

## CASE REPORT



## Correction of vertical diplopia with soft contact lenses

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## INTRODUCTION

Small-angle, vertical binocular diplopia may not benefit from strabismus surgery and patients may not desire prism glasses. We report a case of vertical diplopia corrected with prism ballast soft contact lenses (CTLs).

## CASE PRESENTATION

A 61-year-old woman developed constant vertical binocular diplopia for 6 years. Past medical history included a right acoustic neuroma status-post resection and subsequent radiation therapy. While she had successfully utilized prism glasses for many years, she expressed interest in contact lenses (CTLs).

On examination, her visual acuity was 20/20 in each eye. Her extraocular motility was full, and she had Bruns nystagmus consistent with peripheral vestibular asymmetry. Sensorimotor examination showed an incomitant two-prism dioptre (PD) right hypotropia consistent with a skew deviation and mild excyclotorsion with her nystagmoid movements. Her diplopia was corrected with a two PD base down prism in the left eye. The rest of her ocular examination was unremarkable.

She had no interest in hard CTLs and was fitted for soft CTLs. The toric lens design used required one prism base down for fit stability. Thus, for a net sum of two PD vertical diplopia, three prism base down was added to the left lens and one prism base down to the right. The patient tolerated them well without diplopia for 3 years.

## DISCUSSION

CTL options for binocular diplopia are an often overlooked potentially viable option for patients. One method of rotational stability for CTLs that incorporates cylindrical refractive error is the prism ballast, in which the thinnest portion of the lens is at the apex and the thickest closer to the base. Classically, a minimal quantity of prism of approximately one PD is grounded base down into the lens, utilizing gravity to keep the lens rotation base down. As a secondary effect, between two-thirds to the full amount of prism is translated onto the optical axis. Adding prism for the purpose of diplopic correction is limited by lens thickness and tolerability. It adds lens thickness inferiorly, reduces oxygen permeability, and subsequently increases the likelihood for dry eye issues and localized corneal edema. [1]

Rigid gas-permeable (RGP) CTLs can correct small-angle vertical diplopia with an upper limit of approximately four PD bases down. Recently, 3D-printed custom-moulded or other rotationally stable scleral lenses have also been shown to incorporate up to four PD in any direction including horizontally (theoretically up to eight PD corrections using four PD in each eye). [2]

We found eight cases of vertical diplopic correction, six with RGPs and two with custom scleral CTLs. [2–5] Engel et al. reported three cases treated with hard CTLs with correction of diplopia for 2.5–8 years. However, in one case, they added a piggyback silicone hydrogel lens under an RGP to relieve inferior desiccation. [3]

To our knowledge, this is the first report of treatment of vertical diplopia using custom prism-ballast soft CTLs. These lenses can provide an upper limit of four PD base down of incorporated prism. [6] Taking this into account, the best candidates for this option include those with small-angle vertical diplopia (one to three PD) with a history of CTL experience without dry eye or inflammation. Compared to hard lenses, soft CTLs provide more comfort and tolerability to patients. Provider awareness of these options for diplopic correction provides patients with greater control of their lifestyle.

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### COMPETING INTERESTS

The authors declare no competing interests.

### ADDITIONAL INFORMATION

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