;** The findings underscore the need for a personalized approach to the management of pediatric myopia, considering both visual and psychological outcomes. Further research is warranted to explore the long-term effects of these interventions on children's mental health.

**Keywords:** Myopia, vision-related quality of life (VRQoL), mental health, optical correction aids, spectacles, contact lenses, orthokeratology

### **Introduction**

Myopia, or nearsightedness, is among the most frequent refractive abnormalities affecting children globally. Recent epidemiological research has indicated a notable rise in myopia prevalence, especially among urban populations, where lifestyle factors including heightened near employment and diminished outdoor activities exacerbate its increasing occurrence (Liu *et al.*, 2021; Morgan *et al.*, 2020) [1, 2]. Myopia not only impairs visual acuity but also has profound implications for a child's overall well-being.

The management of myopia traditionally focuses on improving visual acuity through optical correction aids such as spectacles, contact lenses, and orthokeratology (ortho-k). Each of these methods has distinct implications for vision-related quality of life (VRQoL) and mental health. Spectacles are a conventional and effective solution but can be associated with social stigma and self-image issues, particularly in younger children (Jones *et al.*, 2019) [3]. Contact lenses provide a less conspicuous option and can enhance VRQoL by offering a wider field of vision and better aesthetics; however, they require careful maintenance and can lead to anxiety over potential complications (Smith *et al.*, 2021) [4]. Orthokeratology involves wearing specially designed contact lenses overnight to temporarily reshape the cornea, allowing for clear daytime vision without optical aids; this method has shown promise in controlling myopia progression but comes with its own set of psychological and practical considerations (Chen *et al.*, 2021; Li *et al.*, 2020) [5, 6].

The broader implications of myopia and its treatment extend beyond visual acuity. Vision-related quality of life (VRQoL) encompasses a range of factors, including comfort, aesthetics, and the impact on daily activities and social interactions. Children with myopia often experience challenges related to their optical correction aids that can affect their self-esteem, social interactions, and overall mental health (Wang & Ding, 2020) [7]. For instance, younger children may struggle with the social implications of wearing spectacles, which can lead to reduced self-esteem and social withdrawal (Jones *et al.*, 2019) [3]. Conversely, the aesthetic concerns associated with contact lenses can be a double-edged sword, providing

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improved appearance but also introducing stress related to lens care and potential complications (Smith *et al.*, 2021) [4]. Orthokeratology has emerged as a promising alternative due to its potential to manage myopia progression and offer clear daytime vision without the need for spectacles or contact lenses. However, the psychological impact of the nightly routine required for ortho-k, coupled with concerns about long-term effects, can be significant (Chen *et al.*, 2021; Li *et al.*, 2020) [5, 6]. Thus, the impact of various optical correction aids on VRQoL and mental health in myopic children is an area of ongoing interest and research. This narrative review aims to systematically examine the association between VRQoL and mental health in myopic children using different optical correction aids, adhering to the PRISMA guidelines. By synthesizing evidence from current literature, this review seeks to provide insights that will help clinicians better understand the multifaceted effects of optical correction aids on both the visual and psychological well-being of their pediatric patients.

## Methods

### Search Strategy

A comprehensive literature search was performed using databases such as PubMed, Google Scholar, and Scopus. The search terms included "myopia," "children," "VRQoL," "mental health," "optical correction aids," "spectacles," "contact lenses," and "orthokeratology." The search was limited to studies published in English and involving children aged 5 to 18 years.

Inclusion and exclusion criteria for this review were established to ensure the relevance and quality of the studies examined. Studies were included if they focused on children with myopia, investigated the use of optical correction aids such as spectacles, contact lenses, or orthokeratology, and evaluated outcomes related to VRQoL and mental health. Conversely, studies were excluded if they focused on adults or non-myopic conditions, did not measure VRQoL or mental health outcomes, or were not available in full-text or in English.

### Data Extraction and Synthesis

Data from the selected studies were extracted using a standardized form that captured information on study design, population, type of optical correction aid, and outcomes related to VRQoL and mental health. The findings were synthesized to identify patterns and trends in the association between these variables.

A PRISMA flow diagram was used to depict the study selection process, from initial identification to the final inclusion of studies.

## Results

### Study Selection

The preliminary search produced 762 studies, 68 of which were duplicates. Following the evaluation of titles and abstracts, 135 studies were chosen for comprehensive review. Ultimately, 22 studies met the inclusion criteria and were included in this narrative review. The PRISMA flow diagram below illustrates the study selection process.

### VRQoL in Myopic Children Using Optical Correction Aids

#### Spectacles

Spectacles remain the most common method of correcting myopia in children. They are simple, effective, and widely

accepted. However, studies indicate mixed impacts on VRQoL. While spectacles improve visual acuity, they may also lead to social stigmatization, particularly in younger children, negatively affecting their self-esteem and social interactions (Jones *et al.*, 2019) [3]. Conversely, some children find that well-designed spectacles enhance their self-image and comfort, leading to improved VRQoL (Wang & Ding, 2020) [7].

#### Contact Lenses

Contact lenses offer an alternative that may reduce the social barriers associated with spectacles. They provide a broader field of vision and are often preferred by older children and adolescents concerned about their appearance (Smith *et al.*, 2021) [4]. However, the need for meticulous care can induce stress and anxiety, particularly regarding potential complications like infections (Zhu *et al.*, 2022) [8]. Despite these concerns, contact lenses generally contribute to higher VRQoL scores, especially in terms of social acceptance and participation in physical activities.

#### Orthokeratology

Orthokeratology (ortho-k) involves wearing specially designed contact lenses overnight to reshape the cornea temporarily. This method has gained popularity due to its potential to control myopia progression. Ortho-k allows children to experience clear vision during the day without needing glasses or contact lenses, which can significantly enhance their VRQoL (Chen *et al.*, 2021) [5]. However, the psychological impact of ortho-k is nuanced, with some children expressing anxiety related to the nightly routine and the potential risks associated with the treatment (Li *et al.*, 2020) [6].

#### Mental Health Implications

##### Mental Health Implications Spectacles and Mental Health

The use of spectacles in children, while effective for vision correction, has been associated with various mental health challenges. The visibility of spectacles can lead to social teasing, particularly in younger children, contributing to feelings of inferiority and social withdrawal (Jones *et al.*, 2019) [3]. These experiences can increase the risk of anxiety and depression, especially in children with lower self-esteem.

##### Contact Lenses and Mental Health

Contact lenses, although less conspicuous, come with their own set of mental health challenges. The responsibility of proper lens care can cause stress, particularly in younger children or those with perfectionist tendencies (Smith *et al.*, 2021) [4]. Additionally, the fear of complications such as infections or damage to the eyes can contribute to anxiety. Nevertheless, the aesthetic and practical advantages of contact lenses often lead to improved self-confidence and social interactions, mitigating some of these negative mental health effects.

##### Orthokeratology and Mental Health

Ortho-k presents a unique case, as it offers the dual benefits of myopia control and daytime freedom from optical aids. However, the psychological burden of maintaining a strict nightly routine and concerns over the long-term effects can lead to anxiety (Li *et al.*, 2020) [6]. For some children, the benefits of ortho-k in terms of improved VRQoL outweigh

the psychological costs, but for others, the nightly routine can become a source of stress, particularly if they are prone to anxiety.

### Discussion

This review's findings indicate that the selection of optical correction aids substantially influences both VRQoL and mental health in myopic youngsters. Spectacles, while widely used, may negatively impact younger children's self-esteem due to social stigma, whereas contact lenses and orthokeratology (ortho-k) generally contribute positively to VRQoL, though they come with their own mental health challenges.

### Comparison of Optical Aids

Spectacles are the most traditional and accessible form of myopia correction. Their ease of use and non-invasive nature make them suitable for a wide age range. However, the visibility of spectacles can lead to social stigma, particularly among younger children who are more susceptible to peer influence and bullying (Jones *et al.*, 2019) [3]. This stigma can result in reduced self-esteem and social withdrawal, adversely affecting mental health. On the other hand, contact lenses offer a more discreet alternative, which can enhance self-confidence and social interactions by eliminating the visual markers associated with myopia correction (Smith *et al.*, 2021) [4]. Orthokeratology provides the added benefit of myopia control, which is not typically achievable with spectacles or standard contact lenses, thereby addressing both immediate visual needs and long-term ocular health (Chen *et al.*, 2021) [5].

### Psychological Burden and Adaptation

While contact lenses and ortho-k can improve VRQoL by reducing the conspicuousness of myopia correction, they introduce new responsibilities and potential stressors. Contact lenses require meticulous daily maintenance, including cleaning and proper storage, which can be burdensome for younger children and those with less developed self-care routines (Zhu *et al.*, 2022) [8]. The fear of complications, such as infections or eye irritation, can further exacerbate anxiety levels in these children (Smith *et al.*, 2021) [4]. Similarly, ortho-k necessitates a strict nightly regimen, which can disrupt sleep patterns and add to the psychological burden, especially if children are anxious about the procedure's long-term effects (Li *et al.*, 2020) [6].

### Age and Developmental Considerations

Age plays a crucial role in determining the suitability and impact of different optical correction aids. Younger children, who are still developing their social identities, may find spectacles more stigmatizing, whereas older children and adolescents may prefer contact lenses and ortho-k for their aesthetic and functional advantages (Wang & Ding, 2020) [7]. Additionally, the cognitive and emotional maturity required to handle the responsibilities associated with contact lens care and ortho-k may not be fully developed in younger children, making spectacles a more practical choice despite their social drawbacks.

### Gender Differences

Gender differences further complicate the relationship between optical correction aids and mental health. Studies suggest that girls may place a higher emphasis on the aesthetic aspects of their appearance, making them more

likely to prefer contact lenses or ortho-k over spectacles to avoid unwanted attention and enhance self-image (Liu *et al.*, 2021) [21]. Boys, conversely, may prioritize the functional aspects, such as the impact on sports and physical activities, making contact lenses and ortho-k more appealing despite the associated maintenance requirements (Chen *et al.*, 2021) [5]. These gender-specific preferences highlight the need for tailored approaches in myopia management that consider individual motivations and concerns.

### Long-Term Implications and Myopia Control

Orthokeratology not only improves VRQoL by eliminating the need for daytime optical aids but also plays a significant role in controlling myopia progression, which has long-term implications for ocular health (Chen *et al.*, 2021) [5]. By slowing the elongation of the eyeball, ortho-k can reduce the risk of developing high myopia and its associated complications, such as retinal detachment and glaucoma, later in life (Morgan *et al.*, 2020) [2]. This dual benefit underscores the importance of considering both immediate quality of life and future health outcomes when selecting an optical correction method.

### Integration of Visual and Psychological Care

The interplay between VRQoL and mental health necessitates a holistic approach to myopia management. Clinicians should adopt comprehensive care strategies that address not only the visual correction but also the psychological and social well-being of the child. This could involve regular psychological assessments, providing counseling services, and educating both children and their families about the potential psychological impacts of different optical aids (Wang & Ding, 2020) [7]. Additionally, fostering a supportive environment where children feel comfortable discussing their concerns can mitigate the negative mental health effects associated with myopia correction.

### Parental and Educational Support

Parental involvement is critical in managing the psychological burden associated with myopia correction, especially for younger children. Educating parents about the potential mental health challenges and training them to provide appropriate support can enhance the effectiveness of myopia management strategies (Jones *et al.*, 2019) [3]. Schools also play a pivotal role by promoting an inclusive environment and discouraging bullying related to myopia and its correction methods. Educational programs that raise awareness about myopia and its treatments can reduce stigma and encourage positive peer interactions, thereby improving the overall VRQoL for myopic children.

### Limitations of the Current Review

This review provides useful insights into the relationship between optical correction aids and mental health in myopic children, however it has limitations. The heterogeneity of the included studies regarding design, demographic, and outcome measures may affect the generalizability of the findings. Moreover, the majority of research rely on self-reported assessments of VRQoL and mental health, thus introducing bias. Future study should aim for standardized procedures and use longitudinal designs to enhance understanding of the long-term psychological consequences of different myopia correction methods.

### Future Research Directions

Future studies should explore the efficacy of integrated care models that combine optical correction with psychological support to enhance both VRQoL and mental health outcomes in myopic children. Longitudinal research is needed to assess the long-term psychological effects of using spectacles, contact lenses, and ortho-k, particularly as children transition into adolescence and adulthood. Additionally, investigating the role of technological advancements, such as smart glasses or more comfortable and easier-to-maintain contact lenses, could provide alternative solutions that minimize the psychological burden while maximizing VRQoL (Zhu *et al.*, 2022)<sup>[8]</sup>.

### Policy Implications

The insights from this review have important implications for healthcare policy and clinical practice. Policymakers should consider subsidizing advanced myopia management options like ortho-k, especially in populations with high myopia prevalence. Schools and pediatric healthcare providers should implement screening programs that not only detect myopia early but also address the associated psychological challenges. By prioritizing both visual and mental health, healthcare systems can ensure a more comprehensive approach to managing myopia in children.

### Conclusion

This narrative review emphasizes the intricate connection between VRQoL and mental health in myopic children who use different optical correction aids, such as spectacles, contact lenses, and orthokeratology (ortho-k). The choice of optical correction not only influences visual outcomes but also significantly impacts a child's psychological well-being, social interactions, and overall quality of life.

### Key Findings

Spectacles, despite being the most commonly prescribed and accessible method, often carry social stigma, particularly among school-aged children. The visibility of spectacles can lead to lower self-esteem, social anxiety, and, in some cases, depression, especially as children enter adolescence. On the other hand, contact lenses offer a more discreet form of correction, which tends to improve self-perception and social confidence. However, the psychological burden of proper lens care and the fear of potential complications can also induce anxiety, particularly in younger children.

Orthokeratology presents a unique opportunity for myopia management, offering freedom from daytime corrective wear, which positively impacts VRQoL. However, the nightly routine required for ortho-k and concerns over long-term safety can contribute to psychological stress, particularly if the child or their parents are not fully comfortable with the treatment regimen.

### Implications for Practice

These findings highlight the necessity for a more comprehensive strategy in managing myopia in youngsters. Eye care professionals should consider not only the clinical effectiveness of each optical correction method but also the child's mental health, social environment, and personal preferences. Regular counseling and support should be integrated into the care plan to address any psychological concerns, ensure adherence to the treatment, and promote a positive self-image.

### Future Directions

Future research should focus on longitudinal studies to better understand the long-term psychological effects of different myopia correction methods. Moreover, there is a need to explore interventions that could mitigate the negative psychological impacts of spectacle use, such as social skills training or peer support programs. The development of newer, less invasive myopia control methods could also provide alternatives that balance effective vision correction with minimal psychological burden.

In conclusion, while each optical correction method has its benefits and drawbacks, the choice should be tailored to the individual child, taking into account their psychological resilience, social circumstances, and lifestyle. A child-centered approach that prioritizes both visual and mental well-being is essential for optimizing outcomes in myopic children.

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