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CASE REPORT

Therapeutic use of mini-scleral lenses in a patient with Graves' ophthalmopathy

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KEYWORDS
Graves' Ophthalmopathy;
Ocular surface disease;
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Abstract Patients with Graves' ophthalmopathy can be very challenging to manage secondary to the complex nature of their disease presentation. Patients may present with a variety of ocular findings including: lid retraction, periorbital and lid swelling, chemosis, conjunctival hyperemia, proptosis, optic neuropathy, restrictive myopathy, exposure keratopathy and/or keratoconjunctivitis sicca. Mini-scleral and scleral lens designs have been important in the management of irregular and regular corneas, and in the therapy of ocular surface diseases.

We present here the case of a 48-year-old Caucasian male who had been diagnosed with Graves' ophthalmopathy 13 years earlier. With significant ocular surface staining and over ten diopters of astigmatism, the patient had never been able to wear contact lenses comfortably. After being fit with the Mini-Scleral Design™ lenses, his vision improved to 20/25 OU, his ocular surface improved, and overall quality of vision increased.

PALABRAS CLAVE
Oftalmopatía de Graves;
Enfermedad de la superficie ocular;
Lentes de contacto mini esclerales

Uso terapéutico de lentes mini esclerales en un paciente con Oftalmopatía de Graves

Resumen Puede ser difícil tratar a los pacientes con Oftalmopatía de Graves, debido a la naturaleza compleja de la presentación de su enfermedad. Los pacientes pueden presentar variedad de manifestaciones oculares tales como: retracción parpebral, hinchazón periorbital y parpebral, quemosis, hiperemia conjuntival, proptosis, neuropatía óptica, miopatía restrictiva, queratopatía por exposición y/o queratoconjuntivitis seca. Los diseños de lentes mini esclerales y esclerales han resultado ser importantes para el tratamiento de las córneas irregulares y regulares, y para la terapia de las enfermedades de la superficie ocular.

Presentamos el caso de un varón caucásico de cuarenta y ocho años al que se había diagnosticado Oftalmopatía de Graves trece años antes. Con una significativa tinción de la superficie ocular, y más de diez dioptrías de astigmatismo, el paciente no había podido llevar nunca lentes de contacto con comodidad. Tras adaptarle las lentes Mini-Scleral Design™, su

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visión pasó a ser de 20/25 OU, mejorando su superficie ocular e incrementando su calidad de visión general.

Introduction

Graves' disease is an autoimmune disorder that is most commonly known as hyperthyroidism. This disease is defined by increased thyroid gland synthesis and production of the thyroid hormone.[1] Manifestations of the disease are thought to be caused by production of antibodies that bind to the thyroid-stimulating hormone receptor (TSHR) and therefore result in an overproduction of the T3 and T4 hormones.[2] While patients with Graves' disease often present with fatigue, weakness, heat intolerance, weight loss, tachycardia, and tremor, they may also present with ophthalmopathy; one of the main and potentially serious clinical features. Characteristic ocular findings include lid retraction, lid lag, proptosis, restrictive extraocular myopathy, optic neuropathy and inflammation of the ocular surface.[2,3] Around 1/2000 women per year are affected by Graves' and it occurs 5–10 times lower in men, with peak onset at 40–60 years of age.[1] Approximately 60% of patients with Graves' disease develop Graves' ophthalmopathy and 85% of patients with Graves' ophthalmopathy present with ocular surface disease.[2]

Patients with Graves' ophthalmopathy will typically present with advanced ocular surface disruption which can lead to corneal complications and irregularities.[4] Patients with these problems who also require refractive correction may experience difficulties in achieving both acceptable quality of vision and improvement in their ocular surface with traditional contact lens designs. Although smaller diameter lenses work well for many patients, they are somewhat limited in their tear reservoir capacity, whereas mini-scleral and ultimately scleral contact lenses can produce a much larger tear reservoir, reducing mechanical disruption to the ocular surface. When the cornea becomes more irregular, the fitting process becomes more complex. A scleral lens may be indicated for the irregular cornea to create a smoother refractive surface and to avoid pressure to the corneal apex, thus minimizing scarring. Even with maximum topical and systemic therapy, these patients' ocular conditions may be difficult to manage. With the option of mini-scleral and scleral lens designs, patients now have an option to protect the cornea and offer better vision. Scleral contact lenses allow for successful and comfortable fitting and vision in patients with complex corneas. These lenses also serve as a pre-corneal fluid reservoir which provides optical correction while rehabilitating the ocular surface.[5–7] The following case involves a patient with Graves' disease, severe ocular surface disruption, and keratoconus. Secondary to his irregular astigmatism and ocular surface disease, the patient was fit with mini-scleral lenses not only to assist in the rehabilitation of his ocular surface, but also to improve the quality of his vision.

Case report

A 48-year-old Caucasian male initially presented with complaints of blur at distance and near with his current hybrid lenses, double vision at the end of the day, and significant redness and irritation that did not improve with traditional supportive dry eye therapy. The patient had been diagnosed with Graves' 13 years earlier and was status-post a complete thyroidectomy. He was being monitored closely by his endocrinologist. The patient had failed with all other lens modalities and was concerned that the problems with his vision and ocular discomfort would interfere with his ability to continue working.

Entering corrected vision with his hybrid lenses was 20/30 OD and 20/50 OS. His refraction was $-5.50-4.50\times082$, 20/80 OD and $-11.00-3.00\times115$, 20/200 OS. Topographies showed irregular astigmatism that was greater in the right eye than the left, 10.44 diopters OD and 3.57 diopters OS (Fig. 1A and B). Topographies also revealed corneal ectasia (keratoconus) OU. Upon further investigation of the patient's ocular history, keratoconus had not been discussed with the patient in previous examinations. No evident restriction was noted upon extra-ocular motilities, even though the patient complained of slight diplopia at the end of the day. Mild proptosis was noted OU, with an increased vertical fissure width measured. Marginal Reflex Distance 1 was 6 mm for both the right eye and left eye. Marginal Reflex Distance 2 was 7 mm for the right eye and 8 mm for the left eye. The corneas showed 2+ diffuse sodium fluorescein staining and the conjunctiva showed 3+ lissamine green staining (Fig. 2A and B). Schirmer scores without anesthetic were 13 mm OD and 8 mm OS. The patient was started on Restasis® (cyclosporine ophthalmic emulsion) 0.05% BID, Lotemax® (loteprednol etabonate ophthalmic suspension) 0.5% BID, preservative free artificial tears QID, and preservative free ointment QHS OU to improve his ocular surface and increase tear production. Intraocular pressure was 12 mmHg OD and 14 mmHg OS by Goldmann applanation tonometry. Dilated fundus examination was unremarkable.

Successful use of scleral lenses in the management of ocular surface disease has been well documented.[5–7] After reviewing the patient's initial presentation, we wanted to begin the lens fitting process with the 18.2 mm Jupiter series to create increased surface coverage and enhance the therapeutic effect of the lenses. However, after lengthy discussion with the patient and the fact that the patient did not have insurance at the time of the initial contact lens fitting, mini-scleral lenses were selected to try to keep costs down while still having some therapeutic effect to the ocular surface. The 15.8 mm Mini-Scleral Design™ lenses (Blanchard Contact Lenses Inc) were selected due to the patient's irregular astigmatism, ocular surface disruption, and discomfort with other lens modalities. Mini-scleral lenses were also chosen to provide a protective barrier between the lids