

# A non-surgical approach to the management of exposure keratitis due to facial palsy by using mini-scleral lenses

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## Abstract

**Rationale:** This is a retrospective study aimed to determine the efficacy of mini-scleral contact lens in protecting the cornea and improving vision in cases of facial palsy.

**Patient concerns:** Patients with facial palsy get exposure keratitis because the cornea is dry. They feel pain, discomfort and excessive watering. If left untreated, it leads to permanent damage to the cornea and loss of good functional vision. Mini-scleral lens keep the cornea covered by saline solution all wearing hours.

**Diagnoses:** Three patients (4 eyes) with acoustic neuroma, two unilateral and one bilateral, who underwent acoustic neuroma surgeries resulting in facial palsy, are presented.

The gold implant and lateral tarsorrhaphy were not enough for corneal protection.

Two patients (patients 1 and 2) suffered continuous pain and watering. They had to apply thick lubricant, Lacri-Lube ointment (Allergan, Inc., Dublin, Ireland), several times daily to the affected eye for 15 years. The vision of these patients in the affected eyes were counting fingers (CF) at one foot.

Patient 3 with bilateral facial palsy had exposure keratitis in both eyes resulting in constant watering, pain and blurred vision.

**Interventions:** The 4 eyes were fitted with mini-scleral lenses. The lenses were 15.8 mm rigid gas permeable filled with preservative free saline solution that continuously covers the cornea all wearing hours.

**Outcomes:** In patients 1 and 2 with unilateral facial palsy, vision improved through the mini-scleral lenses to 20/30 and all their symptoms disappeared.

The keratitis in case 3 with bilateral facial palsy disappeared within one week of mini-scleral lens use.

Follow up for 2 years showed that these patients maintained good vision with no side effects.

**Lessons:** Mini-scleral lenses protected the cornea, gave comfort and improved the vision and the quality of life of these three patients with facial palsy and should be considered for all patients with facial palsy.

**Abbreviation:** CF = Counting fingers.

**Keywords:** acoustic neuroma, exposure keratitis, facial palsy, lateral tarsorrhaphy, mini-scleral lens, neuroma surgery

## 1. Introduction

This retrospective case study sought to assess the efficacy of mini-scleral contact lens in protecting the cornea in cases of facial palsy. Three patients with facial palsy due to acoustic neuroma surgeries are the focus of this study.

Facial palsy is a frequent complication of surgery<sup>[1]</sup> and radiation<sup>[2]</sup> treatment for acoustic neuromas. In facial palsy, the

closure of the eye is incomplete. This causes the cornea to dry out and if left untreated, leads to exposure keratitis and permanent damage to the cornea.

In the management of incomplete closure of the eye due to facial palsy, the main goal is to keep the cornea wet to prevent the side effects of exposure keratitis. This goal is achieved by using lubricant drops and ointments. The drops do not blur vision, but they evaporate quickly; thus, patients require many drops each day. Eye ointments keep the eye wet for longer periods, but they blur the patient's vision. In advanced cases of facial palsy, the typical management is the insertion of a gold implant in the upper lid.<sup>[3]</sup> The weight of the implant pulls the lid down to cover part of the cornea. Lateral tarsorrhaphy<sup>[4]</sup> can also be performed to protect the cornea. This procedure is performed by stitching the lateral thirds of the lids together, which leaves a smaller portion of the cornea uncovered. Many patients do not like tarsorrhaphy because it simultaneously restricts the field of vision and affects the appearance of the patient. New surgical techniques, such as recession and extirpation of the lower eyelid retractors,<sup>[5]</sup> are also used in some cases.

## 2. Timeline

All patients were seen by the author at Lexington Eye Associates, Westford, Massachusetts between 2012 and 2015.

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Informed consent form was given and signed by each patient.

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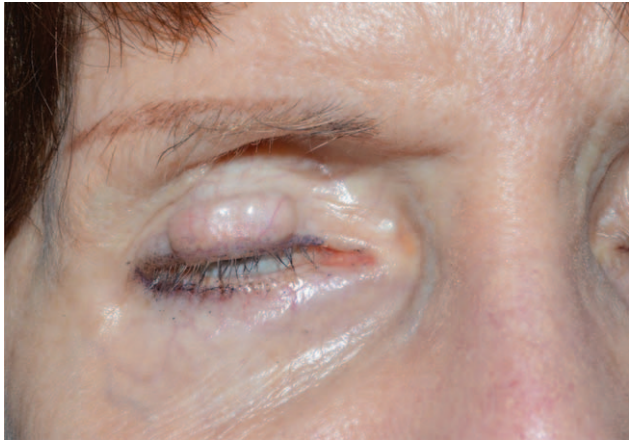
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**Figure 1.** Case 1: Incomplete closure of right eye.

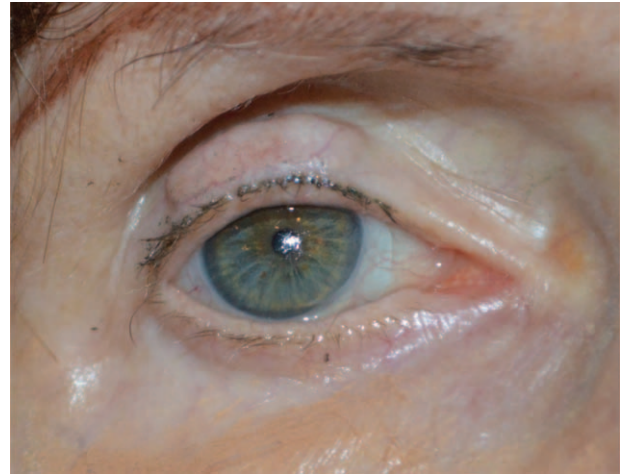
First eye examination—history—eye examination—first mini-scleral fit—1-week follow-up—every 6 months' follow-up for 2 years.

### 3. Patient information

Case 1 is a 74-year-old white female. She underwent acoustic neuroma surgery in 1997 and subsequently suffered right facial palsy. A gold implant was inserted and she has to use a thick layer of Lacri-Lube ointment (Allergan, Inc., Dublin, Ireland) many times a day, which kept her vision at counting fingers (CFs) at 1 foot for 15 years and she was still experienced gritty sensation and discomfort (Fig. 1).

Case 2 is a 59-year-old Asian female. She underwent acoustic neuroma surgery in 1997 and subsequently suffered from left facial palsy. She had a history of a corneal ulcer that left a scar on her left cornea. A gold implant was inserted, lateral tarsorrhaphy was performed, and punctal plugs were inserted. For 16 years, she experienced a gritty sensation and her vision was CF at 1 foot because of the Lacri-Lube ointment that she has to use (Fig. 2).

Case 3 is a 56-year-old white male with a history of bilateral acoustic neuromas (No photos for this patient). The tumor resected in 1984 and 1988. A right lateral tarsorrhaphy was



**Figure 3.** Case 1: Right eye with mini-scleral lens.

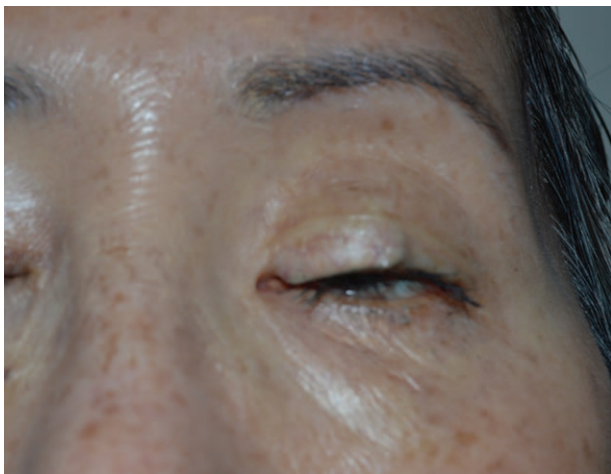
performed in 1984, and in 2010, gold implants were placed in both upper eyelids. He was using lubricant eye drops and ointments throughout the day and night, but still complaining of pain and discomfort. His eye examination in 2012 revealed marked exposure keratitis that was more severe in the right than the left eye due to the incomplete closure of the eyelids of both eyes. This patient's corrected visual acuity was OD 20/40 and OS 20/25.

### 4. Interventions

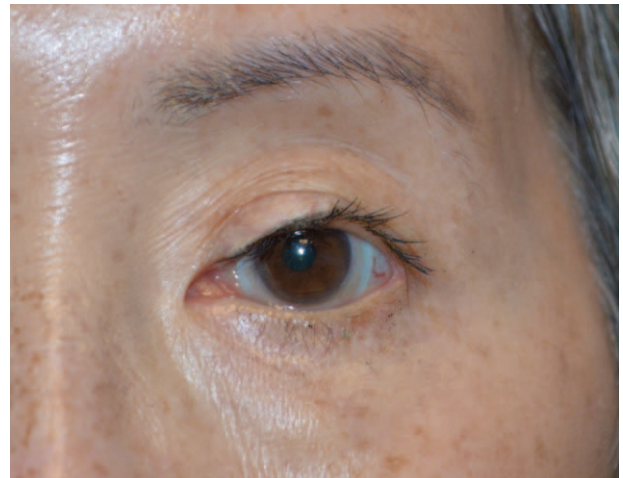
Mini-scleral lenses are large-diameter, rigid gas-permeable contact lenses, and those used here were 15.8mm in diameter. Before insertion the lens is filled with 0.9% saline solution. Mini-scleral lenses are completely supported by the sclera and do not touch the cornea or the limbus. Such lenses maintain a fluid reservoir in the space between the posterior surface of the lens and the anterior surface of the cornea.

In Case 1, the right eye was fitted with a mini-scleral lens on November 20, 2012 (Fig. 3).

In case 2, the left eye was fitted with a mini-scleral lens on February 20, 2013. (Fig. 4).



**Figure 2.** Case 2: Incomplete closure of left eye.



**Figure 4.** Case 2: Left eye with mini-scleral lens.

In case 3, mini-scleral lenses were fitted to both eyes on March 21, 2012. (No photos for this patient).

All 4 eyes were followed up after 1 week and every 6 months and thereafter for more than 2 years. At each visit, vision was assessed. The fit was checked by estimating the gap between the cornea and mini-scleral lens and checking for any blanching of the conjunctival vessels at the site of contact with the mini-scleral lens. The cornea was checked for any changes, edema, or neovascularization. Fluorescein staining was applied to detect any abrasions or keratitis.

## 5. Ethical review

No ethical review was needed because Mini-scleral design lenses have been widely used for many years.

## 6. Follow-up and outcomes

In Case 1, the vision of her right eye improved from CF to 20/30, and the symptoms of irritation and watering disappeared. She has been using the mini-scleral lens 16 hours daily for more than 2 years. Her Lacri-Lube Ointment use was reduced to once per day at bedtime after removing the lens. The vision in her right eye was maintained at 20/30 and no side effects seen from using the mini-scleral lens for the 2 years follow-up.

In Case 2, the vision improved from CF to 20/40. After 2 years of using the mini-scleral lens 17 hours daily, vision is 20/30 and no side effects seen.

In Case 3, 1 week later, the patient's vision was 20/25 in both eyes. All of the symptoms and signs of keratitis disappeared. The patient was using the mini-scleral lenses during all waking hours. After 2 years of follow-up, his vision was 20/30 in both eyes. There was no pain and no side effects seen.

## 7. Discussion

Mini-scleral lenses are primarily used to improve vision in cases of corneal deformities, such as those in cases with keratoconus,<sup>[6]</sup> pellucid marginal degeneration,<sup>[6]</sup> post-corneal grafts,<sup>[7]</sup> post-LASIK Ectasia,<sup>[7]</sup> and many other corneal surface irregularities. Mini-scleral lenses are also used to protect the corneal surface. Thus, they are used in dry eye syndrome, neurotrophic keratopathy, exposure keratopathy,<sup>[8]</sup> Graves' ophthalmopathy,<sup>[9]</sup> and for a variety of ocular surface diseases.<sup>[10]</sup>

Mini-scleral lenses cover the cornea at all times with saline solution and thus meet the goal of keeping the cornea wet (Fig. 5). In addition, a mini-scleral lens corrects the refractive error of the eye and thus enables the patient to see better without glasses (Fig. 5).

In the present study, the 3 cases (4 eyes) demonstrated the effectiveness of mini-scleral lenses in the prevention of exposure keratitis due to facial palsy following acoustic neuroma surgery. The mini-scleral lenses helped all patients to protect their corneas, relieved their symptoms, and restored their functional vision with no side effects.

More patients with facial palsy need to be fitted with mini-scleral lenses to achieve statistically significant results.

## 8. Conclusion

The mini-scleral lenses proved to be an effective management strategy for incomplete closure of the eye due to facial palsy after



**Figure 5.** Fluorescein showing the saline solution filling the gap between the cornea and mini-scleral lens.

acoustic neuroma surgery. We suggest that mini-scleral lenses be considered the first-line management for all cases of facial palsy.

## 9. Patient perspective

Patient 1 and 2 mentioned that they are very happy with mini-scleral lenses. They were suffering for 16 years from continuous pain and their vision was bad, and now they retained their comfort and vision. They asked me to write this paper to inform all doctors that there is a mini-scleral lens, so no other patient will suffer again like them.

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## References

- [1] King TT, Morrison AW. Translabyrinthine and transtentorial removal of acoustic nerve tumors. *J Neurosurg* 1980;52:210–6.
- [2] Rowe JG, Radatz MW, Walton L, et al. Gamma knife stereotactic radiosurgery for unilateral acoustic neuromas. *J Neurol Neurosurg Psychiatry* 2003;74:1536–42.
- [3] Zwick OM, Seiff SR. Supportive care of facial nerve palsy with temporary external eyelid weights. *Optometry* 2006;77:340–2.
- [4] Sohrab M, Abugo U, Grant M, et al. Management of the eye in facial paralysis. *Facial Plast Surg* 2015;31:140–4.
- [5] Compton CJ, Clark JD, Nunery WR, Lee HB. Recession and extirpation of the lower eyelid retractors for paralytic lagophthalmos. *Ophthalm Plast Reconstr Surg* 2015;31:323–4.
- [6] Rathi VM, Mandathara PS, Taneja M1, et al. Scleral lens for keratoconus: technology update. *Clin Ophthalmol* 2015;9:2013–8.
- [7] Segal O, Barkana Y, Hourvitz D, et al. Scleral contact lenses may help where other modalities fail. *Cornea* 2003;22:308–10.
- [8] Weyns M, Koppen C, Tassignon MJ. Scleral contact lenses as an alternative to tarsorrhaphy for the long-term management of combined exposure and neurotrophic keratopathy. *Cornea* 2013;32:359–61.
- [9] Harthan JS. Therapeutic use of mini-scleral lenses in a patient with Graves' ophthalmopathy. *J Optom* 2014;7:62–6.
- [10] Pullum KW, Whiting MA, Buckley RJ. Scleral contact lenses: the expanding role. *Cornea* 2005;24:269–77.