

Presbyopia and Recent Advances in it's Management-A Review

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Abstract

Presbyopia, not a refractive error, is a physiological reduction in amplitude of accommodation which brings deterioration in near vision. It is an irreversible loss of the accommodative ability of the eye. One cannot escape presbyopia, even if one has never had a vision problem before. Usually, it begins between the ages of 40 - 45 years but it varies with profession, working distances, lighting and many more factors. A number of treatment approaches have been established to correct this age-related condition. The spectacle correction, commonly referred to as "reading glass" still remains the most extensively prescribed method. Other optical management techniques like bifocals, multifocal, Progressive lenses, contact lenses, monovision technique, corneal inlays etc. are also popular and though less popular, surgical procedures are also available these days. There have been many advances in presbyopia management and this has helped people spend their presbyopic ages with comfort. Eye care professionals are responsible for creating awareness about presbyopia, counsel and provide them with appropriate optical corrections and also update them with recent advances in presbyopia management.

Keywords: Accommodation; Reading Glasses; Bifocal; Progressive; Monovision

Introduction

According to American Academy of Ophthalmology (AAO), Presbyopia is a condition of physiological insufficiency of accommodation in which our eyes gradually lose the ability to see things clearly up close. It is an irreversible loss of the accommodative ability of the eye due to reduced amplitude of accommodation leading to progressive fall in near vision [1]. The term "presbyopia" comes from a Greek words "Presbus" and "ops" which means "old eye", therefore this condition begins between the ages of 40 - 45 years [2] normally but it varies with profession, working distances, lighting and many more factors. And nowadays, with the extensive use of electronic gadgets, presbyopia is often reported among the population from early-thirties to late thirties.

In a healthy state, the lens helps to focus light on the retina by changing its shape and it is done with the help of contraction of ciliary muscles. However, with aging, the lens becomes less elastic so, it cannot change its shape easily and the contraction of ciliary muscles also decreases. As a result, it is unable to bend the light to focus it on the retina so it becomes harder to perform any near vision task. A number of treatment approaches have been established to correct this age-related condition. The spectacle correction, commonly referred to as "reading glass" still remains the most extensively prescribed method.

A number of treatment approaches have been established to correct this age-related condition. The spectacle correction, commonly referred to as “reading glass” still remains the most extensively prescribed method. However, people with certain lifestyles find the use of contact lenses or spectacles inconvenient, whether due to cosmesis or due to the limitation of daily or athletic activities. Although near vision can be easily recovered by the use of reading glasses, there is nonetheless a great demand for more permanent solutions to avoid the use of corrective lenses. Therefore, focus have been shifted towards a more cosmetically acceptable approach and with advent of refractive surgery, interest in the development of surgical techniques to correct presbyopia have been explored.

Presbyopia is the only ocular condition which arises 100 percent on patients above age 50, with a peak prevalence at the age of 52 years [2]. One may start to notice presbyopia shortly after the age of 40. People probably find themselves holding the reading materials farther away in order to see them clearly. According to the World Health Organization (WHO), the total presbyopic patient in the world is around 1.3 billion [3], which has doubled in 2015. In Nepal 58.8% among age group 35 and over are presbyopic [4] whereas in Asia; 43.8%, in America and Africa; 58.9%, in China; 32%.

Increment in age is irreversible and unstoppable but in addition to that, gadgets have added one of the main factors to cause presbyopia even in early 30s. Both *Homosapiens* and superior primates cannot escape from being presbyopic after reaching a certain age but the modernization has caused the humans to be a superior sufferer. Presbyop workers over 40 years old are at increased risk for symptoms associated with CVS [5].

According to an article published in “The Kathmandu post” over 65 percent of the people suffering from presbyopia, or the long sightedness, in their early 30s, were found to be heavy users of electronic gadgets, including tablets and laptops [6]. Excessive use of gadgets not only cause presbyopia but redness, dryness, blurring vision, headache and even disorders like Digital eye strain, Dry eye syndrome, Computer vision syndrome and many more.

Risk factors

Though presbyopia is an age-related condition, number of risk factors have been associated with the early onset and they are:

1. **Geographic factors:** Proximity to population near to the equator (higher average annual temperature, greater exposure to ultraviolet radiation).
2. **Gender:** Females preponderance over males.
3. **Systemic illness:** Diabetes Mellitus, cardiovascular accidents, multiple sclerosis, myasthenia gravis, anemia, vascular insufficiency, etc.
4. **Occupation:** People with near vision demand like watch-makers, microbiologist, heavy computer workers, etc.
5. **Drugs:** Anti-anxiety, anti-depressants, hydrochlorothiazide, alcohol, antipsychotics, antispasmodics, diuretics, antihistamines, etc.
6. **Refractive error:** The frequency follows: Hyperope > Emmetrope > myope.
7. **Hyperopia:** Additional accommodative demand.
8. **Iatrogenic factors:** Scatter (pan-retinal) laser photocoagulation, intra ocular surgeries, etc.

Mechanism and pathophysiology

Decrease in the accommodative power of crystalline lens with increasing age leads one to become presbyopic. With that, age related decline in ciliary muscle power for accommodation, premature sclerosis of crystalline lens, chronic simple glaucoma and change in elasticity of lens also contribute to causation of presbyopia.

In presbyopia, an age related changes occur within the proteins of the lens, making the lens harder and comparatively less elastic over time. Increased lens volume with age results in reduced response of anterior radius of curvature to the vitreous pressure gradient created by ciliary body contraction. Age related changes also occur in the muscle fibers surrounding the lens. With less elasticity, the eye feels hard to focus up, these are best explained by theories of accommodation- HELMHOLTZ, SCHACHAR and CATENARY [7].

Symptoms

The main symptom of onset of presbyopia is difficulty in near vision. One may notice the inadequacy of vision while reading small print like newspaper and finer objects at usual reading distance. To start with, such problems occurs in the evening and in dim light, and later even in good light. Finally, near work becomes impossible. With that, asthenopic symptoms like eye strain, headache, and ocular discomfort are also complained due to fatigue of ciliary muscle [8] while performing any near work. Some presbyopes may even feel that their hands are not long enough for near works.

Signs

- Low accommodative amplitude
- Secondary convergence insufficiency
- Low PRA
- Fails monocular and binocular accommodative facility with minus lenses
- Esophoria at near
- High MEM and fused cross cylinder.

Classification

Depending upon the level of decrease in amplitude of accommodation, presbyopia can be of five types as described below:

- **Incipient presbyopia:** As the name indicates, it is the incipient stage, marking the beginning of presbyopia. During this stage, the symptoms of difficulty in near vision are present only during dim room light illumination but absent on normal conditions. The amplitude of accommodation begins to decline in this stage, but not significant enough to cause near vision difficulties, except for dim light illuminations.
- **Premature presbyopia:** Normally presbyopia begins between the ages of 40 to 45 years old. When presbyopia occurs at an age earlier than that expected for a normal population, it is known as premature presbyopia. The causes of premature presbyopia are:

- Uncorrected hypermetropia
 - Premature sclerosis of crystalline lens
 - General debility causing pre-senile weakness of ciliary muscle
 - Chronic simple glaucoma.
- **Latent presbyopia:** Latent presbyopia is the type of presbyopia which is masked by the eye's ability to accommodate for near visual demands. Therefore, there is no need for corrective glasses.
 - **Manifest (Functional) presbyopia:** Manifest presbyopia is the form of presbyopia in which symptoms of near vision difficulties are present in both dim and normal room lightening conditions. Some amount of amplitude of accommodation is present thus, some degree of accommodative effort can be exerted.
 - **Absolute presbyopia:** When the amplitude of accommodation falls to zero, it is referred to as absolute presbyopia. In absolute presbyopia, no amount of accommodation can be exerted.

Implications of presbyopia

For many of us, it may seem like just another annoyance that comes on the way of ageing. Uncorrected presbyopia, however it can result in severe visual impairment and vision is likely to deteriorate gradually with time [9]. It may increasingly affect one's lifestyle over time and one may have to face significant visual disability if not treated with time. The global burden of uncorrected presbyopia in terms of productivity loss is estimated to be just over \$11 billion annually [9]. As no one can escape from presbyopia, it may cause some other ocular complication along it like; astigmatism, far sightedness and near sightedness. The presbyopic years spent by a person is likely to increase more with use of electronic gadgets.

Prevalence of presbyopia is estimated to be higher in regions with longer life expectancies, whereas the greatest burden of VI resulting from uncorrected presbyopia occurs in low-resource countries [3]. Moreover, uncorrected presbyopia especially among geriatric population have been an important cause of fall injuries and its co-morbidities. Though the presbyopic population accounts for more than 50% of Nepalese population, no effective measures have been taken to correct them, which adds to the burden of uncorrected refractive errors even more. The co-morbidities along with visual impairment due to unmanaged presbyopia will increase the dependency of presbyopic patients on others which will affect their quality of life. It is important to stress that presbyopia describes the number of people who would be visually impaired at near without adequate optical correction. Therefore, optical correction of presbyopia by any means will prevent them from being visually impaired.

Prevention?

One cannot escape presbyopia, even if one has never had a vision problem before. However, the occurrence of presbyopia at an early stage can be prevented by avoiding the long-hour exposure to mobile phones, tablets and laptops. Presbyopia also cannot be prevented just by diet and exercise as they have no effect. Those who use near vision daily in their activities will notice and complain about it sooner which is why these days, with greater use of gadgets, people need corrective glasses sooner, sometimes even at the age of 30 - 32 years [6].

Luckily, this condition can be corrected by different options: which includes non-invasive options like optical correction and therapies, and invasive procedures including surgeries. Optical correction includes the prescription of glasses and contact lenses. It is done by supplementing accommodation with convex lenses of appropriate power, required for a clear and comfortable near vision. Bifocal contact lenses available in many soft and RGP lens designs can also be considered. There are various methods of prescribing near add in spec-

tacles or in contact lens; some of them have been described below:

A. Spectacle correction: For supplementing accommodation by the use of spectacles, various modes are available and they are:

- **Single vision reading glasses:** Single vision reading glasses are most suitable for those patients who have no significant distant correction, but need a near correction. The patient should be instructed to remove the near glass during distance and intermediate viewing conditions. The most suitable frame for single vision reading glasses is "Half-eye" as it allows comfortable distance vision over the spectacle level without having to remove it.
- **Bifocals:** Bifocals are suitable for those patients who have significant distance ametropia along with presbyopia. The bifocal consists of two different powers: upper for distance vision and lower for near vision. Bifocals are suitable for high add power requirements. One of the major disadvantages of bifocal is the noticeably visible segment top and image jump at the segment top.
- **Trifocals:** Trifocals have three portions: upper for distant vision, middle for intermediate vision and lower for near vision. It is suitable for those patients who have got more exacting use of intermediate distance. The intermediate portion consists of 50% of the near zone. It has comparatively less image jump, but it is unsuitable for large anisometric prescriptions.
- **Progressive addition lenses (PALs):** It is a lens designed for presbyopes with power gradually increasing from the distance zone through a progression to a near zone. The most evident advantage of PALS over other modes of spectacle prescription is the absence of image jump and good cosmesis as the segment top is not present. However, it is contraindicated in cases of large anisometropia and in patients who require large near add.
- **Monovision:** It is suitable for patients who has significant distance prescription. In monovision, one eye is corrected for distance, with the other eye corrected for near vision.

B. Contact Lenses: Nowadays, contact lenses have also been designed to correct presbyopia. In comparison to tradition glasses, contact lenses provide a much greater cosmetic outlook. The various designs available are:

- **Multifocal contact lenses:** It is designed to correct distance and near vision along with intermediate vision and astigmatism as well.
- **Monovision:** Here, one patient wears a near vision contact lens in one eye and the other eye wears a distance contact lens.
- **Modified monovision:** Patient wears a single vision contact lens in one eye and the bifocal lens in other eye, or two bifocal lenses with different near vision power.

The optical correction of presbyopia has been used for many years due to its cost effectivity, simplicity and its non-invasive nature. While bifocal or multifocal progressive addition lenses, monofocal or bifocal contact lenses can provide satisfactory distance and near vision to presbyopes without the potential risks of a surgical procedure, they cannot restore or substitute the true process of accommodation of a younger individual [10]. Moreover, the supplemental optical methods of treatment require replacement with increasing age and degree of declining accommodation i.e. they are temporary. Given the prevalence, an increasing emphasis has been placed on the development of novel treatments for the treatment of presbyopia. As of surgical treatment, different procedures have been introduced

which includes: Presbyopic bifocal LASIK or LASIK-PARM in which shape of cornea is altered; Presbyopic multifocal LASIK (PMLC) in which several independently calculated ablations are performed at various optical zones of cornea. PRESBYOND Laser Blended Vision is another surgical method that is similar to mono-vision in which the dominant eye is corrected for distance and non-dominant is corrected to be slightly near sighted for near vision.

Recent advances in presbyopia treatment

To lessen the dependence on glasses and contact lenses, other methods to correct presbyopia have been extensively studied, attempted and established. Currently, in fact, more than half a dozen modalities are available, or in development for presbyopia management which not only includes surgical means but pharmacologic interventions as well. These methods can be chosen as per the needs of the patient, depending upon their age, profession, working demands, ocular health, lifestyle and economy. Improvements in technology have advanced surgical options, offering a variety of approaches [10]. The surgical procedures are performed either on the cornea, lens or the sclera. The recent advances in presbyopia correction includes the following techniques/procedures:

- Monovision laser ablation: LASEK, PRK, Epi-Lasik
- Presbyopic excimer laser ablation
- Presbyopic femtosecond laser ablation (Intracor)
- Corneal inlays: Kamra, Acufocus Inc, Raindrop, Revision Optics, Lake Forest, Flexivue Microlens, Presbia, PEARL, etc.
- Lens extraction with lens implantation: Multifocal IOLs, Monofocal IOLs, Accommodating IOLs, etc.
- Scleral expansion or anterior ciliary sclerotomy
- Electrostimulation (Ocufit)
- Pharmacologic interventions.

Monovision laser ablations

Monovision has been used to compensate for presbyopia by optically correcting one eye for distance vision and the other eye for near vision [11]. The dominant eye is corrected for clear distance vision while the non-dominant eye is corrected for comfortable near vision. The target monovision is controversial with some authors suggesting a monovision upto -2.50 D, whereas others suggest not exceeding -2.00 D [12]. Though the target monovision is controversial, it is necessary to determine the correct amount of monovision depending upon the patient's needs.

Advantages:

1. High success rate [13,14].
2. Reasonably safe, effective and predictable [15].

Disadvantages:

1. Reduction in the binocular acuity and stereopsis [13].

2. Difficult to adapt due to induced anisometropia and esophoric shift [16].

Presbyopic excimer laser ablation

Excimer lasers have been used to create a multifocal corneal profile as a method to correct presbyopia. Different corneal profiles have been suggested by different authors. In central presbyopic laser profiles, the near distance is corrected with the central zone which is hyperpositive, whereas the peripheral zone of ablation is preserved for far vision [17]. This corneal multifocality approach has been termed as “central presbyLasik” which creates a bifocal cornea. Another approach is using the peripheral zone for near vision [18], which is known as “peripheral presbyLasik”, creating an increased depth of focus. Recently Jackson, *et al.* [19] also reported an aspheric ablation profile to improve near vision in presbyopic patients with hyperopia. Very recently, a new proprietary ablation pattern (Supracor, Bausch and Lomb/Technolas, Munich, Germany) was applied using a profile that steepens the center of the cornea to create hyperprolate shape resulting about 2 D near addition with controlled higher order aberrations (HOA) [20]. Although many alternatives to presbyopia management have been offered by presbyopic laser ablation, many of them are still under evaluation and lack strong scientific evidence.

Advantages:

1. More controllable technique for corneal multifocality.
2. Insignificant reduction in contrast sensitivity following aspheric ablation profile.

Disadvantages:

1. Reduced contrast sensitivity at higher spatial frequencies.
2. Night halos and loss of two lines of distance best spectacle correction.

Presbyopic femtosecond laser ablation (Intracor)

The precision of femtosecond laser has made its utility in different types of corneal refractive procedures including the intrastromal correction of presbyopia (INTRACOR). Intracor creates a hyperprolate, multifocal cornea by making a series of intrastromal corneal ring incisions without cutting a flap. The laser delivery is purely intrastromal, meaning the rest of the corneal structures are untouched.

Advantages:

1. No epithelial disruption and extensive damage to endothelium; quick recovery.
2. Stable visual acuity.

Disadvantages:

1. Reduction of mesopic contrast sensitivity [21].
2. An increase of glare sensitivity [21].

Corneal inlays

The idea of inserting intrastromal corneal implants for the correction of ametropia was first proposed by Barraquer [22] in the mid-

20th century, but was soon abandoned due to corneal tissue's aggressive response to the flint glass material. Their use was halted until the development of biocompatible implants like hydrogels, which had good nutrient permeability, well tolerance, and transparency. Currently, there are three different designs of presbyopic corneal inlays and they are: Small aperture inlay (Kamra, Acufocus Inc.), Space-occupying inlays (Raindrop, Revision Optics, Lake Forest), and Refractive annular addition lenticules (Flexivue Microlens, Presbia, Irvine).

Small aperture inlay utilizes pinhole effect to increase the depth of focus to restore near and intermediate visual acuity without significantly affecting distance vision. Karma AcuFocus was launched in 2015 and this is the only FDA improved synthetic corneal presbyopic implant [9] due to its high biocompatibility *in vitro*. Space-occupying inlays create a hyper-prolate cornea and improves near and intermediate by inducing a differential surface curvature change resulting in a multifocal cornea. Refractive annular addition lenticules work as bifocal optical inlays separating distance and near focal points. The most recent advance in corneal inlays is development of multifocal refractive inlay -The Icolens in which hydrophilic acrylic hydrogel lens combines a neutral central zone with a peripheral optical zone of 3 D.

Soosan Jacob and her team based in India introduced the presbyopic-allogenic refractive lenticule (PEARL) procedure which helps to avoid pitfalls of corneal melt, implant fibrosis, opacification and haze associated with synthetic corneal implants. A SMILE lenticule of specified thickness (mean: $61.5 \pm 3.32 \mu\text{m}$) from a serologically tested donor was trephined at the center to 1-mm diameter and implanted in the cornea on the coaxially sighted light reflex under a femtosecond laser-created cap of $120 \mu\text{m}$ in the non-dominant eye of presbyopic patients [23].

Advantages:

1. Enhanced biocompatibility.
2. Potential reversibility.

Disadvantages:

1. Thinning and melting of the overlying stroma [24].
2. Corneal opacification, decentration and haze [24].

Lens extraction and IOL implantation

Nowadays, surgeons attempt to correct the refractive errors during a cataract surgery. The growing interest for the treatment of presbyopia among individuals without cataract has led surgeons to perform operations that correct reading disability by exchanging the crystalline lens with intraocular lenses (IOL) designed for this purpose [9]. Different types of IOLs are available that facilitate the loss of accommodation, which are based on refractive and diffractive technology. Two approaches available for presbyopic correction. In one approach, the visual system is given two simultaneous images, either monocularly using multifocal IOLs or binocularly through monovision. Another approach is to utilize accommodative IOLs that use the ciliary muscle contraction to change the refractive state of the eye by shifting the IOL position.

Advantages:

1. Excellent clinical outcomes.
2. Reduction of corneal astigmatism [25].

Disadvantages:

1. Reduced contrast sensitivity with multifocal IOLs [26].
2. More glares and halos

Anterior ciliary sclerotomy

Scleral extension is based on Schachar's theory in which the lens is under increased equatorial zonular tension during accommodation, and thus, any procedure that increases the distance between the lens equator and the ciliary muscle (thereby increasing tension) should reverse presbyopia [27]. Other treatment approaches described above are unable to restore true accommodation to the presbyopic eye, but scleral procedures seek to restore true accommodation combined with pseudo accommodation and have several advantages over other more invasive options to treat presbyopia. Currently, two technologies are under development that aim to correct presbyopia by modification of the sclera-ciliary complex-Presview Scleral Implant (Refocus Group, Dallas, TX) and the LaserACE system (Ace Vision Group, Silver Lake, OH). LaserACE is a less invasive, less surgical binocular treatment method that does not alter the optics of lens or cornea which is performed using the VisioLite 2.94 μm erbium: yttrium-aluminum-garnet (Er:YAG) ophthalmic laser system in 4 oblique quadrants on the sclera over the ciliary muscle in 3 critical zones of physiological importance (over the ciliary muscles and posterior zonules) with the aim to improve natural dynamic accommodative forces [27]. Presview (PSI, Refocus-Group, Dallas, Texas, USA) is being evaluated as a treatment for presbyopia, in an FDA monitored investigational device exemption (IDE) clinical trial currently underway in the USA [28].

Advantages:

1. IOP lowering effect on the normotensive presbyopic emmetropes [28].
2. Restore true accommodation combined with pseudo accommodation.

Disadvantages:

1. Perforation of the anterior chamber.
2. Mild postoperative anterior segment ischemia manifested by sectoral iris akinesis.

Electrostimulation (Ocufit)

In this method the ciliary muscles is stimulated to increase its potency so that it can overcome the higher resistance of the system associated with ageing. The purpose of this method is to report short-term results of pulsed ciliary muscle electrostimulation to improve near vision, likely through restoring accommodation in patients with emmetropic presbyopia. The process includes four quadrants (one every 2 weeks within a 2-month period) of bilateral pulsed (2 sec on; 6 sec off) micro-electrostimulation with 26 mA for 8 minutes, using a commercially available medical equipment [29].

Advantages:

1. Decreases intraocular pressure in patients suffering from ocular hypertension and glaucoma [30].
2. May restore the function of trabeculae in aged patients [31].

Disadvantages:

1. Effect of stimulation progressively regresses over time [32].
2. Necessary to periodically repeat the treatment.

Pharmaceutical treatment

While several surgical techniques for correcting presbyopia have already been developed or are being explored, various groups are interested in finding noninvasive measures. As such, several classes of eyedrops that address presbyopia are being developed or are currently under clinical evaluation [33]. Some of them are described below:

1. **True vision treatment:** A new scientific study in Yolia health, Mexico on July 2018, proved that there is a non- invasive treatment of presbyopia, known as True Vision, and is said that it offers significant, measurable, and stable improvement which is done by a customized lens in addition to a unique ophthalmic solution in its kind. Treatment True Sight (TVT, by the acronym True Vision Treatment) of Yolia Health involves custom contact lenses and an ophthalmic solution which mould the cornea in order to improve the near vision. This treatment is developed for those patients who do not need glasses to see at distance but at the reading distance. With the help of corneal topography, lenses for each patient are determined, Patients wear lens for 8 hours a day for 7 days with the ophthalmic solution exclusive to Yolia Health - given every hour (only during treatment).After the period of seven days, patient is reviewed on the 8th day to access the result [34].
2. **PRX (100):** (PRX-100) is being researched in Coronado, CA by Presbyopia Therapies. It involves an eye drop which acts by causing miosis (constriction) of the pupil without the typical accommodative effect. This constriction creates an increased range of focus that allows for improved near vision without sacrificing distance vision. A study in Mexico, found that they all experienced marked improvement in near vision. The only side effect was the short term “dimming” of the vision but this issue was less noticeable [35].
3. **EV06:** EV06 is under investigation across the Atlantic by Novartis in Basel, Switzerland. It is also an eye drop but its mode of action differs from PRX (100). With the age, the tissue fibers of the lens get hardened. This hardening impedes the natural accommodation that is experienced in youth and can cause age-related blurred vision. EV06 softens the lens by un-cross linking the collagen fibers to restore accommodation and improve near vision. After the 90 day randomized trial of EV06, the pretreatment and post treatment results were observed. It showed the improvement of near vision from 20/54 to 20/28, a very significant achievement [36].
4. **Dioptin:** It is a lipoic acid-based, topically instilled pro-drug that penetrates the lens. A clinical study in presbyopes demonstrated statistically and clinically significant improvement in distance corrected near vision acuity of 20/22 and controls, 20/40 following BID dosing with lipoic acid choline ester eye drops (EV06 Ophthalmic Solution, 1.5%) compared to vehicle control (Placebo). After the 90-day dosing period, the near visual acuity improvement persisted through the 301-day follow-up [37].
5. **Oxymetazoline:** This drug is traditionally used to treat sinus congestion and conjunctival hyperemia. In the Phase II trial, about 70% of subjects had at least a two-line improvement in uncorrected near visual acuity. Allergan is currently recruiting for Phase III trials for two preparations, individually and in combination with each other. It is a vasoconstriction decongestant, a direct-acting alpha-1 adrenergic agonist and alpha-2a adrenergic partial agonist [38].
6. **Presbidrops:** Presbidrop combines parasymphomimetic with an NSAID in an oil-based vehicle to preclude discomfort due to

ciliary spasm and minimize the risk of uveitis. It is currently on its second phase conventional trial. The Phase IIb clinical trial met the three-line improvement criteria for distance corrected near visual acuity and achieved good comfort with no significant adverse effect on distance vision [39].

Advantages:

1. Non-invasive method
2. Effective especially for emerging presbyopes.

Disadvantages:

1. Adverse effects include headache, ocular stinging and nausea.
2. Effects are diminished after several hours.

Due to the growing ageing population, most of our population will spend roughly half their lives as presbyope [40], the presbyopic years are expected to be more with introduction of gadgets.

Conclusion

Though the epidemiology of presbyopia is 100%, the majority of people are not aware of presbyopia; this not only contributes to the burden of unmanaged presbyopia but decreases the quality of life of the patient. Dozens of treatment approaches have been established besides the use of reading glasses and contact lenses. Improvements in technology have advanced surgical options, offering a variety of approaches. It is our prime responsibility to educate patients on the various available treatment approaches. Eye care professionals are responsible for creating awareness about presbyopia, counsel and provide them with appropriate optical corrections and also update them with recent advances in presbyopia management.

Financial Interest

None.

Conflict of Interest

The authors declare that they have no competing interest. All authors have agreed to authorship and order of authorship for this manuscript.

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