Resected Iris Tissue + Surgically Induced Irregular Astigmatism Secondary to Open Globe Repair = A Unique Piggyback Combination

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Background

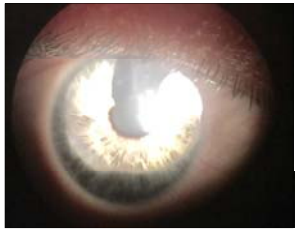
A 28 year old male presented to clinic for a contact lens evaluation status-post ruptured globe repair of his right eye. The corneal and scleral sutures from surgical repair resulted in severe irregular astigmatism. In addition to corneal irregularity causing decreased vision, the patient was experiencing light sensitivity secondary to iris resection of the superior quadrant of his iris. The patient's primary goal upon presentation was for visual acuity recovery; however, as acuity improved with a gas permeable lens, his light sensitivity became of increasing concern. With his goal and symptoms combined, the resulting lens combination required a unique piggyback system.

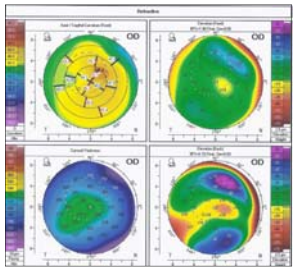
Case Description

The patient's injury occurred five months prior. The patient recalled using wire cutters to remove a wire band wrapped around a bale of hay. When the tension was released, the wire band recoiled and penetrated through his cornea and sclera. He presented as an urgent patient to Saint Louis University Hospital with a ruptured globe and hyphema. He underwent a successful globe repair surgery. Before the accident, the patient reported that his vision was 20/15 in his right eye and regaining that vision was important to him.

The patient presented for his contact lens evaluation with 20/200 acuity in the right eye. With pinhole, it improved to 20/70. The slit lamp examination revealed scleral stitches superiorly that were covered well by conjunctival tissue, scarring of the superior cornea secondary to suture placement, and sectoral loss of iris tissue from 11 o'clock to 1 o'clock. His topography revealed a defined area of superior steepening. His best spectacle corrected visual acuity was 20/60.

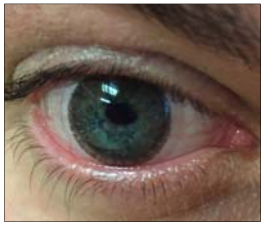
The Fitting





A corneal gas permeable lens with a lid attachment fit corrected the patient's vision to 20/25. The lens alignment revealed slight touch over the superior area of steepening with good edge clearance and movement. The lens was dispensed after insertion and removal training, as well as care and handling instruction.

At the follow up, the patient was satisfied with the vision. His primary concern was light sensitivity, forcing him to wear sunglasses while inside. He also expressed that the comfort of the lens was bothersome. A piggyback system was utilized in order to satisfy both of his concerns. The lens selection for the piggyback lens proved difficult due to the low oxygen transmissibility (dK/t) values of available light-blocking prosthetic lenses. According to research performed by Weissman and Ye, the corneal oxygen requirements required a minimum value of 100 mmHg corneal oxygen tension to prevent hypoxic changes to the cornea. In this study, a chart was created to help practitioners select the appropriate combination of materials based on dK values (1).



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In order to prevent hypoxic changes to the cornea, our lens selection was limited to a tinted cosmetic silicone hydrogel contact lens with a dK/t of 138 that was combined with a gas permeable lens material with a dK/t of 100. Although the cosmetic lens did not completely block light transmission, the patient did experience relief of light sensitivity symptoms. The comfort was also significantly improved (1).

RGP (Fatt *Dk/t* units)	SCL *Dk/t* (Fatt *Dk/t* units)	Open eye pO_2(mmHg)	Closed eye pO_2(mmHg)
15	10	0	0
15	20	9	0
15	60	39	0
15	100	46	0
15	140	50	0
60	10	9	0
60	20	57	0
60	60	99	17
60	100	109	25
60	140	114	28
150	10	17	0
150	20	69	0
150	60	114	29
150	100	125	37
150	140	130	41

Table derived from Weissman, et al.

Conclusions

The combination of satisfying patients' concerns and symptoms with optimizing patients' ocular health can present with unique contact lens prescribing challenges. It requires the practitioner to stay current on the available contact lens materials and properties, as well as research related to the contact lens-ocular health relationship.

Bibliography

1. Weissman BA, Ye P. Calculated Tear Oxygen Tension Under Contact Lenses Offering Resistance in Series: Piggyback and Scleral Lenses. *Contact Lens and Anterior Eye.* 2006 Dec;29(5):231-7.