

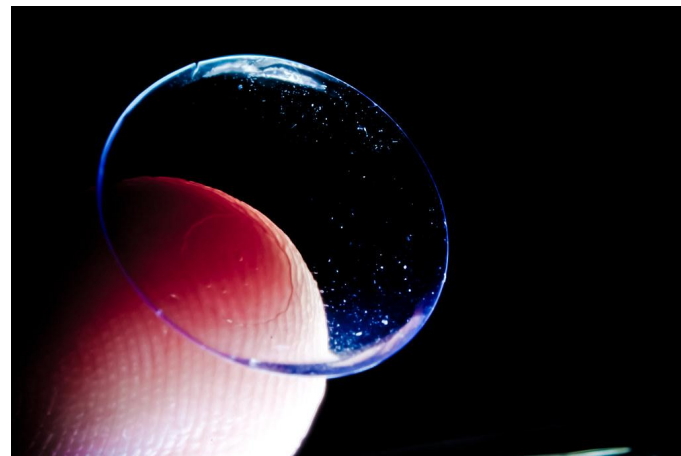
Contact Lenses In LV Rehabilitation

C-101367 Peer Review

Contact Lens Solutions to LV Problems

When we talk about Low Vision solutions we often focus on low vision aids as the primary resolution to overcome the challenges of low vision, but contact lenses can provide a valuable and effective option.

This peer review will focus on the positive impact that contact lenses can have in low vision dispensing and how we can use them as a therapeutic option to aid in several conditions.



Discussion Points:

- **What benefits can contact lenses provide to low vision patients?**
- **What advantages can contact lenses have over spectacle lenses with some low vision conditions?**
- **What barriers and potential complications must we consider?**

CL Benefits to LV Patients

Advantages:

- Increased field of view
- Fewer oblique aberrations
- Significant psycho-social benefit for patients with low vision, due to enhanced cosmesis and reduced conspicuity and potential related effects of improved self-esteem and peer acceptance

CL Benefits to LV Patients

Advantages:

- Improved fixation
- Increased magnification in high levels of myopia
- LVA's can be held much closer to the eye therefore improving FOV with LVA use
- Tinted lenses to reduce photophobia

CL Benefits to LV Patients

Disadvantages & considerations:

- Myopes have the added benefit of base in prism with spectacle lenses to aid convergence - therefore contact lenses create increased convergence demand
- Spectacle can be removed for close tasks with myopes
- Mid peripheral thickness with high minus RGPs may cause lenses to move on lid interaction

CL Benefits to LV Patients

Disadvantages & considerations:

- The quality of the fit for RGP lenses needs to be perfect - lots to consider with regards to the design to ensure performance
- Potential hypoxia related issues with high minus soft CLs due to increased thickness
- Greater retention of solutions in high minus soft CLs, could lead to solution hypersensitivity & preservative toxicity
- Peroxide may require longer neutralisation time
- Soft CLs also prone to changes in curvature due to on eye dehydration

Patient 1: Achromatopsia

Discussion Points:

- Describe the condition - aetiology, symptoms etc
- What issues does this condition present for the patient?
- What contact lens options could be used?
- What considerations must we make when selecting the lens choice?

Male, 49 years old, Achromatopsia

Rx: R:-7.25/-4.25x80

L: -6.75/-5.25x90 Add: +1.25

VA's: 6/30 R&L



Patient 1: Achromatopsia

- Achromatopsia (rod monochromatism) is a rare, stable condition with an autosomal recessive inheritance pattern & characteristic clinical features, including reduced visual acuity (between 6/30 and 6/120), light sensitivity, pendular nystagmus (often worse in high illumination)
- A wide range of spherical refractive errors has been observed in achromatopsia (from high myopia to high hyperopia greater than ± 12 D) with an increased incidence of corneal astigmatism
- Theoretically, patients with complete achromatopsia should benefit the most from a red filter that reduces the amount of short wavelength radiation reaching the retina, thereby reducing rod photoreceptor activity; however, a range of preferred tints has been reported, most likely due to differences in disease severity & cone function (for example, red-brown tints may be more suitable for patients with residual cone function or a magenta tint may be favoured in blue cone monochromatism)

Patient 1: Achromatopsia

- A tinted contact lens is often an excellent solution for patients with achromatopsia, as the lens can usually provide sufficient relief of symptoms to eliminate the need for dark-tinted sunglasses with side shields and/or protective headwear, while indoors.
- With tinted CLs modest improvements in visual acuity (0.10 to 0.20 logMAR), contrast sensitivity (0.9 to 1.2 log units) and colour discrimination have also been reported.
- Very dark tinted contact lenses may significantly reduce visual acuity in low illumination. Therefore, a moderate tint is typically prescribed & if a further reduction in illumination is required, sunglasses can also be worn when outdoors or a plano tinted contact lens may be used in conjunction with a photochromic spectacle over-correction worn at all times.

Patient 1: Achromatopsia

- The contact lens used may be soft or rigid and the final preferred tint may be red, brown, amber, grey or a combination of these, with a transmittance value typically between 14 to 30 per cent
- Some people recommend extending the tint only to 2.0mm beyond the pupil diameter measured in dim illumination; however, light entering the eye through the peripheral cornea may still cause glare using this approach.
- Therefore, a conservatively large tint, at least to within one to two millimetres of the total lens diameter or include an opaque tint in the lens periphery may be prudent.
- While silicone hydrogel soft contact lenses are preferred in high ametropia to maximise oxygen transmissibility, their lower water content compared to traditional hydrogel materials means they do not tint as readily.

Neil Harbisson - I Listen To Colour



Px 2: Albinism

Discussion Points:

- Describe the condition - aetiology, symptoms etc
- What issues does this condition present for the patient?
- What contact lens options could be used?
- What considerations must we make when selecting the lens choice?

Female, 11 years old, Albinism

Rx: R:+3.75/-2.25x90

L: +5.00/-3.50x85 Add: +1.25

VA's: 6/30 R&L



Px 2: Albinism

- Albinism describes a group of genetic conditions in which melanin synthesis is impaired, characterised by an absence of pigmentation of the iris & retinal pigment epithelium (resulting in glare and photophobia), nystagmus which often decreases with age, foveal hypoplasia, reduced visual acuity & often strabismus & high ametropia.
- High levels of with-the-rule corneal astigmatism are often present (on average 2–3 D), hypothesised to be due to the mechanical interaction between the cornea & pressure from the eyelids associated with repeated horizontal eye movements or narrowing of the palpebral aperture due to photosensitivity.
- Contact lens correction in albinism may be beneficial for a number of reasons, including an improved cosmetic outcome for high spherical & astigmatic refractive errors, a reduction in nystagmus & potentially the prevention of the development of meridional amblyopia; however, a primary use of contact lenses in albinism is to reduce photophobia with tinted or opaque iris lens designs.

Px 2: Albinism

- Contact lenses with special iris tinting and a clear pupil area can be introduced to patients with albinism and can benefit these patients by reducing the amount of light entering the hypopigmented eye, thereby reducing the symptoms of glare and sensitivity to light.



Nystagmus - How do therapeutic CLs help?

- Contact lenses are the preferred optical correction, as the refractive correction moves with the eye.
- Additionally, case reports & laboratory-based studies suggest that contact lens wear (with or without a tint or artificial iris) reduces the amplitude and frequency of the nystagmus in some patients, potentially by providing some tactile or proprioceptive feedback about eye movements.
- For example, in a recent clinical trial, 11 per cent of patients reported a subjective improvement in their nystagmus, while wearing soft contact lenses compared to 37 per cent for RGP contact lenses.
- Galilean contact-spectacle lens telescopes may also be used to magnify and stabilise the retinal image in nystagmus

Nystagmus - How do therapeutic CLs help?

- if a contact-spectacle lens telescope is constructed, such that the first nodal point of the system coincides with the centre of rotation of the eye (approximately 13.5mm behind the cornea), a stable magnified retinal image is provided which minimises oscillations of the eye.
- Base out prism has also been suggested to reduce nystagmus by increasing the convergence demand; such an increase is created at near when moderate myopes are corrected with contact lenses instead of spectacles. The dampening effect has been observed with both soft & rigid lenses & the nystagmus may rebound or become exacerbated when the lenses are removed.
- When attempting a contact lens fitting in patients with nystagmus or poor fixation, high-speed videokeratoscopy (capturing a sequence of continuously rapidly acquired corneal topographic maps) may be required to determine the corneal shape rather than keratometry or static videokeratoscopy.

Final Thoughts...

- Opaque or semi-opaque tinted contact lenses ensure that less light reaches the retina, which may result in visual difficulties in mesopic or scotopic viewing conditions.
- Patients (or their parents) should be advised that contact lens correction for albinism or aniridia may not always result in a substantial improvement in visual acuity but a marked improvement in photosensitivity, contrast sensitivity & a reduction in nystagmus are often observed.
- For the correction of moderate to high levels of astigmatism common in albinism, the increased thickness of a soft toric lens may result in inferior decentration requiring an increase in the clear pupil zone diameter.
- When prescribing an annular tinted contact lens for an eye with an abnormal pupil or altered iris architecture, the lens power required may be significantly different to the power required for a contact lens without a tint (a limiting aperture) particularly for higher-powered lenses.

Final Thoughts...

- The practitioner may be able to form an impression about the likelihood of successful contact lens wear during a preliminary low vision consultation. The state of personal hygiene (particularly finger nails) or the application of facial or eye make-up provides some insight into difficulties with visually guided fine motor activities, which can be challenging tasks for patients with reduced central vision.
- Practitioners should be aware that patients with substantially impaired vision are usually able to insert, remove and care for contact lenses (and related devices such as cases or plungers) with practice. The process may be time consuming initially but can gradually be learned by touch.
- If a contact lens is lost from the eye, it may be difficult for patients with visual impairment to locate the lens. Handling tints are useful to provide additional contrast and patients should be encouraged to insert and remove lenses over a white towel or cloth. Patients should have a pair of spectacles to aid with the location of a lost lens, if comparable acuity is achievable, otherwise a backup pair of contact lenses may be required.

References:

The use of contact lenses in low vision rehabilitation: optical and therapeutic applications

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doi:10.1186/1752-1947-6-316

<https://www.moorfields.nhs.uk/condition/achromatopsia>