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Pregled
Review

ROLE OF CONTACT LENSES IN PEDIATRIC OPHTHALMOLOGY

SNJEŽANA MILJAK*

To highlight the importance of wearing contact lenses (CLs) for achieving the best results in vision development. A significant body of literature referring to this issue has been reviewed. The experience of many years of work in our Department of contactology is included as well. It is also important to point out the ease with which children with no previous contact lens experience are able to handle and be fitted with contact lenses.

Descriptors: CONTACT LENSES, REFRACTIVE ERROR, VISUAL DEVELOPMENT

Children wear contact lenses for the same reasons adults do, including improved vision, better appearance and better comfort. However, while adults have a limitation in their vision change capability, children's vision is constantly developing due to brain plasticity. So, it is very important to offer them the best possible visual input at an early age to give them a chance for the development of the best vision, single as well as binocular, and prevent amblyopia. Among all ways for combat with refractive errors, including refractive surgery, contact lenses (CLs), especially gas permeable (GP), provide the sharpest vision by correction of any corneal irregularities or astigmatism.

Indications for contact lens wear vary widely in child population. The most common reason for contact lens wear in youngsters is correction of refractive error. However, contact lenses may also be used to improve binocular vision, slow the progression of myopia, as a protective, bandage lens for various corneal disorders and for improvement the cosmetic appearance of disfigured eyes. Although the vision improvement is the main goal in those who are wearing CLs, a psychological effect and self-confidence about their appearance, are not less important for children who are wearing contact lenses (1-3).

Advantage of wearing contact lenses versus spectacles:

- better correction of high refractive errors;
- better peripheral vision, less distortion;
- eliminating prismating spectacle effect;
- minimal aniseikonia in high anisometropia;
- prevention of amblyopia;
- myopia progression reduction (Ortho K, multifocals);
- improving children's perception of themselves and increasing their self-esteem;
- ability to participate in athletic activities.

Medical indications for fitting contact lenses

- high refractive error;
- anisometropia >3.0 Diopter (D);
- high degree of astigmatism or irregularity (i.e. keratoconus);
- pediatric cataract;
- occlusion therapy or penalization in amblyopia treatment;
- bandage CLs after trauma, surgery or some other ocular surface disorders;
- prosthetic CLs for covering disfigured eyes (corneal scar, leucoma, iris coloboma,
- aniridia, albinism).

Anisometropia

Refractive error differs in two eyes. Greater than 3.0 D cannot be corrected properly with spectacles because of presenting two different sizes of images to the brain, which it would be unable to process. This problem does not exist with contact CLs on eyes, because the images that they provide are more natural and acceptable to brain (8). If not corrected with CLs, the child will develop amblyopia.

Astigmatism

Astigmatism simply means that the cornea is not perfectly spherical. It creates multiple focal points for the light entering the eye. This results in blurred vision. Almost all astigmatism results

*Department of Ophthalmology
University hospital Split

Address:
Dr. Snježana Miljak, spec. oftalmolog
Department of Ophthalmology
University hospital Split
21000 Split, Spinčićeva 1
E-mail: smiljak2000@yahoo.com

from the front surface of the cornea. Since GP lenses are rigid, they can mold the tear film on the front of the eye into a spherical shape. This is why GP CLs are an ideal corrective solution, much better than spectacles or soft toric CLs (7). For the extremely irregular corneas as iandn keratoconus or following an injury, special GP lenses are the treatment of choice.

Pediatric cataract

According to a large multicenter randomized clinical trial, Infant Aphakia Treatment Study (IATS) which is still in progression, cataracts account for 5-20 % of childhood blindness worldwide. The incidence is 2-3/10.000 live births. 40-50% of congenital cataracts are unilateral, that is more expecting to be strongly ambliogenic and sight-threatening. There are two main approaches to deal with this issue: cataract surgery with lens extraction and correction of aphkia with CLs or primary implantation of an intraocular lens (IOL). After 4.5 years of following those children, there was no significant difference in visual outcomes between the two methods. Because of accelerating eye grow after birth and multiple postoperative complications of infantile cataract surgery, the attitude, according to this study, is that children under 7 months of age would be correct with contact lenses with possible secondary implantation of an IOL in later age (12, 13). After seven months of age the recommendation is to implant an IOL.

Amblyopia (lazy eye)

This is disorder of sight when eye and a brain are not working well together. This results in a decreased visual acuity in one eye which is otherwise normal. Amblyopia can result from any condition that prevents the eye from focusing clearly. It is most common cause of decreased vision among children. The way of treating this condition is to deprive sound eye and make the child to use the weaker eye. This can be done by putting a patch or prosthetic CL over the child's stronger eye (16). Another way is to make vision blurry in the stronger eye using eye drops (Atropin) or wearing spectacles or contact lens with power that blurs vision in that eye (penalization).

Figure 1
An examination with a biomicroscope

Figure 2
A young patient putting a contact lens on eye

Myopia slow down

There are many controversies about slowing down myopia with contact lenses. Today we are witnesses of drastic increase in the prevalence of myopia. It is predictable that a 50% of world population will become myopic to the year of 2050. Also, opposite to the earlier, general accepted opinion, that central retina has a main place in correction of a refractive error; recently we have the knowledge that the peripheral retina plays a dominant role in the development of myopia progression (4). Based on that facts, the special design of GP CLs, named Ortho-K, have been produced and give us a hope of possible way for dealing with an accelerating eyes growth and slowing down myopia progression (9, 10).

Bandage contact lenses

These kinds of lenses protect the injured or sick cornea. Use of bandage lenses facilitates corneal healing and brings a pain relief (14).

Prosthetic contact lenses

When the eye is disfigured from the birth defect (iris coloboma, microphtalmus, heterochromia), trauma or eye disease it has a great impact at a child's vision and social life. Prosthetic CLs help to mask such defect and mach to the appearance of a healthy eye with improvement self-esteem as well (15).

Kind of contact lenses

- rigid gas permeable;
- soft.

Children can be fitted with any kind of contact lenses. Soft CLs give more comfort instantly, but GP CLs need some short period to be accepted. However GP lenses provide sharper and more stable vision, they are less prone for infections or attraction lipids and proteins from tears. They are also extremely durable, less expensive and easier for handling. And last but not least, they are healthier due to a highest oxygen transmission.

From all these reasons European Contact Les Society of Ophthalmology (ECLSO) recommend GP CLs for youngsters as the first choice for all ametropias and all ages. Despite of all benefits of contact lenses, it is important to never forget that wearing CLs include some serious risks, like infections, allergies, irritation. The most dangerous and possible sight-threatening risk is microbial corneal ulceration. Parents must be strongly aware of potential harm and help children in care regimen and CLs handling. Children can be fitted with CLs at any age, just days old if the medical indication exists. They are great CLs wearers but in those early years, they need to be monitored and encouraged by their parents.

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Sažetak

ULOGA KONTAKTNIH LEĆA U DJEČJOJ OFTALMOLOGIJI

Snježana Miljak

Istaknuti važnost nošenja kontaktnih leća u postizanju najboljih rezultata u razvoju vida. Pregledan je značajan broj objavljenih radova koji se bave ovom temom. U rad je uvršteno i dugogodišnje iskustvo u radu s djecom u našoj ambulanti za kontaktne leće. Za naglasiti je da su djeca, unatoč čestim predrasudama, izvrsni nositelji kontaktnih leća, vrlo odgovorno se brinu o njima i s lakoćom ih nose.

Deskriptori: KONTAKTNE LEĆE, REFRAKCIJSKA GREŠKA, RAZVOJ VIDA

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