



Published by DiscoverSys

Update in non surgical management of refractive disorder



CrossMark

Ariesanti Tri Handayani^{1*}, Ni Made Ari Suryathi¹, I Made Agus Kusumadaja¹,
Nila Wahyuni², Cok Istri Dewiyani Pemayun³, I Gusti Ayu Ratna Suryaningrum¹

ABSTRACT

Refractive error is one of the most common cause of avoidable blindness in the world. The prevalence of refractive error occurs in the worldwide were increasing every years, including in the Asian regions. This condition influenced by many risk factors, which are both modifiable and non-modifiable risk factors. There are three types of refractive errors: myopia, hypermetropia, and astigmatism

with low vision condition as the impact of the untreated refractive disorder. Two types of refractive disorder therapies was surgical and non-surgical therapy. Non-surgical therapy including spectacles, contact lenses, and optical low vision devices. The proper management of the refractive error can improving patient's quality of life.

Keywords: Refractive error, nonsurgical therapy, spectacle, contact lens, low vision device

Cite This Article: Handayani, A.T., Suryathi, N.M.A., Kusumadaja, I.M.A., Wahyuni, N., Pemayun, C.I.D., Suryaningrum, I.G.A.R. 2019. Update In Non Surgical Management of Refractive Disorder. *Bali Journal of Ophthalmology* 3(2): 25-28.

¹Ophthalmology Department, Faculty of Medicine, Udayana University, Sanglah Hospital, Denpasar

²Department of Physiology, Faculty of Medicine, Udayana University, Denpasar

³Ophthalmology Department, Faculty of Medicine, Udayana University, Bali Mandara Eye Hospital, Denpasar

INTRODUCTION

Refractive errors are one of the most common eye disorders, often occurring both in children and adults. Previous studies have shown a surge in the number of people with refractive error in Asia compared to western countries.¹ There are 3 types of refractive errors : myopia, hypermetropia, and astigmatism. Correcting refractive error both improve the quality of life and assist patients in carrying out activities related to vision. Surgical and non-surgical therapy are available for correcting refractive errors. Non-surgical therapies includes using spectacles, contact lenses, and low vision devices.^{2,3}

SPECTACLES

Spectacles are the most common way to correct refractive error. Three main types of lenses used are (1) concave lenses, used to correct myopia; (2) convex lens, used to correct hypermetropia; and (3) cylindrical lenses, that used in astigmatism (Figure 1).⁴

Spectacles with monofocal lenses are the most commonly used for the correction of myopia or hypermetropia. This type of lens only has 1 focus of vision. Individuals over the age of 40 need additional spectacles for near vision. Spectacles that have 2 focus in 1 lens, both for far and near vision, are using spectacles with bifocal lenses. Bifocal

spectacles have a line that limits the lens for each focus. Whereas multifocal spectacles have 3 focus in 1 lens and do not have a border line on the lens (Figure 2).^{3,4}

CONTACT LENSES

Contact lenses are an option in the management of refractive errors, especially in young adults. Contact lenses originally used glass materials, but over time, there are various choices of contact lens materials.⁵ The use of contact lenses must be based on indications, with proper fitting preparation, and taking into account the patient's medical condition. Indications for use of contact lenses can be divided into therapeutic and cosmetic indications (Table 1). Contraindications for the use of contact lenses are presented in Table 2.⁶

Contact lenses are divided into 2 categories, namely rigid and soft lenses (Figure 3). The use of these two types of contact lenses is based on the patient's refractive error, whether it is spherical or spherocylindrical abnormalities. Soft contact lenses are use to correct hypermetropia or myopia with astigmatism <1 D. While rigid contact lenses are usually use to correct both regular and irregular astigmatism.^{7,8}

The steps wearing and caring of contact include (1) hand washing; (2) clean each contact lens with a special cleaning fluid, according to the

*Corresponding to:
Ariesanti Tri Handayani;
Ophthalmology Department,
Faculty of Medicine, Udayana
University, Sanglah Hospital,
Denpasar;
dr.ariesanti@gmail.com

Received : 2019-03-03

Accepted : 2019-03-26

Published : 2019-06-01

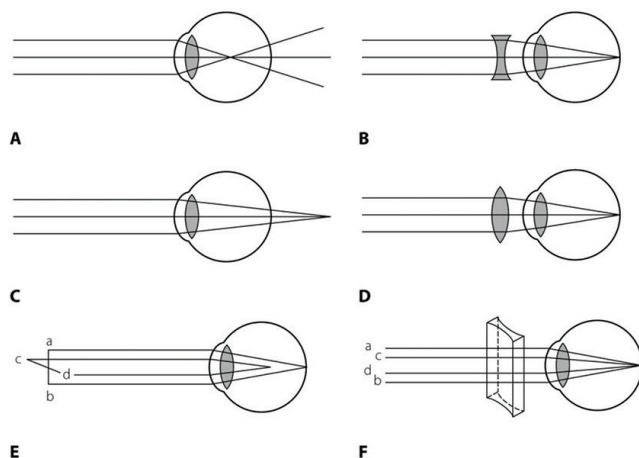


Figure 1. The principle use of lenses in refractive error. A-B, in myopia; C-D, in hypermetropia; E-F, in astigmatism⁴

Table 1. Indications for use of contact lenses⁶

Indications	Description
Therapeutic	• Management of refractive disorder • Aphakia • Keratoconus • Irregular cornea due to trauma or surgery • <i>Bandage contact lens</i> • Occlusion • <i>Accommodative esotropia therapy or convergence of excess</i>
Cosmetic	• Use of prosthetic

Table 2. Contraindications to the use of contact lenses⁶

Contraindications	Description
Ocular	• Active Infection of anterior segment • <i>Dry eye</i> (relative contraindication) • Allergy • Presence of <i>active filtering bleb</i> • Decreased corneal sensibility
Sistemik Systemic	• Immunosuppressant therapy • Diabetic Patient



Figure 3. Comparison between soft (right) and rigid (left) contact lenses⁷

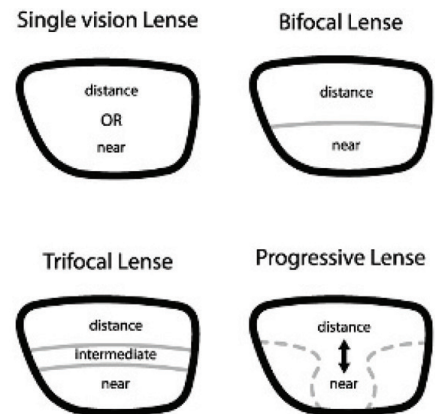


Figure 2. Illustration of monofocal, bifocal, multifocal and progressive spectacles³

manufacturer's instructions. Hand movements when cleaning must be gentle, without damaging or scratching contact lenses; (3) After use, contact lenses are cleaned again and stored in a clean and closed lens case; (4) Repeat the same cleaning procedure before wearing contact lenses again if the first attempt fails. Make sure the contact lenses used are not damaged.^{5,6}

Complications of using contact lens can be divided into infectious and non-infectious. Non-infectious complications include allergic reactions, irritation, or dry eye. Management of non-infectious complications includes stop wearing contact lens, improving eyelid hygiene, and using artificial tears, anti-allergic or anti-inflammatory eye drops. Infection in contact lens wearers is caused by *acanthamoeba*, bacteria, fungi, or viruses. Management of infections caused by the use of contact lenses is done according to the etiology.⁶

LOW VISION DEVICES

Low vision is a condition that involves a minimal ability to see (particularly central vision) which is usually 6/18 or worse that is uncorrected with spectacles, contact lens, intraocular lenses, or refractive surgery, accompanied by difficulties in performing daily activities. According to WHO statistics, there are 135 million low-vision individuals worldwide, of which 90% of these individuals live in developed countries and 1.5 million are children aged 0-15 years.⁹ Common causes of low vision in young individuals include retinitis pigmentosa, papillary atrophy, cataracts or glaucoma, whereas in the elderly are age-related macular degeneration and diabetic retinopathy. Effective low vision therapy and rehabilitation can be done if this condition is detected earlier.¹⁰



Figure 4. low vision patient using a monocular telescope (left); Monocular telescope with various magnifications (Left)¹⁰



Figure 5. Spectacle magnifier in the left frame⁹



Figure 6. Hand-held magnifier (Left); Stand magnifier (Right)¹¹



Figure 7. Tinted lenses glasses⁹

Instruments used to improve vision in low-vision individuals are called Low Vision Devices (LVD). LVD is divided into 2 categories, namely optical and non-optical LVD. Optical LVD is an instrument that uses special lenses, such as magnifiers and telescopes, while non-optical LVD is a simple instrument that can help people with low vision without use of special lenses. It usually uses printed items such as magazines with larger printed letters, digital clocks, calculators, and text-to-speech instrument.¹¹

OPTICAL LOW VISION DEVICES

Telescopes

Distance-vision telescopes are the only optical devices that assist low-vision patients with distance tasks when conventional glasses are unsuccessful. Telescopes improve the resolution of objects by angular magnification. Telescopic lenses are not preferred due to cosmetic reasons and because of restricted field of view.¹⁰

Spectacle Magnifier (High-Plus Reading Spectacles)

These are monocular or binocular convex reading lenses mounted in a standard full diameter or half eye frame. The powers range up to +24 D. They are used for close working distance such as reading or needlework. The disadvantage is a requirement of close working distance which may obstruct the illumination and make writing difficult if the lens is stronger than +10 D.⁹



Figure 8. high contrast and larger clock (left); writing guides (right)¹²

Magnifiers

These could be either hand-held or stand magnifiers and are designed to help low-vision patients with short-term spotting tasks like reading a newspaper. Hand-held magnifiers need to be held with the hands while stand magnifiers are convex lenses with a fixed focus stand, thus more preferable especially in old patients with tremors. Magnifiers range from +10 to +24 D. The disadvantages are a reduced field of view and are inconvenient to carry around.⁹⁻¹¹

Glare Control Devices

Low-vision patients often experience glare. Absorptive tinted lens or anti-reflective coating can be prescribed to counter glare.⁹

Non-optical Low Vision Devices

Non-optical LVD helps bring the image closer to the eyes and may include the use of larger print items (i.e. magazines, newspaper, books, cards, street signs), larger and illuminated watches and clocks, writing guides and text-to-speech instruments.¹²

CONCLUSION

Refractive errors are one of the most common eye disorders, often occur both in children and adults. Meanwhile low vision is a condition that involves a minimal ability to see which is usually 6/18 or worse (uncorrected with spectacles, contact lens, intraocular lenses, or refractive surgery) accompanied by difficulties in performing daily activities. Managing refractive disorder is an important step to increase patient quality of life. Both surgical and non-surgical therapy are available for correcting refractive error. Nonsurgical therapy including spectacles, contact lenses, low vision device (both optical and non-optical devices) could be chosen to manage low vision and refractive disorder well.

REFERENCE

1. Saw SM, Chan YH, Wong WL, Shankar A, Sandar M, Aung T, Wong TY. 2008. Prevalence and risk factors for refractive errors in the Singapore Malay Eye Survey. *Ophthalmology*. 115(10): 1713-1719
2. Lamoureux EL, Saw SM, Thumboo J, Wee HL, Aung T, Mitchell P, Wong TY. 2009. The impact of corrected and uncorrected refractive error on visual functioning: The Singapore Malay Eye Study. *Clinical and Epidemiologic Research*. 50: 2614-2620
3. Naidoo KS, Maharaj YI, Pillay V, Fellhauer S. 2011. Optical Products for Refractive Error and Low Vision. *Community Eye Health Journal*. 24(76)
4. Kolker RJ. 2015. Subjective Refraction and Lens Prescription. In: *Subjective Refraction and Prescribing Glasses*.
5. Barr JT. 2005. History and development of contact lenses. In: Bennett ES, Weissman BA, eds. *Clinical contact lens practice*, 2nd ed. Philadelphia: JB Lippincott. pp1-10
6. American Optometric Association. 2006. Optometric Clinical Practice Guideline Care of The Contact Lens Patient 2nd ed. St.Louis.
7. Charman WN. 2018. Rigid Lens Optics. Nathan E editor, In: *Contact Lens Practice* 3rd ed Chap 3. Elsevier
8. Charman WN. 2018. Soft Lens Optics. Nathan E editor, In: *Contact Lens Practice* 3rd ed Chap 2. Elsevier
9. Liz S. 2008. Low vision and rehabilitation for older people: integrating services into the health care system. *J Comm Eye Health*. 21: 28-30
10. Arya SK, Kalia A, Pant K, Sood S. 2010. Low vision devices. *Nep J Oph*. 2(3): 74-77
11. Brown B. 2007. Optical low vision aids. In *The Low Vision Handbook for Eyecare Professionals* 2nd ed: Ledford JK, Daniels K, Campbell R. USA: Slack Incorporated
12. Lee SMY, Cho JCW. 2007. Low vision devices for children. *Community Eye Health Journal*. 20(62)



This work is licensed under a Creative Commons Attribution