

Children and Contact Lenses: Where Do They Fit into the Spectrum of Care?

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Abstract

Many improvements have been made by the contact lens industry in the past decade. Eye care providers should take a fresh look at the use of contact lenses as part of their vision correction plan for the pediatric population. It is not uncommon for practitioners to tell parents that their child cannot be fitted into contact lenses until at least 13 years of age. Recent studies are proving that children are at no additional health risk, are just as satisfied, and are as capable of caring for their lenses as compared to teens. Children and teens benefit equally in self perception and confidence in terms of appearance and correction during their given activities. Beyond normal vision correction, contact lenses are also being examined for their ability to halt the progression of myopia, as well as their role in correction of infant aphakia. The following article provides a review of the latest findings and attitudes for fitting children into contact lenses.

Key Words

ACHIEVE, aphakia, contact lenses, daily disposable, CLIP, orthokeratology, pediatrics

Introduction

Vision correction can have a significant impact on a child's life and development. Improving vision in young children affects how the individuals interact with the world.¹ Evolving technologies raise new questions regarding the safe use of contact lenses in pediatric eye care. Practitioner attitudes are changing as multiple recent studies have concluded that fitting contact lenses in children improves a child's self-perception, does not increase the risk of adverse events, and is not anymore demanding of a practitioner's time. In the not too distant past there were many fears, as well as limited lens options, that made an optometrist reluctant to fit a child into contact lenses. Common concerns included a child's lack of responsibility to care for lenses, decreased ability to successfully insert or remove lenses, and an increased risk of adverse effects such as contact lens-induced acute red eye (CLARE) or, infiltrative or microbial keratitis. Prescribing contact lenses was reserved for children on a medically necessary basis or until the child had reached the teenage years.

Lens Options for Children

Vast improvements have been made in contact lens technology in the past decade. New lens materials increase oxygen permeability, improving comfort and physiology. Multiple replacement options exist, including daily, biweekly, and monthly. There are not only options such as soft or rigid lenses, but also a myriad of choices for materials and designs.

Many children perform without complication in gas permeable (GP) lenses, especially infants, aphakes, and those with high refractive errors or irregular astigmatism. GP lenses can be easier to insert and remove in smaller eyes, have a lower risk of microbial keratitis, and can correct any cylinder present that may not have been found during refraction of

an infant or difficult patient.^{2,3} This modality is often avoided since it can be more challenging and require more attention and adaptation time.

Soft contact lenses are the most popular choice and come in a variety of materials and, wearing modalities and offer features like ultraviolet protection. Daily disposable lenses are a great choice for children since they decrease some responsibility of lens care by eliminating the need for disinfection and solutions. Given its simplicity, this option can improve compliance with care and replacement of the lenses. Daily disposables are also an excellent alternative for those who participate in sports and wear glasses. Giving the patients and their parents the chance to purchase contacts to wear on a part-time basis for sports, special events, and occasions such as vacations or summer activities, can often be a practice building opportunity. Explaining the added benefits of this replacement modality to parents can usually allow them to overcome the extra cost of these lenses. In a study performed to determine whether daily disposable lenses were a feasible option for children ages 8 to 11, the subjects reported both good vision and comfort while wearing contacts. Ninety percent of the children rarely reported having problems handling their lenses.⁴

Extended wear (EW) lenses are not a viable option for children for many reasons. The most obvious reasons are the increased risk of complications and long-term effects, such as corneal neovascularization, and increased incidence of microbial keratitis. Not providing a child with enough practice inserting and removing lenses can be an issue since it is not done on a daily basis.⁴ On the other hand, EW lenses may be a practical option for infants, since insertion and removal (I & R) may not be feasible at all times with the frequency of nap times.² This option ensures consistent refractive correc-

tion while the child is awake and aids in the convenience of care for the parent.

Educating Your Patient

Although there is little evidence that kids and teens are less compliant than adults, taking extra precautions and time to pick out the most appropriate lens type for each individual is an important step that should not be overlooked.⁵ Education and extra supervision on common day to day activities such as hand washing and lens care can help prevent adverse events. This communication can help the child realize that contact lenses are a medical device that should not be taken for granted. Parents need to be educated on contact lens wear and hygiene techniques along with the child. Even with improved contact lens materials and studies reporting no increased risk of adverse events, children still require a certain amount of parental supervision. It is necessary to educate your patients, the children and parents, on simple common issues such as sharing contact lens solutions, sleeping in lenses, frequent case replacement, and removing lenses prior to showering or swimming. A recent study showed that wearing watertight goggles over contact lenses appears to reduce the opportunity for bacteria to attach to the contact lenses, regardless of lens material.⁶ Even with this new evidence, one should stress the necessity either to disinfect lenses immediately or to discard daily disposables after getting out of the pool.

Children and parents need to be educated on how to handle a child sleeping in their lenses against the doctor's instructions. Reiterate that it is important to take out the lenses once they wake up. Instilling a rewetting drop can help aid in removing the lens. Even more significant is informing the patient about problem signs to look for and what to do if those occur. While contacts are a healthy option, more frequent follow-up visits are needed for children than for adults. This is necessary in order to observe changes due to child growth or refractive error and to prevent complications by catching problems early.

Proper hygiene in children when deciding to suggest contact lenses as an option for vision correction must be considered. A recent study explored this issue and concluded that the micro biota found on the ocular surface of young contact lens wearing subjects, ages 8 to 14, was made up of normal flora and was similar to bacteria found in the adult population.⁷ This demonstrates that wearing contact lenses does not alter the normal microbacterial content of external ocular structures. These findings should relieve some fears that practitioners and parents may have about increased risk of infection in children.

Results of Recent Studies

The American Optometric Association (AOA) recently distributed the Children & Contact Lenses survey among its members regarding the practicing optometrist's opinion about fitting contacts on a younger age group.^{8,9} (Table 1) Greater than a half of AOA optometrists responded that they were comfortable fitting children 10-12 years old into soft contact lenses. Daily disposable lenses were the most popular modality prescribed in this age group. The study found that with the advent of improved materials and daily disposable lenses, eye care professionals are realizing the benefits of fitting children into contact lenses as primary vision correction. Another survey concerning prescribing contact lenses for in-

fants, children, and teenagers was performed by Efron et al.² They found that there is still a great difference in the way practitioners fit infants and children compared to teenagers and adults. The majority of children were prescribed either daily disposable lenses or lenses for part-time wear. There was little difference in the fitting profile between teenagers and adults.

Orthokeratology is gaining popularity as an option for correcting myopia. Recent studies show promising results in halting myopic progression with this treatment modality.¹⁰ This is an extremely important area of research for many reasons. In the United States about 25% of the population is myopic, with over half of those becoming myopic around the ages of 8 to 16.⁴ Of even more concern is progressive myopia, a detrimental and visually debilitating condition. Progress is being made in the attempt to halt myopia progression in children with treatments including progressive addition lenses (PALs), atropine, and peripheral retinal defocus. Recent focus has been placed on investigating the use of different contact lens modalities, such as dual-focus lenses, orthokeratology, multifocal lenses, and soft lenses in reducing myopic progression.¹¹ Questions remain on whether the changes being reported are clinically relevant and the effect on ocular growth (decrease of axial length or change in choroidal thickness). Some studies are reporting only a 0.25D slowing of myopic progression and have not shown whether the effects can be sustained long-term.^{12,13}

There is a theory that exists concerning the fitting of low Dk/t soft contact lenses in the pediatric population and whether or not it possibly leads to a progression of myopia.¹⁴ New studies have finally answered this question. It has been found that there is no clinically significant change in axial length or steepening of corneal curvature leading to increased myopia, in children fit with soft contact lenses versus glasses.^{15,16}

The Contact Lenses in Pediatrics study (CLIP) sought to determine if it was appropriate to fit children under the age of 12 into contact lenses. This was evaluated from a practice management, physiological, and psychological standpoint. One portion of the CLIP study investigated whether more chair time was necessary to fit a child, 8-12 years old, compared to a teenager, 13-17 years old. It was found that younger children can take up to 15 minutes longer to fit into contacts, but this increased time was only in the time spent in teaching I & R. The researchers of this study noted that in most practices, I & R training is performed by staff members, so the time spent directly with the practitioner for the fitting remained the same between children and teens.¹⁷ The study also found that during the three-month study period, there were no significant differences in serious contact lens related adverse events between the two age groups. When examining slit lamp findings, teens and children adjusted equally, physiologically, to the contact lenses fitted in the study. Both groups proved they were able to care for their lenses properly.

A survey of participants to determine the number of patients that continued in contact lenses found 80% of teens and 63% of children used lenses three months after the conclusion of the study.¹⁸ According to the surveys filled out by the parents, children were most likely to drop out of contact lens wear because they preferred wearing their glasses, while teenagers dropped out of contacts due to the added expense. Both groups reported wearing their contacts "often" or "always"

Table 1: Summary of recent studies concerning contact lenses and children.

Study	Purpose	Outcome
Adolescent and Child Health Initiative for Vision Empowerment (ACHIEVE)	Investigated what advantages contact lens wear has over glasses on a child's vision specific quality of life.	Contact lenses provide improvements in vision specific quality of life in the areas of appearance, athletics and satisfaction with correction.
Contact Lenses in Pediatrics Study (CLIP)	Should children between the ages of 8-12 be fit into contact lenses, from a practice management and physiological standpoint.	Compared to teens, 8-12 year old children take up to 15 minutes longer to fit, only in the area of I & R. No significant differences in serious contact lens related adverse events between children and teenagers.
Children & Contact lenses, AOA survey	Survey done to establish attitudes and practices of practicing AOA optometrists concerning fitting children into contact lenses.	>50% were comfortable fitting a child 10-12 years old into contacts. Most popular: daily disposables
Infant Aphakia Treatment Study	Which correction, Contact lenses vs IOLs, will provide the child with the best visual outcome.	To date, results of the IATS have been collected at age one and show no significant difference in visual acuity between the two treatment groups.
Emergency Department Visits for Medical Device- Associated Adverse Events Among Children	Determine reasons for the pediatric population to present to the emergency department for medical device associated events (MDAEs)	Contact lenses were the most common MDAE (23%)

over 80% of the time.¹⁸ Children and teens also experienced symptoms less often than what has been reported for adults in other studies.

The Adolescent and Child Health Initiative to Encourage Vision Empowerment (ACHIEVE) study researched the advantages of contact lens wear over glasses on a child's vision-specific quality of life.^{19,20} More specifically, the impact of contact lens versus spectacle wear on a child's self perception was examined over a three-year period. The children in the study completed the Pediatric Refractive Error Profile (PREP) survey while using glasses at the baseline visit and then again when using contacts at follow up visits. The survey included a wide range of questions covering care and handling, quality of vision, and satisfaction in wearing the correction. Contact lens wearers in the ACHIEVE study had greater improvements in the areas of appearance, athletics, and satisfaction with correction.²¹ The ACHIEVE study also looked at the amount of time participants wore contact lenses or spectacle correction. Spectacle wearers on average wore their glasses more than contact lens wearers did their contacts. On the other hand, contact lens wearers spent the same amount of time wearing correction as did spectacle wearers, since they wore their glasses when not in contacts. The study also showed that the higher the refractive error, the longer the wearing time for correction, and that younger participants wore their contact lenses for shorter periods than spectacle wearers wore their glasses. Contact lenses were proven to be a beneficial option for primary vision correction since they had a major impact on a child's motivation to wear vision correction.

Fitting children and teens with contact lenses is not simply about correcting refractive error and providing great vision. This mode of correction empowers children by boosting their self-confidence, impacting the way they feel among their peers and their involvement in activities such as sports.²² This can be a major advantage in a child's social development and

self esteem. A very important consideration is a child's performance in the classroom. This goes beyond allowing them to function with good, clear vision. A child may be concerned about their appearance when wearing glasses while at school. Contact lenses can increase motivation to wear vision correction in the classroom, giving the self-confidence needed to succeed academically. Based on the aforementioned studies, practitioners can now confidently, routinely fit contact lenses on children as young as eight years old.

Therapeutic or medically necessary contact lenses make up the majority of contact lens fittings being performed currently for the pediatric age group. The Infant Aphakia Treatment Study (IATS) was performed to determine which correction, contact lenses or intraocular lens (IOL) placement, provided the best visual outcome. Contact lens fitting after cataract extraction is currently the most common mode of correction of aphakia in infants or toddlers. In recent years, surgeons have increasingly implanted IOLs in young children, but there is still concern as to whether this option increases complications. Uncertainty remains as to what is the optimal treatment for infants with unilateral congenital cataracts after surgery.²³ This study sought to determine the effectiveness of IOL implantation in infancy and to compare the visual outcomes of contact lenses versus IOLs. The average study patient was seven weeks old. All patients underwent lensectomy and were placed into one of two groups. The first group was provided contact lens correction to account for aphakia. The second group underwent IOL implantation and was given a spectacle over correction for any remaining refractive error. After surgery, patching regimens were implemented in either group to allow maximum visual development. To date, results of IATS have been collected at age one and show no significant difference in visual acuity between the two treatment groups. As expected, there were more complications that required surgical intervention among the IOL group, but this did not have any effect on the overall visual outcome.

A recent article examined the most common reasons for emergency department visits for medical device associated adverse events (MDAEs) in the pediatric population (birth to 21 years). The most common device, making up one third of MDAEs, was found to be ophthalmic devices; specifically contact lenses worn by children of at least eleven years of age.²⁴ The adverse events included corneal abrasion, ulceration and conjunctivitis. The types of eye injuries that reported to the emergency departments were for the most part preventable and should have instead presented to an optometric office. A majority of these patients presented to the emergency department for reasons attributed either to lack of knowledge of proper contact lens hygiene, non-compliance with lens care or wearing time, or improper lens replacement schedules. This study emphasized the necessity to review proper lens care, hygiene, replacement, and what to do if complications arise. This education should be performed with every contact lens patient, not only at the initial visit, but also at every subsequent office visit. This information needs to be stressed not only with the child, but with the parents as well. Proper education, frequent follow-ups, and an established on call service are ways to ensure these patients return to your office when problems arise and prevent unnecessary trips to the hospital. It is important to keep in mind that some of the cases could have been common childhood eye problems, like conjunctivitis. Contact lens wear may not actually have caused or contributed to the problem.²

A child's interest, motivation, maturity, independent ability to take care of lenses, personal hygiene, and parental support are factors that should be considered. Activities in which the child participates and specific lifestyle needs of the child should be evaluated on a case-by-case basis.

We must be cautious of those children who are being pushed by their parents to start wearing contact lenses. Fitting a child who is unmotivated and hesitant can make for a difficult exam. The child could potentially be less compliant, decreasing the practitioner's ability to monitor corneal integrity and lens fit.³ During the CLIP study, eye care providers were asked a series of questions prior to fitting the child. This was done to establish whether practitioners could predict which children were capable of successful contact lens fit and wear based solely on first impression. Analysis at the conclusion of the study confirmed that overall, doctors were able to pick out which young patients would require more attention. Practitioners reported that assessing a child's hygiene, parental and patient motivation, anxiety, maturity, and aperture size could help in determining ease of the possible fit.¹⁷

Conclusion

With current studies advocating safety of contact lens wear for children, optometrists need to be prepared to fit and care for younger contact lens patients who present to their practices. Appropriately train your staff on how to deal with children, whether in the form of simple communication skills or tips on I & R training. This can help relieve stress not only for your staff, but for your patients as well. Develop certain training techniques or homework exercises to aid in your patients' I & R skills, such as practicing touching the eye prior to learning contact lens insertion. Make sure that the child can remove the lens themselves, not the parent, before dispensing. This can help avoid problems at home or unnecessary frantic after-hours phone calls. Patient and parent education

is a step that should not be overlooked. Contact lenses are a viable and safe option for primary vision correction for our young patients and should be considered as a first line option for vision correction.

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